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THE DEVELOPMENT OF CONTINENTAL AIR DEFENSE TO 1 September 1954

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THE DEVELOPMENT OF CONTINENTAL AIR DEFENSE TO 1 SEPTEMBER 1954

By
Dr. C. L. Grant

[redacted]

USAF HISTORICAL DIVISION
RESEARCH STUDIES INSTITUTE
AIR UNIVERSITY

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In accordance with the provisions of AFR 205-1, Section III, paragraphs 45a, and 45b, this entire study is classified SECRET.

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Foreword

This study was written by Dr. C. L. Grant of the USAF Historical Division, Research Studies Institute, Air University, Maxwell Air Force Base, Alabama.

Like other Historical Division Studies, it is subject to revision, and additional information or suggested corrections will be welcomed.

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Introduction

Following the successful conclusion of the long Allied struggle against the Axis, the American people looked forward to an era of peace and prosperity. World conditions in late 1945 appeared favorable for a permanent peace. Great faith was placed in the United Nations Organization which, it was hoped, would be able to prevent any future world war. Yet, within the next decade, the United States was compelled to erect the most powerful air defense system that the free world has ever known. This monograph relates the development of that air defense up to the creation on 1 September 1954 of the Continental Air Defense Command.

The construction of a continental air defense system during peacetime was not without precedent. During the 1920's and early 1930's discussion concerning such a system had taken place among airmen but, at that early stage in the development of the airplane, was largely academic. Geography was still considered America's best defense. Nevertheless, in the late 1930's, some efforts were made by the air arm to provide and test an aircraft warning service manned by volunteer civilians.

By the outbreak of World War II in 1939, the United States had lagged behind other nations in the development of air defense elements. Therefore, Maj. Gen. Henry H. Arnold, Chief of the Air Corps, proposed the establishment of a command to study defensive doctrine and equipment. Arnold's proposal resulted in the activation of the Air Defense Command—a planning agency—on 26 February 1940.

The new command was given no forces; all available forces were assigned to GHQ Air Force, a predecessor of the Army Air Forces. Responsibility for air defense rested with four interceptor commands until early 1941 when it was also assigned to GHQ Air Force in recognition of the belief that air defense should be the responsibility of one air command. GHQ Air Force, in turn, was to control four continental air forces. Each air force was to create an interceptor command to control the air defense means, including the aircraft warning service and antiaircraft units, in its area.

The Army Air Forces, created 20 June 1941, undertook to establish an aircraft warning net along both seacoasts. The AAF goal was a chain of radar stations 70 miles apart. By 7 December 1941, only 8 stations were fully operational, 2 on the east coast and 6 on the west coast. However, when the Japanese success at Pearl Harbor indicated that, for the first time, the American people faced the possibility of being bombed, installation of the radar network was accelerated. Eventually, 95 radar sites were constructed—65 on the Pacific coast—but never more than 75 sites were in use at any one time. Actually the radar sets available—SCR-270's and 271's—could do little except tell the direction and distance of approaching aircraft. The network was supported by a Ground Observer Corps which numbered one and one-half million volunteers at its peak strength in April 1943.

The continental air defense system, of course, was not called upon to function against an actual enemy attack. By February 1943 the Joint Chiefs of Staff had approved a report that the danger of an air attack on the United States was slight. By September the AAF had begun to dismantle the system, substituting a standby system. Finally, in April 1944 the JCS decided to inactivate the aircraft warning network.

Although the continental air defense system was untested, World War II produced several significant decisions regarding air defense doctrine and responsibility for air defense. Defense against air attack was recognized as an air force responsibility and War Department doctrine called for air force control of all air defense elements. Also, an aircraft warning service was recognized as an essential part of an air defense system. Furthermore, air defense doctrine specifically called for an air defense command as part of an air force. These wartime innovations were reflected in, and had great influence on, postwar efforts to set up a continental air defense system.

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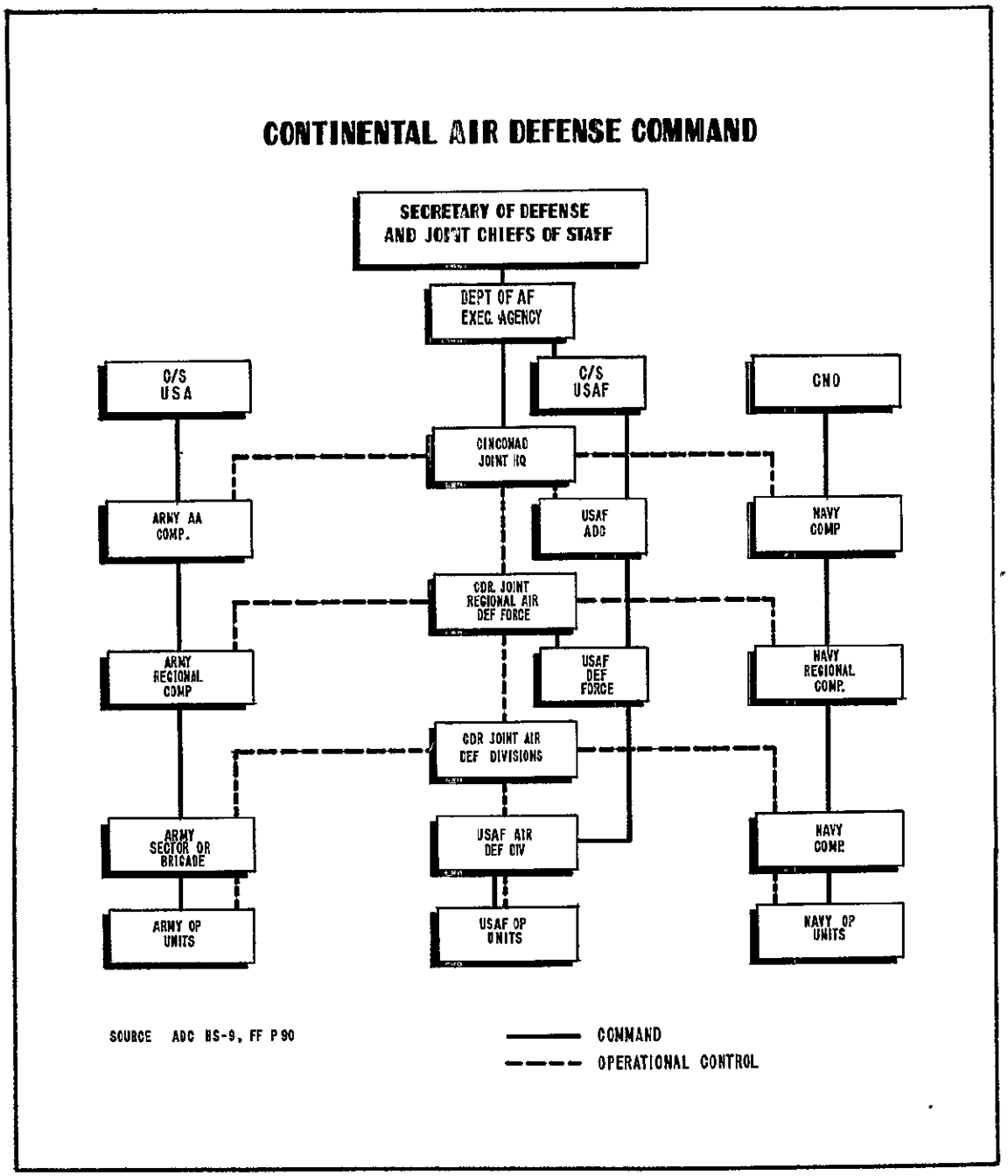

Chart 1

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POST WORLD WAR II ORGANIZATION FOR AIR DEFENSE

Defense of the continental United States against air attack was to be one of the most important missions of the postwar military establishment. This opinion was apparent in postwar planning begun in the War Department months before the end of World War II. At least as early as February 1945 the group planning the peacetime establishment had recognized continental air defense as a requirement.[1]

Air Force leaders, of course, realized the necessity for a peacetime air defense. They assumed that the United States would not be the aggressor in any future war but would undoubtedly have to defend its continental limits against an initial surprise attack. As an AAF staff officer explained, this assumption did not mean that an air defense in being was needed because air defense could be considered relatively unimportant at that time. Nevertheless, he stated, plans were required so that the AAF would never "duplicate the woeful inadequacy of the system that existed before the war" and could avoid "the extravagant and comparatively ineffective but necessary makeshifts" that were resorted to after 7 December 1941.[2]

To fill the need for air defense plans, Headquarters, AAF had taken some action by mid-1945. In January consideration had been given to a survey to determine if the existing radar sites were adequate for a postwar radar network. By June, however, the responsible organization, the Continental Air Forces (CAF),* had submitted no information.[3] Also, in April, AAF had requested the First and Fourth Air Forces to review the aircraft control and warning (AC&W) requirements in their areas and to develop plans to use the latest types of ground radar equipment in current and postwar networks.[4]

Near the end of June, representatives of Headquarters, AAF and CAF, met to discuss the air defense problem and, in the following month, CAF submitted its recommendations. If the United States hoped to protect itself against the type of attack that would be possible in the future, CAF believed, an air defense system would have to be in place "on a standby status with competent, full crews available in not more than twelve hours." World War II radar would be of limited value against future air attacks. Therefore, CAF recommended that research and development be undertaken on radar and allied equipment for an air defense system capable of meeting the future threat.[5]

AAF's Deputy for Operations, Brig. Gen. William F. McKee, acknowledged the validity of CAF's beliefs. Taking a more realistic view of the situation, however, he stated that the need for postwar air defense plans was too urgent to await future developments in radar. Currently available equipment and personnel would have to be used. Training and operational techniques developed during World War II would have to form the basis for a postwar AC&W system. Military characteristics for radar capable of combating future air attacks could be drawn up, McKee said, but until the kind of defense needed to counter future attacks could be determined, AC&W planning would have to be restricted to the use of available radar sets. In the meantime, so that personnel and newer types of equipment would be available for an interim force, he stated that the formation

*Continental Air Forces, activated 12 December 1944, had been assigned the mission of continental air defense upon activation (ltr, Hq AAF to CG CAF, subj: Directive, 14 Dec 44, in Hist CAF, 15 Dec 44-21 Mar 46, doc 47).

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of a postwar AC&W radar plan was an essential consideration.*[6]

AAF Plans for Reorganization

Although some air defense planning was being done, realistic plans could not be made until responsibility for air defense was firmly fixed. Air defense, as an important mission of the postwar military establishment, was properly an air force responsibility, AAF planners believed. Unless the AAF was prepared organizationally to assume the responsibility, a staff officer warned, "strong representations" might be made for transferring the function to the air arm of the Navy, Marines, or Coast Guard.[7]

Based upon this consideration, Headquarters, AAF had prepared a plan by 15 June 1945 for a reorganization of air defense activities. Following closely the postwar military organization proposed by AAF planners, the reorganization called for two air defense commands under the "direct command and administrative jurisdiction" of the Commanding General, Continental Air Forces. These commands would have the same areas of responsibility as the wartime Eastern and Western Defense Commands (i.e., east and west of the 103d meridian).[8]

According to the plan, the proposed air defense commands would not be concerned solely with air defense. In addition to fulfilling the air defense mission, the commands would perform emergency air rescue service, train National Guard and Reserve forces, and possibly provide for a system of flight control. In fact, the planners predicted that the air defense commands might become "permanent training organizations" through which National Guard and Reserve personnel could be rotated.[9] According to a staff officer, one of the advantages of the reorganization was that it would continue war-tested AAF policy calling for an air defense command as part of a typical air force.[10]

Two other proposals for AAF reorganization were made, both of which revealed different conceptions of how the AAF could perform its role. In July Headquarters, AAF produced a tentative plan calling for an AAF composed of a number of commands. Strategic and tactical missions would be provided for by a Strategic Air Force and a Provisional Air Force Headquarters, respectively, while a Continental Air Forces would prepare for air defense and conduct training.[11]

The second plan, which was sent to Headquarters, AAF by Continental Air Forces on 20 June, stressed training activities. It called for the establishment of an operational air force consisting of two tactical air commands and a bomber command. One of the missions of the operational air force would be to provide air force units to assist in continental air defense.[12]

Although these organizational plans were still under consideration when hostilities ended in August, the advent of peace necessitated changes in planning. On 14 September, Headquarters, AAF announced its peacetime objectives in a revised V-J Plan based on a requirement for an Army Air Forces of 70 groups.*[13] Probably with advance information of this announcement, CAF had submitted to Headquarters, AAF a week earlier a proposal to combine the AAF V-J Plan and the CAF operational plan in the establishment of an interim air force. As one of its missions, Headquarters, CAF would plan for the air defense of the continental United States, any resultant plan to be augmented at the direction of "higher authority."[14] Headquarters, AAF's Director of Operations, Maj. Gen. C. C. Chauncey, regarded the CAF plan as a valuable contribution to the solution of the AAF postwar problem. However, for the present, he informed CAF on 1 October, AAF organization had to be based on the existing armed forces structure and on any arrangements which might develop in the establishment of a unified department of national defense.[15] Nevertheless, Continental Air Forces sent copies of the organizational correspondence to its air forces for in-

*CAF submitted such a plan in January 1946. According to the plan, radar would be located to defend strategic industrial areas and population centers and would be manned by Regular Army and Air Reserve personnel augmented by the Air National Guard. Since CAF realized that it was not feasible or practical to set up a complete radar screen around the nation, the proposed plan would provide a nucleus around which a complete system could be immediately constructed when needed. The proposal had not been approved by the time CAF was abolished in March (ltr, Hq CAF to CG AAF, subj: Radar Defense Report for Continental United States, 28 Jan 46, in Case Hist AC&W System, doc 9; R&R comment 2, AC/AS-5 to P&TE Br, AC/AS-3, subj: Radar Defense Report for Continental United States, 12 Mar 46, in DRB 413.44 Radar 1946-47 v 1).

*Two previous postwar plans had called for 105 and 75 groups respectively, (Draft) Record of Development of Plans for Postwar Air Force, provided by Special Projects Office, 24 Jan 1945, in USAF HD 145.041A-12).

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formation and planning.[16] And, in the meantime, Headquarters, AAF had restated CAF's responsibilities for air defense in AAF Regulation 20-1, dated 15 September 1945.

On 14 November, in another organization plan, Maj. Gen. St. Clair Streett, CAF's Deputy Commander, showed the influence of the opinions expressed by Headquarters, AAF personnel. Continental Air Forces would be reorganized under this plan to consist of four commands, an Eastern and a Western Air Command, dealing largely with air defense, a Central Air Command for training, and a Tactical Air Command. Strategic forces would operate directly under the Commanding General, AAF in an M-Day Strategic Air Task Force.[17]

Nothing concrete resulted from these various plans and, early in December, an *ad hoc* committee was designated in Headquarters, AAF to study the problem of armed forces reorganization. The committee considered all of the proposed plans, each calling for strategic, tactical, training, and air defense commands in some form. Finally on 2 January 1946 General Carl Spaatz, Deputy Commander, AAF, approved an organizational plan which would set up an Air Force Combat Command with four corps. strategic, tactical, and two regional corps, one for defense east of the Mississippi and one for defense west of the river. The nuclei for these four corps would be CAF's four continental air forces. By 29 January,* this organization was revised to delete the Air Force Combat Command and to distribute its functions among an Air Defense Command, a Strategic Air Command, and a Tactical Air Command.[18] Thus, after months of discussion and planning, the organization approved was basically the same as provided in World War II doctrine, i.e., the normal composition of an air force included a strategic air force, a tactical air force, an air defense command, and various supporting commands.[19]

Almost two months were to elapse before the reorganization actually took place. It was originally intended that the reorganization would go into effect about 15 February with Continental Air Forces becoming the Air Defense Command.[20] CAF had planned, therefore, that as the Air Defense Command it would be organized to work with the six existing army areas. Thus, six air districts were planned, each of which would contain National Guard and Reserve units in addition to those of the Regular Army. No reorganization had taken place by 15 February and planning continued until, on 12 March, it became known definitely that CAF would be the nucleus for Strategic Air Command.[21] On 21 March the AAF reorganization became official with the activation of Strategic Air Command, Tactical Air Command, and the Air Defense Command, the latter at Mitchel Field.[22] Such plans as CAF had made in expectation that it would become ADC were passed on to the new command.[23]

With this reorganization, the AAF completed a major point in its postwar rebuilding program,[24] although it remained to be seen how well the new commands could function with the personnel and equipment available to them. An Air Defense Command existed but not an air defense.

Effect of Demobilization

The reorganization of the AAF came in the midst of a rapid and drastic postwar demobilization fostered by the prevailing national mood in the months after V-J Day. Nearly four years had been required for the subjugation of the Axis nations and the American people were eager for peace. The United States, as the sole possessor of the atomic bomb, appeared to be free from danger as long as its monopoly continued. Most people believed that there was no enemy in sight and, even if one should appear, the United Nations offered hope that peace could be maintained. The combination of a monopoly of atomic weapons and a functioning international organization engendered the popular belief that a large military establishment was no longer a requirement. Rapid demobilization became the order of the day. By the end of 1945 what had been the world's finest military force had been reduced to a shadow of its former self. All that remained of an Army Air Forces of almost two and one half million was an air force of under 750,000, many of whom were either due for early discharge or were untrained. And this force was destined to be cut in half by the end of 1946.[25] From a peak wartime strength of 243 groups, the AAF had been reduced by the end of

*On 22 January 1946, the mission of Continental Air Forces—including the provision of continental air defense—was restated by Headquarters, AAF. Apparently a major reorganization was not expected immediately (ltr, Maj. Gen. C.C. Chauncey, Actg C/AS to CG CAF, subj: Mission of the Continental Air Forces, 22 Jan 46, in USAF HD 168.64-16).

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1945 to 89 groups, only 25 of which were in the continental United States. A mere 3 fighter groups, plus 2 squadrons of night fighters, were included in this total of 25 groups.[26] But even these totals were unrealistic because many of the groups were at skeleton strength or were manned by inexperienced personnel. The AAF was rapidly approaching a low state of combat readiness which caused one writer to report that, in the middle of 1946, the AAF could not put a single B-29 squadron in the air.[27] As demobilization continued AAF hopes of retaining even an establishment of 70 groups appeared slim.

ADC Has Mission Without Means

Coming in the midst of postwar demobilization, the reorganization of the AAF posed a question for air force planners. Could the AAF, with its manpower decreased in size and its materiel being moth-balled or scrapped, spread its meager resources enough to man the new air commands? It soon became apparent that the AAF could not. Furthermore, prospects for increases in manpower or materiel were remote. As a result, AAF was forced to regard preparations for performing its missions in terms of priorities. With the United States the only nation having the atomic weapon, highest priority was accorded the Strategic Air Command and its delivery vehicles.

In view of this situation, it is not surprising that, from its inception, the new Air Defense Command with a low priority suffered from inadequate resources. The command was assigned an interim mission to organize and administer the integrated air defense system of the continental United States, to exercise "direct control of all active and coordinate all passive means of air defense," to train units and personnel in air defense operations, and to operate and maintain Air National Guard (ANG)* and Air Reserve units.[28] To perform this mission—and such other tasks as AAF wished to assign—ADC was given only two percent of the total AAF manpower strength.[29] Six air forces were assigned to ADC—First, Second, Fourth, Tenth, Eleventh, and Fourteenth—but only the First and Fourth were in an active status.[30] Obviously such a force would be inadequate to discharge the Air Defense Command mission.

Shortly after his assumption of command of ADC, Lt. Gen. George E. Stratemeyer considered the means at his disposal for performing his mission. According to his interpretation, "the Air Defense Command, with its subordinate Air Forces, will have primary interest in the repelling of an air attack, and we should therefore have at our command all air, ground, and sea forces which may be necessary to repel such an attack."[31] Clearly he did not have sufficient forces to repel an air attack. Therefore, he attempted to obtain the use of other forces in the event of an emergency.

The mission directive had assigned to ADC the maintenance and training of ANG and Air Reserve units. Since the bulk of the meager AAF combat forces was assigned to SAC, Stratemeyer assumed that "the means available to the Air Defense Command for the purpose of implementing the mission of that command, are the Air National Guard and Air Reserve programs."[32] Headquarters, AAF immediately informed him that his assumption was not entirely correct. The ANG and the Air Reserve constituted a total AAF reserve; they would be used in an emergency to support the entire AAF. Thus, if the AAF position remained unchanged, Air Defense Command would continue to be without adequate forces with which to perform its air defense mission. In so far as air defense was concerned, ADC would be relegated largely to the role of a planning agency.

The scarcity of resources was emphasized further in joint planning between the Fourth Air Force and the Army and Navy commanders on the Pacific Coastal Frontier. Because plans had progressed by April 1946 to the point where Fourth Air Force had to know what forces it would have in an emergency, General Stratemeyer recommended that Headquarters, AAF specify what forces would be available for air defense. Furthermore, he suggested that Headquarters, AAF tell the commanders of SAC and TAC which of their units would be placed under the operational control of ADC in an emergency and inform those commanders that the Commanding General, ADC was authorized to deal directly with them in forming plans for the use of those units.[33] Headquarters, AAF chose to reply by citing the condition of the AAF combat units in the continental United States.

*The organization of the ANG began on 25 April 1946 and the first ANG unit received federal recognition on 30 June of the same year.

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Over-all effectiveness of these units at that time was less than 20 percent. A gradual improvement could be expected, yet by December 1946 effectiveness would be only 65 percent. The only AA units in the United States were one group at Fort Bliss and another at Orlando, Florida, both at cadre strength with no combat effectiveness.[34] Headquarters, AAF could not assign nonexistant forces to the Air Defense Command.

Air Defense Planning

Even though forces were not available, planning for air defense began. However, attempts to formulate plans revealed several differences of opinion—some that could be settled only at the Joint Chiefs of Staff level*—resolution of which would greatly affect the availability of forces for air defense. Based upon its interpretation of existing air defense doctrine and on wartime experiences, Headquarters, AAF had assigned to the Air Defense Command the organization and administration of the "integrated air defense system of the Continental United States," with direct control of all active air defense measures. Actually, AAF did not possess the air defense mission which it had assigned to ADC. This anomaly was revealed in April when, in response to a request from General Stratemeyer, Headquarters, AAF prepared a compilation of documents pertaining to continental air defense. AAF had assumed responsibility for the air defense of the United States. Yet these documents disclosed that as of the date of the assignment of the interim mission to ADC (12 March), continental defense, including air defense, belonged to the Army Ground Forces (AGF), to be exercised in conjunction with designated naval and air commanders. This irregular situation had been partially clarified as of 8 April by a War Department letter which placed air, naval, and ground commanders in coequal status in regard to the defense of the United States. Nevertheless, from the compilation of documents Maj. Gen. Lauris Norstad, Assistant Chief of Air Staff for Plans, concluded that "the responsibility for Air Defense of the Continental United States was given to the Air Forces in 1942; in 1944 was given to the Defense Command Commanders, and now . . . is in the process of reverting to the Air Forces."[35]

*See chapter II.

Disregarding the uncertainty surrounding mission responsibility, ADC sent a preliminary planning directive to its subordinate commands early in May. The commands were informed that until general plans were published by the War Department ADC would begin preliminary planning for active air defense. This planning would be conducted in conjunction with AGF and in coordination with appropriate naval commanders and passive defense agencies.[36] Copies of the directive were sent to Headquarters, AAF along with a letter which revealed some of the problems facing the command. Although, ADC declared, the directive was based on the best assessment of the information available, it did not offer much assistance to the ADC air forces because of its scope and because responsibilities for air defense had not been clarified. Since ADC was anxious to issue more specific instructions to its subordinate commands, information was requested.[37]

Headquarters, AAF's reply five weeks later did little to clarify ADC's position. Because a clarification of responsibilities was linked with the questions of unification and the missions of the land, sea, and air forces, ADC's queries could not be definitely answered. When unification was achieved and the missions of the services were clearly defined, Headquarters, AAF believed that the questions posed by ADC would be automatically answered. AAF could only state that it had not been given a definite mission directive similar to the one issued to AGF on 8 April.[38]

Stratemeyer's dilemma was recognized in Washington in the summer of 1946. Headquarters, AAF personnel realized that he would welcome any action which designated more clearly his responsibility and authority in performing his "complicated and important task"; furthermore, every possible assistance should be given him.[39] By August, this recognition of his problems had resulted in no satisfactory solutions and Stratemeyer, told to execute a mission with inadequate means, was concerned lest his meager resources not be used to best advantage. Therefore, he asked Headquarters, AAF to approve an analysis of the ADC interim mission which was compiled to determine "a realistic method" for the discharge of his responsibilities. The analysis was based on the current allocation of forces and existing assignment of responsibilities and authority.[40]

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According to Lt. Gen. Earle E. Partridge, Assistant Chief of Air Staff for Operations, all interested sections in Headquarters, AAF examined the ADC analysis and concluded that the air defense mission would be effectively accomplished through the recommended courses of action. Stratemeyer's decisions were considered reasonable and could be approved, Partridge stated, but "such approval should not imply that specific actions taken as a result of the approved courses of action would in all cases have the sanction of this Headquarters." Although Headquarters, AAF could concur in principle with Stratemeyer's proposals, concurrence should contain a request for ADC to draw up plans containing specific recommendations upon which AAF could take action. Significantly, Partridge stated that one assumption contained in the analysis should not be sanctioned. An air defense in being should not be maintained at that time because the size and shape of the integrated system was still a matter of conjecture. According to the approved troop basis, he pointed out, ADC would have insufficient troops to maintain an air defense system and "in peacetime will have only enough troops and equipment to provide a thin peripheral early warning screen with a negligible amount of interception control."[41]

This explanation was not given to Stratemeyer, possibly because it was not the unanimous opinion of the AAF. Headquarters, AAF merely approved the analysis in general and recommended minor changes.[42] When the AAF reply was received, a member of Stratemeyer's staff expressed the opinion that the approval might be "more apparent than real." It appeared to him that Headquarters, AAF had not given thorough study to the analysis.[43] Nevertheless, there was nothing in the AAF reply to cause ADC to discontinue its planning for air defense.

Before approval of the analysis of its mission was received from Headquarters AAF, the Air Defense Command had issued to its subordinate air forces a new planning directive which rescinded the one of 2 May 1946. This new directive indicated that air defense plans would be based upon the assumption that the ADC interpretation of its air defense mission would be accepted and would begin, pending receipt of detailed plans from the War Department. Headquarters, ADC would issue general plans, policies, and directives from which air force commanders were to prepare detailed plans. Air force commanders were given much wider latitude in air defense than had existed under the previous planning directive. They were to prepare and test plans; to defend with assigned forces the critical areas within their assigned areas; to integrate additional forces which might be allocated into their active air defense operations; to institute passive defense measures; and to attack "floating targets of opportunity within the capabilities of assigned forces." In preparing their plans, the commanders should assume that each would be responsible for all air defense measures in his area unless relieved by a commander appointed by the War Department and that, when needed for air defense purposes, additional forces would be allocated.[44] Plans were to be made even though differences of opinion still existed and even though no one could be certain that the forces would be on hand when required to carry out the plans.

The Problem of Operational Control

In the absence of forces of his own, Stratemeyer was compelled to look to the forces of the Army, the Navy and the other AAF commands. This gave rise to the problem of operational control. According to the interim mission, Headquarters, AAF had given control of all active air defense means to Stratemeyer who interpreted this to include command of all forces having an air defense potential. Current Joint Chiefs of Staff and War Department policies invested command of all forces in "the force primarily concerned with the element that the enemy is utilizing for attack"—which meant that ADC would be in control only if the enemy's primary attack came by air. Stratemeyer felt that such a general policy did not directly assign ADC " . . . the control of all three forces in opposition to the most logical modern attack, the Air-Borne attack." He recommended that the Commanding General, ADC be given control of all forces to be used in repelling an air attack or an airborne invasion.[45]

Lt. Gen. Ira C. Eaker, Deputy Commander, AAF explained in reply that the Commander, AAF had been assigned responsibility for the air defense of the United States. In turn, the AAF Commander had delegated to the Commanding General, ADC authority "to take immediate and independent action in the event of air attack against continental United States." Furthermore, the air defense commander was responsible for coordinating within

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the continental United States the air defense means available from the Army and Navy. Effective coordination was possible only through assignment of operational control of these means to the air defense commander during periods of emergency; to this principle all services apparently agreed. In Eaker's opinion, command over land and sea forces not participating in air defense was not required by the Commanding General, ADC for the discharge of his air defense responsibility. If a sustained attack occurred on the United States, the JCS would declare a theater of operations, appoint a theater commander, and allocate to him suitable forces. Eaker believed that it was unlikely that the air defense commander would be so designated. He added that further clarification would have to await the results of a study being conducted by Headquarters, AAF.[46] Further clarification was not immediately forthcoming and the question of operational control was not settled until December 1947, almost two years after the assignment of the air defense mission to the Air Defense Command.

General Stratemeyer had also discovered that his authority to control the forces of the other air commands in event of emergency was not unanimously accepted within the AAF. In September, following a conference held at Tactical Air Command Headquarters, he informed Headquarters, AAF that he and the Commanding General, TAC disagreed on his responsibilities in the event of an air attack. He reminded Headquarters, AAF that

> You have indicated that a theater commander is expected to be appointed in any area of the United States which is attacked or threatened with attack. My concern is for the period between the time hostile action occurs or is first expected to occur, and the time a theater commander has actually been appointed and assumes responsibility in the area. During this period I believe a unified air command in any one area is essential.[47]

Only a firm decision by Headquarters, AAF on his responsibilities would give Stratemeyer a solid basis for further air defense planning. Therefore, he asked approval for the ADC air force commander to command or control any forces in his area that could contribute to air defense during an emergency. The air force commander would continue to exercise this command or control until a theater commander assumed responsibility at the direction of higher headquarters.[48] Within the Air Staff, Plans Directorate again urged that Stratemeyer's concept of his responsibilities be approved, with minor exceptions, and stated that plans "should permit the transfer, if required, to the Air Defense Command of operational control of all units capable of air defense." The ADC commander was the logical person to assume over-all air defense responsibility until a theater commander was designated.[49] Although the directorate was preparing an air defense plan which would consider all available air defense forces,[50] Headquarters, AAF still issued no directive to that effect to the Air Defense Command.

ADC Air Defense Plans

While the decisions on the allocation of forces and responsibility for air defense were still pending, ADC compiled three plans. The first plan was received in Headquarters, AAF in October 1946. This short term plan was actually a capability study designed to indicate what the command could do if called upon to set up an air defense "using only the forces, weapons, facilities and resources currently available."* Thus, the air defense system envisioned was of World War II vintage. Although the plan recognized a number of vital strategic areas that might be subject to attack, its objective was defense of the *one* area considered most likely to be the target of the type of attack which an enemy could launch in the near future. Only one area could be defended because ADC did not have sufficient forces for a more extensive air defense and because there was little prospect of a strong enemy force capable of making a large scale attack in the immediate future.† The short term plan assumed a "very great" calculated risk but there was no other way to assume a concentration of the meager forces available.[51] Also, as General Stratemeyer admitted a month later, the plan "states many things as fact which have not yet been approved

*According to the plan, effective forces for continental air defense during 1946-1947 included only 6 fighter groups, with an average combat effectiveness of about 50 percent, 3 AC&W groups, and one AA group (ADC Air Defense Plan (Short Term), 18 Oct 46, in USAF HD 419.01).

†Intelligence estimates at this time maintained that the Soviet Union would have only harrassing capabilities until they developed the atom bomb. Soviet development of the bomb was considered a remote possibility in two years and a probability in about three years (Air Intelligence Div Study, Air Defense of the United States, 2 Oct 46, in OPD 373.24 (3 May 46) sec 1 Annex 2).

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by Army Air Forces or agreed between the services."[52]

Although tentative allocations of forces were made to the ADC air forces for implementing the short term plan and were revised six months later to bring them up-to-date, AAF approval of the plan was not received by ADC.[53] Nevertheless, formulation of the short term plan convincingly demonstrated to ADC the "inability of the Army Air Forces to provide an adequate air defense for this country under present conditions, particularly if a surprise attack . . . were to occur."[54] Headquarters, ADC submitted, therefore, on 19 October, preliminary personnel and equipment estimates for a second plan which called for an air defense in being. The air defense system called for in this plan would provide defense for the *five* most vital areas and would form the nucleus for the development of a complete continental air defense system. It was designed "to provide a reasonable chance of interception and destruction of attacking aircraft or guided missiles with a minimum of forces."[55]

A month later Headquarters, AAF received the complete plan—actually a requirement study—from ADC for the establishment of an air defense in being. As a preface to the plan, ADC stated that

> It is generally recognized that this country will most likely be the initial objective of any future aggressor and that the start of hostilities is very apt to take the form of a surprise air attack against the United States. Our security therefore depends, unless this country is prepared to initiate offensive operations, wholly upon the establishment of a permanent air defense in the most vital areas in this country.[56]

According to the plan, regular air force units would be deployed for the defense of the five most vital areas, "in numbers adequate to give a reasonable chance of interception and destruction of minor air attacks." The nation would be divided into three areas of responsibility, each of which could be given a minimum air defense as soon as resources were made available. If Headquarters, AAF made the necessary decisions by 31 December 1946, ADC believed that defenses—except AA—could be in operation between April 1948 and March 1949. Also, ADC stated that it could expand this air defense system when necessary if assigned sufficient forces.[57] Even though Headquarters, AAF had not commented upon this plan by the end of 1946, it remained a basis for study of air defense requirements by the Air Defense Command.

The third plan being drawn up by ADC, a long term plan, was a requirement study for establishment of an air defense by 1955. Such factors as the type of war to be expected, the methods of defense needed to meet that type of warfare, the resources required, and the dates when the resources would be required were considerations. The plan—preparation of which had barely begun in 1946—was designed to provide Headquarters, AAF with a basis for coordination of effort so that an adequate air defense could be established in the future. For the success of such a plan, complete and accurate intelligence of the enemy's capabilities and intentions was required. The long term plan contemplated a perimeter air defense system which would move toward the possible enemy. When this perimeter defense, which would include an extensive radar screen for early warning, reached its practical limit, defenses in depth would be built rearward to cover the vital industrial and population centers.[58]

Status of Air Defense at End of 1946

Preparation of these plans indicated that one of the most pressing needs of the air defense system was for an early warning network composed of high-performance radar equipment. General Stratemeyer had stated in October 1946 that, for the long term plan, the radar screen would have to have an effective range of 1,500 miles and an effective altitude coverage of 100 miles.[59] These requirements, of course, far exceeded the capabilities of the currently available or planned radar equipment. When Continental Air Forces had called the lack of improved equipment to the attention of Headquarters, AAF in July 1945, AAF had replied that radar defenses would have to depend upon the available radar, most of which had been developed during World War II. By 1946 air defense personnel realized that prolonged reliance on obsolescent equipment could not be tolerated and steps were taken to investigate radar requirements. At a conference held in June at the Watson Laboratories in New Jersey various electronics manufacturers were invited to express interest in the problem of more efficient early-warning radar equipment.[60] Several investigating committees furnished further proof that current equipment was unsatisfactory. For example, tests conducted at White Sands indicated that no available radar was capable of detecting and tracking

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the V-2 rocket.[61] In an attempt to fill this need, a radar early warning system was proposed by the Research and Engineering Division, Headquarters, AAF. The proposal was sent to the Air Materiel Command for study and comment even though limited funds would probably preclude its acceptance.[62]

Despite these efforts, the outlook for air defense at the end of 1946 was not encouraging. In a review of the situation, the Chief of the Guided Missiles and Air Defense Division in Headquarters, AAF, Brig. Gen. William L. Richardson, pointed out that the means for performing the air defense mission were still meager. In fact, no AC&W units had been activated for assignment to ADC and none were planned for the near future. The entire radar equipment picture looked discouraging, General Richardson reported, because fiscal year 1948 budget allocations for ground radar equipment production had been cut from $88,000,000 to $15,000,000. Such limited funds would curtail greatly any developmental work and would necessitate reductions in equipment and personnel. The primary difficulty, as Richardson saw it, was that

> Overall policies and programs affecting air defense are subject to considerable controversy inasmuch as the means required for establishing air defense systems are excessive when compared with the amount of insurance gained and the actual need for air defense systems in the next few years has not been firmly established.[63]

The uncertainties—which actually applied to the entire military establishment—indicated by General Richardson could also be seen outside of the AAF. At the beginning of the second year of peace the cause of air defense was hampered by an apparent contradiction in the attitudes of the people and their representatives in Congress. Although no real danger was felt by most people, some interest in an adequate national defense was apparent in the results of public opinion polls and statements of congressional and other governmental leaders.[64] On the other hand, two factors seemed to indicate that economy was the paramount consideration: the congressional elections of 1946 had resulted in a victory for the Republican Party after a campaign waged on an economy platform, and, the Truman Administration had declared in favor of reductions in expenditures. This desire for economy was reflected in the status of the AAF at the end of 1946. Total strength of the AAF was only 228,000,* which was little more than half of the strength considered acceptable in the planned interim air force. The goal of a 70-group AAF was maintained by AAF planners yet only 55 groups were activated.[65] And of these 55 groups, only two were considered as combat effective. Budget-wise, only 17 percent of the total War Department funds in fiscal year 1948 would be appropriated for the Air Force. The decrease in funds for radar equipment production indicated by Richardson was destined to be repeated in other phases of AAF activity.

Differences of Opinion in Headquarters, AAF

Of more immediate concern to the Air Defense Command was the fact that, in spite of persistent urging by General Stratemeyer, Headquarters, AAF continued to refrain from issuing a mission directive to the command. Although possession of a mission directive would not provide the command with the means for carrying out its mission, it would make planning more realistic and clarify the problem of responsibilities. Stratemeyer's plight in attempting to perform his mission without clear-cut authority was recognized within Headquarters, AAF yet attempts early in 1947 to draw up an ADC mission directive were fruitless.[66] Finally, General Spaatz, Commanding General, AAF informed Stratemeyer in March that, although his staff had completed its studies on the assignment of the ADC mission, because of budgetary discussions and the pending reorganization of the War Department, action would be withheld until a more appropriate time.[67]

Within Headquarters, AAF, discussions were held concerning an AC&W policy drawn up in the office of General Partridge. These discussions revealed in March 1947 that a serious difference of opinion—which would have to be reconciled before Stratemeyer's problems could be solved—still existed. The policy repeated the belief expressed earlier by General Partridge that an air defense should not be maintained. The limitations of the World War II air defense system were generally known, it pointed out, as was the fact that personnel and equipment were not availa-

*Although ADC strength had increased proportionately to about 11 percent—25,906 out of the total of 228,048—this did not necessarily mean more emphasis on air defense. Most of the increase was absorbed by the various tasks performed by the command.

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ble to revive that system. Nevertheless, projects to improve the system were under study and promised to alleviate the situation if they were properly supported. In order to concentrate on the development of new radar and on an improved AC&W system, the policy paper proposed taking a calculated risk in continental air defense—do without aircraft control and warning rather than spend money rehabilitating the World War II system or constructing new systems of the same type. To set up an obsolete system with the currently available equipment would be "a scandalous waste of public funds," it asserted, and would tend to create the illusion of an air defense system where none existed. Partridge's staff maintained that "any diversion of our of our crumbling resources to sustain the present bow and arrow systems would be indefensible." Based upon these considerations, the proposed AC&W policy called for increased research and development, establishment of nuclei AC&W systems only on a training basis, production of current radar equipment solely for training and limited stockpiling purposes, and elimination of the existing fixed operational radar systems.[68]

Although the Intelligence and Materiel divisions agreed with this proposed AC&W policy,[69] Maj. Gen. O. P. Weyland of Plans felt that it was too sweeping in its implications. The proposed policy, he believed, tended to create the impression that AAF was taking a negative approach to the problem of air defense. Since the public regarded air defense as the chief mission of the AAF, this impression had to be avoided. Weyland believed that the United States enjoyed a period of grace—estimated at approximately five years—during which a calculated risk could be taken. This period of grace was the result of the limited capabilities of potential enemies "and for no other reason." At the end of that five year period, he warned, some sort of an air defense in being would have to be in existence and probably would have to be continued indefinitely. Regardless of the type of defense which was maintained—it might be only a passive defense—Weyland believed that:[70] "The American people would not tolerate uninterrupted attacks without warning against their cities by atomic laden aircraft or guided missiles, even if the attacks were of a sporadic nature. They look to the Air Forces for protection." As better equipment would always be "just around the corner," he stated, the AAF would have to use what was on hand when the period of grace was over. In the meantime, AAF should be progressively developing an air defense system even if equipment and personnel were inadequate. At least a skeleton system had to be maintained, Weyland declared, "into which we can fit new developments and with which we can formulate and test the techniques of an air defense, such as the rapid deployments and control of interceptor forces."[71] Before mission directives could be assigned or forces allocated, this question of the necessity of an air defense system in being had to be resolved at the Headquarters, AAF level.

These discussions highlighted the fact that the AAF had only a limited basis upon which to estimate the capabilities of its techniques and equipment against actual air attack. Air defenses had been greatly improved during the course of World War II but their operational use was not extensive; continental defenses, of course, were completely untried. In order to fill this void, Headquarters, AAF requested the Air Proving Ground Command in June 1947 to establish a project to determine the potential value of AAF air defenses. Not only would the results of such a test aid in air defense planning—and help resolve the differences of opinion that existed—but by forestalling any basic errors which might exist, "the security of the nation would be measurably increased as well as the wasteful spending of great sums of money avoided."[72] Although a plan was drawn up later in the year,[73] no test was made, mainly because the necessary equipment and personnel could not be diverted from other tasks.

In the meantime, Stratemeyer continued to press Headquarters, AAF for action on his many requests. To assist the Plans Directorate in the consideration of his problems—and, it is suspected, to keep headquarters personnel aware of them—Stratemeyer submitted a priority list of air defense matters which required action. Approval of the short term air defense plan was considered most urgent for, in order to complete the plan, ADC needed authority to make arrangements with other AAF commands. Secondly, ADC continued to be without an up-to-date statement of its mission, and thirdly, the question of operational control of AA needed to be settled.* Next in priority was implementation of the short term plan and deciding on the plan for an air defense in

*See chapter II.

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being. In connection with the latter proposal, AAF had to decide whether or not an air defense in being was desired and, if so, what forces would be allocated. Present plans would give the ADC "almost sufficient forces to establish the rudiments of an air defense in being" but additional forces were desirable. Stratemeyer once again emphasized his conception of the problem, which agreed in the main with the ideas expressed by General Weyland:

> I consider it essential that some kind of air defense in being be established if for no other reason than to keep alive the art and science of providing an integrated air defense system; once established, its extent can be readily adjusted to the resources made available for the purpose. However, we must have authorization from your headquarters to make any plans or preparations—and some indication as to the troop basis on which these plans can be predicated.[74]

Effect of the Creation of USAF on Air Defense

One stumbling block that had prevented the AAF from settling many of the problems posed by General Stratemeyer was overcome on 26 July 1947 with the creation of the United States Air Force. Before the passage of the National Security Act which set up USAF, air force planners had been forced to regard any recommendations they might desire to make in light of their possible effect on the pending unification legislation.* As the new Secretary of the Air Force Stuart Symington had stated: "What has stumped us is the controversy over the unification of the services into a streamlined single department. Until that is settled, it is hard for the Air Force to know where it is going or where it can go."[75] Now that independence has been secured, the Air Force could better determine its own future. Furthermore, events in 1947 such as the situations in Greece and Turkey which prompted the issuance of the Truman Doctrine, and that in Western Europe which resulted in the announcement of the Marshall Plan, indicated to many that defensive measures might take on new urgency.

At least in part because of these events, in the latter part of 1947 the USAF took several definite steps, which strengthened the cause of air defense. Air defense planners had realized, of course, that an aircraft control and warning system was of primary importance in a successful air defense system. Much planning and discussion concerning an AC&W system had been carried on in Headquarters, AAF since 1945.* Efforts had been made, but without success, to have funds for such a system included in the regular military budgets for the fiscal years 1947, 1948, and 1949.† Also, in 1947, a joint development-production contract had been let with the General Electric Company for the AN/CPS-6B radar, an improved search radar.[76] Nevertheless, for several reasons in addition to the unification negotiations, announcement of an AC&W plan was delayed. Within the Air Staff, as pointed out above, the advisability of a major expenditure for air defense was questioned and no agreement was reached as to when an AC&W system should be operating in place. Other delaying factors were: disagreements on the theories of air defense; changes in requirements for AC&W because of the mass destruction weapons; and the fact that entirely new radars would not be available until at least 1953.[77] Despite these handicaps, an aircraft control and warning plan had been completed by November 1947.††

The aircraft control and warning plan, which was approved by Chief of Staff Spaatz on 21 November, was based on all information available, including the various plans submitted by the Air Defense Command. It was to be implemented within five years from the time funds were allocated and would provide 24-hour operation of Alaska and continental peripheral stations and part-time operation of interior United States stations. The plan—known as SUPREMACY—was to be implemented in three phases: Phase I to run to 30 June 1948; Phase II for fiscal year 1949; and Phase III for fiscal years 1950 through 1953. A total expenditure of $388,000,000 was called for which would eventually provide 411 radar

*An unofficial opinion was expressed that "one of the most serious consequences of delay in armed forces unification is that the AAF, lacking autonomy, has been powerless to fight for enough funds to support even a minimum plan for air defense." (Kendall K. Hoyt, "What Price Air Power?" in *Air Force*, XXIX, no 7 (Jul 47), 24.)

*See above pp. 1-3.

†The over-all financial picture was altered still further in March 1947 when future funds for AAF were reduced. As a result, the Air Staff determined that only 55 rather than the planned 70 groups could be supported (Report of Chief of Staff USAF to Secretary of the Air Force, 30 Jun 48).

††Secretary of Defense James Forrestal publicly announced on 12 November 1947 that the Defense Department was making plans for an air warning network (*The New York Times*, 13 Nov 47).

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stations, 374 of which would be in the United States. Operating personnel would consist of 25,138 Regular Air Force and 13,788 National Guard troops.[78] Although this network would be "the heart" of any integrated air defense system which would be established, admittedly it, in itself, would not provide air defense; nor would it provide an "air tight" warning and control system, primarily because of radar limitations. It would constitute a "moderately efficient" system against conventional long-range air attacks and would afford facilities for training and developing tactics and techniques. Also, the system could be easily modernized and expanded as more efficient radar became available.[79]

Following a presentation of SUPREMACY to General Stratemeyer and his staff on 25 November, General Weyland, the Acting Deputy Chief of Staff, Operations, requested Stratemeyer's comments on the proposed system. Since the Air Defense Command was to be the implementing agency for the plan, it would be concerned with detailed planning.[80] Stratemeyer replied that, in general, the proposed system would "provide a minimum aircraft control and warning coverage for the strategic areas of the continental United States within the inherent capabilities of presently available equipment." In order to make the radar screen more effective, he believed that it was essential for the Air Defense Command to be connected by reliable communications with the Canadian Air Defense system, the Alaskan Air Command, and the proposed Northeast Air Command. In addition, coastal radar coverage should be extended by the use of radar picket vessels or airborne early warning stations. As for implementing the plan as proposed, Stratemeyer stated that initial radar siting ought to be undertaken without delay; ADC would do this as far as available resources would permit.[81] In SUPREMACY, the Air Force now had a definite AC&W system plan from which to work.

A second step taken by USAF in late 1947, undoubtedly as a result of the achievement of independence, was the granting to the Air Defense Command of a definite mission directive. In the event of emergency, and as a basis for planning, Stratemeyer was informed on 17 December that he was to provide for the defense of the United States against hostile air attack. Initially he would be assigned operational control of those SAC and TAC units which had been designated for participation in air defense. For planning purposes, this was to include any units which possessed an air defense potential. Stratemeyer was directed to prepare and keep current, in coordination with the commanding generals of SAC and TAC, plans for the integrated use of such forces.[82]

In another significant action on the same day the role of the Air National Guard was also clarified. Stratemeyer was told that, in performing the air defense mission, the ANG would constitute his major source of units; and, in event of war or emergency, all ANG units would be available to him initially.[83]

Thus, after nearly two years, Headquarters USAF issued a definite mission directive to the Air Defense Command and designated the means for carrying out that mission. As a result of these directives, the ADC staff could plan more realistically. Of equal significance, this and other actions by Headquarters USAF indicated to Stratemeyer "that at the Washington level ever-increasing importance is being placed on requirements for the air defense of the continental United States.[84]

Outside of the Air Force there was also evidence that, at the "Washington level," interest in airpower, including air defense, was re-awakening. Several rumors circulating of Soviet atomic test explosions included one story of a test which had taken place 15 June 1947. This story assumed added significance because it had been preceded by a statement by V. M. Molotov, Russian Foreign Minister, that "the secret of the atom bomb ceased to exist a long time ago."[85] Also, several Air Force leaders, such as Generals Spaatz and Doolittle, had pointed out to the public in 1946 and 1947 the weakness of the American air forces and the importance of maintaining a strong air force in being.[86] General Stratemeyer had put the case more strongly in mid-1946 when he had stated publicly that the Air Force was in a worse state than after the World War I armistice. He revealed to the members of the Aviation Writers Association that "we couldn't punch our way out of a wet paper bag."[87] The decline in the nation's air strength had been further publicized during the first half of 1947 in the hearings and debates which had preceded the adoption of the Unification Act.

Because of the generally unfavorable condition of American aviation—civil as well as military—and in order to form an aviation policy for the

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nation, President Truman appointed an Air Policy Commission, under Thomas K. Finletter, on 18 July 1947. Hearings were held throughout the last four months of 1947, and copious testimony—most of which illustrated a growing interest in airpower—was heard from military and civilian leaders. According to *The New York Times:* "This is the serious situation in which we find ourselves today in the matter of air power. Practically without exception, witnesses, military and civil, have hammered with all the force at their command on the fact that the nation's security rests on adequate air defense."[88] The need for an adequate air defense was brought home forcibly to the public when, in perhaps the most startling testimony before the Finletter Commission, General Spaatz disclosed that Russia was building copies of the B-29 long-range bomber.*[89]

In its entirety, the testimony presented before the commission revealed a grave situation* and most interested persons could agree with Chairman Finletter that "in these times air defense assumes a special importance in the creation of national policy."[90] Plan SUPREMACY, if approved by Congress and implemented, would constitute an important step in the creation of an adequate continental air defense.

*Actually, this had been known for some time for the Soviets had tried unsuccessfully to buy B-29 type tires, wheels, and brake assemblies in the United States in December 1946 (Stuart Symington, "We've Scuttled Our Air Defense," in *The American Megazine*, CXLV, no 2 (Feb 48), 50). Furthermore, a flight of 48 B-29 type aircraft had been observed in Russia on 23 October 1947 (Dept of the Army, Intelligence Division, Intelligence Review, no 102, 5 Feb 48).

*Senator Henry Cabot Lodge (R-Mass.), appearing before the Senate Foreign Relations Committee, also stressed the necessity for an adequate air defense. He believed that the Air Force was stunted and that the United States was without a nation-wide organization to cope with massive air attacks (*The New York Times*, 14 Nov 47).

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CHAPTER II

USAF RECEIVES THE AIR DEFENSE MISSION

Background of the Key West Meeting

Although the "Unification Act" (National Security Act) of 1947, which set up an independent Air Force, was a most important step forward in the creation of an effective military establishment, many problems concerning the roles and missions of the services remained unresolved. The statute, as well as President Truman's follow-up Executive Order "Functions of the Armed Forces," was expressed in such general terms that each service had its own interpretation of many of its assigned functions. For example, neither document specifically assigned the mission of air defense to the USAF; yet USAF continued to regard air defense as its mission. As a result of the different interpretations, the Joint Chiefs of Staff struggled unsuccessfully during the ensuing months to reconcile interservice views in order to prepare a unified plan of action.[1]

Because neither the congressional legislation nor JCS deliberations produced real unification, the entire National Military Establishment received considerable criticism. The President's Air Policy (Finletter) Commission report, which appeared 1 January 1948, stated that tomorrow's war could not be fought with yesterday's military establishment. Instead, the report stated, for the defense of the United States a new strategic concept—the core of which would be airpower—was needed. This objective could only be attained through a unified military establishment.[2] Two months later the Congressional Aviation Policy Board also criticized the JCS for its failure to achieve real unity.* Stating that it had been unable to secure a unified plan of action from the Joint Chiefs, the Board added that

> We are not unaware of the fact that the Joint Chiefs of Staff, who individually represent the three separate services, may find it difficult to prepare truly coordinated and integrated plans. The loyalty of each service to its traditions is understandable, but unyielding adherence to service loyalties at the expense of national security is a luxury the Nation no longer can afford.[3]

Within the USAF these views were endorsed by an Air Policy Board which was formed to review the findings of the two civilian commissions.[4] Moreover, another USAF group, an Air Defense Policy Panel, expressed similar beliefs when it recommended to the Chief of Staff that the JCS establish a fundamental military policy based upon airpower. This policy, the panel reported, should contain a clear definition of interrelated missions and roles of the services.[5]

The need for real unification and for a consistent basic strategic plan for the military establishment had been recognized by Secretary of Defense James Forrestal. Now, prompted by these criticisms, as well as by the increased international tension which was apparent in Washington early in 1948,* he called for the Joint Chiefs of Staff to meet at Key West, Florida, 11 March 1948. The time had come, Forrestal stated, to determine "who does what with what weapons." He was prepared, he informed President Truman, to make the decisions himself if the JCS failed to make them.[6]

*Representative Carl Hinshaw (R-Cal.), a member of the Board, stated that delay and diversion in the National Military Establishment had created a "shocking, deplorable situation." Instead of unification, Hinshaw declared that the American people were getting "triplification" (*The New York Times*, 12 Mar 48).

*The Communist seizure of Czechoslovakia on 24 February 1948 was the start of a period of several weeks during which tension was high in the Capital. While the JCS was meeting in Florida, Congress was considering ways and means—such as Universal Military Training—to strengthen the nation. This tension was an important factor in the setting up of an active air defense later in the year (see chapter III).

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Interservice Controversy over Missions

Before considering the results of the Key West meeting, it is pertinent to examine the disagreements concerning the air defense mission. The principal difference of opinion existed between the Air Force and the Army and was an outgrowth of the controversy over the control of Antiaircraft Artillery (AA). During World War II the AAF had made continuous efforts to bring about the integration of AA with other air defense elements. Because of Army opposition, only limited integration was accomplished but the wartime experience convinced the AAF that AA functioned best under air force control. Consequently, AAF planners looked forward to integration and included in their postwar plans the assumption that AA would be integrated into AAF.[7] Support for integration came from several highranking AAF officers, including Generals Arnold* and Partridge.[8]

The AA question was revived late in 1945 as a result of an Army Ground Forces (AGF) reorganization. As part of this reorganization all previous instructions to the commanding generals of the wartime Eastern and Western Defense Commands had been rescinded, and a new War Department directive, making those commanders responsible for the defense of the continental United States, had been issued. They were to command, train, and make plans for the use of all army forces assigned to their commands. For air defense, the Commanding General, AAF was to designate an AAF commander in each Defense Command to prepare air defense plans "under the general supervision of the Defense Commander."[9] Under this directive, AAF had been given no control over AA. In February 1946, the Defense Commands were placed under the control of the Commanding General, AGF who was to assume their missions and to inactivate them as soon as practicable.[10]

Following its assumption of responsibility for the defense of the continental United States, Headquarters, AGF submitted a proposal in March for a revised statement of its defense mission. Antiaircraft Artillery, according to this proposal, would be a responsibility of the Army Ground Forces except when part of the defense of air and naval installations.[11] This assignment of an active air defense means to a ground service did not agree with the interim mission that Headquarters, AAF had delegated to ADC a week earlier. Nor did it coincide with the report of the Board of Officers on the Organization of the War Department (Simpson Board). This report had stated on 28 December 1945: "The Air Force is charged with the mission of air defense and will require antiaircraft artillery under its command to carry out this mission." Although the Simpson Board had added that it did not advocate integration of AA with the AAF at that time, Headquarters, AAF cited this report as the basis for its rejection of the proposed AGF defense mission insofar as it pertained to AAF. Because the AAF was charged with air defense and the command of AA employed therein, Maj. Gen. Lauris Norstad, Assistant Chief of Air Staff for Plans, reminded General Spaatz that an Air Defense Command had been activated to carry out the air defense mission. Since that command had to be an integrated whole, planning for all air defense elements had to be a function of the Commanding General, AAF.[12]

Based upon the belief that it possessed the air defense mission and would be assigned AA, Headquarters, AAF prepared a lengthy study setting forth its AA requirements for air defense.[13] On 17 April 1946, this study was submitted to General Jacob L. Devers, Commanding General, AGF. His reply revealed that the two services were not in agreement on the meaning of the term "air defense." He described the mission of the AAF as "defense by air;" therefore he could not agree to an extension of AAF responsibility to include over-all AA operations other than those necessary for the defense of airfields and AAF installations. General Devers did, however, agree that a unified defense command—air defense as part of over-all defense—was a necessity.[14] This Army Ground Forces interpretation, if accepted by the AAF and the War Department, would have far-reaching effects not only on the status of AA in the air defense system but on control of guided missiles in the future.

*In August 1945 General Arnold stated that integration should take place at once so that the AAF could benefit from the experience of demobilizing AA to its peacetime size and of applying the lessons of the war to peacetime training (memo for C/S from CG AAF, subj: Integration of Antiaircraft Artillery into the Army Air Forces, 4 Aug 45, in DRB 381 War Plans "Miscellaneous" National Defense 1945 v 2).

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The appearance of War Department Circular 138, 14 May 1946 clarified somewhat the relationship between AAF and AGF in air defense matters. Based primarily on the reports of two War Department reorganization boards (the Simpson Board and its precedessor, the Patch Board), the circular was issued as tentative doctrine, subject to revision as soon as possible after 1 September. It specifically assigned ADC the mission to provide for the air defense of the United States and to control and train AA units assigned to it.* Furthermore, the circular directed AAF and AGF to cooperate in the development and determination of those special tactics needed for the use of arms, especially AA, by the AAF and that the Commanding General, AAF recommend to the War Department the means, including AA units, required for air defense.[15]

General Partridge, the Assistant Chief of Air Staff, Operations informed Assistant Secretary of War for Air Stuart Symington that Circular 138 was "a step toward the eventual assumption by the Army Air Forces of responsibility for organization and control of all means of area air defense." In particular, Partridge believed that the assignment to ADC of the mission to provide for the air defense of the United States was an indication that the War Department recognized the need for a unified command in air defense. AA would still be a part of AGF but units would be assigned or attached to ADC for control and training. Other encouraging parts of the circular, Partridge told Symington, were those which gave AAF some control over the development, tactics, techniques, and organization of all elements of air defense and which designated the Commanding General, AAF as the primary source for recommendations to the War Department of the means required for air defense. Since the circular was tentative, Partridge recommended to the Secretary that, in the interest of air defense efficiency, any revision should retain the above favorable provisions as War Department doctrine.[16]

Shortly after the appearance of WD Circular 138, the Special Assistant for AA at Headquarters, AAF compiled a staff study on the status of AAF in air defense. He stated the situation as follows.[17] The Air Force was charged with the mission of air defense. It had no officially adopted policies on the matter. War Department thinking was not crystallized. The issue was to devise a sound policy for the organization of air defense. It was unwise to stir up a controversy about the integration of AA while unification legislation was pending, but a firm policy ought to be adopted. Therefore, he suggested a series of 10 proposals as a basis for an AAF policy. The first proposal called for integration of AA with the Air Force; the other nine suggested ways of carrying out the air defense mission if integration of AA was not achieved.[18] When the Air Board met early in June in an attempt to clarify the responsibilities of AAF and AGF in air defense, these proposals were presented as the views of the AAF on air defense and security.[19] Still, no action was taken and the question of air defense was continued over to the next Air Board meeting.

Soon after the Air Board meeting General Devers submitted to General Spaatz a lengthy staff study explaining the AGF position. In effect, the AGF position called for a division of the air defense mission: AGF to provide local ground defense, while AAF was providing air defense beyond the range of ground weapons.* The AGF position was based upon the contention that Air Force control of AA during World War II had been ineffective, and the study reasserted that air defense should be redefined as "defense by air."[20]

Headquarters, AAF replied to the AGF study in detail; each AGF proposal was met with an AAF counterproposal.[21] The most important objection to the AGF position, however, was stated by General Spaatz to General Devers in a letter accompanying the AAF comments. According to Spaatz, it appeared to AAF that the principal divergence between the views of the services lay in the interpretation of unity of command. In the AAF view, air defense was a single mission which had to be accomplished by a single commander with direct control over all necessary weapons. The necessity for unity in command in air defense would become greater as offensive weapons became faster and more powerful. Furthermore, Spaatz pointed out, unity of command would also avoid duplication in

*Assignment of these functions to CG ADC was confirmed in AAF Reg 20-6, 11 June 1946.

*For a detailed account of the AGF proposals and AAF counterproposals see: ADC Historical Study 4, Army Antiaircraft in Air Defense, pp. 3-9.

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detection and communications systems. Therefore, he suggested that the current system be retained and be amended only after thorough trial.[22] Spaatz also explained the AAF position to the War Department General Staff and recommended that the AGF proposals be disapproved.[23]

The response by AGF to the Air Force comments was a reaffirmation of the AGF position—the need for unity of command was agreed on but the Ground Forces regarded air defense as but a part of the over-all defense problem. As long as the services disagreed on this vital point, General Devers stated, no progress could be made in carrying out air defense responsibilities. Therefore, he suggested that further discussion be postponed until agreement could be reached, or instructions issued by the War Department, on the application of unified command to the defense mission.[24] Apparently AAF agreed for the matter was not pressed further at that time.

After 1 September 1946, the War Department General Staff emphasized the AAF-AGF controversy in the consideration of a revision of War Department Circular 138. Although the War Department was the only agency that could settle the conflicting Air Force-Army views, the General Staff decided to make no firm decision at that time. Pointing out that the issue of responsibility for development and operational employment of guided missiles as well as conventional AA was inherent—even though unstated—in these conflicting views, for the present it recommended that the definition of air defense and those parts of Circular 138 pertaining to AA remained unchanged.[25] Since these sentiments were approved by the Secretary of War and the Chief of Staff,[26] it appeared that the air defense mission remained with AAF with the solution to the problem of AA left for future consideration. Subsequent correspondence illustrated that the Army position had not been abandoned; yet, settlement of the problem was placed in abeyance during the struggle for unification.

Some indications that the Navy and the AAF were not in complete accord on the air defense mission also were seen during the immediate postwar period. In September 1945, representatives of the two services disagreed on the granting of operational control of each other's forces in the event of an emergency.[27] Despite such disagreements, General Stratemeyer, in his initial air defense planning, had contemplated using naval forces and had authorized the air force commanders to make local agreements for that purpose with their naval counterparts. Attempts by the air force commanders to arrive at agreements had revealed further differences. For example, the Navy did not recognize the validity of ADC's interim mission which directed the command to be prepared to operate independently or in cooperation with the Navy against seagoing vessels or in the protection of coastwise shipping.[28] Since such problems would have to be settled at the highest level, Stratemeyer recommended that attempts be made to clear up the matter with the Navy Department.[29] Engrossed at that time in the negotiations for unification, Headquarters, AAF believed that such problems would be solved by independence. However, the general terms of the National Security Act and the President's Executive Order still left these Navy-Air Force differences unresolved.

The Key West Agreements

The Joint Chiefs of Staff deliberated at Key West from 11 through 14 March 1948 and reached agreement on most of the major problems concerning the three services. These decisions were embodied in an official directive "Functions of the Armed Forces and the Joint Chiefs of Staff" issued 21 April. In the main, the Functions paper assigned to each service a group of primary functions as well as a collateral group of activities in which each service would support the other services. The Joint Chiefs of Staff was set up as the final arbiter in all matters pertaining to the National Military Establishment.

Of paramount importance to air defense was the function assigned to USAF "to be responsible for defense of the United States against air attack in accordance with the policies and procedures of the Joint Chiefs of Staff." This functional assignment—in addition to the acceptance of the Air Force's definition of air defense as "all measures designed to nullify or reduce the effectiveness of the attack of hostile aircraft or guided missiles after they are airborne"—appeared to assign definitely the mission of air defense to the USAF. Other provisions of the paper indicated that USAF was responsible for land-based air defense and, in coordination with the other services, would develop doctrines, procedures, and equipment to carry out that

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responsibility. Sea-based air defense and sea-based means for coordinating control of air defense were to be provided by the Navy. Both the Navy and Army were to provide their forces "as required for the defense of the United States against air attack, in accordance with joint doctrines and procedures approved by the Joint Chiefs of Staff." Among its collateral functions, USAF was assigned the conduct of antisubmarine warfare, the protection of shipping, and the interdiction of enemy sea power through air operations.[30]

Although this assignment of functions did much to clarify the roles and missions of the services, the Joint Chiefs of Staff had failed to settle one controversial issue—the status of AA in air defense. Unification had made the problem more complicated for USAF because independence meant that AA was further from its reach. Henceforth, doctrine concerning the use of AA had to emanate from the Department of Defense. From the viewpoint of USAF, according to the Air Defense Policy Panel in February 1948, this assignment of AA, including ground-to-air missiles, to the Army was "contrary to good organization" and "to the most efficient utilization of the weapons in air defense." The panel recommended that USAF be given responsibility for organizing, manning, training, equipping, and employing AA and ground-to-air missiles.[31] Air Force representatives at the Key West meeting, in turn, recommended the integration of AA with the USAF: The Joint Chiefs disagreed and stated in the Functions paper that the Army was to continue to organize, train, and equip AA units. However, the JCS specifically assigned an air defense responsibility to the Army in that it was "To provide Army forces as required for the defense of the United States against air attack, in accordance with joint doctrine and procedures approved by the Joint Chief of Staff."[32] USAF would have to acquire the needed AA from the Army on the basis of this functional assignment.

Although the Key West agreements—and the additions thereto decided upon at a subsequent meeting at Newport, Rhode Island*—initially engendered a great deal of optimism within the Defense Department,[33] later interpretation was to cause a renewal of interservice controversies in the field of air defense. Nevertheless, the agreements constituted a step in the right direction; further progress could result only from action by the Joint Chiefs of Staff.†

*This meeting was held at the Naval War College 20-22 August 1948. The official directive embodying the results of the meeting stated that, in its field of primary missions, each service had to have exclusive responsibility for programming and planning, subject only to control by higher authority. All available forces should be used by a service in the execution of any of its missions (R. Earl McClendon, Unification of the Armed Forces: Administration and Legislative Developments 1945-1949. Air University Documentary Research Study, MAFB, Apr 52, p. 73).

†Although it cannot be denied that these agreements left many questions unresolved, one of Stratemeyer's staff members undoubtedly exaggerated when he stated: "that the mountain has labored and brought forth a small mouse which is likely to increase rather than reduce the confusion that already exists in this vital subject [air defense]" (memo for Stratemeyer from Col R.C. Candee, subj: Key West Conference, 23 Apr 48, in Hq ADC HD 50.1).

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START OF AN ACTIVE AIR DEFENSE SYSTEM

The first three months of 1948 witnessed a number of events which brought World War III closer than at any time since the defeat of Japan. A series of Soviet actions, including the seizure of Czechoslovakia and the presentation of a group of demands to Finland,* began a new phase in the Cold War and prompted President Truman to identify Russia for the first time as the "one nation" blocking peace efforts.[1] Also, during this period, General Lucius D. Clay, American Military Governor in Germany, cabled from Berlin on 5 March that he believed war might come "with dramatic suddeness" at any moment.[2] Although Clay's fear proved unfounded, it illustrated the tension of an interval during which, according to Headquarters USAF, "some slight danger of hostilities with USSR" existed.[3]

Active Air Defense Begins

Because of the uncertainty of the international situation, on 25 March General Carl Spaatz directed the immediate augmentation of the Alaskan air defense system.† On the following day he directed the Alaskan Air Command to place its warning radar on a 24-hour operating basis by 4 April.†† On 27 March representatives of USAF conferred with Strategic Air Command, Tactical Air Command, and Air Transport Command personnel and determined on several actions: to send one fighter group to Ladd AFB, Alaska, to move a second fighter group from Kearney AFB to McChord AFB, to fly several radar sets to Alaska at once; to direct ADC to add four lightweight radar sets to the equipment of the 505th AC&W Group in the Northwestern United States (Seattle area);* and to place the group's radar sites on 24-hour operation.[4]

Headquarters USAF indicated the reason for this sudden decision in an order to ADC to set up an AC&W system in the Seattle area. Although there was no evidence that an air attack would occur in the near future, ADC was informed, such a possibility existed and would continue to exist for at least the next 60 days.† Therefore, General Spaatz desired "immediate and vigorous" action at once to provide the best possible radar warning screen. He emphasized that steps were to be taken promptly to place the air defense system in operation.[5] These instructions were relayed to the Fourth Air Force on the same day.[6] Three days later the First Air Force in the Northeast was apprised of these actions by ADC†† and was told it might receive orders to occupy radar sites in its area.[7]

*Among the demands was one for radar sites in Finland. If the Soviets had been granted access to these sites, their radar screen would have been advanced 300 to 400 miles closer to North America along the Great Circle Route (Dept of the Army, Intelligence Division, Intelligence Review, no 108, 18 Mar 48, p. 3).

†The Alaskan network was manned by the 625th and 626th AC&W squadrons. Both squadrons began 24 hour operations on 26 March 1948. The former continued 24 hour operations until 28 April while the 626th squadron continued until 14 June (Hist 625 AC&W Sq, Apr-Jun 48; Hist 626 AC&W Sq, Apr-Jun 48).

††By early 1948 four radar sites and a fighter control center had been established in the Alaskan Air Command area (Hist Alaskan Air Command, 1948, p. 64).

*The 505th AC&W Group had been scheduled for transfer to the First Air Force by 1 July 1948 (Hist 1st AF, 1 Jan-30 Jun 48, p. 4).

†On 16 March Central Intelligence Agency had submitted an estimate to President Truman that no war was probable within 60 days. Two weeks later, CIA extended this estimate beyond the 60 day period. AAF did not agree with the latter opinion (Walter Millis (ed), *The Forrestal Diaries* (New York, 1951), pp. 395, 409).

††The First Air Force had been working leisurely on an air defense system along the lines indicated by the ADC Air Defense in Being Plan. Two fighter groups were being organized and trained and negotiations were underway for the acquisition of radar sites (Hist 1st AF, 1 Jan-30 Jun 48, p. 3).

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Prompt efforts were made in the Northwest to comply with the directive. These efforts immediately indicated the haste involved in making the decision to establish an active air defense. No right of entry into the selected areas had been obtained for some of the radar sites, the required funds had not been authorized, and no specific mission directive had been issued to the Air Defense Command by Headquarters USAF. As an additional handicap, there would be no military control of civil air traffic in the defended area.[8]

In spite of these unfavorable conditions, the Northwest Air Defense Wing, which had been set up as the tactical agency for the system, was ready to begin operations by 12 April.[9] In the Northeast, First Air Force had been ordered on 3 April to be ready "at any time" to establish an air defense system similar to that set up in the Northwest.[10] However, shortly after 12 April, ADC received word that the crisis was over. On 22 April Fourth Air Force was permitted to discontinue 24-hour operation of its radar stations. Since Headquarters USAF did not order the emergency system broken up, ADC instructed Fourth Air Force to keep its AC&W sites in operation as much as personnel and equipment would allow.[11]

Within three weeks after ADC received the emergency order, its commander, Lt. Gen. George E. Stratemeyer, reported to Headquarters USAF concerning the difficulties encountered by Fourth Air Force. Stratemeyer reviewed the handicaps under which the attempt was made to set up an air defense system. He concluded his report with a series of recommendations, the principal one being that the Air Defense Command be given the means for carrying out its mission.[12]

Brig. Gen. William L. Richardson, Chief, Guided Missiles Group, replying for Headquarters USAF, did not specifically approve any of the recommendations. He stated that the problems facing ADC were appreciated and assured Stratemeyer that Headquarters USAF would continue to seek satisfactory solutions. With respect to the recommendation that ADC be given the means to accomplish its mission, Richardson promised that:[13] "The Air Defense Command will be given the means for accomplishing the mission to the maximum extent that such action is consistent with meeting other Air Force missions and will be given the maximum freedom in the utilization of these means." Also, Richardson informed ADC that the assignment of forces to the command rather than merely placing them under its operational control was being studied.[14] Since General Richardson's reply actually did nothing to alleviate the command's lack of forces, it was received without enthusiasm in Headquarters, ADC. In fact, one staff officer stated that, to accept the reply as final, would be to accept that an air defense in being was impossible of achievement.[15]

Meanwhile, Headquarters USAF approved the retention of the emergency system when it directed ADC on 23 April 1948 to establish "with current means" AC&W systems in the following priority: Northwestern United States, Northeastern United States, and the Albuquerque, New Mexico, area.[16] Since the emergency net in the Northwest was still in place, the nucleus of an AC&W system existed in that area.* Because it is the near-

*Actually, discussions concerning the air defense of the Hanford Engineering Works at Hanford, Washington had been taking place for several years. As early as March 1945 the Fourth Air Force drew up air defense plans for the installation. In July 1946, after the question of military or civilian control of atomic energy had been resolved in favor of the latter, the Atomic Energy Commission was formed. In June of the following year, David E. Lilienthal, AEC chairman, suggested to Secretary of War Robert Patterson that the matter of military protection for vital AEC installations, one of which was Hanford, be reviewed. Secretary Patterson agreed and designated the Plans and Operations Division of the War Department General Staff the responsible War Department agency for conducting discussions with the AEC. Maj. Gen. Lauris Norstad, the director of the division, in turn requested the Commanding General, AAF to make air defense plans for the AEC facilities. In addition, AAF was to advise what protection could be afforded by the current forces in being and what changes might be required to provide "an appropriate and reasonable provision for each installation." Maj. Gen. Curtis LeMay, Deputy Chief of Air Staff for Research and Development, replied that immediate provision for air defense of AEC facilities would adversely affect current planning and that the cost in manpower and equipment for an air defense of the four isolated AEC installations (Hanford, Los Alamos, Sandia and Oak Ridge) would be excessive. Nevertheless, LeMay outlined an emergency plan while emphasizing that such emergency air defense had to be integrated into any over-all air defense plan. General Norstad returned LeMay's plan with the recommendation that it not be approved for planning purposes. Instead, Norstad suggested that the protection of AEC facilities be included, and given special consideration, in planning for the active air defense of the United States (ltr, Hq 4th AF to CG AAF, subj: Survey of Requirements for the Air Defense of the Hanford Engineering Project, Hanford, Washington, 3 Mar 45, in USAF HD 145.96-98 (111-B-5); ltr, Lilienthal to Sec of War, 4 Jun 47, in DRB 381 War Plans—Miscellaneous National Defense, 1946-1947, v 1, ltr, Patterson to Lilienthal, 18 Jun 47, in DRB 381 War Plans—Miscellaneous National Defense 1946-47, v 1; memo for CG AAF from Norstad, Dir P&O WDGS, subj: Security of Vital Atomic Energy Facilities, 8 Jul 47, in 381 War Plans—Miscellaneous National Defense 1946-47, v 1; memo for Dir P&O WDGS from DC/AS for R&D,

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est part of the continental United States to Russia and because of its AEC installations, that area was accorded first priority. Since the Albuquerque area was located in the interior of the continent and therefore appeared relatively safe, it was considered third in importance.

The Northeast area was given second priority because of its population and industrial concentrations. The 23 April directive stated that the first step in the implementation of plans in that area was the establishment of a model air defense system, initially in the vicinity of New York City.[17] Actually, First Air Force had been ordered as early as 3 February 1947 to draw up plans for the defense of Metropolitan New York. Although 1947 had been devoted largely to planning, some concrete steps toward acquiring radar sites and bases had been taken.[18] Early in 1948 air defense activities in the First Air Force area had received added impetus because of preparations for exercises scheduled to be held in May. Lack of funds later caused their postponement.[19] Beginnings had been made, therefore, in both the Northwest and the Northeast before the directive of 23 April. However, except for the transfer of AC&W personnel, Stratemeyer was informed in that directive, augmentation of the resources available to ADC for establishing these systems would have to await action by Headquarters USAF. Funds for setting up these systems would have to come from the money currently available.[20]

Because of the meagerness of resources at his disposal, General Stratemeyer experienced great difficulties in attempting to carry out the directive. In fact, as he told Headquarters USAF in April, adequate air defense was impossible "even though the total forces, resources and facilities presently available to the United States Air Force were placed at my disposal." Although he assured Headquarters USAF that he would provide the best defense possible with what he had, he pointed out that his task could be made easier if USAF would approve several of his recommendations. He again urged Headquarters USAF to make a firm decision to establish and maintain in being an air defense system which would conform in general with the system proposed in SUPREMACY and the ADC air defense plans. In summary, Stratemeyer stated, a sound air defense system could be established more quickly if a carefully planned program were followed. This course would avoid a lowering of efficiency and morale among air defense personnel and would prevent "accusations of our having cried 'Wolf' without justification." However, if intelligence available to Headquarters USAF but unknown to him indicated that no time remained for orderly preparations, Stratemeyer repeated with emphasis, *"it is essential that ADC be given immediately the resources required for such preparations as is possible in the time available."*[21]

The inadequacy of the air defense system in the Northwest was soon illustrated by maneuvers conducted in May.[22] In his report on these exercises, the Commanding General, Fourth Air Force to whom the defensive forces were assigned, stated that the tests "left little doubt as to the inability of this headquarters to defend any part of its areas against hostile air attack under the present operating conditions and using the equipment now available."*[23] General Stratemeyer echoed this opinion and, reiterating that the status of air defense greatly disturbed him, he once again called upon Headquarters USAF for action to strengthen air defense.†[24]

This time Headquarters USAF answered Stratemeyer's plea by a lengthy endorsement that expressed the handicaps under which it was operating.†† Headquarters USAF shared Strate-

subj: Air Defense of Vital Atomic Energy Commission Facilities, 15 Sep 47, in Case Hist AC&W System, doc 52, memo for C/S USAF from Dir P&O WDGS, subj: Air Defense of Vital Atomic Energy Facilities, 1 Oct 47, in DRB 381 War Plans—Miscellaneous National Defense 1946-47, v 1).

*In view of the obviously inadequate air defenses for the Northwest, Chairman Lilienthal of the AEC again asked the Defense Department to consider further the defense arrangements for the Hanford works in the state of Washington (ltr, Lilienthal to Forrestal, 28 Jun 48, in DRB 381 National Defense—War Plans Misc). USAF replied that, as resources became available, the degree of protection afforded vital installations such as Hanford would be increased (Air Staff Summary Sheet prepared by Dir P&O subj: Defense of the Atomic Energy Facilities, Hanford, Washington, 3 Aug 48, in DRB 381 National Defense—War Plans Misc).

†Exercises in the Northeast in June gave proof of the inadequacy of the air defense system in that area (ltr, 1st AF to CG ADC, subj: Report on Air Defense Maneuvers in the Metropolitan New York Area, 14 Oct 48, in Hist ADC through June 1951, III, doc 39).

††This endorsement was approved by Generals Norstad and S.E. Anderson, but was delivered unsigned to Stratemeyer by Brig. Gen. John P. Doyle, ADC's DC/S, Materiel (handwritten notation on 1st ind (ltr, Hq ADC to CG USAF, subj: Air Defense of the Continental United States, 2 Jun 48), Hq USAF to CG ADC, 7 Jun 48 in OPD 373.24 (3 May 46).

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meyer's "concern for the low capabilities of the Air Force for the defense of the United States against air attack" and was taking many steps, such as the presentation of SUPREMACY to Congress, to improve the situation. The underlying cause for the inability of USAF to provide ADC with the needed facilities had been the shortage of personnel and materiel. When USAF had taken unfavorable action on his requests, Stratemeyer was informed, it had not been "through desire, but because our resources throughout the Air Force were so meager that filling your requirements would have cut across the missions and responsibilities of other major Commands." Headquarters USAF admitted that it had been remiss in taking no action on ADC's three air defense plans,* but Stratemeyer was assured that they were used in the preparation of SUPREMACY. In conclusion Headquarters USAF gave Stratemeyer a detailed accounting of the actions it had taken or would take to aid him in the performance of his mission.†[25] It was apparent that, as far as limited funds, personnel, and materiel allowed, Headquarters USAF had been doing all that it could to improve continental air defense.

Failure of SUPREMACY

Meanwhile, Project SUPREMACY, approval of which would have greatly aided the Air Force in improving the air defense system, had encountered difficulties. In December 1947 Air Force representatives discussed the project with members of the Bureau of the Budget and decided to secure congressional enabling legislation before considering SUPREMACY from a budgetary standpoint. Therefore, Headquarters USAF prepared legislation which was sent to the Army and Navy for concurrence early in February 1948. The Army agreed promptly but concurrence was not received from the Navy until the end of April. Consequently, the draft legislation was not submitted to the Bureau of the Budget until 30 April.[26] The Bureau of the Budget returned the proposed bill to the Secretary of Defense for reconsideration. The principal objection of the Bureau was that, since the program pertained to all agencies of the National Military Establishment, it should have been tied together and reviewed by the Office of the Secretary of Defense (OSD) and the Joint Chiefs of Staff.[27] The Department of the Air Force stated that the program had not been presented to the OSD or the JCS as a total program because SUPREMACY called for only a land-based early warning system which was the responsibility of the Air Force. The other elements required in an air defense system—fighters and AA—were included in other programs which had been approved by OSD and JCS. The important consideration, the Air Force emphasized, was that, if the system was to be completed by 1953, it was essential that legislative authority be obtained from the Congress then in session.[28]

While the Executive branch was considering the bill, Senator Chan Gurney (R-S. Dak.) became interested and, on 25 May, asked Secretary Symington to submit the bill to Congress without waiting for clearance from the Bureau of the Budget.[29] Symington agreed and on 27 May Senator Gurney introduced the legislation in the Upper House while on 2 June, Representative Carl Vinson (D-Ga.) introduced the measure in the House of Represenatatives.[30] Before hearings could be held on the legislation, the 80th Congress adjourned. According to General Hoyt Vandenberg, the delay of almost three months while awaiting naval concurrence proved the deciding factor in the failure of Congress to act on the legislation during that session.[31]

Since failure of Congress to act meant that the legislation could not be considered before January 1949, Secretary of Defense James Forrestal submitted the program to the JCS for consideration. By 1 October 1948 he wanted to know the need, cost, and possible effectiveness of the program and the relative priority it should be accorded.[32] For the Air Force, Secretary Symington expressed the need for SUPREMACY in his annual report. "Because of its critical importance to our national security," he stated, "the Air Force recommends top legislative priority consideration for the aircraft control and warning system."[33]

When it appeared that a special session of Congress might be called by President Truman

*See above pp. 7-8.

†Among the significant steps taken during this period was the establishment of the Continental United States Defense Planning Group on 6 April. This group, which was directed by an Army officer with an Air Force officer as deputy, was to perform a major role in defense planning at a later date (A/S Summary Sheet, General Anderson Dir P&O to DCS/O, subj: Director, Continental US Defense Planning Group, 29 Apr 48, in OPD 381 (11 Dec 45) sec 3).

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in the late summer of 1948, General Vandenberg felt that the Air Force should make every effort to get Congress to consider SUPREMACY. Congressional action would not interfere with JCS consideration of the program, he pointed out to Symington, and passage of the legislation would provide funds for USAF to begin the installation of radar equipment then on hand. General Vandenberg recommended that Symington personally advise Secretary of Defense Forrestal of the necessity for prompt passage of the legislation.[34] No special session was called and, according to an Air Force staff officer, SUPREMACY appeared to be a "dead duck" until the next session of Congress.[35]

Origins of the Permanent System

The postponement of SUPREMACY and the obvious inadequacy of the existing radar networks as illustrated by the exercises indicated the urgent need for some action to set up an air defense system. This need was clearly reflected within Headquarters USAF during the summer of 1948. On 1 July an Air Defense Division was established in the Directorate of Plans and Operations for the purpose of reviewing USAF's position with respect to air defense. To head this new division, Maj. Gen. Gordon P. Saville, one of the USAF's strongest advocates of an air defense system, was recalled from his post as Chief, Air Section of the Joint Brazil-United States Military Commission in Rio de Janeiro. Saville and his staff tackled the problem immediately and soon announced several conclusions: (1) the Air Force could not discharge its responsibilities for air defense by continued waiting; (2) SUPREMACY would have to be rephased as a result of the delays and fund limitations; (3) immediate and positive action was required to begin the establishment of a limited air defense in being pending final approval of an over-all air defense program. With these conclusions in mind, the Air Defense Division began the development of an "Interim Program."[36]

General Saville decided that the best way to strengthen continental air defenses was to limit the scope of the Interim Program to the deployment and installation of radar equipment. He reasoned that additional fighter units would improve the system little if additional early warning and control radar equipment was not on hand. In order to make use of the available sets most effectively, the division planned for the installation of radar equipment on a line-of-defense rather than a defense-in-depth principle.[37]

The Air Defense Division presented the Interim Program to the Air Staff and to representatives of the Air Defense Command on 9 August. A month later, when General Saville presented the program to Secretary of Defense Forrestal, he impressed upon Forrestal that implementation of the program had to begin at once. To meet any possible objections from the Defense Department or Congress, the program was limited to radar equipment already on hand or under current procurement from funds appropriated. Saville said that he found it utterly impossible to overstate the complete inadequacy of the existing radar installations.* The picture of what the USAF possessed for air defense was "certainly shocking," and when the time factor involved in developing and setting up radar sets was considered, the situation was even more startling.

The Interim Program presented by Saville called for a total of 61 basic radars and 10 control centers to be deployed in 26 months. This deployment would provide high altitude coverage only; a system of ground observers—"the only practicable low cover answer for any air warning and control system by 1952"—would be set up. Augmenting the radar and ground observer system would be an Air National Guard program for the manning of gap-filling and air transportable radar. In addition, the Interim Program called for the deployment of ten radar stations and one control center in Alaska. The inadequacy of the Interim Program was obvious, Saville stated, but it was all that could be done by 1952, and it would be "a great deal better than nothing."

Everything needed for implementing the Interim Program was available or approved, Saville assured Forrestal, except authorization and funds for construction. The best that the Air Force could do in diverting funds to begin the program at once was the small sum of $706,000. And since the effect of this expenditure would be wasted if no additional funds were made avail-

*Before presenting the details of the Interim Program, General Saville described the current radar situation. Only six basic radars—one of which was Navy equipment—with two control centers, were deployed in their permanent sites. Not only was the contribution of this radar to air defense negligible but it did not furnish adequate facilities for development and testing.

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able, a supplemental appropriation by Congress of $44,300,000 would be required as soon as possible. Saville concluded:

> It is therefore urged that the Secretary of Defense and the Director of the Bureau of the Budget approve the submission of this supplemental appropriation for FY 1949, and push it to the limit. Only in this manner can the Air Force discharge its responsibility to the American people for air defense.[38]

Even when completed the Interim Program would not provide acceptable minimum radar coverage. Therefore, General Saville included a program, which he called "First Augmentation," to add 15 radar stations to the Interim Program. The First Augmentation would begin in fiscal year 1950, would include only those radars which could be procured or developed and procured immediately, and would add $41,900,000 to construction costs. Because it was impossible to foresee what future world requirements might be, a funding plan could not be projected beyond fiscal year 1950.

Although future requirements were not entirely clear, General Saville emphasized that what the Air Force proposed was the establishment of a system which could be improved as required. What was set up under these programs would be part of a permanent system; the Air Force would neither buy nor develop radar equipment which could not be used in the system "through the useful life of that equipment." In summary he said: "this matter is one of very great urgency, and requires immediate action. Nothing can be found in the world situation, in the attitude of the people, or in any other field which would justify continued delay. We *must* get on with it."[39]

Shortly after Saville's presentation of this Modified Program* to Forrestal an *ad hoc* committee, appointed by the Joint Chiefs of Staff to reply to Forrestal's memorandum of 1 July regarding SUPREMACY, submitted its report. The committee indicated that it recognized the desirability of SUPREMACY as an ultimate goal but implied that the Modified Program should be approved. It further implied, reported an Air Force staff officer, "that the decision to proceed beyond the first augmentation should be determined in light of experience gained through operation and test of the partial system, of future technical developments, and of advanced intelligence."[40] In other words, the committee seemed unwilling to go beyond an approval of the Modified Program.

In his memorandum of 1 July, Secretary Forrestal had requested the Joint Chiefs to consider "possible modifications of the program [SUPREMACY] that would achieve substantially the desired objectives at lower costs."[41] On the basis of the *ad hoc* committee's report, the Joint Chiefs, in the opinion of Maj. Gen. S. E. Anderson, Director of Plans, seized upon the Modified Program—if revised to include naval means—as fulfilling Forrestal's request for "possible modification" of SUPREMACY.[42] Therefore, although they stated that the establishment of an air defense system should be accorded a priority second only to an offensive striking force, the JCS reported to Forrestal in favor of the Modified Program. In addition, they recommended that the Secretary of Defense favor early congressional authorization for an over-all air defense program and that he support budgetary requests for immediate implementation of the Modified Program and later additions as they became practicable.[43]

The attempt to substitute the Modified Program for SUPREMACY obviously would not meet with USAF approval. Air Force staff officers took the position that SUPREMACY had represented Air Force requirements for an AC&W system. The Modified Program did not meet USAF requirements; it represented the "irreducible minimum" system. Furthermore, as Anderson pointed out to General Vandenberg, there was no relationship between SUPREMACY and the Modified Program. The latter was complete in itself, as far as it went, and was not to be considered either a modification or a part of the larger program.[44] Despite this USAF position, because they were linked together in Department of Defense discussions, both programs suffered. In actuality, the Modified Program was so named because it indicated a reduction in the demands of the Air Force. Nevertheless, apparently it gradually replaced SUPREMACY as a goal as far as the Department of Defense was concerned.

Beginning in late October 1948 discussions of the Modified Program were held within the Department of Defense. As a result, a bill was pre-

*During the discussion stage, the Interim Program and First Augmentation were jointly referred to as the Modified Program by Headquarters USAF personnel. The actual AC&W radar network which resulted from congressional approval of this program was the basis for the Permanent System.

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pared calling for an appropriation of $85,500,000 for radar construction purposes substantially as requested by General Saville in the previous September.* Secretary of the Air Force Symington sent the bill to the House of Representatives on 8 February 1949.[45] Introduced on the following day, the measure was referred to the Armed Services Committee.[46]

At hearings before a special subcommittee appointed to consider the legislation, Saville and Gen. Muir S. Fairchild, Vice Chief of Staff, testified for the bill in behalf of the Air Force. They were supported by representatives of the Army and Navy. Fairchild emphasized the need for an early warning system and stated that failure to provide such a system "could result in disaster on a Nation-wide scale and surely would result in unnecessary death and destruction throughout our country should we be attacked in the future." Passage of the act, he asserted, was essential to the security of the nation.[47]

The major Air Force presentation in support of the measure was given before the Armed Services committees of both houses of Congress by General Saville, now Commanding General of the Air Defense Command. Saville explained that immediate establishment of an Aircraft Control and Warning system was essential because no effective defense of any sort against an air attack was possible without such a system. He also explained the costs involved in setting up the radar network and attempted to answer those critics who opposed buying radar equipment that was considered obsolescent. He stated that

> With respect to the future, we cannot speak with certainty. We know that we will require new and better radar equipment as it becomes available—in much the same way we need new and modern aircraft. Our equipment will develop and change. So far as we can see, our land-based radar stations, once set up, will be suitable for many, many years to come—in fact as far as we can see or guess.[48]

Because of the time involved in installing and perfecting an adequate control and warning system, General Saville told the congressmen, it was urgent that authorization be given the Air Force immediately.[49]

Representative Carl T. Durham (D-N.C.) explained the Aircraft Control and Warning system to the members of the House when the measure was considered on 9 March 1949. He pointed out that, although the authorization included in this bill was only for construction purposes, the USAF needed congressional approval before equipment and personnel could be added to the system. He informed his colleagues that the program had been considered and approved by intelligence experts who had studied the nation strategically from the point of view of a possible enemy. The program would not furnish absolute protection, he cautioned, "but it will give us a reasonable degree of protection where protection is needed at a cost which the economy of this country can sustain."[50] The measure passed the House of Representatives without further delay and without a recorded vote.[51] According to an observer, "a note of urgency was sounded in the brief debate. It was a plea to get things started soon."[52] On 18 March the bill passed the Senate without debate or a recorded vote and was signed by President Truman on 21 March.[53] The USAF now had authorization for an Aircraft Control and Warning System but it was to be some time before Congress actually appropriated the money to establish the system.

Start of a Temporary Network

Neither SUPREMACY nor the Modified Program was designed to furnish immediate protection against air attack. SUPREMACY had been regarded as a five-year program, and the system envisioned in the Modified Program would not be completed until 1952. In the meantime, the nation would be virtually defenseless against enemy bombers. Although those concerned with air defense realized that an air defense in being was needed at once, funds, personnel, and materiel were not available. Nevertheless, before the end of 1948 a start had been made at establishing a temporary radar network, designed to serve both for protection and for training and development.

The conception of the temporary network—the installation of which was called LASHUP by General Saville[54]—apparently was a combination of First Air Force, Air Defense Command, and Headquarters USAF thinking. The USAF directive of 23 April 1948 had authorized the establishment of a model air defense system in the Northeast,* however, lack of funds had kept progress at a minimum.[55] When it became ap-

*See above, p. 23.

*Since that time considerable interest had been evinced in a model air defense system. Among those who had recommended such a system were Dr. Vannevar Bush,

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parent that SUPREMACY could not receive congressional approval before 1949, Headquarters USAF attempted to obtain funds for the construction of a model system. Such a system would be valuable for training and would provide a measure of defense for that area. To aid in planning for the Northeast system, ADC was requested to furnish Headquarters USAF with estimates of the funds required for its establishment.[56]

While Headquarters USAF was considering a model system for the Northeast, First Air Force, which was responsible for the area, was drawing up a plan for the installation of available radar over a two-year period on government-owned property. The plan was submitted to ADC along with a request for $152,000 for construction purposes.[57] Apparently the construction called for in the First Air Force plan would satisfy Headquarters USAF's desire for a model system for, on 14 September, ADC was informed by Saville's office that the request for funds had been approved.[58] Actually, the $152,000 was included in the $706,000 requested by General Saville in his presentation to Secretary Forrestal. Approval was not received from Forrestal until early October,[59] and ADC did not formally approve the First Air Force plan until 14 October.[60] As a result of the approval of LASHUP, implementation of a temporary AC&W network could be undertaken even though its operations would be handicapped by the use of obsolescent radar equipment. Also, the government-owned land that was available often was not located in the most practical places for radar operation. By the end of 1948 First Air Force had begun preliminary work on LASHUP.[61]

Chairman of the Research and Development Board, Charles A. Lindbergh, who was engaged in a study of USAF strategic bomber forces, and Assistant Secretary of the Air Force A.S. Barrows (memo for C/S USAF from Bush, subj: Air Defense System, 10 May 48, in Case Hist AC&W System, doc 60; ltr, Lindbergh to Symington, 2 Aug 48, in DRB Files of the Secretary of the Air Force, Radar, memo for Symington from A.S. Barrows, 10 Aug 48, in DRB Files of the Secretary of the Air Force, Radar).

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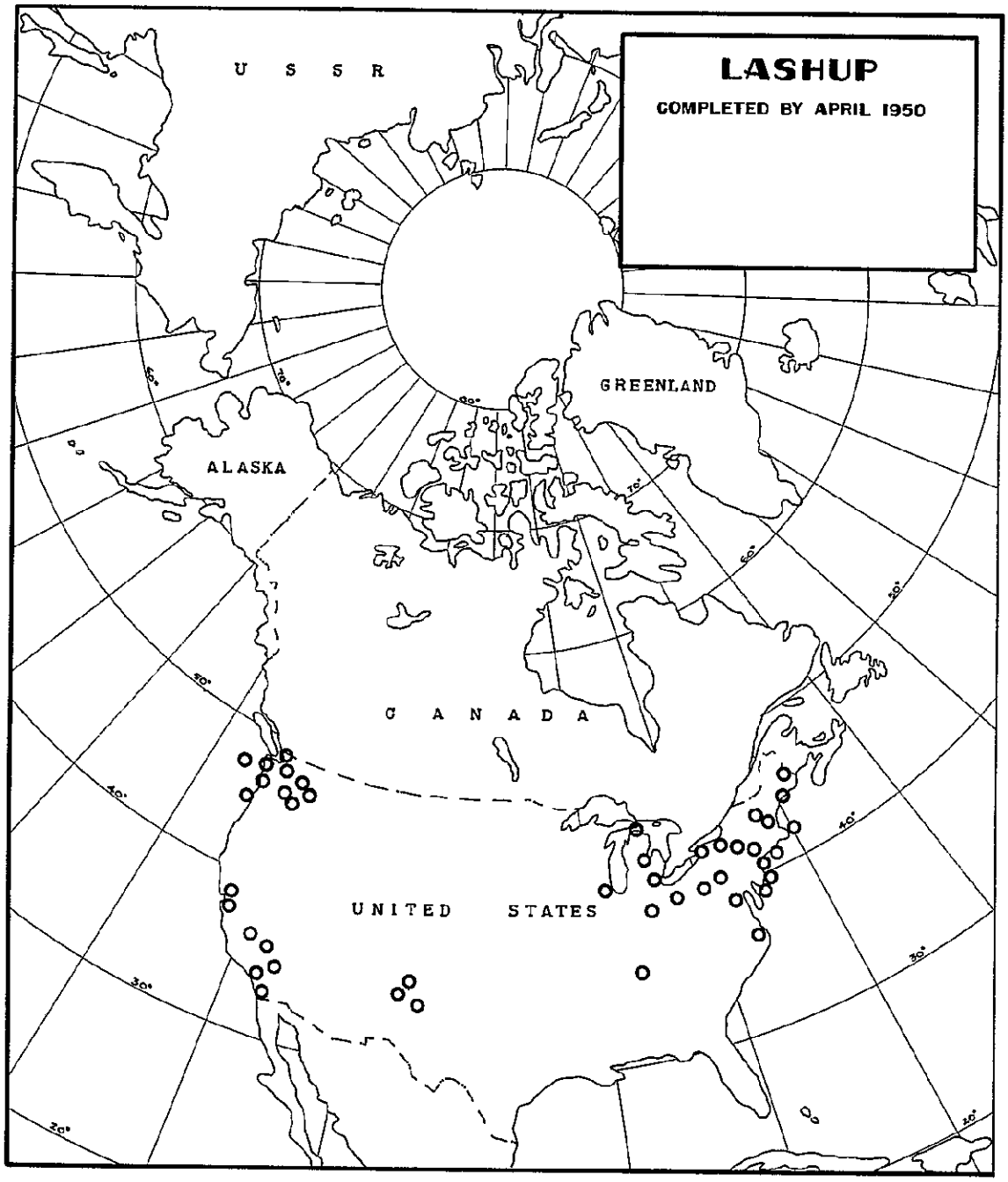

Map 1

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CHAPTER IV

GROWING EMPHASIS ON AIR DEFENSE

During the period when the Air Force was finally able to establish the nucleus of an active air defense system, its position on funds, personnel, and materiel continued to be very uncertain. Based upon the Finletter and the Congressional Aviation Policy Commission reports, the Air Force drew up early in 1948 several long term expansion programs aimed at a 70-group Air Force. The most realistic of the programs called for a buildup from the 55-group force projected in January 1948 to 70 groups by September 1949.[1] Shortly thereafter, Congress approved 70 groups as an ultimate goal for the Air Force.[2]

Although air force planners had visualized an establishment of 70 groups as far back as World War II, that number had remained merely a target. Now, even with congressional sanction, that target was not to be reached. In May 1948 President Truman set a ceiling of 15 billion dollars for the Defense Department budget for fiscal year 1950. This amount represented about half of the total Army-Navy-USAF request for the year. Instead of expanding to the planned 70 groups, this limitation meant that USAF would probably have to cut back from the 59 groups that it was scheduled to attain by December 1948. Therefore, the Air Force reprogrammed with a 48-group Air Force as its goal and was prepared when the President asked for such a reduction in his next annual budget message to Congress.

In the face of an increasing threat of Soviet offensive capabilities and size limitations, the Air Force's only course was to concentrate on the buildup of the Strategic Air Command even at the expense of the other USAF missions. Air defense and tactical functions, of necessity, retained a lower priority in the 48-group program than the strategic force.[3]

The Establishment of Continental Air Command

While the Air Force was struggling to plan for the fulfillment of its missions with a reduced force, it carried out a major reorganization intended in part to strengthen the nation's air defense potential. On 15 October 1948, President Truman issued an Executive Order calling for greater emphasis on the organization and training of the Armed Forces reserve components.[4] In order to implement this presidential directive a new command, Continental Air Command (ConAC), was activated with Lt. Gen. George E. Stratemeyer as commander. Among its four major missions, ConAC was to provide for the active air defense of the United States and to be responsible for the Air National Guard and Air Reserve. Air Defense Command and Tactical Air Command were to continue as "operational" commands under ConAC.[5] All air defense and tactical air units and stations were transferred to the six existing air forces (four ADC and two TAC) over which ConAC assumed direct control.*

This reorganization, effective 1 December 1948 but not completed until 1 February 1949, was designed partly to make more economical and effective use of the Regular Air Force. As explained in a USAF press release, henceforth the Air Force could "throw the full weight of the combined units either to the Air Defense command or to the Tactical Air Command, as circumstances may require."[6] The air defense system would be improved because responsibility for air defense would be centralized in the Continental

*Earlier in the year, two of ADC's original six air forces had been abolished; the reorganization once again made six air forces available for air defense. (1st ind, (ltr, General Stratemeyer to C/S USAF, subj: Plan for Reorganization of Air Defense Command, 30 Jun 48), Hq USAF, to CG ADC, 29 Jul 48, in Hist ConAC, 1 Dec 1948-31 Dec 1949, I, doc 8.)

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Air Command thus allowing ADC to concentrate on planning and the operational employment of the air units allocated for air defense by ConAC.* Training, supply, and administration would be the responsibilities of the six ConAC air forces. The reorganization had the virtues of relieving ADC of several minor tasks and of placing all resources of ADC and TAC under one commander. Such an arrangement, as noted by *The New York Times*,

> . . . would guarantee a better defense structure than was possible under divided authority. This is what would have to be done anyway if an emergency arose. Such improvisations always take some time before optimum efficiency is achieved. By making the change now, time is won that could never be wholly made up even under the spur of emergency conditions.[7]

On the other hand, as a result of the reorganization, the position of the Air Defense Command was unusual. It had major command status yet had only operational control over air defense forces, no resources were actually assigned to it.†

The Johnson Economy Program

Shortly after the USAF reorganization was completed, two events, the Johnson economy program and the resultant investigation of the B-36 intercontinental bomber, added to the uncertainty within the Defense Department. These events focused attention on national defense (including air defense) and, in the main, hindered its development. Louis M. Johnson, who succeeded James Forrestal as Secretary of Defense in March 1949, instituted an economy program, a move that undoubtedly met with public approval. Reductions were made in personnel, equipment, and facilities, with all services sharing proportionately in the cuts. Although its serious effects would not be felt for many months, the Johnson program was an additional handicap in the attempt to establish an active air defense.*

As an integral part of his economy program, Secretary Johnson, continuing the concentration on strategic airpower as the principal force upon which the nation would rely for protection, stopped construction of the Navy's supercarrier. Also, in accord with this reaffirmation of emphasis on strategic air warfare, the Air Force cancelled orders for 470 advanced type aircraft in order to purchase 75 additional B-36's. These actions by the Secretary of Defense and the USAF resulted in a congressional investigation, the so called "revolt of the admirals," and a heated controversy on the merits of the B-36 and the supercarrier. Among the many charges hurled at the Air Force by its critics was that air defense had been neglected in favor of strategic airpower. Significantly, although the charge was never answered specifically, the Air Force was completely vindicated by the congressional probers. Regardless, the debates illustrated that, despite unification, much difference of opinion as to the proper way to defend the nation still existed. Considerable time, energy, and money were diverted from the national defense effort during the lengthy controversy which not even the announcement of an atomic explosion by the Soviets could terminate.

Impact of the Soviet Atomic Explosion

Throughout the postwar period American leaders in science and industry as well as in the military realized that Russia would eventually develop atomic bombs and vehicles capable of carrying them to the North American continent. Estimates as to when the Soviets would possess bombs and aircraft in sufficient quantity to risk a major war varied greatly. However, it appeared to many that the United States had at least until

*On 1 March 1949, the commanding generals of the six ConAC air forces were relieved of air defense responsibilities. In order to fill the vacuum thereby created, the Air Defense Command was authorized two operational headquarters through which it would exercise its air defense responsibilities. It was planned that these headquarters would be the Eastern and Western Air Defense Forces which would be activated later in 1949. (They were activated on 1 September.) In the meantime, an Eastern and Western Air Defense Liaison Group were set up to coordinate air defense east and west of the 103° longitude and, in event of air attack, to exercise operational control of the air defense forces allotted to the Commanding General, ADC. In addition, ADC would eventually be assigned eight air defense divisions, the first two of which were to be assigned 1 March (ltr, Hq ConAC to CG 10th AF, subj: Air Defense Responsibilities, 1 Feb 49, in Hist ADC through June 1951, V, doc 162; ltr, Hq ConAC to Chief Eastern Air Defense Liaison Group, subj: Mission and Responsibility of the Eastern Air Defense Liaison Group, 23 Mar 49, in Hist ConAC 1 Dec 1948-31 Dec 1949, I, pr 2, doc 59).

†Also, a possible source of misunderstanding was the fact that the commanding general of ADC, Maj. Gen. Gordon P. Saville, also served as Deputy for Air Defense, ConAC.

*The Secretary's economy move was quite likely a factor in the congressional delay in appropriating the AC&W system funds which had been voted in March 1949. See above p. 25.

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1952 before its monopoly of atomic weapons would be seriously threatened. Based upon the intelligence available in mid-1949 the Joint Chiefs of Staff held that viewpoint. They stated that the AC&W system had to be functioning by 1 July 1952 and that the remainder of the system had to be operationally ready by 1953.[8] These opinions, in addition to the occurrence of such incidents as the economy program and the B-36 investigation, illustrated that, though the period of comparative freedom from danger of atomic attack was rapidly drawing to a close, no great sense of urgency was apparent within the Defense Department.

In August 1949 the Soviet Union set off its first atomic explosion. No longer could the United States rely solely upon its atomic stockpile as a deterrent against attack. General Hoyt S. Vandenberg, Air Force Chief of Staff, immediately called the attention of his colleagues on the Joint Chiefs of Staff to the "desperate need for a vastly more effective air defense for the continental United States."[9] And the USAF, in view of the unexpected Russian atomic explosion, advanced from 1953 to 1950 its estimate of Soviet capabilities for atomic attack and increased the emphasis being placed on air defense preparations.[10]

Because of budgetary limitations and the amount of time needed to actually make additions to the air defense system, USAF could do little to bring about an immediate improvement in air defense capabilities. The temporary (LASHUP) radar network had been completed in June in the Northeast and installation was progressing in the Northwest. Since the latter area contained the closest targets in the United States for Soviet-based bombers, efforts were made to improve its air defense system.*[11] Within Continental Air Command headquarters, air defense was henceforth recognized as the command's most important mission.[12] ConAC began drafting manning schedules based upon top priority for air defense units. A higher priority would mean more personnel which would enable the air defense system to increase its hours of operation.[13] Finally, on 23 January 1950, for manning purposes Headquarters USAF placed air defense units on the same priority basis as SAC and the overseas bases.[14]

The realization that the United States no longer possessed an atomic monopoly also affected the establishment of the Permanent System.* Authorized by Congress in March 1949 the AC&W program had lagged badly because of lack of funds. Congressional approval had not been followed by appropriation of the money needed. Furthermore, by the end of April, inclusion of the funding in fiscal year 1949 had been disapproved and USAF had been asked to re-examine the program to see if some of the authorized amount could be deferred until fiscal year 1951. Upon re-examination, USAF concluded that delay until 1951 would mean that the operational readiness date for a reasonable effective system in 1953, as directed by the Joint Chiefs of Staff, could not be met.[15] The decision was finally reached to seek the authorized $85,500,000 in the fiscal year 1950 appropriations[16] but, when the measure for that fiscal year was passed in October 1949, it did not include a specific appropriation for radar site construction. Instead, the bill authorized the Secretary of Defense, at his discretion, to use for that purpose not more than $50,000,000 of the Air Force appropriations. Thus, it would be necessary for the Air Force to take funds away from some other project in order to begin the authorized construction program.†[17]

Now that a source of funds had been designated, action could be taken to begin installation of the radar equipment for the Permanent System. Therefore, on 2 December 1949 Headquarters USAF directed the Office of the Chief of Engineers to proceed with the construction of the 24 radar sites which had been accorded priority.†† The end of 1950 was designated as the target date for the construction of these sites.[18]

Action within Headquarters USAF also illustrated the increased emphasis on air defense.

*The weakness of the West Coast air defenses had been of public concern for some time before the report of the Soviet atomic explosion. Both the Washington congressional delegation and Secretary of the Air Force Symington reported civilian unrest in that area during the summer of 1949 (memo Maj. Gen. T.D. White, Dir L&L to Sec of the Air Force, 22 Aug 49, in DRB Files of the Secretary of AF 381, ltr, Whitehead to Maj. Gen. W.F. McKee, Asst VC/S Hq USAF, 23 Oct 49, in Hq ADC HD 51.3).

*See above, pp. 23-25.

†Actually, specific congressional appropriations for carrying out the AC&W program authorized by Congress in March 1949 were not made until 6 September 1950 and 6 January 1951 (64 Stat. 749, 1233).

††Funds for these 24 sites were available by 24 February 1950 (ltr, Hq USAF to CG ConAC, subj: Personnel Requirements for Aircraft Control and Warning Units in Accelerated Air Defense Program, 24 Feb 50, in Hq ADC HD).

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Gen. Muir S. Fairchild, the Vice Chief of Staff, presented a memorandum to the USAF Scientific Advisory Board expressing General Vandenberg's opinion that a "vastly more effective air defense" was needed. As a result, Dr. George E. Valley, a member of the Board, recommended in November the establishment of a special committee to consider the air defense problem.[19] Vandenberg approved the recommendation and the Air Defense Systems Engineering Committee, with Dr. Valley as chairman, was appointed. Formation of the committee (popularly known as the Valley Committee) "reflected a realization that the air defense problem had become so critical that every means must be employed to insure the full utilization of scientific resources in reaching the best solution."[20] Also, on 1 December, an Air Defense Team was activated under the Deputy Chief of Staff for Operations.* This group was directed to see that all steps within the capabilities of the USAF were taken to speed up the air defense program and was to establish requirements for means beyond the capabilities of the Air Force. The team immediately began planning on a variety of air defense subjects.[21]

General Whitehead's Efforts to Improve the Air Defense System

These efforts in Washington to strengthen the air defense system notwithstanding, Lt. Gen. Ennis C. Whitehead, commander of ConAC since 15 April 1949, was not satisfied. An active air defense system was still far from a reality and Whitehead believed that an active system had to be established at once, "regardless of the limitations of personnel and equipment."[22] As Whitehead pointed out to General Vandenberg many population centers including Chicago, Pittsburgh, and Washington, D.C. remained undefended.[23] Since air defense was his responsibility, Whitehead continued to urge Headquarters USAF to provide the means to establish an active defense.

On 1 March 1950, Whitehead in submitting a series of recommendations to Headquarters USAF stated what he felt to be the major defects of the air defense system at that time:

> It is firmly believed that the urgency to mobilize our defensive air power based on 24-hour, 7-days a week operation, cannot be postponed. An active air defense in being must include the provision for actual interception and shooting down of unidentified aircraft crossing our borders or penetrating our defense areas. Our present capability, even if mobilized, lacks the decisive authority to shoot down an aircraft until after the hostile act has taken place. An aircraft control and warning net which is primarily a means of controlling our own aircraft has become our only means of intelligence of Soviet intentions. Until the entire situation is remedied . . . the capability of ConAC to conduct adequately the air defense of the United States remains ineffective.[24]

Thus, continuous operation of the air defense system and the armed interception of unknown aircraft were the two primary requirements. In addition, Whitehead made 22 other recommendations, approval of which would have gone far toward correcting the defects of the continental air defense system.* Headquarters USAF personnel were well aware of these defects, of course, and for the most part agreed that an active air defense was needed. As had been the case since World War II, however, the Air Force did not have the resources to satisfy simultaneously all of its commitments. Although Whitehead considered all of his requests urgent, Headquarters USAF could fill them only gradually.

By June 1950 much had been done to improve the potential of the continental air defense system. On 8 April, Headquarters USAF had authorized ConAC to begin armed interceptions over the Atomic Energy Commission installations and on the East Coast.[25] Furthermore, the temporary AC&W network had been completed and the Joint Chiefs of Staff had changed the operational readiness date for a reasonably effective permanent air defense system from 1953 to the "earliest date possible."[26] The JCS had also decided that, if more money was needed for completion of construction for the AC&W system, they would support the request for funds as a matter of highest priority.[27]

Because of the new threat posed by Soviet possession of atomic weapons, research and development for air defense was also given increased emphasis. Budget-wise, the fiscal year 1951 appropriations for air defense constituted 14 percent of the total USAF research and development appropriations, contrasted with only six percent for the previous fiscal year.[28] Also, acceleration of fighter aircraft procurement was ordered, this

*The team was headed by Col. T. J. Dayharsh.

*Since Whitehead's recommendations ranged from "a" to "x," this letter was referred to within the Directorate of Plans and Operations as the "ax" letter (interview with Col. T.J. Dayharsh, Military Representative, Permanent Joint Board on Defense, 22 Mar 56).

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increased procurement to be brought about by means of amendment to the fiscal year 1950 procurement program.[29] And, in order to use more effectively any improvements which were made, negotiations with Canada for agreements to extend the air defense system northward were spurred on during this period.* All of these actions indicated that, although the strategic striking force still retained priority, air defense was at last being accorded much greater emphasis.†

The Effect of Hostilities in Korea

The invasion of the Republic of Korea by the North Korean Communists on 25 June 1950 emphasized the need for the best possible continental air defense system. Since the United States, acting as a member of the United Nations, immediately moved to halt the aggression, the resulting military action greatly increased the possibility of a third World War. With hostilities actually taking place, a major conflict between two nations armed with atomic weapons might easily be touched off by accident. No longer could the nation tolerate weak and halting efforts which produced only an ineffective air defense system.

The existence of hostilities in the Far East posed many new problems for USAF. Actual combat meant that fighting units would have to be accorded first priority in personnel and equipment. Moreover, additional combat units were needed immediately for, although the strength of the Air Force ostensibly was 48 wings, only 45 were in being.†† Hence, the initial Air Force expansion to 58 wings was intended to fill the Far East Air Forces (FEAF) requirements. Personnel for this expansion had to come from all sources—volunteers, the draft, the Air National Guard, and the Air Reserve, while available equipment was of World War II vintage. For the moment, little could be done to augment the air defense system in personnel or materiel.*

Although FEAF was given priority in matters of personnel and materiel, the air defense system benefited in other ways. ConAC immediately placed the AC&W network on 24-hour operations which, however, later had to be abandoned.[30] Also, control of air traffic was made easier. ConAC had been authorized to begin armed interception in certain areas on 8 April 1950.† Now that the danger of air attack had increased, it was imperative that the air defense forces be allowed to carry out active defense operations wherever required. Such operations entailed the control of air traffic for purposes of identification and, if necessary, interception.†† Therefore, shortly after the outbreak of hostilities, Air Defense Identification Zones (ADIZ) were created in the most vital areas. Within these zones all military aircraft were required, and civil aircraft were requested, to file flight plans as an aid to identification.[31] In addition, on 24 August, President Truman approved a USAF policy statement which permitted active defense operations. The Commanding General of ConAC was authorized

> to destroy aircraft in flight within the sovereign boundaries of the United States which commit hostile acts, which are manifestly hostile in intent, or which bear the military insignia of the USSR, unless properly cleared or obviously in distress.[32]

By September Congress had established a legal basis for air traffic control by its passage of Public Law 778. Henceforth, the government had the power to regulate civil aircraft and to

*See below pp. 140-41. Headquarters USAF also emphasized planning for the air defense of Strategic Air Command bases overseas (Hist Hq USAF, 1 Jul 49-30 Jun 50, p. 32).

†General Whitehead was undoubtedly overenthusiastic when he informed his Air Force commanders in March that General Vandenberg and the Air Staff had come to realize that air defense had become "the most important mission assigned to the USAF." Nothing in Headquarters USAF correspondence would indicate that defense against air attack had replaced retaliation as the priority mission of the Air Force (ltr, Hq ConAC to all Air Force commanders, 4 Mar 50, in ADC Special Historical Study, The Air Defense of Atomic Energy Installations, March 1946-December 1952, supp doc 16).

††AFR 20-15, Organization of the Air Force Combat Wings, issued 13 December 1948, designated the wing rather than the group as the basic operational unit of the USAF. A wing was composed of a combat group and its supporting elements.

*Indicative of the increased interest in air defense within the Defense Department was Secretary of the Air Force Thomas K. Finletter's request early in August for a requirements study by the Air Staff. This study was to show what would be needed, "regardless of cost," to realize as close to a 100% kill potential as possible against enemy bombers. According to a staff officer, Finletter actually desired a "Manhattan-type project" for air defense (memo for DCS/O from Col. W.S. Steel, Spec Mil Asst to OSAF, subj: Requirements for Air Defense of the United States, 9 Aug 50, in OPD 373.24 (3 May 46) sec 3).

†See above p. 31.

††For a study of the identification problem see: ADC HS-3, The Identification Problem in the Air Defense of the United States, 1946-1955.

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require the filing of flight plans by civilians within the ADIZ's.[33] As a result of these actions, air traffic control for purposes of identification was made more effective and air defense forces could thereafter undertake active operations anywhere in the United States without necessarily waiting for a hostile act to take place.

Although the air defense commander now possessed authority to institute active air defense operations, this authority meant little if he did not possess an adequate interceptor force. Such a force was not in existence in mid-1950. On 2 March 1950, Headquarters USAF had presented its recommendations in regard to air defense to the Joint Chiefs of Staff. This "Package Presentation" stated the minimum acceptable force requirements needed by the Air Force to carry out the air defense mission.* One of the most important of the USAF recommendations called for 61 squadrons of interceptors to be deployed at 52 bases.[34]

Even if approved by the JCS, this "Package Plan" would not produce interceptors immediately. Therefore, in an attempt to make better use of its available aircraft, shortly before the outbreak of Korean hostilities, ConAC had submitted to Headquarters USAF a plan for the redeployment of its fighter squadrons. ConAC had experienced difficulty under the existing wing-base organizational structure in deploying to best advantage the few fighter squadrons at its disposal. Squadrons had been located at the same base as their wing headquarters. The ConAC plan would allow greater dispersal by deploying the three fighter squadrons of each wing at bases separate from the wing headquarters. If its proposal received approval, ConAC planned to deploy its 23 squadrons on 14 bases.[35] Headquarters USAF approved the plan temporarily but informed ConAC that a permanent change of that nature would necessitate JCS approval. By the middle of July this deployment had been completed.[36]

*Two Air Force goals were being discussed at this time. In the 58-wing program, 35 squadrons of interceptors were planned, while in the 69-wing program, 48 squadrons were included. When the Chinese Communists entered the Korean struggle, the USAF raised its goal to 95 wings including 61 squadrons of interceptors (Hist ConAC, 1 Jul-31 Dec 50, pp. 73-74; Semiannual Report of the Secretary of the Air Force, 1 Jan-30 Jun 51, p. 200).

*Federalization of the Air National Guard**

Although this dispersal would result in a more effective use of the fighter forces, the Korean conflict emphasized the inadequacy of continental-based interceptor forces. The only immediately available source of additional fighter units was the Air National Guard. Since the establishment of the Air Defense Command early in 1946 the role of the Air National Guard in air defense had been of much concern to the Air Force. It had been necessary for ADC to include ANG units in its air defense plans, yet scant reliance could be placed on the units. This situation was not the fault of the Air Force, as *The New York Times'* military analyst Hanson W. Baldwin had pointed out, "but is part and parcel of the country's postwar military policy, which is based fundamentally upon the maintenance of relatively small professional forces backed up by large semi-trained part-time forces."[37] According to Baldwin, the Air Force was handicapped in its reliance on the ANG because ANG personnel were "week-end warriors" who "despite all the will in the world—cannot be instantly ready for action in an emergency, as any efficient air force must in the atomic age."[38] Moreover, the ANG was hampered by obsolete equipment, cumbersome mobilization procedures, and the fact that ADC had no control over ANG units in peacetime except for training.

Despite these shortcomings and handicaps, in December 1947 Headquarters USAF had designated the ANG as General Stratemeyer's major source of air defense strength,[39] and in 1949, USAF was depending upon the ANG to supply approximately 70 percent of the interceptors for its continental defense M-day force.[40] That this reliance was, at best, uncertain, was indicated by an estimate made late in 1949 that it would take from three days to two weeks to bring the ANG into service.[41]

The greatest obstacle to the use of the Air National Guard in air defense was inherent in its very structure. The ANG was under the control of the various states and therefore outside of the authority of the Air Force. Without an ANG capable of performing its mission of aug-

*For a study of the role of the Air National Guard in air defense see: ADC HS-5, Emergency Air Defense Forces, 1946-1954, *passim*.

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menting ADC—which could not be done without Air Force control of ANG units—the value of the ANG to the air defense system was limited. Because congressional action was required to bring about any change, several attempts by Headquarters USAF to clarify the status of the ANG were unsuccessful in 1948 and 1949. Immediately following the entrance of the nation in the Korean action, however, Congress acted to make use of the ANG. On 30 June President Truman was authorized by the 81st Congress to call into active service for not more than twenty-one months any member or unit of the Reserve Forces.[42]

Despite this legislation, which ConAC believed would provide "a basis for more realistic planning for the utilization of ANG fighter units for air defense,"[43] no immediate increase in fighter strength for the air defense system resulted. Moreover, according to existing plans, the air defense forces would not have 35 regular air force squadrons until the end of June 1951. To General Whitehead, this increase was too slow and, in July 1950, he proposed that Headquarters USAF authorize at once a partial mobilization of the ANG. Whitehead recommended that 20 ANG squadrons be called to active duty and assigned to air defenses.[44] Headquarters USAF considered such a step inadvisable at that time because the addition of the 12 regular air force fighter squadrons scheduled for deployment in fiscal year 1951 to the 23 squadrons of ConAC fighters already deployed on 14 bases was sufficient to maintain the air defense system. Furthermore, such action would have to be deferred while completion of the radar net before 1 July 1951 was being pushed.[45]

General Whitehead also asked Headquarters USAF for the delegation of mobilization authority down to the Defense Force level. If this authority were granted, ANG units could be brought into action much more quickly. Again Whitehead's request was refused. At that time the Secretary of the Air Force decided to retain mobilization authority.[46]

The situation in Korea soon forced a reconsideration of the Air Force's position on federalization and mobilization authority. Although the United Nations forces met with considerable success during the opening months of the campaign, the entrance of the Chinese Communists into the struggle early in November altered the military picture and forced the UN on the defensive. In view of this new threat the air defense system had to be strengthened and in December General Whitehead asked that his requests for mobilization authority and for federalization of ANG squadrons be reconsidered. For immediate federalization he listed 15 squadrons. Also he designated 23 other squadrons which, although available, should not be federalized until adequate housing and operational facilities were available. These ANG squadrons would be in addition to the regular air force units scheduled for activation in the USAF expansion program.[47] In January both requests were granted. Henceforth, the air defense commander could issue mobilization orders and federalization of the first 15 squadrons was scheduled for 1 February 1951. Before the end of 1950, however, Whitehead requested federalization of the other 23 squadrons which would give ConAC the 61 squadrons it considered the minimum for an adequate air defense. By 1 March 1951 all but 16 ANG fighter squadrons had been federalized and those squadrons were programmed for air defense.[48] All available interceptor forces had been at last placed in the active air defense system.

Reestablishment of the Air Defense Command

Continental Air Command had been created late in 1948 in part to permit more economical and efficient use of the available air defense and ground support units. No other course was open for, as long as the bulk of USAF resources was devoted to the strategic air force, not enough remained to provide for two other major commands, Air Defense Command and Tactical Air Command.* Therefore, those commands were reduced to "operational" status under ConAC. In addition to the assignment of the air defense and tactical air missions, the new command was also given a number of lesser responsibilities.

When events of 1949-1950 forecast an expansion of the Air Force, the inadequacy of this command arrangement became obvious. Because of the many missions assigned to his command, General Whitehead found it impossible to devote attention to the air defense and tactical air functions commensurate with their growing importance.†[49] Also,

*See above p. 28.

†The tactical air mission received increased emphasis during 1949-1950 as a result of the B-36 investigation and weaknesses indicated in joint exercises PORTREX

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the increasing emphasis placed on the development of fighter aircraft designed specifically for the air defense or ground support roles indicated that, at some future date, it would be necessary to divide ConAC into its component parts.[50]

Because of its unwieldy composition and the variety of its missions, ConAC organized an internal structure to supervise the available forces and to control them in possible air battles. For air defense, two operational headquarters (Air Defense Forces) and a number of air divisions were created under Headquarters ConAC. The Air Defense Forces, Eastern and Western, were to have responsibility for air defense east and west of the 103° meridian. With the activation of EADF and WADF on 1 September 1949, Headquarters, ADC was reduced to record status leaving the responsibility for air defense with General Whitehead.[51]

While these organizational changes were taking place, the Air Staff in Headquarters USAF, beginning in the fall of 1949, studied the problem of increasing the emphasis on air defense and tactical airpower.[52] These studies revived a proposal which had been made periodically since the end of World War II—that a unified defense or unified air defense command be established. As had been the case previously, these discussions, which continued throughout 1950, indicated that the Defense Department was not ready for such a step. Neither interservice agreement nor unanimity within the Air Force existed on the necessity for a unified organization.*[53] Nevertheless, Headquarters USAF originated a reorganization plan and submitted it to ConAC for comment. In response, ConAC proposed the establishment of a "Combat Command" having the air defense and tactical air missions. ConAC would retain its other assigned missions. This new command and its subordinate commands, which would be EADF, WADF, and TAC, would have administrative and operational control over assigned units. Because of the shortage of personnel, the plan was not approved by Headquarters USAF.[54]

ConAC then submitted a plan for an internal reorganization. By this plan received by Headquarters USAF in April 1950 both administrative and operational responsibilities would be assigned to the headquarters of the Air Defense Forces and Tactical Air Command. All of ConAC's regular air force combat units would be reassigned to the Air Defense Forces or TAC, leaving ConAC free to concentrate on the training and support of reserve activities and the other miscellaneous functions assigned to the command. ConAC would continue to exercise supervision over the air forces and to act as over-all planning agency for air defense of the continental United States.[55] Since this reorganization could be accomplished with no increase in personnel, Headquarters USAF approved in May.[56] In July, ConAC was finally relieved of several minor responsibilities by transfer to other commands. As a result of this reorganization, Headquarters, ADC was abolished, ConAC retained primary responsibility for air defense, while the Eastern and Western Air Defense Forces became self-sufficient organizations with administrative and operational control over air defense units.[57]

Shortly after ConAC's reorganization was approved, the Korean hostilities increased the emphasis on its air defense mission. A need for a separate command for air defense was strongly indicated. Furthermore, the anticipated expansion of the Air Force promised to alleviate the personnel shortage which had mitigated against the formation of such a command earlier in the year. Now both General Whitehead and Headquarters USAF pressed for action on reorganization. By 20 October 1950, General Vandenberg had submitted a memorandum to the JCS proposing a unified Air Defense Command. General Nathan F. Twining, Vice Chief of Staff, explained to General Whitehead that such a command would be supported by the USAF if the Army and Navy were willing to assign forces to the command commensurate in size to the Air Force contribution. If the other services offered only token forces, however, the Air Force would press for the type of command recommended by ConAC.[58]

General Whitehead responded immediately with a renewal of his recommendation for an Air Defense Command separate from ConAC. He pointed out that the new command should be set up by 1 January 1951 for :

Beginning the first of the year, 1951, some of our permanent radar sites become operative. During the

and SWARMER (these exercises are discussed in: USAFHS-80, Air Force Participation in Joint Army-Air Force Training Exercises, 1947-1950, chap 3; USAFHS-94, Air Force Participation in Joint Amphibious Training Exercises, 1946-1950, chaps 3 & 4).

*See below, chap VII.

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course of the year, many additional new sites will come into being. Over the same period of time, twelve additional Air Defense fighter squadrons are programmed for activation. To be sure that these activities receive adequate, undivided attention and supervision, the Hq Air Defense Command should be organized immediately and a permanent site designated for its headquarters.[59]

This time Whitehead's proposal was speedily approved. Undoubtedly the delay of the Joint Chiefs in considering the plan for a unified command and the increasing importance of the air defense and tactical air functions spurred Headquarters USAF to action. On 10 November 1950 the Air Defense Command* and Tactical Air Command were redesignated major USAF commands.[60]

In accordance with the recommendations of General Whitehead—designated as commander of the new organization—the Air Defense Command was assigned but one mission.* It was to provide for the air defense of the United States.[61] Henceforth, air defense would take its place as one of the most important missions of the USAF.†

*ADC was "re-established" on 1 January 1951 and was in operation in its new location, Ent Air Force Base, Colorado Springs, Colorado, by 8 January (ltr, Whitehead to Twining, 10 Jan 51, in KCRC Hq ADC File 312, Commanding General 1 Jan-15 Oct 51).

*The Tactical Air Command was also accorded one mission while ConAC retained the remainder of the many missions it had been assigned.

†The status of ADC and TAC were made legal by Congress in September 1951. Thereafter their existence could be threatened only by congressional action (65 Stat. 332).

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COMPLETION OF THE INTERIM AIR DEFENSE SYSTEM

As early as 1945, AAF leaders, including Commanding General Henry H. Arnold, had warned that a future war probably would be opened by a surprise air attack on the continental United States.[1] Primary responsibility for countering such an air attack and for striking back through the air in sufficient force to assure victory belonged to the Army Air Forces. Since such a war would be of extremely short duration—possibly a matter of days—offensive and defensive air forces had to be in existence, ready to operate at any time. Thus, air force planners became increasingly aware during the postwar years that mere possession of the various weapons and supporting elements would not be sufficient. What was needed was a weapon system that would combine all elements around an aircraft.* The air arm could perform its basic missions only by employing the various elements in a strategic, tactical, or air defense weapon system. Such a weapon system, of course, could not become a reality until the required elements were developed.[2]

Although its actual implementation was for the future, the influence of the weapon system concept could be seen in organizat onal changes made by Headquarters USAF in 1950. Since development of the weapon system elements would increase the importance of the role of the scientists, a new staff organization under a Deputy Chief of Staff for Development was formed. Established in January 1950 under Maj. Gen. Gordon P. Saville, DCS/Development was given chief responsibility for the development of the weapon system concept. This organizational change was followed by the formation of the Air Research and Development Command and several other installations devoted to research and development.*[3] As a result of these innovations, Air Force research and development were centralized under one directorate through which scientific research and development and military necessity could be closely correlated.

Emphasis on the weapon system concept promised great improvement in national defense for the future. However, in air defense, until such a system was developed, USAF would have to depend on an air defense composed of those elements on hand or procurable in a reasonable length of time. Thus, Headquarters USAF planned that during the decade 1950-1960 the air defense system would consist of a manually operated Aircraft Control and Warning system operating with manned all-weather interceptors. Of necessity, these elements would be supported by a Ground Observer Corps and Antiaircraft Artillery. Toward the end of the decade, automatic interception might be possible and guided missiles would be taking their place in the system.[4] By the middle of 1954, much progress had been made in improving each of these elements and welding them together into an interim system.

The Radar System

Completing the Permanent System

The Air Force requirements for a radar network had been stated in the ill-fated Project SUPREMACY in 1947.† Following the failure of Congress to act on SUPREMACY, the Air Force

*One committee reported to Headquarters USAF that a weapon system is "the complete combat airplane including its armament and including any special ground based flight or firing control equipment that will be used as a functional item in accomplishing the mission" (Hist Hq USAF, 1 Jul 50-30 Jun 51, p. 38n).

*These organizations included the Arnold Engineering Development Center, the Special Weapons Command, and the Joint Long Range Proving Ground. These innovations were recommended by a Scientific Advisory Board committee headed by Dr. Louis N. Ridenour. The committee reported in September 1949 (USAF, R&D Quarterly Review, 30 Jun 51, p. 89).

†See above, pp. 11-12.

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had substituted what it called the "Modified Program" (Interim Program plus the First Augmentation). The Modified Program did not fulfill Air Force radar requirements but did represent the minimum acceptable radar network. As approved by Congress in March 1949, the Modified Program called for a Permanent System of 75 radar stations and 10 control centers in the continental United States.*

Despite the relatively modest scope of the Modified Program, it was not scheduled for complete implementation until 1952. In the meantime, some radar for defense and training was required. Therefore, in 1948, the Air Force undertook the establishment of a temporary network (LASHUP), which was to consist of available radar sets sited on government-owned land in four vital areas (Northeast, Northwest, Albuquerque, and the West Coast). Although it was recognized that LASHUP would afford little actual protection, it would serve as a means for training radar personnel.† By mid-1950 the 44 radar stations of the LASHUP network were operational.

Meanwhile, construction of the Permanent System was progressing slowly. Partially because of the Department of Defense economy program of 1949, congressional approval of the program was not accompanied by appropriation of the $85,500,000 called for in the measure. Siting work had been undertaken by the Air Defense Command as soon as congressional authority had been given but little else could be done without funds.†† Finally, in the fall of 1949, the Air Force was authorized to divert $50,000,000 from other sources for the Permanent System. This action was followed by the designation of 24 of the 85 permanent sites as a first priority group with a target date for completion of 1 July 1951. A deadline of 1 July 1952 was set for completion of the 85 sites of the Permanent System.

The Soviet atomic explosion in August 1949 caused the Air Force to revise its estimates of Russian capabilities. For purposes of Air Force planning, the date that Russia could attack the United States was advanced from 1953 to 1950. Therefore, USAF accelerated the installation of LASHUP.* Also, in March 1950, the completion date for the first priority group of 24 permanent stations was advanced to 31 December 1950.[5]

At the same time that USAF was taking this action, General Whitehead was pressing Headquarters USAF to accelerate the air defense program.† Among Whitehead's recommendations was one to speed up construction of the permanent radar sites.[6] In reply General Vandenberg pointed out several factors that might delay an acceleration program. If site selections were not completed by Whitehead's command on schedule, construction would be retarded. Furthermore, additional funds and authorization were being requested from Congress; unfavorable action on these requests would impede progress. However, Vandenberg assured Whitehead that Headquarters USAF was doing all that it could, within its means, to speed up the radar construction program.[7]

The beginning of a "hot war" in Korea in June 1950 made an acceleration of the construction program imperative and early in July, Secretary of the Air Force Thomas K. Finletter sent the Defense Department a plan to speed up the AC&W network construction. Finletter's plan called for expedition of the program with funds available, on the assumption that the remainder of the money voted by Congress in 1949 would be included in fiscal year 1951 appropriations. Steps were to be taken to avoid bottlenecks and all Headquarters USAF staff agencies were requested to cooperate in the program.

Congressional interest in acceleration of the program was also indicated by a request from Carl Vinson (D-Ga.), Chairman of the House Armed Services Committee, for periodic progress reports. Specifically, Vinson wanted a report from the Department of the Air Force immediately after 31 December 1950 on the status of the 24 priority stations scheduled for completion by that date.[8] Congressional interest was further indicated by the appointment of subcommittees—in the House under Vinson and in the Senate under Lyndon Johnson (D-Tex.)—to monitor the AC&W program. The Vinson subcommittee told the Air Force to push the radar buildup because "progress had not

*Also included in the Modified Program were ten radar stations and one control center for Alaska.

†See above, pp. 25-26.

††In April 1949, following a study by General Saville, the Joint Chiefs of Staff placed the AC&W program as the first item in the Public Works construction schedule. Such a priority meant little, however, if funds were not made available (memo for record, Lt. Col. W.C. Odell, Hq USAF, P&O, in Case Hist AC&W System, doc 157).

*See above, p. 30.

†See above, p. 31-32.

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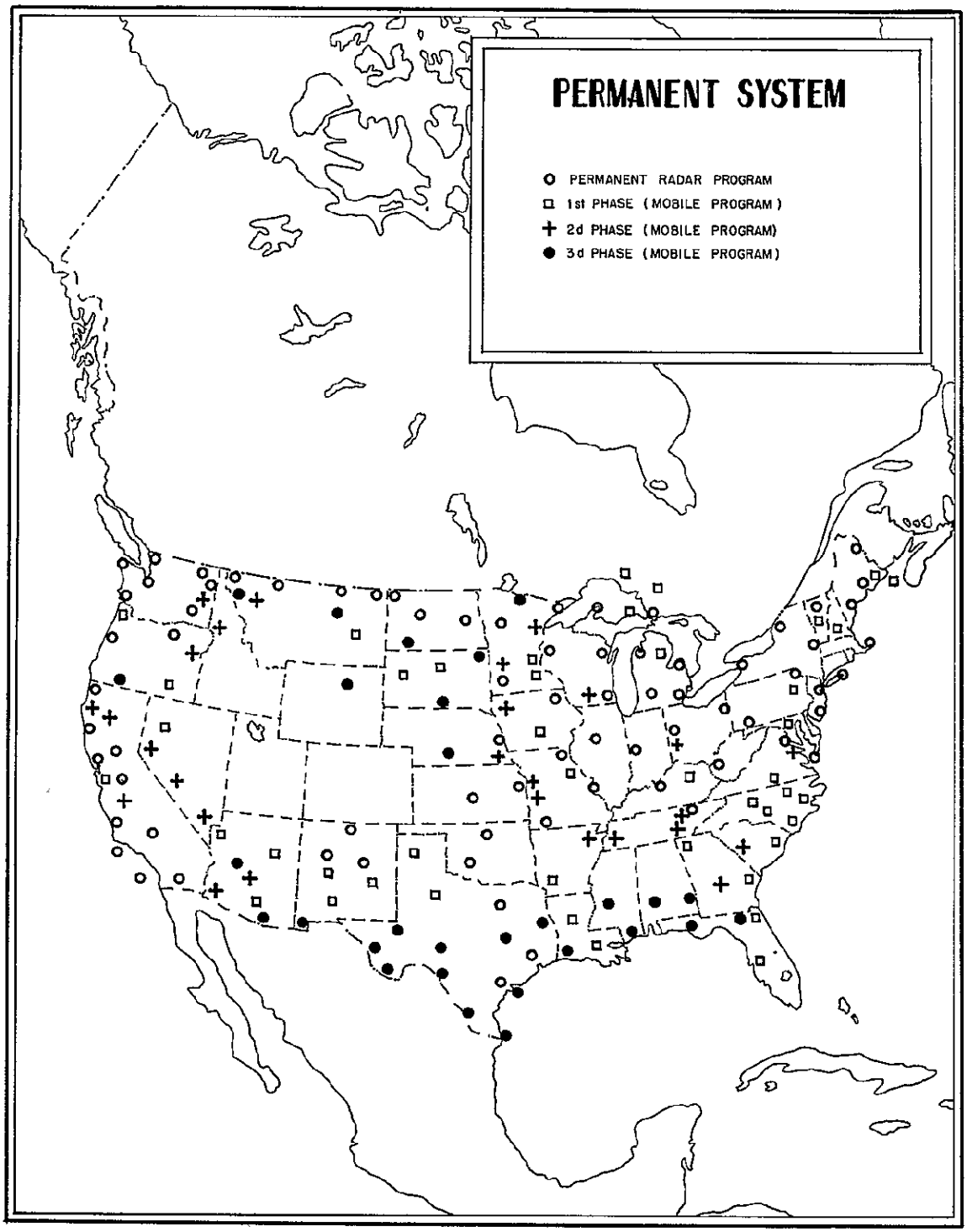

Map 2

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been sufficient in the light of existing world conditions."[9]

Although Finletter's plan was not acted upon, early in August the Vinson subcommittee was informed by Brig. Gen. George J. Nold, Chief of Engineers, that for an additional $2,500,000 the completion (beneficial occupancy*) of the first priority group might be advanced to 1 November 1950.[10] However, General Nold also stated, that in any event, all of the 24 stations would not be fully completed by the end of the year. Instead, the Air Force would have beneficial occupancy by 31 December. Actually, construction schedules indicated that it would be from one to three months after the end of 1950 before the 24 priority sites could be completed.[11] In effect, this was a return to the original target date of 1 March 1951. As a result, on 30 August 1950, Secretary Finletter authorized an expedited program for all 84 sites.† in the Permanent System.[12]

Early in October Undersecretary of the Air Force John A. McCone informed the Vinson subcommittee that the 24 stations would be "in complete operation, with trained men there and everything going," by not later than 1 March 1951.[13] By November, that date was officially designated as the target date once again, while the date for the completion of the entire radar network remained as 1 July 1951.[14]

Despite the efforts of the Department of the Air Force—as well as those of a civilian expediting group[15]—these estimates and target dates proved overly optimistic. Strikes and threats of strikes slowed down progress both at the construction sites and in the factories producing construction material and radar equipment.[16] Manpower and materiel were required elsewhere because of the demands of the Korean action.[17] Furthermore, spare parts and maintenance parts were not available when the first of the 84 sites was ready for operation.[18]

All of these factors entered into the delay yet probably the most important reason was a change in Air Force plans for employment of the radar equipment. McCone's commitment of the Air Force to 1 March 1951 as a completion date was based on a plan to transfer LASHUP radar equipment to permanent sites as soon as construction was completed. Because of the international situation, this plan was abandoned in December, 1950. The Air Force decided that radar coverage should not be lost while equipment was being transferred.[19] Therefore, the LASHUP sites would remain operational until the new stations were completed. This decision meant that the permanent sites would have to wait for new equipment before actual operations could begin. Since completion would thereby be delayed from one to four months, the target date of 1 March 1951 was replaced by completion "as soon as possible."[20]

Despite the combined efforts of Headquarters USAF and the Air Defense Command, the completion date for the permanent radar sites continued to be postponed. By the end of January 1951 no station was operational and the target date for the priority sites had been set at 1 August 1951.[21] This date also proved too optimistic and, by fall, the completion date had been reset as 1 March 1952.[22] This protracted delay was caused primarily by the shortage of equipment for, by 28 February 1951, the first priority group of 24 stations was ready for beneficial occupancy.* Later monthly reports indicated that construction was being completed on schedule.[23]

Because of the continued delay, by October the status of the Permanent System again occupied the attention of the Department of the Air Force. Since the primary difficulty lay in the shortage of radar equipment, Under Secretaries of the Air Force R. L. Gilpatric and Eugene M. Zuckert recommended that the Joint Chiefs of Staff be requested to grant the AC&W program an urgency

*Although there was some misunderstanding at this time within the Defense Department about the meaning of the term "beneficial occupancy," it apparently meant that radar personnel could occupy the sites and begin installing equipment (memo for Chief of Staff from Maj. Gen. F.H. Griswold, Asst DCS/Materiel, subj: Mr. McCone's Testimony Regarding the Radar Fence, 20 Oct 50, in DRB C/S Files 1950, 27101-27200). Later beneficial occupancy was defined as the stage of construction when the operations building was complete and installation of technical equipment could begin (ADC Hist Report 2, doc 1).

†The Interim Program plus First Augmentation had called for 75 radar stations and 10 control centers, a total of 85 installations. By 1950 the total discussed in Headquarters USAF was 84. However, in December 1950 a control center was added to the program bringing the total back to 85 (Hist OSAF, 1 Jul 50-31 Mar 51, p. 67).

*In order to use and control properly the increasing air defense facilities, ConAC proposed the establishment of a Central Air Defense Force in mid-1950. Headquarters USAF turned down the request at first but, at the urgent request of ConAC, reconsidered and approved the proposal. Central Air Defense Force was activated 1 March 1951 (Hist CADF, 1 Mar-30 Jun 51, p. 1).

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classification of "S" which would give it a higher classification than overseas units.[24] When the Air Staff disagreed, Gilpatric and Zuckert requested the opinion of the Air Force Chief of Staff, General Nathan F. Twining, on the need for a change in priority.[25] General Twining also indicated disagreement with the under secretaries,[26] and they reluctantly abandoned the idea. Gilpatric now accepted the delay in the establishment of the Permanent System as a calculated risk. Within the existing priorities, the Air Force would do everything possible to accelerate the completion of the radar stations.[27]

In the meantime, completion of the permanent sites posed the problem of phasing over from the LASHUP to the Permanent System with no loss of detection capability. In some cases, LASHUP stations continued operations until Permanent System stations could replace them in the network. In other instances, LASHUP equipment and personnel were moved to the new sites to operate until new equipment arrived. Thus during the final stages of the creation of the Permanent System, the radar network was composed of three types of stations: LASHUP, LASHUP-Permanent, and Permanent. Although this situation led to some confusion, continuous radar coverage was maintained.[28]

While site construction proceeded on an "as soon as possible" basis, work on the Permanent System continued into 1952. By the end of May, construction was completed on the sites, and all 85 stations were operational by the end of the year.[29] Thus by 13 April 1953 the so-called Permanent System, which at the time of its approval in 1949 was considered an interim system and only the minimum acceptable, was in place and fully operational.

Radar Equipment for the Interim System

Efforts to complete the radar network involved the procurement of radar equipment as well as the construction of the sites. When the decision was made to install the temporary LASHUP network, the Air Force had no alternative but to use the available radar equipment even though it was of World War II vintage. For the most part, this radar had insufficient range and lacked height-finding equipment. Nevertheless, its use in the temporary system afforded at least a modicum of protection and training facilities.

The need for improved radar for the postwar period had been recognized before V-J Day. In July 1945 the Continental Air Forces had recommended the development of radar equipment capable of detecting objects at a range of 1,000 miles, at an altitude of 200 miles, and at a speed of 1,000 miles per hour.[30] These characteristics, of course, were beyond the capabilities of the radar art at that time. Nevertheless, as Brig. Gen. William F. McKee, Deputy for Operations in Headquarters, AAF, pointed out, military characteristics for better radar than then available would be written as soon as requirements were determined. However, until better radar was produced, radar defense plans would have to be based on the equipment in being.[31]

By January 1946, military characteristics had been prepared in Headquarters, AAF for improved radar equipment, and Headquarters, CAF had drawn up plans for a radar defense based upon such advanced equipment.[32] Even though CAF's plan received some favorable consideration, Headquarters, AAF, Plans issued a reminder to the command that radar defense planning had to based on the available equipment.[33] From these discussions emanated a difference of opinion within Headquarters, AAF (and later between AAF and the Scientific Advisory Board) as to whether an air defense system should be established with the equipment on hand or be delayed until more modern equipment was developed.* Late in 1947 the preparation of Project SUPREMACY indicated that the Air Force had decided to proceed with the available equipment.

Meanwhile, concrete steps had been taken to initiate the production of better radar equipment. In the immediate postwar period, the World War II radars on hand included the AN/CPS-1, AN/CPS-5, and a handful of AN/CPS-6's for early warning† and the AN/CPS-4 for height-finding. These sets were of little value against jet propelled aircraft or even the faster conventional aircraft of the period. Therefore, in mid-1946 Air Force officials, in a conference with several leading electronics manufacturers, explained the need for improved search radar. The manufacturers were invited to express their interest in the problem.[34]

By 1947 bids had been submitted and characteristics had been agreed upon for an improved

*See above, pp. 9-11.

†These air transportable radar sets provided primarily range and azimuth information. Only the CPS-1 was used in combat in World War II.

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(mainly by addition of a height-finder) version of the AN/CPS-6, called the AN/CPS-6B.* A joint development-production contract for 16 sets was let with General Electric. Delivery of the first set was scheduled for February 1949 and for the remaining 15 sets by December 1949.[35] Shortly thereafter, production of the AN/FPS-3,† an improved version of the AN/CPS-5, was awarded to the Bendix Corporation with delivery of the first set scheduled for the summer of 1949 and complete delivery for 1 April 1950.[36] The CPS-6B and FPS-3 were destined to be the basic search radars for the Permanent System.

Since these radars still fell short of future requirements, the Air Force enlisted the aid of several civilian groups to make certain that the research and development effort would produce the required equipment. In December 1946, General Carl Spaatz, Commanding General AAF, had called upon the Scientific Advisory Board for aid either in forming a special panel to study air defense or in recommending another group for the task. Spaatz pointed out that providing for a complete air defense system was "a costly undertaking in time and funds," and therefore the AAF could not afford to implement an ill-considered plan. Posing a series of questions, he asked, for example, what type of radars would be on hand and what type would be needed in the future.[37] As a result of Spaatz's letter, the RAND Corporation was requested to make a complete study of the active defense of the United States against air attack.

The Research and Development Board (RDB) was also studying the air defense system from the standpoint of radar equipment. In December 1947, General Vandenberg had asked Dr. Vannevar Bush, chairman of the board, for advice on the radar phase of SUPREMACY. Vandenberg had explained that the radar equipment planned for in SUPREMACY, installation of which was to be completed by 31 December 1952, was of World War II vintage and, as soon as possible, had to be replaced with improved equipment. The Air Force was greatly concerned about the development of more modern radar, Vandenberg stated, and Bush's views on the current electronics and development program were requested.[38] Replying in May 1948 Bush informed the Chief of Staff that the RDB had given preliminary consideration to the research and development aspects of the air defense system and had drawn up a program for developing equipment to detect aircraft and guided missiles. This program could be accomplished only if the USAF gave research and development its full support. Bush offered the support of the board if needed by the Air Force in requesting additional appropriations and personnel.[39]

By July 1948, acting on the recommendation of the Research and Development Board, USAF's Director of Research and Development was able to report to General Vandenberg that emphasis was being placed on research and development equal to that accorded the operational aspects of the air defense program.[40] Furthermore, in conjunction with the JCS review requested by Secretary Forrestal, the RDB had considered SUPREMACY in connection with "the question of proper research and development programs for the evolution of more advanced equipment pertinent to all aspects of air defense." The RDB panel on radar had concluded, Dr. Bush reported to Forrestal, that no currently available early warning equipment should be procured for use in the air defense system since the panel members believed that available radar was inadequate and that minor modifications of the equipment would not provide material improvement.[41]

The panel's conclusion revived the difference of opinion in regard to the use of radar equipment in the air defense system. The divergent views in Headquarters USAF had been reconciled and, as indicated in Project SUPREMACY, the Air Force took the position that there was an immediate requirement for an air defense in being and that this air defense should be established with the available equipment, even though this equipment might be obsolescent. On the other hand, the panel members believed that currently available equipment was inadequate and therefore should not be purchased for use in an AC&W network. "The equipments . . . are useful for local defense against aircraft of current types," the panel concluded, "but cannot comprise useful parts of a system for early warning against the several types of offensive weapons expected in the future." In addition, the panel members felt that major

*The CPS-6B is an S-band radar system, air transportable, for early warning, ground controlled interception, and general air traffic control. It has height finder.

†A fixed radar set which has long range and high power. The FPS-3 has a range of 325 miles, more than twice that of the CPS-6B.

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procurement of the equipment then available would divert effort from the recommended research and development program. General Fairchild, Vice Chief of Staff, informed Secretary of the Air Force Stuart Symington that the Air Force believed the position of the panel to be incorrect. Establishment of an air defense in being with the equipment on hand would not divert effort from the research and development program. Fairchild stated that

> Basically, the Panel is saying that *present* equipment is not suitable for use against probable *future* offensive weapons. In this they are wholly correct. The impression given, however, is that *present* equipment is almost wholly useless against enemy offensive weapons in the immediate future. In this, the statement is not correct. The apparent conflict arises from a difference in timing. The Air Force requires an "air defense in being" by 1952, while the Panel is discussing what we hope to have in an air defense system by 1957.[42]

In its efforts to obtain funds for the immediate installation of radar equipment, the Air Force had to take into consideration this belief as expressed by the RDB panel.*

Regardless of diverse opinions on the feasibility of the purchase of available radar equipment, the Air Force decided to establish the 44-site LASHUP network with the World War II types on hand and to replace these sets later with the more modern equipment of the larger Permanent System. All told, it was planned that the 75 permanent sites would consist of 26 AN/CPS-6B's and 49 AN/FPS-3's.[43] As seen above, delivery of these improved sets had been scheduled for early 1949.

From the beginning the procurement program for the CPS-6B and FPS-3 radars was delayed. Although initial delivery of the CPS-6B was scheduled for February 1949, no sets had been delivered by October. At that time, in view of the Soviet atomic explosion, acceleration of the entire air defense program began.† This acceleration produced no radar sets immediately but announcement was made of a new delivery schedule which called for the initial set in January 1950 and two sets each month thereafter.[44]

The Soviet atomic explosion also had prompted General Whitehead to begin to beseige Headquarters USAF for action to improve the air defense system.†† In addition, he called upon Lt. Gen. Benjamin W. Chidlaw, Commanding General, Air Materiel Command, in March 1950 to "build a fire under every one who has anything to do with buying and building the radars which go into the [AC&W] sites."[45] Chidlaw assured him that every effort to expedite procurement of the radars would be made.[46] And, in April, he informed Whitehead that the first AN/CPS-6B had been delivered to its radar site in the state of Washington.[47]

This delivery of an improved set did not mean that the site became immediately operational. Although Headquarters USAF approved a proposal from Headquarters ConAC to save time by performing the operational suitability testing of the set at its permanent site, the delays which beset the entire Permanent System also delayed the testing.*[48] Consequently the set was not tested as planned and no permanent site was operationally ready until March 1951.[49]

Throughout 1951 the completion of the remainder of the Permanent System was held up largely by the delay in procurement of the CPS-6B and FPS-3 radars.[50] Labor union problems caused delay in the last half of 1950.[51] Also, some manufacturers were reluctant to accord the production of electronics equipment the emphasis needed if production schedules were to be met.[52] Despite the slippage in the program which resulted, USAF decided in the fall of 1950 not to seek a change in priority but to place additional emphasis on procurement and production of equipment. Therefore, completion of the Permanent System was geared to the availability of the new equipment. As was expected,[53] further delays were encountered and the 85 radar sites of the Permanent System were not fully operational until April 1953.[54]

As indicated above, the Air Force was under no delusion when the decision was made to install the temporary LASHUP radar network or the Permanent System. The limitations of the radar equipment, and any system composed of the equipment, were well known. Therefore, while the Permanent System was being installed, efforts

*See above pp. 23-25.

†See above, pp. 29-31.

††See above, pp. 31-32.

*Among the time-consuming aspects of the radar installation program were. site adaptation (3½ months), bid advertising (30 days); award of construction (45 days); construction (10 months for control center, 7-9 months for radar sites); installation of equipment (5 months); "shakedown" period (4-6 months), integration into air defense system (5-6 months). (Memo for record, Lt. Col. W.C. Odell, Headquarters USAF, P&O, 2 May 49, Case Hist AC&W System, doc 157.)

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to improve the equipment and the system were undertaken.*

Late in 1949 the Scientific Advisory Board had appointed the Air Defense Systems Engineering Committee (Valley Committee) to study the air defense system and make recommendations for improvements.† At first the Valley Committee directed its study to long-range problems but, by late 1950, had turned its attention to the problem of improving the existing radar equipment and the Permanent System.[55] Committee studies revealed that available radars were not achieving the range that they were designed to get, test equipment was inadequate, spare parts were lacking, and there was a shortage of trained personnel. These findings were discussed with the Air Staff and the Air Defense Command[56] with the result that the committee recommended that the Western Electric Company (using the Bell Telephone Laboratories) had the scientific and engineering "know-how" to improve the air defense system.[57] Acting upon this recommendation, Headquarters USAF signed a contract on 5 January 1951 with the Western Electric Company. Primarily the contract for the project—Continental Air Defense System (CADS)—placed emphasis on short-term improvements to the Permanent System. CADS was not to be concerned with redesigning the equipment.[58]

Secretary of the Air Force Finletter, who was "deeply concerned" over the USAF's limited air defense capability, believed that the CADS project would be an important step in improving the air defense system.[59] The office of the Chief of Staff also believed the project worthwhile. All staff sections were told to support CADS as much as possible for according to Gen. Nathan Twining, the Vice Chief of Staff, the project could make a "very substantial contribution to air defense capability."[60]

The CADS project began with a small group of scientists. As soon as this group had familiarized itself with the problem, other specialists, military and civilian, were added.[61] By the end of 1951, the project had proved of value with its "trouble shooting" activities.[62] From that time until it compiled its final report late in January 1954, the CADS project made numerous recommendations for changes in the ground environment of the radar network. According to Headquarters ADC, many of these recommendations were adopted by the command with a consequent improvement of the interim air defense system.[63]

The Ground Observer Corps

At best the interim early warning network, known as the Permanent System, afforded only the minimum acceptable radar coverage for the continental United States. Several defects, one of which is inherent in radar, itself, existed in the network. Radar operates on a line-of-sight principle and is not effective in long-range detection of low-flying aircraft. Because of this characteristic of radar, gaps in coverage are unavoidable in mountainous terrain. Although it is conceivable that a radar network might be constructed with enough radar sets to avoid these gaps, the cost would be excessive. Until radar sets become available in quantity and quality to form a complete radar "fence," the Air Force has no recourse but to depend upon civilian ground observers to fill the gaps.

The use of civilians on a voluntary basis in a Ground Observer Corps (GOC) to augment the radar network had been required during World War II. Civilian response had been satisfactory as long as air attacks on the continental United States seemed possible and more than 6,000 observer posts, with the necessary filter and information centers, were manned by civilians during the war. The effectiveness of the GOC was, of course, never tested against hostile air raids. Nevertheless, as indicated by two postwar civil defense reports which included discussions of a GOC, it was expected that civilians would be used as an integral part of the peacetime air defense system.

The first of these reports, that of the War Department Civil Defense Board (Bull Report),* issued in February 1948, recognized the need for a national civil defense but considered formation of a civilian ground observer corps as an Air Force responsibility and thus eliminated it as a civil defense consideration.[64] The second report, issued 1 October 1948 by the Office of Civil Defense Planning under Russell J. Hopley, disagreed and stated that a civilian aircraft observer system

*For efforts to develop better equipment and extend the Permanent System see below, chapter VI.

†See above, p. 31.

*The War Department Civil Defense Board was established 25 November 1946 under Maj. Gen. Harold R. Bull.

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should be established and organized by the Office of Civil Defense with coordination and evaluation of the information gathered by the system a responsibility of the Air Force.[65]

The expectation that civilians would be used in air defense was shared by the Air Defense Command for according to the interim mission assigned to the command, it was to "co-ordinate all passive means of air defense." In order to obtain authority to include civilians in the air defense system, Stratemeyer asked Maj. Gen. Lauris Norstad, the Deputy Chief of Staff, Operations for a "carte blanche directive to solicit assistance of civilian passive defense agencies as required for air defense."[66] General Norstad replied on 13 June 1946 that it was not believed desirable to have civilian agencies "actually active in an air defense system in peace-time." However, "adequate and workable" plans for integration of civilians into the system were to be kept current and available.[67] Despite these divergent views, ADC continued to assume civilian participation in air defense because, as General Stratemeyer stated in July 1946:

> It will be necessary for the American public to realize that air defense of the United States cannot be secured by the action of the Armed Forces alone. Continental Air Defense will require preparations to mobilize the potentials of civilians and industry to assist such defenses. They must also realize that neither time nor distance will shield them from the necessity of being prepared in peacetime to cope with the threat of air attack. It will be the responsibility of the Air Defense Command to determine the necessity of civilian participation in air defense and when so determined to take such steps as are necessary to secure civilian cooperation.[68]

According to Stratemeyer, ADC should be allowed to determine the extent of civilian participation and to prepare civilian agencies for their roles in the air defense system.[69] His interpretation of ADC's interim mission was approved in general by Headquarters, AAF, but no specific directive was forthcoming to cover actual civilian participation in air defense.

Further efforts by ADC in the first half of 1947 to obtain action on the use of civilians in air defense were to no avail. In August of that year Stratemeyer's Chief of Staff requested an opinion from Headquarters, AAF covering the activation of a Ground Observer Corps. The only specific restriction that AAF could find was General Norstad's letter of 13 June 1946. However, some references which prohibited or appeared to prohibit the conduct of civil defense measures by the War Department were noted. Regardless, Col. John B. Cary of Stratemeyer's staff stated that he did not consider the GOC to be a civil defense measure; provision for a GOC would be included in the revised short-term air defense plan.[70] Thus, Air Defense Command continued to plan for civilian participation in air defense in the expectation that authority would be granted by Headquarters USAF by the time a Ground Observer Corps was needed.

Finally Headquarters USAF specifically approved, for planning purposes, the inclusion of civilians in the air defense system. In its statement of air defense policies and procedures which was issued in June 1949, Headquarters USAF declared that, in the interest of economy and conservation of manpower, a ground observer system would be manned by civilians on a part-time basis. The system would be organized and maintained on a standby basis and its peacetime operations would be limited to tests and exercises.[71]

Although specific authority for the organization of a Ground Observer Corps had not been granted by Headquarters USAF, Air Defense Command and its successor, Continental Air Command, began setting up a ground observer system. A test of the system in the Northeast was made in September 1949 and many deficiencies were indicated.[72] Therefore, ConAC requested Headquarters USAF to authorize the formation of a GOC in those areas that were being defended against air attack. Also, ConAC asked that legislation be sought from Congress to make the GOC an official auxiliary of USAF.[73]

In February 1950 Headquarters USAF authorized the formation of a GOC composed of volunteers and specified that it would operate on a permanent basis. Furthermore, Headquarters USAF stated that the legislation requested by ConAC would be sought as soon as a detailed plan describing the GOC was furnished.[74] Headquarters ConAC at once submitted the plan.[75]

Now that the requisite authority had been granted, ConAC immediately undertook the establishment of a Ground Observer Corps. The target date for the first phase of the system—about 8,000 ground observer posts and 26 filter centers—was set at 1 July 1950, but, because of many difficulties, resolution of most of which required action by Headquarters USAF, several postponements were necessary. Despite publicity designed

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to interest sufficient volunteers to man the observation posts, the public was, in general, apathetic to the needs of the GOC. The outbreak of the war in Korea stimulated volunteering somewhat but interest was difficult to sustain. By the original target date for the completion of the first phase of the ground observer system, only 5 percent of the proposed observer posts were manned.[76] Increased publicity appeared to be the only method of securing sufficient volunteers and Headquarters USAF promised to give wider publicity to the GOC program.*[77] However, apathy among state officials often hindered publicity efforts because recruiting of GOC personnel had to be "on a mutual cooperation basis" between state authorities and ConAC. Also, recruiting had to be coordinated with the Office of Civil Defense Liaison in the Office of the Secretary of Defense.[78] Constant difficulty was encountered by USAF in its attempts to recruit volunteers because the Office of Civil Defense Liaison had no authority over state agencies and ConAC had no method of exerting pressure on the states.

Another hinderance to the completion of the GOC system arose because Headquarters USAF had never issued ConAC detailed directives delineating Air Force responsibilities in civil defense and, consequently, ConAC had issued no directives to its subordinate air forces. This deficiency was remedied in June 1950 when Headquarters USAF assigned most of its responsibilities in civil defense to ConAC. Included in these responsibilities was: "Planning and Operation of an aircraft observer system involving use of civilian volunteers as an augmentation of the radar screen."[79] ConAC, in turn, assigned this responsibility to the Air Defense Forces.[80]

Although this assignment of responsibility solved a major problem, other difficulties remained. There was a shortage of both civilian and military personnel for the 26 planned filter centers. The military personnel problem was solved in July 1950 with the assignment of one regular officer and two airmen to full-time duty at each center, but the number of civilians available remained dependent upon civilian interest in the GOC.* Despite insufficient personnel, by the end of 1950, considerable progress had been made in that the 26 filter centers were installed and operating while 61 percent of the ground observer posts were completely manned in EADF and 52 percent in WADF.[81]

Expansion of the ground observer system was authorized on 30 March 1951 when the Secretary of Defense approved a plan that called for the establishment of some 11,400 observation posts and 24 filter centers by 1 July 1955. This plan was considered Phase II of the implementation of the GOC.[82]

Although this progress was encouraging, the Phase II target date was not met and the GOC remained incapable of properly augmenting the air defense system. During 1951 several civilian groups reported on the deficiencies of the GOC.[83] These reports bolstered the opinion of ADC that two major requirements existed if the GOC was to become an effective air defense element: a higher priority for GOC equipment and around-the-clock operation in the more vulnerable areas.[84] The former change was made in December 1951 when the Air Staff raised the support priority for the Ground Observer Corps.[85] With the solution of the supply problem in sight, the second requirement could be considered and, by March 1952, Headquarters USAF had approved "in principle" the placing of portions of the GOC on twenty-four hour operation.[86]

Operation SKYWATCH, as the 24-hour operation was called, was scheduled to begin on 17 May 1952.[87] As had been predicted by General Chidlaw, full-time operation of the GOC during peacetime was not accepted without protest by civil defense officials and the public.[88] The day before the operation was to start, Secretary of Defense Robert A. Lovett postponed SKYWATCH until the Air Force could clarify the purpose and need for such an innovation. To aid in this clarification, USAF, ADC, and the Office of the Secretary of Defense conducted an extensive campaign in the summer of 1952 to convince civil defense officials and the public of the immediate need for

*In order to stimulate interest in the GOC program as well as to train personnel and evaluate the system, EADF held an exercise which covered the Northeast and Middle West in November 1950. Although many weak spots were uncovered, the exercise was considered a success because interest was stimulated (EADF, Report of Ground Observer Corps Exercise 4-5 November 1950, 27 Dec 50, in AUL M-36229-C).

*In order to improve the GOC coverage in sparsely settled areas, the Department of Agriculture agreed to make available the forestry service stations, as had been done during World War II (ltr, Sec of Agriculture (Brannan) to Sec of Defense, 6 Jul 50, in KCRC Hq ADC File No. 381 National Defense 1 Jan-31 Aug 51).

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a full-time GOC.[89] These efforts looked promising and, on 14 July 1952, Operation SKYWATCH began. In the vital areas of 27 states and the District of Columbia, the Ground Observer Corps of 150,000 volunteers manning 6,000 observation posts and 32 filter centers undertook continuous operations.[90]

With the supply problem alleviated and part of the GOC on 24-hour duty, the Air Force conducted an uninterrupted educational program throughout the next two years. It was hoped that the public would remain aware of the need for an effective Ground Observer Corps. This awareness would, in turn, stimulate volunteering for observation duty. The Air Force had only "fair" success in the program. By 30 April 1954, almost 350,000 volunteers were enrolled in the GOC, an increase of about 70,000 over the previous year.[91] Of these 350,000, however, only 130,000 were actively participating in the program.* These active members manned 5,383 observation posts, a far cry from the 16,000 posts deemed essential by the Air Defense Command.[92] Although the framework for a ground observer system was in being, the GOC remained a weak element in the interim air defense system.

The Fighter Force

Interim All-Weather Interceptors for Air Defense

The airframe which was to be the vital heart of the defensive weapon system was under development during the building of the Aircraft Control and Warning network. Since airmen generally agreed that future air attacks would undoubtedly be delivered at night or in bad weather, the defensive weapon system had to operate in all types of weather. Without an adequate all-weather interceptor, the radar network would be an ineffective but expensive warning device.

The requirement for an all-weather interceptor was influenced by AAF night fighter experience in World War II. Although AAF night fighter operations did not achieve spectacular success during the war (partially because the enemy offensive capability had greatly diminished by the time effective night fighters were in action), the necessity for all-weather operations was impressed on the AAF. Moreover, by 1944, an American night fighter—the P-61—had been developed.* This aircraft, called the "Black Widow," was the first Allied aircraft designed specifically for night-fighting.[93]

Late in November 1945 the AAF approved military characteristics for a jet-propelled aircraft as a postwar successor to the P-61. At first the all-weather interceptor was conceived as an aircraft that would be effective in daylight as well as at night or during inclement weather. However, by 1946, Maj. Gen. Curtis LeMay, the Deputy Chief of Staff for Research and Development, indicated that this conception had been changed. Henceforth, because the heavy radar-equipped all-weather fighter would be no match for a small day fighter, "all-weather" was to mean primarily night and/or inclement weather.[94] Military characteristics were revised to conform to this decision and designs for two experimental all-weather aircraft, the XF-87 and XF-89, were selected for investigation.[95]

Development of these aircraft would be slow and, until such time as a jet all-weather interceptor became available, an interim aircraft was needed. In the immediate postwar period, the P-61 had formed the bulk of the night fighter force.[96] As was expected, maneuvers held in the Northwest early in 1948 had quickly confirmed its limitations. The aircraft was deemed of no tactical value in defensive operations.[97] To replace the Black Widow while jets were being developed, the P-82 "Twin Mustang" had been selected in 1946.[98]† By the end of 1948, some 225 of this twin-engine, conventional interceptor were operational.[99]

Since the P-82, like the P-61, was of no value in daylight operations, jet models such as the P-80 and P-84 were assigned to fighter-interceptor units. These jet aircraft possessed the requisite speeds to combat bombers of the B-50 type but lacked the electronics equipment to allow them to operate any time other than during daylight. In turn, beginning late in 1949, these early jets were replaced by the F-86A, the best daytime

*At the end of July, 362,337 persons were enrolled in the GOC in contrast to the required 995,983 observers. Of the members enrolled, 147,693 were considered active (ADC Command Data Bk, July 54, pp. 73, 75).

*The P-61 had a maximum speed of 375 mph and a service ceiling of 33,000 feet. It was armed with 4 × 20 mm cannon and 4 × 50-cal. machine guns. The aircraft required 13 minutes to climb to 25,000 feet.

†The P-82, with a maximum speed of 475 mph and a ceiling of 45,000 feet, was armed with 6 × .50 cal. machine guns and could carry 25 rocket projectiles.

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interceptor available at that time.* By the end of 1950, of the 365 aircraft assigned to the air defense fighter forces, 236 were A and E models of the F-86.[100] Thus, without a real all-weather interceptor, the Air Force had no alternative than to place its reliance on a dual fighter force—jet aircraft for daytime operations and radar-equipped F-82's for night and bad weather interception.

During these early postwar years, Air Force efforts to obtain more effective fighter planes were influenced considerably by the uncertainties of Air Force programming. In the 70-group program, which was drawn up in April 1948 based upon the Finletter and Brewster reports,† 15⅔ groups of day fighters and 3 groups of all-weather fighters were called for while a revision of that program approved in August doubled the number of all-weather fighters. However, the economy program instituted at that time resulted in the substitution of a 48-group USAF program. Because emphasis had to be maintained on the strategic air force, reductions were made in the plans for the air defense and tactical forces. Under the reduced program, the goal was set at 7 groups of day interceptors and 5 groups of all-weather fighters.[101] In addition to delay because of the reduction in the planned force, aircraft procurement was impeded because when Congress provided funds, the aircraft industry was poorly prepared to expand production.[102] As a result, in July 1948 Headquarters USAF termed the all-weather fighter situation "critical."[103]

One step in solving the critical interceptor problem was taken in the latter part of 1948 when the decision on the procurement of an interim all-weather aircraft was made in favor of the XF-89. Flight tests began on the airplane in August and by October it had proved superior to both the XF-87 and the Navy XF-3D. The XF-87 program was terminated and, in December, Headquarters USAF directed the Air Materiel Command to negotiate for 48 of the new aircraft.[104]

Although the F-89 had been selected as the interim all-weather interceptor, it was an entirely new aircraft and rapid production could not be expected. In the meantime a better aircraft than the F-82 was required and, at the same time that the decision was made to purchase the F-89, procurement of the F-94 was recommended.[105] Because this aircraft was an electronics-equipped version of the two-place jet trainer, T-33, and therefore was based on an aircraft already operational, production could be expected to begin shortly. Although early models A and B were not all-weather, it was hoped that the F-94 would suffice as an interim interceptor since it had adequate speed, climb, and ceiling to operate against B-50 or B-36 type bombers.[106]

In May 1949 another all-weather interceptor was added to the "interim" class of defensive fighters when the USAF Board of Senior Officers* recommended the procurement of the F-86D.[107] These aircraft—the F-89, F-94, and F-86D—were to constitute the standard interceptors up to mid-1954.

While these decisions were being made in regard to interim all-weather interceptors, the first Soviet atomic explosion and the outbreak of hostilities in Korea occurred. These events emphasized the need for a more effective fighter force and fighter strength was increased by the federalization of Air National Guard squadrons.† Because modern aircraft were not available in quality or quantity to equip these squadrons, in December 1949 the Board of Senior Officers revised the aircraft procurement program to place greater emphasis on the modernization of interceptors and all-weather aircraft.[108] This meant improvements in the models currently in production—the F-89 and F-94. Since these models had been conceived and produced hastily in view of the increasing international tension, many desirable features had been sacrificed in order to get the aircraft into the air defense system as soon as possible.[109] For this reason, and because of the obsolescence of those fighter designs, the Air Materiel Command immediately objected to continued improvement of existing models.†† Instead, AMC's Directorate of Research and Development

*The designation of fighter aircraft was changed from P (Pursuit) to F (Fighter) in mid-1948 (AFR 65-60, 11 June 48).

†See above, p. 14

*The Board of Senior Officers, composed of five of the USAF's most senior officers, was appointed in 1948 to review Air Force procurement under the 48-group program.

†See above pp. 33-34.

††General Whitehead stated early in 1950 that "no all-weather fighter with capability for sustained combat is on order." He recommended, therefore, that the B-45 lightbomber be modified for use as an all-weather fighter (memo for Lt. Gen. Idwal H. Edwards, Chairman, Board of Senior Officer, Hq USAF from General Whitehead, subj: All Weather Fighter Situation, 21 Apr 50, in Hq ADC HD).

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wanted funds invested in new designs even if this resulted in fewer combat-ready aircraft.[110]

Although this objection was valid, the Air Force had no alternative. Because of the limitation of funds, a choice had to be made between improvement of the existing models that might be needed for combat at any time or development of new model designs.[111] Under the circumstances, the Air Force had to keep the available interceptors as modern as possible until a better aircraft went into production.*

Although these interim all-weather aircraft promised to improve the air defense capabilities considerably, actual conversion of the Air Defense Command fighter units was consistently behind schedule. Air Force program changes were partially responsible for the delay. At the time of the Korean outbreak, the Air Force was authorized 48 active groups projected through fiscal year 1953. A force of this size had been the goal since December 1948 but, because of inadequate funds, only 45 groups actually were in existence in June 1950. During the next six months the Air Force program was subject to wide fluctuations, primarily caused by the military situation in the Far East. For example, from July to September a goal of 58 groups by 30 June 1951 was in force. This goal was raised to 70 groups in September, lowered to 62 groups the following month, and, by the end of the year, was revised to 95 groups to be activated by the end of fiscal year 1951. Goals planned for future dates were altered in proportion.[112]

The planned number of interceptor squadrons and the scheduled rate of delivery of new equipment, as a consequence, changed accordingly. Also, each variation in the program necessitated a budget revision. And, to complicate the situation further, much equipment had to be diverted to the Far East Air Forces. Under the circumstances, it was difficult for both the Air Force and the aircraft industry to carry out production and procurement plans.

In October 1951 the Joint Chiefs of Staff recommended to the Bureau of the Budget an Air Force program of 126 combat wings and 17 troop carrier wings. This 143-Wing program was to be in existence by December 1954. Two months later President Truman instructed the Department of Defense to keep fiscal year 1953 military spending below $60 billion. Since this would result in a reduction in available funds, a "stretch-out" of the 143-Wing program to July 1955 was instituted. Based upon the reduced funds, an interceptor procurement program approved in June 1952 by the Secretary of the Air Force called for enough interceptors by the end of fiscal year 1955 to give ADC an all-weather force of 40 squadrons of F-86-D's, 2 of F-94C's, and 15 of F-89D's.[113] Although this goal was not attained, 52 of the 55 interceptor squadrons assigned ADC at the end of September 1954 were equipped with all-weather aircraft (38 squadrons of F-86D's, 10 of F-94C's, and 4 of F-89D's).[114]

The delay in the changeover of interceptor squadrons to all-weather aircraft was one result of the slowness of aircraft deliveries which, in turn, was caused in part by the changing Air Force programming.* Deliveries of the F-89 to operational units fell behind schedule from the beginning, and by June 1950 several deficiencies were apparent in the experimental models. Nevertheless, the Chairman of the Board at Northrop, Maj. Gen. (ret.) O. P. Echols, stated his "studied belief" that the F-89 was as good as could be built at that time and was better than any other aircraft available.[115] Although the Air Force remained skeptical, the first production model was delivered at Edwards Air Force Base (Muroc), California, on 28 September 1950.[116] By June 1951 F-89's were being delivered to operational units.[117]

Air Force skepticism was justified in late 1951 when delivery of F-89's was slowed considerably as the result, according to Secretary of the Air Force Finletter, of "some bugs" in the aircraft.† These bugs included defects which made the interceptor ineffective above 30,000 feet.[118] Since current plans called for the F-89 to constitute 25

*For example, the F-94A and B models lacked deicing equipment and therefore were not truly all-weather aircraft. Addition of this equipment was soon made and the ensuing model was designated the F-94C.

*Throughout the period of the interim air defense system buildup, a shortage of all-weather interceptor pilots and radar observers also delayed the program. This shortage of aircrew members was caused by a number of factors including the demands of the Korean War and the lack of training facilities (see ADC Historical Reports 1-7).

†For an account of the many defects encountered in the F-89, see Hist Air Research and Development Command, 1 Jan-31 Dec 53, I, 560-65.

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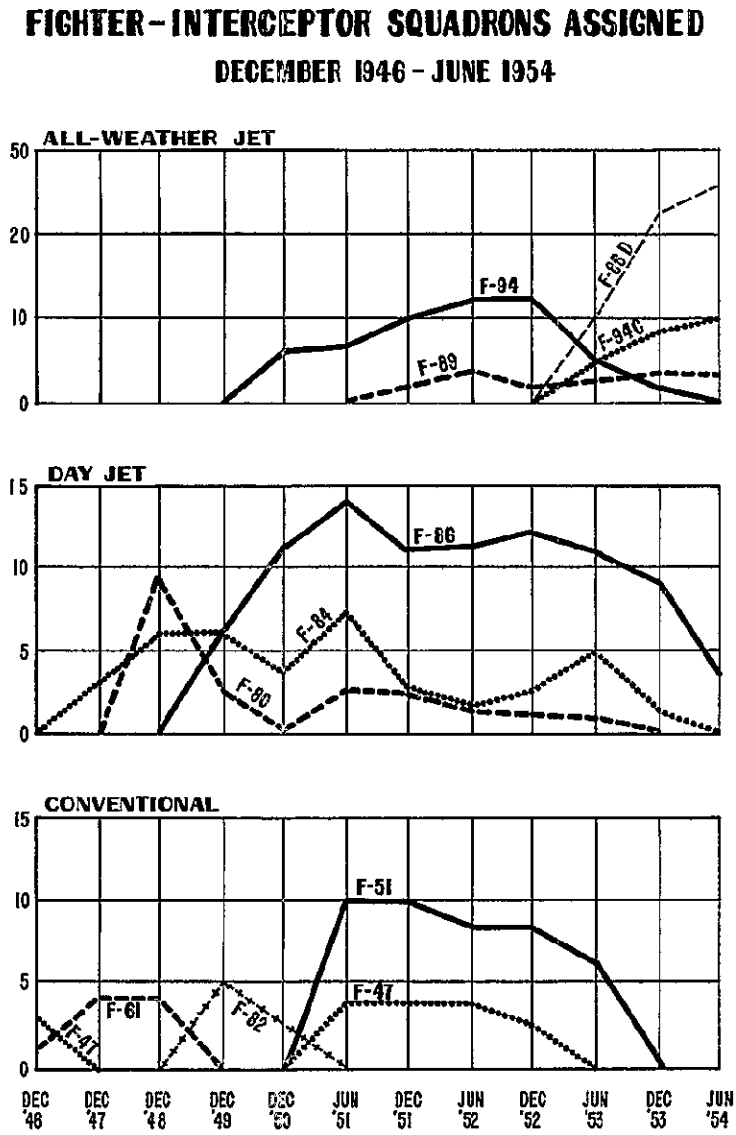

Chart 2

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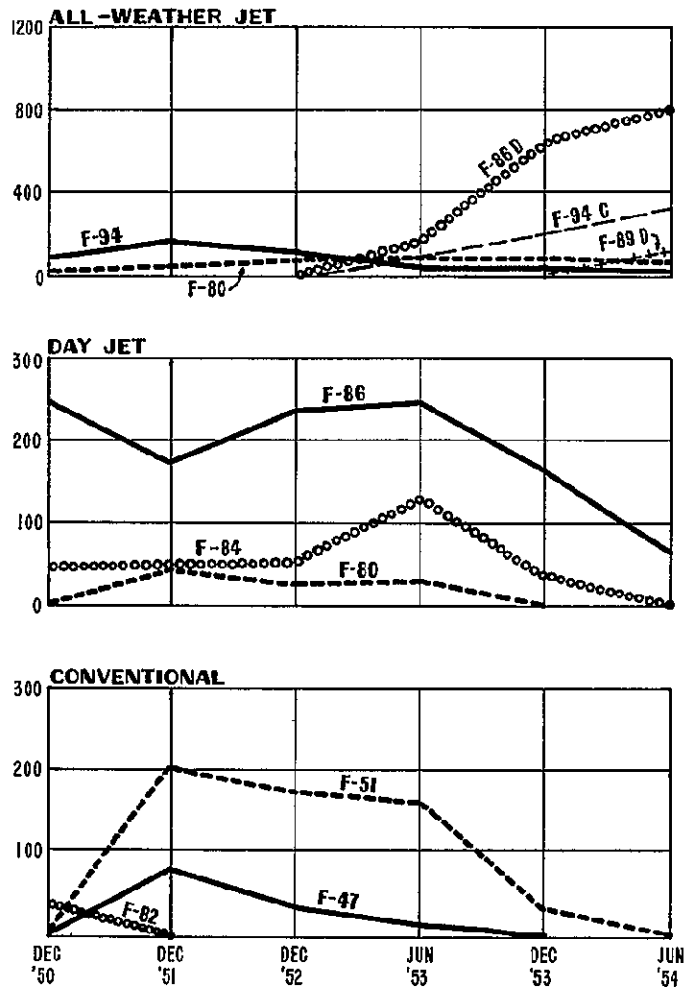

Chart 3

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percent of the ADC interceptor force, the aircraft had to be made combat-ready.[119]

Immediate improvement was not forthcoming and, during the first six months of 1952, the F-89 had seven major accidents which resulted in eight fatalities. Most of the defects were traceable to the attempt to increase output before the model had been adequately tested.[120] Although modifications were undertaken, at a cost of $17,000,000, the aircraft was grounded on 3 October 1952 until the major defects were corrected.[121] The effect of these difficulties could be seen when the Air Force reported only 66 "active" F-89's out of the total of 164 first line aircraft on hand on 30 June 1953.*[122]

Several other factors entered into the delay in the F-89 procurement program. The cost of the aircraft was triple that of an F-86D or F-94C. Thus, when cuts in procurement were required, the F-89 program was a convenient place to begin.[123] Moreover, F-89 production lagged for the same reasons as other aircraft programs.† Labor troubles took their toll while shortages of various types of equipment caused as much as four months difference in the acceptance and delivery dates of completed aircraft.[124] Lastly, because armament development had remained several years behind aircraft development throughout the postwar years, production of the F-89 and most other aircraft was delayed by the lack of an adequate fire control system.[125] Despite all of these delaying factors, production of the F-89 was accelerated during the second half of 1953 so that, by the end of fiscal year 1954, the Air Force had on hand a total of 349 F-89's of various models.[126] Of these aircraft, only 124 were assigned to ADC.††[127]

Because they were based upon models already in production, less difficulty was experienced in the procurement of the F-94 A&B's. These aircraft began to reach operational units in August 1950.[128] However, as early as the last half of 1951 production was delayed up to five months because of a shortage of engines.[129] By 1952 an attempt to modify the aircraft to make it a true all-weather interceptor had been in vain but enough of the modified models—F-94C's—had reached operational units to permit their integration into the air defense system.*[130] By the end of fiscal year 1954, 263 F-94C's were assigned to ADC, 138 of which were considered combat-ready.[131]

The last of the three interim all-weather aircraft—the F-86D—first was flown on 22 December 1949 and aroused considerable discussion from the beginning. It was a single-place aircraft and many airmen felt that all-weather interception was too complicated for one man. However, the superior performance characteristics of the aircraft augured well for it as soon as production could begin.†

By the end of 1951 six test versions of the F-86D had been accepted but the procurement program had been delayed by the lack of a suitable engine.[132] As a result, a year later only 86 of the aircraft had been accepted by the Air Force (none of which had been assigned to ADC) a total much below the planned level of acceptances. In addition to the engine shortage, the fire control system was proving unsatisfactory.[133] Although the program approved by the Secretary of the Air Force in 1952 called for 54 squadrons of F-86D's by the end of fiscal year 1955, attainment of that total looked doubtful when aircraft ordered in fiscal year 1950 had not been delivered by the end of 1952.[134] Delivery increased somewhat in mid-1953 but by December the F-86D had been grounded with an engine deficiency. Because of the grounding, labor troubles, and bad weather, the F-86D procurement program continued to lag badly.[135] Nevertheless, by the end of September 1954, most of the ADC interceptor squadrons (38 out of 55) were equipped with the F-86D.††[136]

*Of these only 18 were combat-ready in ADC fighter squadrons (Air Defense Command Data Bk, July 1953, p. 35.)

†One important reason for the greatly increased production time required to build a modern aircraft was the man hours involved. For example, 1,131,992 man hours were needed to produce an F-86D as compared with 41,880 man hours for an F-51 (Hist AMC, 1 Jan-30 Jun 1952, p. 144).

††The F-89D possesses a maximum speed of 552 knots, a service ceiling of 46,500 feet, and is armed with 104 × 2.75 in. rockets (USAF Aircraft Characteristics Summary, Wright Air Development Center, Suppl. of 25 Aug 54).

*The F-94C has a maximum speed of 556 knots, a ceiling of 51,400 feet, and is armed with 48 × 2.75 in. rockets (USAF Aircraft Characteristics Summary, Wright Air Development Center, Suppl. of 25 Aug 54).

†With a maximum speed of over 601 knots the F-86D has a service ceiling of 49,750 feet. Its armament consists of 24 × 2.75 in. rockets (USAF Aircraft Characteristics Summary, Wright Air Development Center, Suppl of 25 Aug 1954).

††ADC reported 359 F-86D's, 138 F-94C's, and 54 F-89D's combat-ready (Air Defense Command Data Bk, July 1954, p. 45).

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The 1954 Interceptor

The F-86D, F-89, and F-94C all-weather interceptors were considered "interim" aircraft; they were developed to fill the gap between conventional fighters and the semiautomatic interceptor envisioned as part of the ultimate weapon system. While these interim interceptors were becoming operational, the Air Force and the aircraft industry were cooperating in the development of their replacement, the "1954 Interceptor."

Development of this interceptor, known as project MX-1554, marked a new Air Force procedure in filling aircraft requirements. Instead of presenting industry with a set of rigid military characteristics, the Air Force explained its air defense problems to industrial representatives at a 1949 meeting in Washington. At this meeting an agreement was reached to treat the project of a new semiautomatic interceptor as a complete weapon system composed of three major parts. the airborne electronics equipment, the airframe to carry the equipment, and the ground environment. Experimental work began immediately on the radar equipment needed in the system and the Hughes Aircraft Company was awarded a contract for the development of an electronics and control system.[137]

In the fall of 1950, nineteen aircraft companies were invited to submit designs for the airframe needed in the proposed system. Only six companies responded. From these six, three designs were selected and by July 1951, the companies submitting the designs (Republic, Convair, and Lockheed) were awarded contracts. Developmental work on the three designs was to be completed by March 1952, but the interceptor was not expected to be operational until after 1954.[138]

In MX-1554, for the first time, an airframe was to be built "around" the electronics and control system. It was anticipated that the aircraft would employ the FALCON missile and that the intercept and control system could be made fully automatic if desired.[139] Much was expected of the project since performance characteristics proposed by each of the companies greatly exceeded the estimates of the Air Force.[140]

Despite the optimism engendered by project MX-1554, by the end of 1951 it was apparent that the "1954 Interceptor" would not be operational until the 1955-1956 time period. In view of this time lag, a re-examination of the interceptor program by the Board of Senior Officers revealed that a gap would exist between 1953 and 1955 during which the estimated speed of enemy bombers was Mach 0.8 to 0.85,* a speed too great for the interim interceptors. Therefore, it appeared that, once again, an interim aircraft was needed.[141]

A Headquarters USAF study of the need, which was begun immediately, resulted in an extensive survey of all existing and programmed airframe designs. Because of the time element, the usual industrial competition was foregone.[142] In September 1951 the decision was reached to build the interim interceptor from the airframe proposed by Convair for the 1954 Interceptor. The aircraft which would result was designated the F-102A. Although selection of this airframe was intended to accelerate procurement of the interim interceptor, delays in obtaining the final staff action and production difficulties hampered the F-102A program from the start.[143]

The decision to produce an interim version of the Convair design of project MX-1554 affected the final selection of an airframe for the 1954 Interceptor. It was decided that the Lockheed proposal was not satisfactory and that the Republic design would be developed as a separate project The latter design received the designation of F-103. The remaining design, that submitted by Convair, was thereby also selected for the 1954 Interceptor program and was designated F-102B.†[144]

The decision to produce the F-102A marked a milestone in aircraft development.†† The F-102A, a single seat, delta-wing all-weather interceptor would be the Air Force's first truly supersonic fighter. Furthermore, it was the real beginning of the weapon system approach. The aircraft would be integrated into the weapon system "as a whole from the beginning, so that the characteristics of each component were compatible with the others."[145]

*With the advent of supersonic speeds, the term "mach" has been used to measure speed in relation to the speed of sound. For example Mach is the speed of sound at sea level, or 741 miles per hour.

†The principal difference between the F-102A and the F-102B would be the installation of a more advanced engine in the latter aircraft (Hist, Directorate of Requirements, 1 Jul-31 Dec 41, p. 14.)

††In case the F-102 airframe proved unsatisfactory, Headquarters USAF directed the Air Research and Development Command to initiate an engineering study project with North American Aviation regarding an interceptor version of the F-100 "Super Sabre" (Hist Dir R&D, 1 Jul-31 Dec 53, p. 38.)

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The first YF-102A was delivered to Edwards Air Force Base for flight tests in October 1953.[146] In delivering the aircraft on schedule, Convair established a remarkable record for speed in the manufacture of an aircraft prototype—18 months from start to finish. Although the first YF-102 crashed after six successful flights, much satisfaction was expressed with the aircraft.* Tests were completed on 1 June 1954 and F-102A was scheduled for production beginning in December 1955.[147]

Thus, by mid-1954 the interceptor force for the interim system was still not complete. Most of the ADC fighter squadrons were equipped with interim all-weather aircraft—F-86D's, F-89D's, or F-94C's—but the performance characteristics of these aircraft were marginal at best when the capabilities of the only potential attacker were considered. A replacement for these aircraft—the interim version of the planned 1954 Interceptor—had been tested but this F-102A would not begin to enter the interim air defense system for some time. Not until the advent of the F-102B, which would appear as soon as the improved engine was ready, would the interceptors in the interim air defense system be replaced.†

*The F-102A has a maximum speed of 680 knots, a combat radius of 375 nautical miles, and a ceiling of 53,600 feet. Armament consists of 24 × 2.00 in. rockets and 6 guided air rockets (USAF Aircraft Characteristics Summary, Wright Air Development Center, Suppl. of 3 Feb 56).

†An improved interceptor—the Republic F-103—had been scheduled to come into the system about 1958 but was removed from the weapon system category in 1953. It was thereafter considered an experimental model (Hist ARDC, 1 Jan-31 Dec 53, p. 585). Nevertheless, ADC continued to press for an aircraft of the F-103 type (ltr, General Chidlaw to CG ARDC, 19 Aug 54, in Hist Conad and ADC, Jul-Dec 54, IV, doc 226).

The Interim System in Mid-1954

By the middle of 1954 the interim air defense system was almost complete and was functioning to the best of its ability. The Permanent System of 85 radar sites was in place and operational, supplemented by a large Ground Observer Corps. For the most part, the radar system was manually operated, leaving much to be desired from the standpoint of speed and efficiency. In order to extend the early warning coverage of the system seaward and to the north, plans were being made in conjunction with the Navy and Canada.* The interceptor force was almost entirely equipped with all-weather aircraft. A total of 1,202 all-weather interceptors, 551 of which were combat-ready, was assigned to ADC.[148] These aircraft were assigned to 55 squadrons stationed at 41 bases throughout the continental United States. Augmenting this interceptor force in an emergency would be fighter aircraft of the other USAF commands and the Navy. Also, antiaircraft forces of the Army Antiaircraft Command were in place to aid in the defense of vital target areas. As of 31 July 1954, combat readiness of all ADC units except AA was estimated at 40 percent.[149]

Although the interim system constituted a firm basis for an effective air defense, a number of deficiencies limited its operational capability. Skilled personnel were needed and supplies of equipment and spare parts remained inadequate;[150] these shortages could be alleviated only by increased training, development, and production. Other deficiencies, such as poor low altitude coverage and inadequate data handling, were being corrected by the expansion of the interim system.† Much improvement was required if the interim air defense system was to provide adequate protection for the continental United States.

*See below, chap. VI.

†See below, chap. VI.

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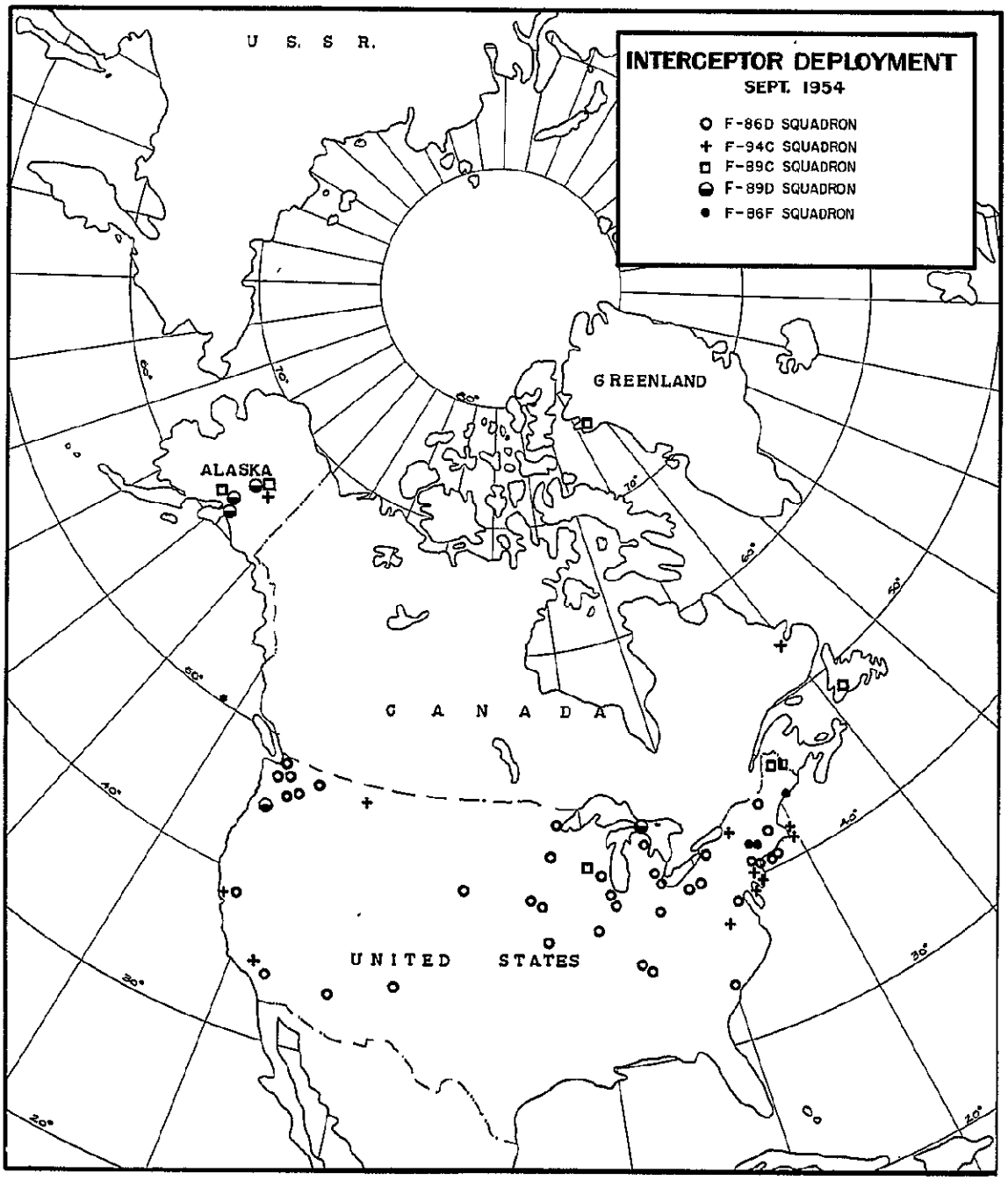

Map 3

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CHAPTER VI

EXPANDING THE INTERIM AIR DEFENSE SYSTEM

The Double Perimeter Concept

Air Force planners had recognized the inadequacies of the Permanent System and, at best, considered it the minimum acceptable. Also, they realized that increasing Soviet capabilities tended to render the system obsolescent before construction of the radar sites could be completed. With each increase—mainly in speed and altitude—attributed to the performance characteristics of the Soviet Long Range Air Force, a corresponding decrease took place in the potential early warning time afforded by the Permanent System. If the nation's air defenses were to offer sufficient protection to allow the strategic forces time to strike back at an aggressor, the interim system had to be improved and expanded to provide the greatest possible amount of early warning.

During the early postwar years several opinions were expressed in Headquarters, AAF concerning the type of radar defense that would provide the greatest amount of early warning. These expressions ranged from a suggestion for a defense system that would cover all approaches to the United States[1] to the statement that no operational system should be established until the nature of the future threat was determined.[2] The latter extreme, which amounted to accepting a calculated risk while requirements were being determined, found some favor within Headquarters, AAF for a time and later was advocated by the Scientific Advisory Board. Approval of Plan SUPREMACY* indicated that Headquarters, AAF had decided against that procedure.

Several factors influenced Headquarters, AAF not to adopt the other extreme. As early as January 1946 Continental Air Forces proposed a radar defense plan based on the principle that it was neither "feasible or practicable" to provide a radar screen around the entire nation.[3] This belief was emphasized by the USAF Air Defense Policy Panel which reported in February 1948. The panel believed that an active air defense of the entire United States was impractical because the cost of such a defense would endanger the national economy and leave insufficient funds for the air offensive.[4] During the following years, conception of SUPREMACY and the Modified Program indicated that the Air Force was compelled to limit its air defense planning to much less than a defense of the entire continental United States. As proposed by the Air Force and approved by Congress, the Modified Program called for only a single line of radar installations defending certain vital target areas.*

After further consideration of the type of network required, Air Force planners concluded that since all of the nations that could menace the United States in the foreseeable future were located north of the 45th parallel, at least for the present a network facing in a southerly direction was not needed. Danger to the nation no longer threatened from the east or west because the polar regions offered shorter and more practical routes than regions in the lower latitudes. This was the "polar concept" on which it was necessary to base all future air defense plans.

The probability that any future major air attacks on the United States would come from the North Atlantic or polar regions had been emphasized by the Joint Chiefs of Staff early in 1946.[5] Air defense plans drawn up at that time, however, did not always reveal an understanding of this concept.† In fact, as late as June 1946, Secretary

*See above, pp. 11-12.

*See above p. 23.

†For an example of early recognition of the concept's importance at this time see "Around the Corner," in *Air Force*, XXIX, no 3, (Mar-Apr 46), 6.

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of War for Air Stuart Symington was alarmed to find that a member of Lt. Gen. George E. Stratemeyer's Air Defense Command staff, in presenting information to the AAF Air Board on the radar warning net, had revealed the lack of a clear conception of the strategic importance of the polar frontier.[6] When Symington queried the AAF Deputy Commander, Lt. Gen. Ira C. Eaker on the matter, Eaker agreed that a misconception had existed but stated that the matter had been clarified and that plans were being made with due regard to the polar concept.[7] During July General Carl Spaatz, AAF Commander, called the attention of AAF commanders to the importance of the new concept.*[8] Also General Stratemeyer informed ADC staff sections and air forces that air defense plans were to be based on the assumption that air attack might come from any direction, but that greatest emphasis was to be placed on the danger of air attack across the polar regions.[9]

These factors—financial limitations, emphasis on the polar concept, and priority for the strategic forces—greatly influenced the type of radar defense sought by the Air Force. In mid-1946 the Air Defense Command had advocated a defense-in-depth in which defenses moved toward the enemy.† When the practical limit of extending the air defense line was reached, ADC planned that a defense in depth would be constructed extending back to the objective being defended.[10] This concept was used in the preparation of the long term air defense plan. Limited forces resulted in the abandonment of expectations for this type of defense. Therefore, when Maj. Gen. Gordon P. Saville took over the Air Defense Division in Headquarters USAF on 1 July 1948, he based his plans—which became the Modified Program—on the principle of a line of defense.[11] The limited network envisioned in Saville's plans was to be located to protect only the most vulnerable areas. Thus, the Permanent System included only enough radar to establish a ring of radar stations around the areas considered most vital: the Northeast, the Northwest, and the San Francisco-Los Angeles areas.

Installation of the Permanent System emphasized the defects of the radar coverage afforded. Coverage was shallow, early warning was lacking for the most vital approaches, i.e. from the North and the seaward areas, and gaps remained in low altitude coverage. Since a complete radar "fence" was out of the question, a new concept was required. This "double perimeter" concept, adopted by ADC in 1952, called for the establishment of two lines of radar around the vital target areas. As far as possible, interceptors would be located within these lines so that enemy aircraft could be detected and destroyed before they reached the bomb release line. Other radars and interceptors would be positioned throughout the defended areas, while the more isolated targets such as SAC bases and atomic energy installations, which were outside the double perimeter areas, would be defended by "island type" defenses. Among the additions to the interim air defense system needed to make this "double perimeter" concept workable were mobile and gap-filler radars, extension of the early-warning radar line northward and to the sea, and more automatic data-handling.

Strengthening the Permanent System

Soon after the Soviet Atomic explosion, Lt. Gen. Ennis C. Whitehead, Commanding General of Continental Air Command, began to press Headquarters USAF for improvements in the air defense system.* Whitehead pointed out that installation of the Permanent System would afford at best less than one hour's warning of B-29 type aircraft attacking the vital Northeast and Northwest areas. In the course of the next few months, he proposed several solutions to the problem of extending radar coverage northward, including the installation of 25 additional AC&W sites on both sides of the Canadian-American border.[12] Although Headquarters USAF approved Whitehead's proposal "in principle," nothing could be done immediately. International complications had to be overcome before American-manned radar stations could be installed in Canada,[13] whereas the addition of AC&W sites to the U.S. network required funds and JCS approval, neither of which could be obtained at that time.[14]

Meanwhile, a plan was being formulated in Headquarters USAF for the augmentation of the Permanent System by the addition of 44 radar

*In order to further the understanding of this concept, Spaatz suggested to the AAF commanders that they substitute Polar Stereographic projections for the Mercator projection maps commonly used.

†See above, p. 8.

*See above, pp. 31-32.

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stations. As approved by Vice Chief of Staff General Nathan F. Twining on 7 November 1950, this plan called for two mobile AC&W groups to man 20 basic radar stations as gap fillers. These units would be organized and trained so that they could readily be converted to tactical air operations. The other 24 radar stations would be assigned to two tactical control groups to provide radar coverage for SAC bases. Headquarters USAF did not submit this plan to the JCS for consideration because these 44 radar stations were not considered additions to the JCS-approved radar network but were mobile augmentations. In order to assist in gaining approval for this additional radar equipment Headquarters USAF defended the program budget-wise by emphasizing that the stations would increase the tactical air capability of the Air Force.[15]

On 10 July 1951 the addition of the 44 radar stations (known as the first phase of the Mobile Radar Program) received final approval from Headquarters USAF and was referred to ADC for implementation according to plan.[16] Air Defense Command immediately began siting surveys but equipment at none of the 44 sites had been installed by the end of 1951.[17]

By January 1952, because of such factors as the increasing Soviet capabilities and the results of air defense exercises, Headquarters, ADC had reconsidered the Mobile Radar Program and had concluded that a reprogramming of the 44 mobile radar stations was needed to place more emphasis on the double perimeter. Therefore, the command recommended siting approximately half of the 44 radars in the perimeter lines. The addition of these radars would complete the double perimeter across the northeastern part of the nation and would form a basis for completion of a double perimeter around the other vital areas.[18] Chief of Staff Vandenberg approved this reprogramming on 13 February 1952, subject to the availability of funds.[19] Approval was not forwarded by Headquarters USAF until 21 March after which ADC immediately began making the necessary alterations.[20]

Having received approval for the first phase of the Mobile Radar Program, ADC requested as a second phase an additional 35 radar installations.* Most of these radars would be used to complete the double perimeter around the Northwest and the San Francisco-Los Angeles area with the remainder placed wherever needed outside of those vital areas.[21] By the end of 1952, Headquarters USAF had approved the second phase of the program, subject to concurrence by Canada since three sites were located there.[22]

Still a third augmentation was requested by Headquarters, ADC late in 1953. This phase was to consist of 25 radar installations to be located along the Gulf of Mexico, the United States-Mexican border, and the United States-Canadian border.[23] Four additional radars were added to this third phase, and the 29 radar station program was approved by Headquarters USAF and given a high priority on 2 December 1953.[24]

Although these additions to the Permanent System would do much to fill the gaps and strengthen the double perimeter radar network, one outstanding weakness remained—surveillance would continue to be inadequate below 5,000 feet. The Ground Observer Corps would provide some low-altitude cover but was very limited in the speed and accuracy of its detection and evaluation. In order to correct this deficiency, in January 1953, Headquarters, ADC submitted a requirement for a system of small automatic radars. These sets, which would have a range of 50 miles, would be sited within the radar network to provide short range, low-altitude cover.[25] Headquarters USAF approved the system in principle and gave its development a high priority.[26]

At the same time, a study of air defense against low-altitude attack was undertaken by the Willow Run Research Center and the Lockheed Aircraft Corporation. The report based on this study emphasized the need for the type of system advocated by ADC and recommended that the Air Force immediately place as much emphasis on a solution to the low-altitude problem as it was placing on the development of medium and high-altitude radar systems.[27]

By September 1953 ADC had worked out a program requiring 323 small automatic radar sets to be deployed in three phases.[28] The program was approved by Headquarters USAF on 2 December and the first phase, consisting of 125 radars, was included in the fiscal years 1954-1955 programs. However, it was not expected that these radars would be operational until 1957.[29]

These additions to the radar network promised to increase greatly the detection and tracking

*The second phase was reduced to 25 sites in February (ADC Hist Rpt 7, pp. 73-74).

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capability of the air defense system. Although it would be months before the augmentation programs were completed, significant progress had been made by the end of July 1954.[30]

Northward Extension of the Radar Network

Adoption of the polar concept, in addition to the realization that Russia was the only potential threat to the United States, determined that the continental air defense system would face the only direction from which an air attack was likely—northward. Actually, several approach routes were involved, each of which presented different problems for U.S. air defense planners. Defense against an air attack through Alaska or other U.S.-held territory involved only the establishment of the required air defense forces. Air defense in Canadian territory, however, required unprecedented peacetime international agreements. Defense for the other approach routes—over the North Pacific and North Atlantic—could be accomplished only by use of new air defense elements; airborne early-warning aircraft, picket ships, and Texas Towers.*

Because Alaska is the closest American possession to Russia, its defense assumed a paramount role in the defense of the United States. And, as stated by Lt. Gen. William E. Kepner, Commander in Chief of the Alaskan Command, "the key to Alaskan defense is in the air."[31] Consequently, in May 1945, before the end of World War II, a plan had been made for Alaskan radar defenses. Postwar cuts in personnel and funds, however, prevented the accomplishment of the plan.[32] In the following year, the Alaska military establishment was reorganized and several new plans were developed for radar coverage of the area.[33] Again little progress was made and, by 1947, only two radar installations were operational in the territory.[34]

Promise for improvement in Alaskan air defenses appeared late in 1947 with the presentation by Headquarters USAF of Plan SUPREMACY. This plan called for 24-hour operation of Alaskan radar stations and installation over a five-year period of 37 radar stations and 4 control centers in a territorial radar network.[35] For several reasons Congress took no action on SUPREMACY.†

*See below p. 68.

†See above pp. 22-23.

On 25 March 1948, in the midst of increasing international tension, General Carl Spaatz, Air Force Chief of Staff, ordered the immediate augmentation of the Alaskan air defense system. During the next few days he directed the Alaskan Air Command (AAC) to place its radar on a 24-hour basis by 4 April and to integrate its radar system with that of the Northwest United States.[36] Spaatz also took action to strengthen the Alaskan air defenses as much as possible. While efforts were being made to comply with Spaatz' directive, the tense period ended.*

Because of weaknesses apparent in the attempt to set up an air defense and because it seemed certain by the fall of 1948 that Congress would not approve SUPREMACY, USAF decided that some action had to be taken to establish an air defense system. Lowering its demands to an irreducible minimum, the Air Force presented its Modified Program to the Secretary of Defense for consideration. In explaining the program to the Secretary, Maj. Gen. Gordon P. Saville pointed out that no discussion of the air defense of the United States was complete without reference to the air defense of Alaska. Therefore, the program called for ten radar stations and one control center for the Alaskan network. Saville admitted that such coverage would obviously be inadequate but it was all that could be done before 1952.[37]

The Modified Program was approved and installation of the radar equipment in Alaska followed the same pattern as installation of the continental radars. During the construction period a lashup program was instituted to give some early warning. Shortages of equipment and personnel served to delay the Permanent System scheduled for completion in 1952.† In addition, the severe winter climate of the territory often hampered construction.[38] As a result, the radar sites of the Permanent System were not operationally ready until early 1954.††[39]

*See above, pp. 19-20.

†The F-94 began joining the Alaskan air defenses in 1950 and during the next three years was the mainstay of the interceptor force. By mid-1954, conversion of Alaskan Air Command's six interceptor squadrons to the F-89 was nearly completed (Hist AAC, Jan-Jun 54, p. 84).

††Like the continental AC&W system, the Alaskan system was scheduled for further augmentation in the 1955-1960 time period (Hist AAC, Jan-June 54, p. 138ff).

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In the same way that plans called for the Alaskan air defense network to detect attacks from the northwest, it was anticipated that Air Force installations in the northeastern areas of North America would afford early warning of attacks from that direction. During World War II the United States had acquired military bases in Newfoundland, Labrador, and Greenland; these bases were under the jurisdiction of the Newfoundland Base Command (NBC) and were used largely as staging areas for ferrying aircraft to the European Theater of Operations. At the end of the war, NBC was transferred to the Army Air Forces, which in turn delegated jurisdiction to the Air Transport Command. On 1 October 1950, NBC was relieved from control of the Military Air Transport Service (ATC's successor) and was redesignated Northeast Air Command (NEAC).[40]

Northeast Air Command was established primarily because of the increased international tension which followed the Soviet atomic explosion and the outbreak of the Korean war. Since the territory included in NEAC lay on the shortest air line from the Russian industrial regions to the most populous, industrialized section of North America, it offered excellent opportunities for early warning and air traffic control.* Therefore, when plans were made to extend continental U.S. radar coverage in 1950, it was evident that the extension program should include radar installations in NEAC.[41]

As continental air defense increased in importance, NEAC's air defense mission assumed a greater role in the activities of the command. By 1951, 10 radar sites, which were part of a 33-radar site Radar Extension Program agreed upon by the air defense commands of USAF and RCAF,† were scheduled to be installed in NEAC. These 10 sites were to constitute the aircraft control and warning system for the command, and their construction became the command's principal AC&W activity. By mid-1954, all but one of the NEAC sites were operational. In order to make use of the early warning afforded by these sites, by early 1953 NEAC had been assigned three interceptor squadrons flying F-94's. These squadrons were scheduled to convert to F-89's in the near future.*[42]

By mid-1954, installation of the air defense systems of the Alaskan Air Command and the Northeast Air Command had kept pace with the development of the interim continental air defense system. At least some detection and control capabilities would thereby be provided through the northeast and northwest approaches to the United States.

In the meantime, progress was being made on the Radar Extension Program which involved cooperation between USAF and the Royal Canadian Air Force. Cooperative defense efforts predated World War II and were continued in the postwar period by the neighboring countries when they agreed in 1947 to allow the wartime Permanent Joint Board on Defense (PJBD) to continue its consideration of the defense of the Western Hemisphere. Discussions between the nations had continued and, in 1949, the American Joint Chiefs of Staff approved the Canada-United States Emergency Defense Plan calling for high-level air defense planning. By the middle of June 1950 an air defense plan establishing the policy that the Canadian and American air defense systems should be mutually supporting in event of emergency had been prepared. Questions of national sovereignty arose, however, and delayed acceptance of the plan until the following year.[43]

Despite this delay in approval of the air defense plan, progress was being made in the northward extension of the radar network. Several suggestions to improve radar coverage along the border by Canadian-American cooperation had been made.[44] General Whitehead pointed out to Headquarters USAF the need for improved coverage early in 1950 when he stated:

> In my opinion, our highly industrialized, highly populated border—which just so happens to be that border facing the threat to our national security—is wide open, and will continue to be so until we extend our presently programmed radar net northward.[45]

*Brig. Gen. C.V. Haynes, NEC's commander, had proposed strengthening defenses in his area as early as 1947. He believed that NEC's defenses should be at least as strong as those of Alaska. Pointing out that the territory in NEC did not belong to the United States, General Spaatz replied: "As you well know. . . it is a great deal more difficult to obtain funds and rights for those latter areas than for Alaska." (ltr, Hq NEC to Spaatz, CG USAF, 8 Dec 47; ltr, Spaatz to Brig. Gen. C.V. Haynes, CG NEC, 31 Dec 47, in DRB 381 War Plans—Miscellaneous National Defense 1946-47).

†See below, p. 61.

*Because of the aircraft shortage, no interceptors were assigned to the command before early 1953. Fighter strength had been provided by the rotation of interceptors through the command for training (Hist NEAC, 1 Jan-30 Jun 51, p. 41).

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Whitehead reminded Headquarters USAF that the Canadian JCS had approved additional radar sites in Canada to serve as a system extension, but he was convinced that the sites would never be built "unless the United States foots most of the bill."[46] Headquarters USAF informed Whitehead that nothing could be done until an international agreement was reached, and that such an agreement was being sought.[47]

Continued discussions were held between Canadian representatives and USAF but no action was taken because, as the PJBD revealed on 29 May 1950, a plan was needed and a decision had to be reached on the division of cost of the radars to be located in Canada. Headquarters USAF directed ConAC, in conjunction with RCAF, to prepare the required plan.[48] The ConAC plan, submitted 17 July, called for a total of 32 radar sites, 6 to be financed by Canada, 12 by the United States, and the remainder to be paid for jointly.* Operational control of the radars would be exercised by Continental Air Command.[49] In conjunction with a representative of the Canadian JCS, "certain politically unacceptable items were removed" from the plan and, at the invitation of Canada, ConAC was directed on 1 August to proceed with siting the radars. Although General Vandenberg approved the plan on 6 September and Canada acquiesced on 22 September, the JCS deferred action when they considered the plan on the 25th.[50]

Further high-level consideration of the plan followed, and by 20 February 1951, it had been approved by the Joint Chiefs of Staff of both countries and by the Canadian cabinet.[51] However, approval (subject to availability of funds) of the radar extension was not obtained from President Harry S. Truman until 14 April.[52]

As finally agreed upon, the extension program (PINETREE) called for 33 AC&W sites, 22 of which would be financed by the United States. Of the 33 stations, 10 were to be manned by NEAC, 8 by ADC, and the remainder by RCAF.[53] It was anticipated that the PINETREE radar chain would do much to fill the gaps in the continental Permanent System.

As had been true of the other radar programs, PINETREE lagged badly almost from the start.[54] A USAF-RCAF Radar Extension Program committee was established to oversee the project and a lashup program was instituted. Continued delay brought about a replacement of this committee in mid-1952 by a Joint USAF-Canadian Project Office composed of representatives of Headquarters USAF, ADC, NEAC, AMC, and RCAF.[55] By the end of 1952 the target date for a fully operational PINETREE chain had been postponed to 1 July 1954.[56] This target date proved more realistic and all PINETREE sites were operational by the end of June 1954.*

*Eight of the sites to be financed by the United States were to be manned by Canadians.

Distant Early Warning Line

As General Twining recently stated, "the first nuclear explosion in Russia was a punctuation mark—signalling the end of an era of American safety by isolation."[57] Because the Soviet atomic explosion referred to by the Chief of Staff—which had occurred several years prior to expectations—increased the danger to the United States, it also resulted in greater emphasis on continental air defense.† Emphasis became greater in mid-1950 when the Republic of Korea was invaded by North Korea and the United Nations moved to halt the aggression. In the wake of these actions, awareness of the vulnerability of the nation began to spread among the people, and during the next three years the amount and type of air defense needed for the nation's protection became topics of public discussion. In the midst of these discussions came the decision to build the northernmost extension of the radar network—the Distant Early Warning (DEW) line.

Background of DEW Line

As an aftermath of the Soviet atomic explosion, an Air Defense System Engineering Committee (ADSEC) was formed by the USAF under the Chairmanship of Dr. George E. Valley of the Massachusetts Institute of Technology (MIT).†† In cooperation with the Air Force Cambridge Research Center and working part-time and weekends, ADSEC began a study of the problem of air defense. In the fall of 1950 another group, the Weapons Systems Evaluation Group (WSEG) of the Office of Secretary of Defense, reported on

*For a discussion of the difficulties encountered in achieving this goal see: ADC Hist Rpt 6, pp. 86-96.

†See above, pp. 29-31.

††See above, p. 31.

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the first phase of a comprehensive air defense study. The WSEG report indicated that the continental air defense system was inadequate and that the situation would not be materially improved by completion of the Permanent System. Therefore, the Air Force decided to establish a laboratory to implement the work of the part-time ADSEC. MIT was considered "almost uniquely qualified" to establish the laboratory.[58]

Early in January 1951 the Air Force and MIT decided that this laboratory should undertake a broad air defense program covering problems of interest to all three military services. The program would be handled in three phases: Project CHARLES—a short term study project to review the problem; improvement of existing radar and communications equipment, and establishment of a new laboratory to carry out the work of the first two phases. This third phase was named Project LINCOLN by Maj. Gen. D.L. Putt, the Acting DC/S for Development at Headquarters USAF.[59]

Work of the Project CHARLES group, directed by Dr. F.W. Loomis of the University of Illinois and composed of 28 scientists and engineers, began 19 February 1951. By 1 August the group had prepared its report. In the main, Project CHARLES confirmed the Air Force position that the air defense system was highly vulnerable to surprise attack and that the early-warning system was inadequate. It was the opinion of the CHARLES group that the addition of a few hours warning would greatly improve the effectiveness of the air defense system.[60]

Simultaneous with the appearance of the CHARLES report, Project LINCOLN was being organized. On 26 July 1951 the three services agreed to a charter for a Project LINCOLN laboratory which would have air defense as a primary mission. The laboratory was established, and work began immediately and continued throughout the next two years.*[61]

LINCOLN Summer Study Group Report

In the summer of 1952 the LINCOLN Laboratory (as Project LINCOLN was known after 17 April 1952) organized a special study committee, called the Summer Study Group, "to review the evolution and future development of the air defense of Continental North America."* The Summer Study Group concentrated on three problems. radar warning network to give three to six hours of early warning; an interceptor force to use this warning; and a defense against intercontinental ballistic missiles. Its findings were made known to representatives of the National Security Council and the Defense Department on 27 and 28 August 1952.[62]

In regard to the existing and planned air defense system the Summer Study Group presented a number of conclusions, all of which were well known to those concerned with air defense. The Group's report emphasized the nation's vulnerability to air attack, particularly to a low-altitude surprise attack. The members of the Group believed that a strong air defense was possible, a defense that would furnish three to six hours of early warning. Establishment of this defense would require measures *"of a kind and on a scale not hitherto required"* in air defense planning.[63]

Specifically, the Summer Study Group called for the creation of a defense in depth northward. Included in this defense would be a distant early-warning zone, a tracking or information zone, and a zone of advanced interception. Behind this defense would be the double perimeter warning network being established at that time.[64]

The section of the Group's report that attracted the greatest attention was its recommendation for the immediate establishment of a distant early-warning line. Two recent technological advances—automatic alerting radar and VHF scatter propagation†—made possible the erection of a DEW line which would be reliable and relatively inexpensive.[65] Installation costs for the line, according to the report, would be about $370,000,000 with an annual maintenance cost of

*Among the many problems investigated by the LINCOLN Laboratory was the requirement for an improved ground electronic environment. See below p. 73.

*The Summer Study Group was composed of J.R. Zacharias, Isidor I. Rabi, Charles Lauritsen, Charles Oppenheimer, and other prominent scientists.

†The automatic alerting radar would be a small set that would sound an alarm when an object approached. The PPI scope could then be checked. This procedure would relieve radar technicians of 24-hour surveillance of a radar scope thus reducing the number of personnel needed to operate a radar station. VHF scatter propagation had been known since early 1951. MIT scientists discovered that certain VHF signals scatter rather than continue in a straight line. Some of these reflect from the ionosphere and can be picked up by an antenna 500 to 1200 miles away. This discovery greatly extended the range of early-warning radar (LINCOLN Laboratory, Project CORRODE, 21 Jul 54, pp. 3-4).

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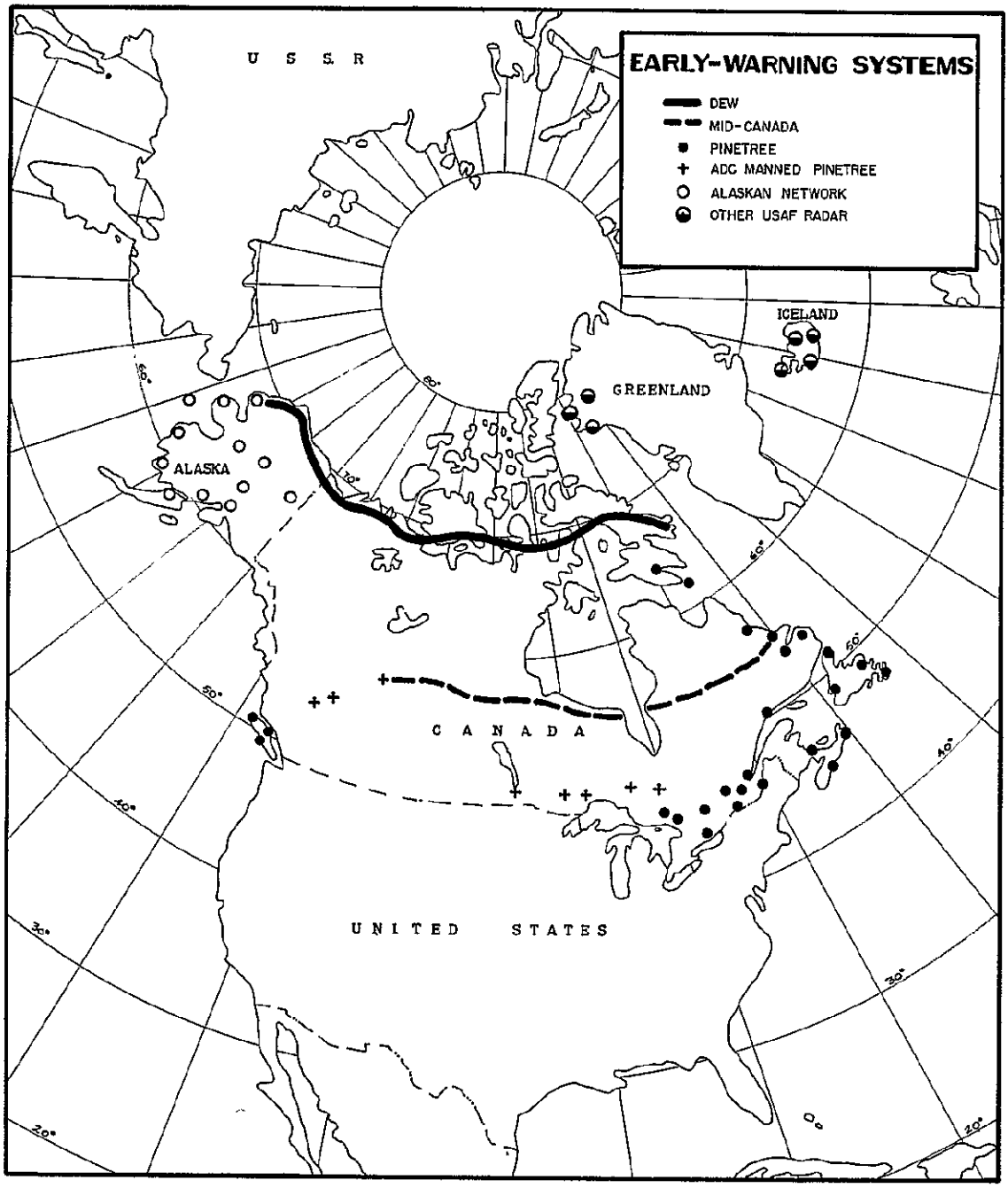

Map 4

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about $100,000,000. The Group recommended that the DEW line be located as far from the United States as possible in order to furnish maximum warning time. It suggested a line running approximately along the 70th parallel and connecting the Alaskan radar network with that of the Northeast Air Command. The Group believed that the DEW line could be operational by the end of 1954.[66]

The recommendations of the Summer Study Group took on added significance in view of the findings of Project EAST RIVER, which issued its final report on 1 October. EAST RIVER was organized by the Truman administration to study the problem of Civil Defense at that time and in the immediate future. The project concluded that an increase in military air defense was necessary to reduce the Civil Defense problem to manageable proportions. Specifically, an hour or more of early warning was required if a Civil Defense program was to be effective.[67] Since even that brief warning time could not be guaranteed by the interim air defense system, need for more early warning was highlighted.

Although neither the Air Force nor the Department of Defense had officially approved it, the Summer Study Group report was presented to the National Security Resources Board (NSRB) in September 1952. Because of the group's conclusions relative to the nation's vulnerability, the members of the NSRB apparently were startled into action. On 24 September the Chairman of NSRB presented a paper to the National Security Council based upon the Summer Study Group findings. This paper advocated immediate implementation of the DEW line with an initial appropriation of one billion dollars to cover the next three or four years. President Truman was also apprised of the findings; the Department of Defense was asked for its position, and, in turn, the Air Force was requested to take over the problem.[68]

The Air Force acknowledged the need for a distant early-warning radar network but stated that the entire air defense system had to be considered. The Air Staff believed that if funds were available for such a crash program, the money might be used more advantageously to improve other phases of the air defense system. Furthermore, the Air Staff felt that development of the improved radar equipment needed for a DEW line was not far enough advanced to warrant a crash program. In consideration of the findings of the Summer Study Group and the LINCOLN Laboratory, however, the Air Force recommended the acceleration of research and development on components for arctic use.* Based upon this recommendation, an Air Force proposal that $20,000,000 be used for that purpose was approved.† These opinions expressed by the Air Staff also became the position of the Department of Defense on the question of a crash program for the DEW line.[69]

The Air Force was not opposed to the establishment of a distant early-warning line as an element of the continental air defense system. Opposition to a crash implementation of the DEW line was based on three factors. the inadequacy of funds for such a project if the Strategic Air Command was to be maintained at the necessary level; the need to use any available funds for improvements in the existing air defense network; and the belief that the equipment needed for an arctic line was not sufficiently developed for immediate installation.

Despite the opposition of the Air Force to a DEW crash program, the National Security Resources Board and other governmental agencies continued to exert efforts to have such a program approved. For the most part these efforts were directed toward persuading President Truman to approve a National Security Council policy statement which included authorization for a distant early-warning line.[70] The Air Force and the Office of the Secretary of Defense (OSD) joined forces in opposition to such a policy statement. According to Air Staff reasoning, no policy statement should be issued unless the means existed for carrying it out.[71]

DEW Line Wins Approval

Air Staff and OSD opposition notwithstanding, President Truman approved the disputed policy

*In December 1952 USAF awarded a contract to Western Electric Company to build two experimental installations, to survey Distant Early Warning sites, and to carry out research and development work (LINCOLN Laboratory, Project CORRODE, 21 Jul 54, p. 3; Project LINCOLN Case History, Air Force Cambridge Research Center, 10 Dec 52, pp. 1-3).

†The DEW line project was immediately studied by the RAND Corporation. RAND concluded that there was no place for a DEW line in the air defense system as long as the budget level then maintained was continued. RAND believed that if future air defense funds were increased, and if a DEW line proved feasible, the line should be considered as a part of the entire continental air defense system (Project RAND, Distant Early Warning in the Defense of the United States, 24 Nov 52).

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statement on the last day of 1952. The statement held that continental defense had to be strengthened and that the defense should be ready for any eventuality not later than 31 December 1955. Since early warning was a key element in this defense, a distant early-warning line that would afford three to six hours warning had to be constructed. The statement directed the Defense Department to undertake the task of developing, installing, and operating the continental defense system. Included in the system were to be well organized programs for civil defense, industrial security, and rehabilitation of vital facilities.[72]

Following this declaration of presidential policy, Secretary of Defense Robert A. Lovett informed all concerned within the Defense Department that in line with the President's directive a distant early-warning line was to be developed, installed, and operational by 31 December 1955. The testing of equipment, which Lovett assigned to the Air Force, was to begin during the arctic summer of 1953. The project was assigned the code name COUNTERCHANGE (later changed to CORRODE).[73]

Meanwhile, the entire conception of the Distant Early Warning line became the object of much public discussion. Conflicting reports of the value and cost of DEW appeared, with estimates of the cost of the line running as high as $150 billion. The reasons for the Air Force reluctance to accept a crash program for DEW installation were often distorted, and sinister motives were attributed to those who advocated or opposed construction of the line. Prominent among the objections to DEW was the fear that its existence would promote a "Maginot Line" psychology among the American people. Although the total effect of the public debate on the merits of DEW was probably harmful to Defense Department security, it undoubtedly played a part in the greater emphasis placed on air defense during 1953 and 1954.[74]

Now that the DEW line had been decided upon and had been assigned to the Air Force, plans for its construction were undertaken. According to an ADC requirements study, the line would be composed of warning stations sited about 30 miles apart and 2 miles in depth. The DEW line, as desired by ADC, would actually extend from Hawaii through Alaska, across Canada, and southeastward to the Azores. The seaward flanks would be covered by airborne early-warning aircraft and picket ships.* The operational date for the northern Canada portion of DEW was set at 1 July 1957. Once the DEW line was operational, early-warning radar would have been placed as close to the enemy as possible. Nevertheless, at best DEW would provide not more than six hours warning for a B-50 type bomber and two hours for jet bombers and missiles.[75]

Mid-Canada Line

One result of President Truman's policy directive approving the construction of a distant early-warning line was Defense Secretary Lovett's decision to begin developing and installing test equipment under arctic conditions. This responsibility was assigned to the Air Force as Project COUNTERCHANGE (CORRODE).[76] On 30 January 1953 American requirements for CORRODE were presented to Canada, and approval for testing equipment and carrying out site surveys for a possible distant early-warning line across Canada was requested. Canada granted conditional approval a month later. One of the conditions was that a study group should be established to study air defense matters of joint concern to the two countries. This condition was acceptable to the United States and the Canada-United States Military Study Group (MSG) came into being. One of the group's first recommendations was the establishment of an early-warning line along the 55th parallel.† Both governments approved the recommendation and work began on Project CORRODE during the arctic summer of 1953.[77]

In September 1953 President Dwight D. Eisenhower approved a policy for improving continental defense. Based upon this policy directive, the National Security Council directed the installation of a radar line across southern Canada with all possible speed.[78] Shortly after the appearance of this directive, the United States and Canada approved the Military Study Group's recommendation for the establishment of an early-warning radar line along the 55th parallel.†† The approved

*See map, p. 69.

†The same recommendation had resulted from a Canadian Department of National Defense study in mid-1952 (Dept of National Defence, Opns Research Memo No 22B, An Operational Assessment of a Northern Radar Alerting Chain Employing Equipment Now in Process of Development by the Defense Research Board of Canada in Cooperation with the National Research Council, Aug 52).

††See map, p. 63.

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MSG report also stated that this line—the Mid-Canada—would be surveyed by the RCAF in consultation with USAF, and that Canada would construct the line, without prejudicing a later decision on the division of costs.[79] This report was supplemented by a second MSG recommendation to assign to USAF and RCAF the task of developing the required equipment and making a system engineering study.[80] By the end of the year Canada had established a Mid-Canada line project in Headquarters RCAF and was conducting a preliminary survey of the region in which the line would be installed.[81]

Reaching a decision on the type of equipment for the line proved a stumbling block. On 24 February 1954 the National Security Council again called for the development of the Mid-Canada line to "a high state of readiness" as rapidly as possible and for continuous improvement of the line to keep pace with Soviet offensive capabilities. However, by mid-1954, a Systems Engineering Group appointed to study the equipment problem had not reported,* and USAF and RCAF had not agreed on the method for using the information furnished by the radar line.[82] Nevertheless, it was anticipated by both Air Forces that the Mid-Canada line would take its place in the air defense system as a valuable extension of the Permanent System and PINE-TREE chain and as a backup line for the Distant Early Warning network.†

Greater Emphasis on Air Defense

The reports of the LINCOLN Summer Study Group and Project EAST RIVER resulted in more than commencement of the Distant Early Warning line installation. As previous reports and publications had failed to do, they served to highlight the nation's vulnerability to an attack from the air. Consequently, the reports focused the attention of the Truman and Eisenhower administrations on air defense. This attention promoted an increase in public awareness of the air defense situation.

The combined effect of the Summer Study Group and EAST RIVER reports on the civilian members of the National Security Council and the National Security Resources Board was apparently electrifying. NSRB members made determined efforts to obtain presidential approval for the Summer Study Group proposals, and the National Security Council favored similar action. In the opinion of a member of the Air Staff, members of those agencies felt that the Air Force was not placing enough emphasis on air defense.[83]

As a result of the efforts of those two agencies, President Truman directed that a review of all programs concerned with air defense be undertaken. Each service complied with a separate report and the Joint Chiefs of Staff sent the combined report to Secretary of Defense Lovett.[84] The total picture presented by the combined report was not considered satisfactory, and on 4 December 1952 Truman established a committee under the chairmanship of Mervin S. Kelly, President of the Bell Telephone Laboratories, to study continental air defense programs with particular emphasis on early warning.[85] Furthermore, on 31 December, President Truman approved the NSC policy statement calling for improved continental defense and construction of the DEW line by 31 December 1955.*

Following the President's demand for a more effective continental defense, the Joint Chiefs directed the Air Force, Army, and Navy to form plans for a system of air, land, and sea defense for the continental United States as of 31 December 1955. These plans were to be based on the Key West Functions paper and subsequent interservice agreements. Plans were to be submitted by 1 July 1953 and were to be revised and submitted by 1 January of each year thereafter. The Continental United States Defense Planning Group† would examine the plans before they were sent to the Joint Chiefs.[86]

*The Systems Engineering Group did not report until 27 August 1954 and the report was not reviewed by USAF until September. The group set a target date for completion of the Mid-Canada line as 1 January 1957, to which USAF agreed (ltr, Hq USAF to CG ADC, subj: Mid-Canada Early Warning System, 11 Dec 54, in Hist CONAD and ADC, Jul-Dec 54, I, doc 51).

†As originally conceived, the Mid-Canada line was to be extended by sea lines composed of AEW aircraft and picket ships. On the Pacific the line would run from Hawaii to Kodiak, Alaska and on the Atlantic side from Newfoundland to the Azores. These extensions were dropped from the Mid-Canada line plan late in 1954 (ADC HS-10, pp. 64-66).

*See above p. 65.

†This combined group had been formed on 6 April 1948. The Air Force furnished the Deputy Director of the Group (A/S Summary Sheet, Maj. Gen. S.E. Anderson, Dir P&O to DCS/O, subj: Director, Continental U S Defense Planning Group, 29 Apr 48, in OPD 381 (11 Dec 45), sec 3).

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Vice Chief of Staff Twining in turn directed the Air Staff to prepare by mid-April an objectives plan for continental air defense. The Air Staff was to work in conjunction with the Air Defense Command. According to Twining, the Air Force plan was to recognize the increased importance of air defense and the distinct probability that future Air Force activities might be limited primarily to two equally important functions—air defense and stragegic air operations.[87] In drawing up the Air Force plan, the Air Staff adhered to three basic considerations. an efficient air defense system would be a powerful deterrent to war; all parts of the air defense system had to be under the operational control of the commander charged with air defense responsibility; and all forces with an air defense capability would be employed.[88]

General Twining's statement and the plan drawn up by the Air Staff indicated the increased importance being placed on air defense. If air defense was to receive greater emphasis and be regarded, along with strategic air, as a powerful deterrent to war, the proper allocation of Air Force resources would be more difficult. As indicated by Lt. Gen. T.D. White, DCS/O, perhaps the Air Force would find that it had to reduce or eliminate some of its lesser responsibilities.[89]

Late in April the Air Force Council approved the Air Staff objectives plan,[90] and it was sent to the Continental United States Defense Planning Group (CUSDPG). In considering the plan, CUSDPG extracted the early warning provisions and employed them as a basis for a separate Joint Outline Plan for an Early Warning System. Both the Air Staff plan and the extracted early warning plan were sent to the JCS and the other services for comment.[91]

While these defense plans were being considered within the Defense Department, the Kelly Committee, appointed in December 1952, issued its report. In the main, the committee buttressed the Air Force position of resistance to a crash DEW program. It recommended the immediate improvement of the existing AC&W system and the implementation of the Mid-Canada line and seaward radar extension. If funds were available the committee recommended that emphasis be placed on research and development for a better air defense rather than on a crash DEW installation program. Also, in line with the basic considerations of the Air Staff objectives plan, the Kelly group recommended the establishment of a centralized authority for coordination of the defense of the United States.[92]

In view of the conflicting reports of the various study groups and the differences of official opinion of the defense problem, the National Security Council created a new committee on 1 June 1953 The Continental Defense Committee, headed by Lt. Gen. Harold R. Bull (USA ret.), was directed to report on the current and planned continental defense programs, to estimate costs, and to indicate the desired priorities. On 22 July the Bull Committee reported its conclusions that the defense programs, current and projected, were inadequate. Immediate action was required to improve the defense situation, and as part of this improvement the committee recommended first priority for early warning and an improved air defense system.[93] Secretary of the Air Force Harold W. Talbot announced general agreement with the committee report for the Department of the Air Force, but the Joint Chiefs of Staff advised the National Security Council against its acceptance until a means of financing increased defense programs was determined.[94]

While the Bull report and the continental defense plans were being considered, the need for adequate air defense became more urgent when, on 12 August 1953, a thermonuclear explosion occurred in Russia.[95] Soon thereafter, on 25 September, President Dwight D. Eisenhower approved a new policy statement calling for increased emphasis on continental defense, subject to monetary considerations. This statement was superseded on 24 February 1954 by a revised presidential statement which formed part of the Republican "New Look" military program. The urgency apparent in Eisenhower's first statement was missing and the revised statement did not specifically call for air defense plans. Rather it pointed out emphatically the need for complete coordination of effort in continental defense and for an orderly buildup of defense programs.[96]

By mid-1954 emphasis on air defense had leveled off somewhat. The service plans and the early warning plan were still under consideration by the Joint Chiefs of Staff. Discussion of the plans had illustrated once again the divergent views on roles and missions held by the three services.* Actually, the new Air Force Chief of Staff, General Twining, believed that interservice

*See below p. 78 ff.

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disagreements on the roles and missions had held up approval of the defense plans.[97] It was anticipated that the formation of the joint air defense command then under consideration would promote interservice harmony and aid in joint air defense planning.

Seaward Extension of Radar Coverage

Airborne Early Warning

In addition to the need for an extension of the continental radar network northward, Air Force air defense planners recognized the requirement for an off-shore extension. It was obvious that the North Atlantic and the North Pacific are ideal avenues of approach for aircraft attacking the industrial areas of the United States and Canada. Not only would a seaward extension of radar covering those ocean areas afford more warning time for land-based defenders and the civil populace, but it would allow interceptor aircraft to operate farther from the defended areas.[98]

Like the northward extension of the radar network, the attempt to place radar offshore as an addition to the air defense system began to make substantial progress during the 1953-1954 period of increased emphasis on air defense. Furthermore, the interservice roles and missions controversy played a significant part in the attempt to extend radar coverage by airborne early warning (AEW) aircraft, picket ships, and "Texas Towers."

The concept of using aircraft to supplement early-warning radar originated with the Navy during World War II. Late in 1943 the Japanese began to use the "Kamikaze" attack on naval forces in the Pacific with some success. These suicide planes approached at a low altitude making it impossible for the fleet radar to detect them at any great distance. In order to extend radar coverage, radar-equipped ships were used as pickets. When use of the pickets proved costly because of the ships' vulnerability to the Kamikaze planes, the Navy considered patrolling radar-equipped aircraft near the fleet. Since equipment was lacking, on 18 April 1944 the Navy asked the Massachusetts Institute of Technology's Radiation Laboratory to develop early-warning radar equipment for use in aircraft.[99] By the end of the war—but not in time for combat use—the equipment had been developed, and some 27 Grumman torpedo bombers had been modified as AEW aircraft (TBM-3W's). Later naval improvements in AEW aircraft involved the use of the B-17 (PB-1W) and the Lockheed Constellation (PO-1W) as aircraft carrying early-warning radar.[100]

Before the end of World War II the Army Air Forces also became interested in airborne radar, and a project was established at the Air Materiel Command to investigate an Airborne Control Center System. The project members considered the system primarily from an offensive standpoint.[101] However, after reviewing the military characteristics proposed for the airborne center, the Air Staff decided in 1946 that a greater need existed for an AEW aircraft for defensive purposes. Therefore, the Air Staff recommended the immediate development of the AEW aircraft, to which fighter control facilities could be added later.[102] This recommendation was not carried out and AAF study of the AEW aircraft was reduced to a consideration of only the radar components. Since there appeared to be some AAF-Navy duplication and because the Navy had two years of experience in the field, the problem of the AEW aircraft was left with the Navy.[103]

The next two years found the development of the AEW aircraft in a state of flux within the Air Force.* Project SUPREMACY had contained no provision for seaward extension of the radar network.[104] However, when a JCS committee evaluated SUPREMACY following the failure of Congress to consider the plan in the spring of 1948, it stated a requirement for 500 miles of seaward extension of radar consisting of 9 picket ships and 16 AEW aircraft. The Air Force did not agree. Although the Air Staff believed seaward surveillance was desirable, development of AEW aircraft and picket ships had not progressed to the point where they were ready for incorporation into the system.[105] For this reason, and because of the scarcity of funds, no provision for seaward extension was included in the Modified Program proposed by the Air Force late in 1948 and approved by Congress early in 1949.

Failure of the Air Force to recommend extension of the radar network did not signify opposition to the extension for planning purposes. As early as April 1947 the Canada-United States

*By February 1947 the Navy had drawn up the requirements for a coastal early warning screen which included AEW aircraft (Opns Evaluation Group Study 309, OCNO, Discussion of Requirements for a Coastal Early Warning Screen, 11 Feb 47, in AUL M-31914-S, no 309).

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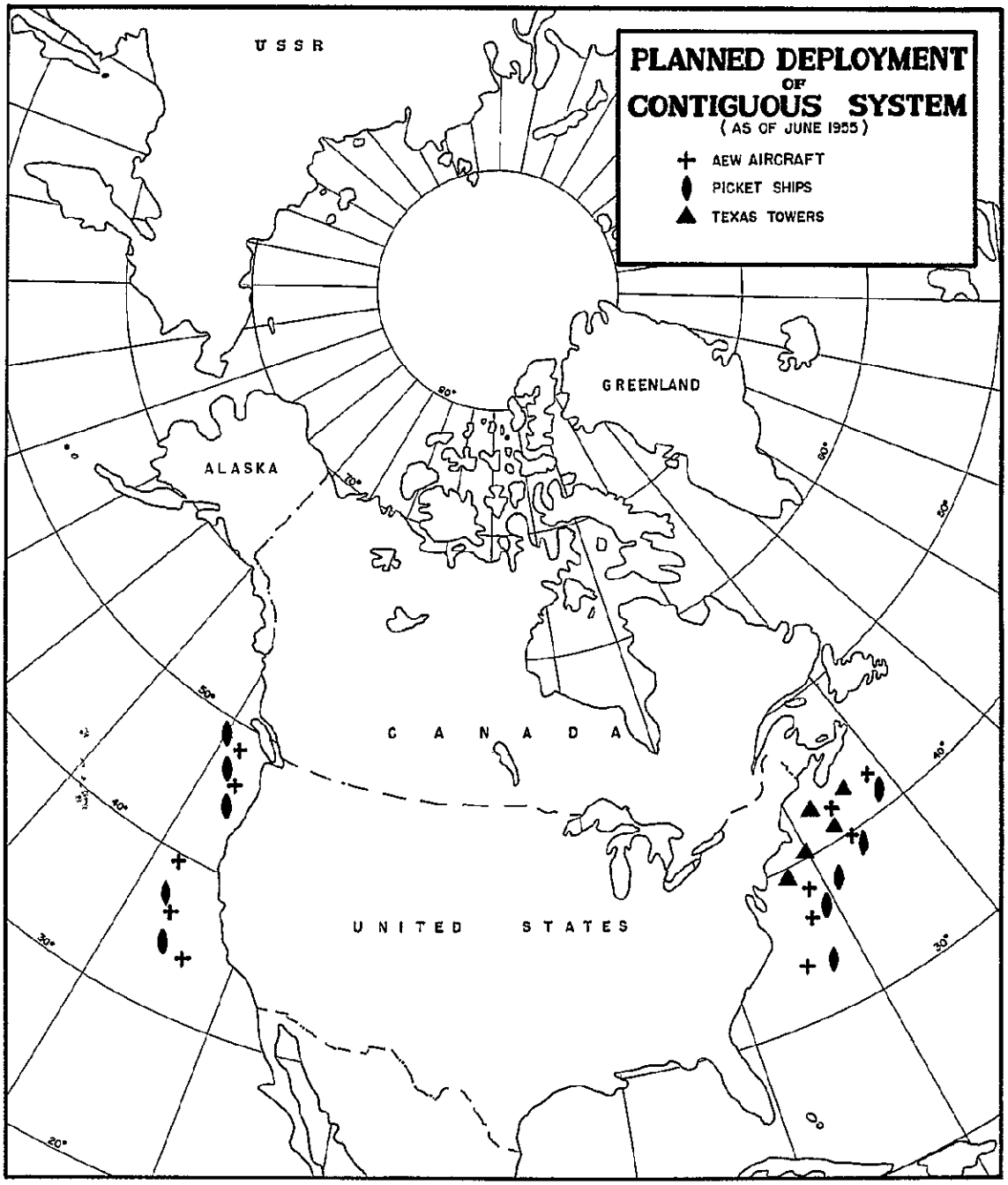

Map 5

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Military Cooperation Committee proposed an early-warning plan—that was never acted upon—which included the use of both aircraft and picket ships to extend the early-warning line.[106] Moreover, in commenting on Plan SUPREMACY, ADC had pointed out the need for an extension of radar coverage along both coasts.[107] ADC envisioned an early-warning line stretching from Hawaii to Puerto Rico through Alaska, northern Canada, Greenland, and Newfoundland.[108] Further support for seaward extension came from the Air Defense Policy Panel, which reported to the Chief of Staff, USAF in February 1948. The panel concluded that naval forces should be assigned to theater commanders for the purpose of seaward surveillance and control. At the same time, the panel recommended that the Air Force obtain or develop and test AEW aircraft.[109] Despite recognition by these agencies of the need for AEW aircraft, lack of funds and insufficient progress forced the Air Force to discontinue all work on the project in September 1948 with the understanding that the Navy would continue development.[110]

The Air Force decision to cease work on the AEW aircraft meant that Air Force-Navy cooperation would be mandatory if any AEW aircraft were added to the air defense system in the near future. The foundation for such cooperation had been laid at Key West in 1948. Among the functions assigned to the Navy were provision of "sea-based air defense and sea-based means for coordinating control for defense against air attack" and provision of naval forces, including naval air, as required for air defense, in accordance with joint doctrines and procedures approved by the Joint Chiefs of Staff.[111] Since no jointly approved doctrines or procedures were forthcoming from the JCS, naval participation in air defense, up to mid-1954, was based on a series of policy statements by the successive Chiefs of Naval Operations. Also, the Navy continued development of the AEW aircraft.[112]

Air Force activity in the AEW field was resumed early in 1951. Within Headquarters USAF the Air Defense Team in the Directorate of Plans urged that the Air Force participate in the development of airborne air defense radar.[113] Because the Navy announced that no picket ships would be available for air defense before 1954 the need for AEW aircraft became more urgent. At about the same time, General Whitehead submitted to Headquarters USAF a statement of requirements calling for five squadrons of eight AEW aircraft each to extend the aircraft control and warning facilities seaward.[114] Because of these factors, the Directorate of Requirements recommended to the Air Force Council that the Air Force begin testing AEW aircraft and program 40 aircraft for procurement. The council turned the problem over to Maj. Gen. Gordon P. Saville's Directorate of Development.[115]

In mid-1951 the Development Directorate approved a recommendation that 48 AEW aircraft be obtained for the Air Force as soon as possible. Included in this total would be 10 C-121C (Lockheed Super Constellation) aircraft then in production which could be converted. The remainder would be the same aircraft as converted by the Navy and called the PO-2W. Also, Headquarters USAF decided to make a study to determine if the B-29 could be modified as an AEW aircraft.[116]

By the end of 1951 a USAF requirement for 56 Super Constellation AEW aircraft had been established.[117] However, since the first of these would not be available until the middle of 1953, the Directorate of Requirements had tentatively approved a proposal made by the Director of Plans that 30 B-29's be modified immediately to be used by ADC until the Super Constellations (RC-121's) could be produced.[118] ADC opposed this interim action and in August Headquarters USAF cancelled the project.

Meanwhile, ADC had prepared a plan for the employment of AEW aircraft in two barriers some 800 miles long established approximately 225 miles off both coasts. Each barrier would be covered by four aircraft spaced about 150 miles apart. ADC estimated that this coverage would afford a probability of detection of between 80 and 90 percent.[119] With this plan as a foundation, ADC proceeded to set up the organization for employment of the AEW aircraft, training for personnel, and the many other plans needed for this new element of the air defense system.[120] Actual operations of the AEW squadrons were delayed, however, largely because of aircraft and radar production lags. The first complete RC-121 was not delivered to ADC until May 1954, and the first AEW squadron was not equipped until October 1954.[121]

Delays in aircraft deliveries resulting from production lags were not the only difficulties encountered in adding AEW aircraft to the radar network. The re-entry of the Air Force into the

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field of seaward radar extension in 1951 did not receive support from the Navy. Although the Air Force looked to the Navy for AEW aircraft at that time, it was apparent that the Navy would not have enough aircraft for the needs of both services.[122] Hence, Headquarters USAF approved the ADC requirement for the procurement of AEW aircraft.

The absence of Naval enthusiasm for Air Force efforts to add AEW aircraft to the air defense system became more serious early in 1953. Following President Truman's policy statement of 31 December 1952 calling for emphasis on the early-warning system, each service was called upon to prepare a defense plan as of 31 December 1955.* The plan submitted by the Air Force contained a requirement for AEW aircraft; the Navy plan did not. According to the Navy viewpoint, the Navy was responsible for the defense against air attack outside the range of the Air Force land-based radar.[123] On the other hand, the Air Force regarded AEW aircraft as an extension of the land-based radar network. Therefore, based on the belief that provision of AEW aircraft was its responsibility, the Air Force continued to plan for AEW employment.[124]

No interservice agreement on the use of AEW aircraft could be reached until this doctrinal difference was resolved, and on 29 July 1953 Secretary of Defense Charles Wilson was asked to make the decision.[125] In support of the Air Force position, General Twining pointed out that the seaward extension was actually a part of the entire air defense system, which was an Air Force responsibility. Also, as he reaffirmed, provision for land-based aviation was an Air Force function; the Navy should provide the necessary seagoing forces.[126]

Discussions of the problem continued until, on 25 September 1953, President Eisenhower approved a National Security Council paper calling for the earliest possible implementation of contiguous seaward extension of the continental radar network.[127] Influenced by this presidential edict, on 22 October General Twining and Admiral Robert B. Carney, Chief of Naval Operations, reached an agreement which accepted the Air Force position. For contiguous extensions of radar coverage, the Air Force would provide the AEW aircraft and the Navy would furnish the required ships.[128] This agreement, which was not signed until December, cleared the way for the implementation of the AEW plan as soon as the aircraft were available.

*See above p. 66.

Picket Ships

There had never been any controversy over which service would provide the ships needed to establish a force of radar-equipped picket ships, if such a force was deemed necessary for air defense. Seagoing surface forces obviously were the responsibility of the Navy. The principal problem concerned the procurement of enough ships to fill the requirements.

Despite the vulnerability of the radar-equipped ships used to protect naval forces during the Japanese Kamikaze attacks during World War II, the Navy continued development of the ships. Attempts were also made in the Mediterranean area to use radar-equipped ships for early warning against German attacks on Allied convoys.[129] Thus precedents existed for the picket ships included by the Navy in a proposed coastal early-warning screen for use against air and submarine attacks.[130] And, early in 1948, the Navy announced that it was attempting to provide a radar screen of picket ships which could surround the United States.[131]

The Air Force at that time had established no requirement for picket ships. No provision had been made in Plan SUPREMACY for the seaward extension of the radar network. Moreover, when the JCS committee appointed in mid-1948 to evaluate SUPREMACY recommended a 500-mile line of picket ships and AEW aircraft, the Air Staff had objected. The Air Staff considered the use of a radar picket line to be of questionable value.[132] This opinion was reflected later in the year in the preparation of the Interim Program and First Augmentation (Modified Program). However, General Saville's planning group believed that picket ships should be considered later along with other radar needed to complete the system. For that reason, the First Augmentation program originally provided for three prototype ships for testing purposes.[133] The $7,000,000 requested for this purpose, however, was eliminated from the program by the Bureau of the Budget.[134]

The Air Force did nothing further about picket ships until early 1950 when ConAC forwarded to Headquarters USAF a requirement for the use of Navy picket ships. Air defense personnel believed that picket ships would be needed to sup-

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plement the seaward extension of the radar network by AEW aircraft. Primarily, the picket ships would afford high-altitude coverage and the AEW aircraft would provide cover for low altitude.[135] Based upon ConAC's recommendations, Headquarters USAF presented to the JCS a requirement for ten picket ships, six on the east coast and four on the west coast. Use of these ships would aid in identifying inbound flights and would add to the defense in depth around coastal targets.[136]

Now that the Air Force had decided upon a requirement for picket ships, efforts were made by Headquarters USAF, ADC, and the air defense forces to arrange with the Navy for the use of the ships.* The principal stumbling block was the Navy's insistence that no ships were available for full-time picket duty. The best that the Navy could do was to make two destroyer-type picket ships available on 24-hour notice off the east coast. Further than that, it would be 1954 before the Navy could furnish the required ships.[137]

Since ADC believed that picket ships were needed before 1954, it continued to urge Headquarters USAF to press for a resolution of the problem. Finally, on 13 March 1952, Acting Secretary of the Air Force R.L. Gilpatric asked the Secretary of the Navy to cooperate in meeting the urgent requirement for picket ships.[138] The Secretary of the Navy replied that the Navy did not believe the world situation warranted radar coverage on a continuous basis; therefore, the need for full-time picket ship operations was not urgent. General Vandenberg then presented the matter to the Joint Chiefs of Staff in December, but at the request of the Chief of Naval Operations action was deferred.[139]

Although one picket ship had begun full-time operations in September 1952, most of 1952 and 1953 was occupied by testing and training.[140] Continued efforts by the Air Force throughout most of 1953 failed to produce a settlement of the problem. Late in 1953 prompted by President Eisenhower's approval of the National Security Council paper requiring implementation of contiguous seaward radar extension as soon as possible, General Twining and Admiral Carney agreed that the Navy would provide the necessary picket ships. The forces used in this radar extension would be directed by the Air Defense Command.[141] The foundations were thus laid for picket ship operations, but further decisions in regard to their use had to await the establishment of a joint air defense command in 1954.

*A RAND Corporation study completed about this time indicated that the use of picket ships would greatly increase the effectiveness of the interceptor squadrons (RM-518, Fighter Effectiveness as a Function of Radar Coverage, 30 Jan 51).

Texas Towers

The third, and most recently conceived, method of extending radar coverage seaward is by use of the so-called "Texas Towers." The idea for these sea-based radar platforms originated in the LINCOLN Laboratory in the summer of 1952. In the opinion of the LINCOLN scientists, picket ships, though very necessary, were not an ideal solution to the problem of contiguous radar extension. The picket ships were very expensive; they were limited to carrying medium power radars and even when anchored were not stable platforms.

A LINCOLN study of the problem resulted on 1 August in a proposal "that would not eliminate all requirements for picket ships but which, if feasible and adopted, would greatly reduce those requirements."[142] The LINCOLN proposal called for the erection of platforms on shoals off the northeast coast to serve as radar sites. Since the towers would resemble the oil well drilling platforms used in the Gulf of Mexico, they were called Texas Towers. These towers, according to the LINCOLN conception, would be rectangular in shape (60 feet by 120 feet) and would cost an estimated one million dollars each to construct. Several shoals between Nova Scotia and the New Jersey coast were suitable,* and the towers built on them would afford high altitude coverage 200 to 300 miles out from shore. The Texas Tower proposal appeared so promising to the LINCOLN Laboratory that a staff study was prepared and circulated among all agencies concerned with air defense.[143]

The Air Defense Command was impressed with the LINCOLN proposal and recommended in September that Headquarters USAF consider the use of the towers along with picket ships.[144] In the following month Headquarters USAF agreed to consider the use of the towers but did not ask ADC for its requirement estimates until March

*The Pacific offshore area had few suitable sites for Texas Tower construction (Hist AFCRC, 1 Jul-31 Dec 53, p. 305).

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1953.[145] In its reply, ADC informed Headquarters USAF that it desired to make operation of the radar on the towers as automatic as possible in order to conserve personnel.[146]

Little progress was made in the months that followed. LINCOLN Laboratory heard no more about its proposal until the end of June 1953. Because of this seeming lack of interest, Maj. Gen. R.C. Maude, Commanding General of the Air Force Cambridge Research Center,* presented the problem to Maj. Gen. D.L. Putt, Commanding General of the Air Research and Development Command. Also, several expedients, such as building a tower as part of the DEW line project, were considered and discarded. Finally, after conferring with Headquarters USAF, General Putt was convinced that the problem was more one of design and installation than of research and development. Therefore, he agreed to place the Texas Tower project in the hands of the Air Installations Office.[147]

At last, in November 1953, USAF announced in a planning guide for Texas Towers that use of the towers was feasible; this decision paved the way for their construction. It was then estimated that each tower would cost $4,000,000.[148] Headquarters USAF followed with approval for construction of five towers—the design of which was changed to that of an equilateral triangle, 210 feet on a side—and inclusion of their cost in the budget programs for the fiscal years 1954 and 1955.[149] By mid-1954, the Navy had been designated as the responsible agent for construction of the Texas Towers, and operational and logistical plans had been prepared.[150] However, it would be 2 December 1955 before the Air Force assumed beneficial occupancy of the first Texas Tower.†[151]

The LINCOLN Transition System

Not actually a part of the radar network extension but essential to its success was the vastly improved equipment designed to make use of the early warning and control data furnished by the radar sets. Furthermore, an improvement in this equipment—the ground electronic environment—was needed to use effectively the projected weapon system. As early as April 1947, Headquarters, AAF had drawn up specifications for automatic radar equipment which would pick up and relay information to an air defense control center.[152] Automatic operation permitted by this equipment would reduce the human element to a minimum. As indicated by a member of the Air Staff, this reduction was needed because there was "serious doubt that successful interceptions of high-speed attacking airborne objects can ever be made by other than fully automatic means."[153] By 1950 it was very evident to air defense personnel that delays resulting from handling the data constituted one of the greatest weaknesses of the interim air defense system.[154]

The handicap to the air defense system resulting from an inadequate ground environment was the subject of one of the first investigations made by the Air Defense Systems Engineering Committee (ADSEC) after its formation late in 1949.* The committee compared the air defense system then in existence to an animal that was at once "lame, purblind, and idiot-like." ADSEC stated that an improved ground environment was required for "it makes little sense for us to strengthen the muscles if there is no brain; and given a brain, it needs good eyesight."[155]

Turning to the scientists in order to provide the brain, the Air Force called upon MIT to establish a laboratory to undertake a broad air defense program. The first phase of this program—Project CHARLES—indicated the many improvements that would be required for an effective future air defense system.† CHARLES recommended erection of a centralized aircraft control and warning system which would combine the use of the high-speed digital computer being developed by MIT with radar data transmission equipment from the Air Force Cambridge Research Center.[156] Project LINCOLN was set up in 1951 partly to continue consideration of these CHARLES recommendations.

*The military organization under which LINCOLN Laboratory functions.

†For a popular account of life and operations on the first completed Texas Tower see: Craig Thompson, "America's Strangest Island," *The Saturday Evening Post*, CCXXIX, no 1 (7 Jul 56), 26-27.

*See above p. 31.

†At the same time, the Continental Air Defense System (CADS) project was investigating the current air defense system. Several CADS recommendations for improvements in the manually operated ground environment were adopted. The ground environment still did not meet ADC requirements (Headquarters, ADC, Operational Plan SAGE, 7 Mar 55, v).

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LINCOLN scientists considered the problem of the ground electronic environment—the brain—from the standpoint of what could be done at once, in the near future, and ultimately. They devised an immediate solution to the data-handling problem. This solution they termed the "Quick Fix" system. Primarily, Quick Fix was designed to simplify data handling by rearranging functions in such a way as to eliminate the human element as much as possible.[157]

Quick Fix was the best that the LINCOLN scientists could devise for the period until a "Future System" could be developed. Between the Quick Fix period and the completion of the Future System, some elements of the Future System—including the digital computer—could be made available. When these elements were placed in operation, a "Transition System" would be in existence.[158]

According to LINCOLN scientists, the Transition System would strike "a balance between men and machines." Machines would be available to perform the functions that men did most poorly, leaving man to complete the operation by making the basic decisions. The heart of the system would be a computing system connected to a number of radar stations. From the data supplied by these radars, information would be received and stored; and interceptors would be controlled. The Transition System would be flexible and could be incorporated into the Future System when required.[159]

The LINCOLN Quick Fix system was demonstrated to Air Defense Command representatives on 29 September 1952.[160] Although the system offered "some potential" for an improved manual system, General Benjamin W. Chidlaw, ADC's commander, reported that it did not meet ADC requirements for an improved semiautomatic air defense system.[161] Testing of the equipment by Air Proving Ground Command (APGC) confirmed Chidlaw's opinion. APGC reported in March 1953 that Quick Fix was "operationally undesirable" and recommended that the project be discontinued. Headquarters USAF agreed and requested LINCOLN to "phase out this program as quickly as possible and divert . . . manpower and funds to more urgent work."[162]

At about the same time, the Air Force was arriving at a decision to support the Transition System. In addition to the LINCOLN system, the Air Force had been interested in an Air Defense Integrated System (ADIS) being developed by the University of Michigan's Willow Run Research Center.[163] As late as January 1953 the Air Force believed that both systems should be supported until further progress had been made.[164] The question was settled on 10 April 1953 when the Air Force decided to proceed with the Transition System and cancel ADIS.* The LINCOLN system was chosen in order to prevent duplication or confusion in development of the system and because the Air Force could not afford to support two projects.[165] Following the Air Force's selection of the Transition System, as the ground electronic environment system, two production prototypes were programmed for fiscal years 1954 and 1955 at a cost of over $56,000,000, with the first prototype to be operational in the New York area by January 1957.[166]

Once the decision had been made in favor of the LINCOLN Transition System,† planning for installation and integration into the Air Defense Command was undertaken. The Western Electric Company was given a contract for the installation of the system and, by the end of 1953, had organized the Air Defense Engineering Services (ADES) to fulfill the contract. Since ADC would be the ultimate "customer," ADES would report to that command.[167] ADC, in turn, had made substantial progress in its planning by mid-1954.[168] Although limitations in the system were already apparent,†† the Transition System held much promise for the future and would provide ADC "with the capability to conduct air battle effectively and flexibly."[169]

In the words of the Air Force Cambridge Research Center historian, the LINCOLN Transition System looked promising because, "in association with better eyes (radar) and better muscles (defensive weapons) it offered a chance to make a significant improvement in the effectiveness of

*In order to test the Transition System, LINCOLN Laboratory established the Cape Cod System in mid-1952. This system, which consisted of 12 radar sites in the Boston area, began actual demonstrations in September 1953. Acting as LINCOLN's proving ground, the Cape Cod system indicated the feasibility of the Transition System (Hist AFCRC, 1 Jul-31 Dec 53, pp. 258-62).

†The Transition System later became known as the Semiautomatic Ground Environment (SAGE) System.

††For example, the system was subject to electronic countermeasures, sabotage, and destruction of the above-ground facilities.

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air defense systems."[170] Northward and seaward extensions of the radar network would move the "eyes" closer to the potential enemy, thus affording the air defense system a greater period of warning. The improved interceptors and the guided missiles still in the developmental stage would strengthen the "muscles" of the system. It was expected that the combination of these improvements would result in a weapon system which would increase significantly the kill potential of the air defense forces. Nevertheless, full benefit from these additions and improvements could not be derived without the proper organization for air defense.

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CHAPTER VII

JOINT ORGANIZATION FOR AIR DEFENSE

From the time that Headquarters, AAF began to plan for the postwar military establishment—before the end of World War II—until the meeting of the Joint Chiefs of Staff at Key West, Florida, in the spring of 1948, the Air Force contended that continental air defense was its responsibility. Several organizational plans, designed in part to enable the Air Force to discharge this responsibility, were drawn up during 1945 in Headquarters, AAF and Headquarters, Continental Air Forces. None of these plans were approved, but in March 1946 the AAF was reorganized along functional lines with the establishment of three major commands, Strategic Air Command, Air Defense Command, and Tactical Air Command.* To Air Defense Command was assigned the mission of organizing and administering the integrated continental air defense system.†

In the months following the formation of ADC, its commander, Lt. Gen. George E. Stratemeyer, was faced with the fact that he had no means for fulfilling the air defense mission. His position became more complicated in 1946 when Headquarters, AAF revealed that the air defense mission did not actually belong to the Air Force but to the Army Ground Forces.†† Furthermore, discussion between the AAF and the AGF indicated that the two services did not agree on a definition of air defense. AGF maintained that air defense was merely part of the over-all defense problem and actually should be defined as "defense by air." AAF believed, on the other hand, that acceptance of the Army's position would have divided the air defense mission.††† Pending the outcome of the unification struggle, discussion of this difference of opinion was suspended.

In March 1948 the Air Force contention that air defense was an Air Force responsibility was confirmed by the Joint Chiefs of Staff meeting at Key West. According to the Functions Paper, which embodied the conclusions reached by the JCS, the USAF was assigned the mission of providing continental air defense in accordance with the policies and procedures of the Joint Chiefs. Also, the Air Force definition of air defense was accepted. Air defense thereby became a unilateral responsibility of USAF, though the Army and the Navy were assigned air defense roles as collateral functions. Whether or not the Key West agreements would solve the problems facing General Stratemeyer in his attempts to carry out his mission was a matter for conjecture.*

Although the assignment of the air defense mission solely to the USAF was considered necessary by Air Force leaders, they recognized that the resources of all the services would be required in an air defense system. Primarily these resources consisted of Army antiaircraft artillery and Navy fighter aircraft and radar equipment. According to the Key West Functions Paper, the Army and Navy were to furnish those resources in keeping with JCS policies. Since no JCS policies were forthcoming, ADC continued to rely on interservice agreements that were intended to provide all available air defense forces in an emergency. Negotiations for such agreements usually revived differences of opinion concerning operational control of the forces.† Also, the agreements were not completely satisfactory for the air defense commander because availability of Army and Navy forces would always depend upon their

*For a discussion of this reorganization see ADC HS-9, Organization and Responsibility for Air Defense, March 1946-September 1955.

†See above, p. 4.

††See above, p. 5.

†††See above, pp. 15-16.

*See above, pp. 17-18.

†See above, pp. 6-7.

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not being required for their primary missions.*

While the Air Defense Command was negotiating for augmentation forces as a means of carrying out its mission, the War Department was drafting a plan for the formation of a continental defense command. War Department planners maintained that this would be an Army command which would unify all ground and air defense forces under one commander. When the WD plan was considered by the Air Staff late in 1946, Maj. Gen. O. P. Weyland, Plans Chief, stated that the proposal did not go far enough. He understood that Admiral Forrest Sherman, the Chief of Naval Operations, had stated that the Joint Chiefs should undertake the establishment of a joint defense command. Therefore, Weyland believed the time was propitious to approach the Navy on the subject. In Weyland's opinion, such a joint command should function under the strategic guidance of the Joint Chiefs of Staff.[1]

Consideration of a joint command continued, and on 26 March 1947, at the direction of the Joint Chiefs, the Joint Planning Staff appointed an *ad hoc* committee to study the question of a unified defense command.† Deliberations of the committee indicated that Admiral Sherman had apparently not expressed naval opinion when he spoke in favor of a joint command. According to the Navy member of the committee, establishment of a unified command was

> unnecessary in the light of potential enemy capabilities and is undesirable in that it would concentrate excessive authority in one individual for a variety of operations which are so diverse in character and geographic area that they can best be performed by separate commands.[2]

He considered the interservice cooperation agreements then in existence sufficient for that time. Because of this difference of opinion, the committee was unable to reach an agreement.[3]

By 1948 attention of Air Staff planners had been focused on the possibility of establishing an Air Defense Command as a specified command of the Joint Chiefs of Staff.* This solution to the command problem met with considerable opposition both from General Stratemeyer and from some members of the Air Staff.† Stratemeyer agreed that responsibility for air defense had to be shared by all services and that unity of command was necessary. However, he objected to a JCS command primarily because the JCS was "a rather cumbersome body to be charged with operating an active component of the Air Force" and because the ADC commander would become responsible to two agencies the Joint Chiefs of Staff for air defense and the Chief of Staff, USAF for all other functions. Moreover, Stratemeyer felt that

> there is no assurance that the JCS would be any more willing to allocate resources of the Army and Navy to air defense by virtue of the ADC becoming a JCS specified command than they are at the present time.[4]

Thus, in 1948 neither the joint command nor the JCS specified command concept found much favor within the Air Force.

The next two years witnessed the formation of the Continental Air Command, to which the air defense mission was assigned, and the gradual demise of the Air Defense Command.†† By means of these organizational changes, more effective use of the available USAF forces was made possible. Also, in 1950, the formation of the Army Antiaircraft Command began the integration of AA into the air defense system and paved the way for closer coordination between the Army and the Air Force in air defense matters.†††

The Soviet atomic explosion in the summer of 1949 placed new emphasis on the problem of organization for continental air defense. Within the Air Staff, organizational studies begun in October 1949 revived a proposal for the establishment of a unified defense or unified air defense command. Plans were drawn up by the Air Staff and in Headquarters, ConAC, but none could be

*For discussions of these problems see: ADC HS-4, Army Antiaircraft in Air Defense, 1946-1954; ADC HS-5, Emergency Air Defense Forces, 1946-1954.

†A unified command is identified by the USAF Dictionary as "a command made up of joint or combined forces, operating under a single commander." Apparently during the period under discussion service planners used the terms "joint command" and "unified command" interchangeably. As herein used they are considered to have precisely the same meaning.

*According to the USAF dictionary a specified command is "a one-service command under the strategic guidance of the JCS for the performance of a specific task."

†One member of the Air Staff stated that creation of a JCS-directed Air Defense Command was "premature, unrealistic, disadvantageous, unnecessary, reckless, and illogical" (memo from Col. A.J. Kinney to Col. John B. Cary, subj: Policies Relative to Air Defense, 4 June 48, in OPD 381 (11 Dec 45), sec 3).

††See ADC HS-9, pp. 21-39.

†††See ADC HS-4, pp. 34-45.

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approved because of the shortage of personnel.* At the end of June 1950 the outbreak of the Korean war drastically altered the situation. Not only did the need for a more effective continental air defense become more acute, but the contemplated buildup of the Air Force promised to alleviate the personnel shortage to some extent. Planning for an organizational change resumed.

By September a plan calling for a unified Air Defense Command had been prepared by the Air Staff. Submission of the plan to ConAC for comments revealed that opposition to the unified command concept still remained. Replying for the command, Brig. Gen. Herbert B. Thatcher, ConAC's Deputy for Operations, stated that application of the concept to the Air Defense Command was "unnecessary and undesirable." Instead, Thatcher expressed agreement with the establishment of a JCS specified command such as General Stratemeyer had opposed two years earlier. ConAC's concurrence was based on the need, in the light of international conditions, for raising the continental air defense organization to a position which would "assure recognition commensurate with the importance of the United States air defense problem." Thatcher stated that the command concept desired was one involving only USAF units, with the commander possessing operational control over the units supplied by the other services.[5]

Despite ConAC's opposition to the unified command concept, Chief of Staff Vandenberg in October sent a memorandum to the JCS proposing a unified Air Defense Command. The Air Force proposal called for the unified commander to command all assigned forces and, within his area of responsibility, to have operational control of all other forces that possessed an air defense capability.[6] In explaining this action to ConAC, General Twining, the Vice Chief of Staff, stated that, if the Army and Navy appeared willing to assign forces to the unified command commensurate to the Air Force contribution, USAF would support the unified command plan. If only token forces were offered by the other services, the USAF would favor the establishment of a JCS specified command, as recommended by ConAC.[7]

In reply to Twining's explanation, General Whitehead renewed his recommendation, made earlier in the year, for the formation of an Air Defense Command separate from ConAC. Such a command was necessitated, Whitehead repeated, by the growth of the air defense system. Since JCS action on the unified command plan was not forthcoming, this time Whitehead's proposal was speedily approved by Headquarters USAF, and the Air Defense Command was "re-established" on 1 January 1951 as a major USAF command.*

Formation of the Air Defense Command did not terminate Headquarters USAF efforts to gain approval for its other organizational plans. When it appeared that the unified command plan would not receive JCS approval, General Vandenberg sent the Joint Chiefs a plan calling for a JCS specified command.[8] Both plans remained before the JCS, and although all agencies concerned continued to consider them, divergent views within the Air Force and between the services precluded acceptance at that time of either a unified or a JCS specified command.[9]

The question of command arrangements in air defense organization arose again in 1953 during the period of increased emphasis on air defense. By that time the Air Force had ceased to advocate a JCS specified command. Based upon an Air Staff study, the Air Force position had become maintenance of the status quo—an Air Defense Command directed by the Chief of Staff and depending upon interservice agreements for emergency forces. Nevertheless, on 6 August 1953, the Joint Chiefs of Staff tentatively agreed on the establishment of a JCS specified command and charged General Twining, who had replaced Vandenberg as Air Force Chief of Staff, with preparation of the necessary plans.[10]

In turn, General Twining instructed the Air Staff to resume consideration of air defense command organization. He reminded staff members that in view of the increasing Soviet nuclear capability, it was necessary for the Air Force to keep the Joint Chiefs of Staff informed of defense problems. As directed, the Air Staff reconsidered but did not change its previous decision in favor of retaining the present organization. In defense of its position, the Air Staff reported that normal JCS or unified command arrangements would not be satisfactory for air defense. Instead, the Air Staff drew up a plan calling for the Chief of Staff, USAF to report to the JCS periodically concerning air defense

*See above, p. 35.

*See above, p. 36.

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matters and to send all air defense plans and policies to the Joint Chiefs for approval.[11]

Apparently with some reluctance, the Air Staff also prepared an alternate plan calling for a JCS specified command. In the opinion of General Thatcher, who had been transferred to the Air Staff as Director of Plans, the Army and Navy favored an arrangement which would unify command of all defense forces. Thatcher believed that such a command would take away from the Air Defense Command commander the split-second control that he needed in order to perform his mission.* In addition, Thatcher feared that a unified command would give both the Army and the Navy, as well as the USAF, a primary responsibility in air defense.[12] Therefore, the alternate plan for a JCS specified command was made ready. The Air Staff objections to a change in the command arrangements and the recommendation for periodic reporting to the JCS by the Air Force Chief of Staff were sent to the Joint Chiefs in December 1953.[13]

Soon after the beginning of the new year, General Twining informed Lt. Gen. Earle E. Partridge, Deputy Chief of Staff, Operations, that a realignment of the Air Force position on continental air defense was urgently needed. Admiral Arthur W. Radford, Chairman of the Joint Chiefs of Staff, believed that the Air Force could no longer afford to carry the full responsibility for such an important function. He was firmly convinced that some type of JCS command had to be devised. Twining agreed and requested the Air Staff to take appropriate action to reverse its previous position in opposition to a JCS specified command.[14]

At about the same time, in a memorandum to the Joint Chiefs of Staff, Admiral Radford expanded his ideas on the type of command arrangement needed for air defense. He reminded the Joint Chiefs that they were charged by law to establish unified commands in strategic areas when such an establishment was in the interest of national security. Radford considered that in the interest of national security a joint command for continental air defense was necessary. This command would be composed of forces from each service and would provide for the coordinated efforts of each service for continental air defense. According to Radford's conception, the command would be under a senior Air Force officer with the Chief of Staff, USAF as executive agent. The joint commander would have a joint staff and would be empowered to activate subordinate joint commands. The joint command would include all air forces assigned to air defense and all antiaircraft artillery involved in permanent air defense. Also, provision would be made for the joint commander to have operational control of any units which could augment the air defense forces. Admiral Radford recommended that the Joint Chiefs approve this type of organization for continental air defense.[15]

On 22 January 1954 the Joint Chiefs of Staff approved in principle the establishment of a JCS command for continental air defense and directed the Joint Strategic Plans Committee to prepare terms of reference for the commander of such a command. The committee report of 1 March indicated that a difference of opinion still existed. The Air Force and the Navy now appeared to favor a joint command with the joint commander having specific guide lines to follow. On the other hand, the Army expressed a preference for a JCS specified command, with the Air Force as executive agent. According to the Army view, terms of reference would be broad and detailed planning would be left for the service component commanders. The committee report also recommended that the views of the Air Defense Command, Army, and Navy be requested.[16]

General Chidlaw replied for ADC on 11 May 1954 with a proposed organization which was very similar to that suggested by Admiral Radford. Chidlaw proposed a joint command under the JCS, with the Air Force serving as executive agent. Under the joint command would be three subcommands: the Air Defense Command, the Army Antiaircraft Command, and a Navy component. At each level of the existing Air Defense Command Chidlaw planned a joint headquarters commanded by ADC officers and augmented by a small number of Army, Navy, and Marine Corps personnel. The Air Defense Command would turn over responsibility

*Col. James F. Whisenand, a member of Thatcher's staff, disagreed. He felt that unified command would strengthen the Air Force in air defense because it would give the commander more influence in planning and would allow more coordination in weapon system development (memo from Col. James F. Whisenand, Asst Dep Dir of Plans, for General Thatcher, subj. Command Arrangements for the Defense of the United States, 15 Dec 53, in OPD 381 (11 Dec 45), sec 10).

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for air defense to the new joint command, which, in an emergency, would have operational control over the forces of the subcommands.[17]

In an accompanying letter, General Chidlaw explained his conception of the requirements for this unprecedented command. Any joint command established, he believed, had to have unity of command and simplicity of operation as overriding considerations. Also, there had to be a clear analysis of the threat; a simple, clear, and direct command structure; and—what he considered the most important single item—a sound JCS-approved air defense plan, binding on all services. Chidlaw stated that since air defense was a functional mission carried out on a geographical basis, the operating air defense command had to be organized geographically with all subcommands having the same mission—air defense of a geographical area. The "United States Air Defense Command" that he proposed would provide this organization.[18]

When Chidlaw's views and those of the other services were received by the Joint Chiefs of Staff, another important difference of opinion was indicated. The Army believed that if a joint command was established, joint headquarters below the ADC level were not necessary or desirable. Operational control, the Army maintained, should be exercised through the service component commanders. On the other hand, the Navy agreed with the Air Force that headquarters down to air division should be joint and that the air defense commander should have operational control over all forces assigned or made available for air defense.[19]

By 2 August this difference of opinion had been resolved in favor of the Navy-Air Force view and the JCS directed the activation of the Continental Air Defense Command (CONAD). As established, CONAD was similar to the organization proposed by Admiral Radford and General Chidlaw. CONAD, a joint command "for the air defense of the continental United States," was placed above the existing ADC structure, with the Department of the Air Force as executive agent. The Air Defense Command, the Army Antiaircraft Command, and naval forces of the contiguous radar coverage system were allocated to CONAD. The Commanding General, CONAD was given operational control of those forces and of all augmentation forces made available during periods of emergency.[20]

The creation of CONAD, which was activated 1 September 1954 at Ent Air Force Base with General Chidlaw as commander, was a significant step in the development of continental air defense. As part of a JCS-directed command, each air defense commander would no longer have to depend upon interservice agreements for augmentation forces. Those forces were available and, during emergencies, the commander's operational control of them was assured. Furthermore, the paramount importance of continental air defense was recognized. Although the Air Force would retain the dominant position—the Department of the Air Force was the executive agent of the command and air defense commanders would be USAF personnel—henceforth the responsibility of protecting the United States from air attack would be shared by the Army and the Navy.

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SUMMARY

Before the end of World War II, Air Force planners recognized that continental air defense would be one of the most important missions of the postwar military establishment. These planners assumed that the United States would not be the aggressor in any future war but would undoubtedly have to defend its continental limits against an initial surprise attack. Although this assumption did not necessarily mean that they advocated an air defense in being, it did mean that they saw a requirement for air defense plans. In order to fill this requirement, discussions in regard to a possible air defense system were held throughout 1945, and several plans were prepared. However, in the midst of the rapid demobilization which followed V-J Day, the Air Force could do little to implement these plans. Nevertheless, as part of a postwar reorganization, an Air Defense Command was activated on 21 March 1946 as one of three major AAF commands.

At the time of the AAF reorganization, it was apparent that Air Force resources would be inadequate for complete manning of each of the major commands. Since possession of the atomic bomb by the United States was the main deterrent to war, the Strategic Air Command and its delivery vehicles had to be combat-ready at all times. Therefore, highest priority for manpower and materiel was assigned to SAC. The Air Defense Command, allotted a heterogeneous group of responsibilities in an interim mission directive, would have to get along with as few resources as possible.

In the field of air defense, ADC was delegated the organization and administration of the integrated air defense system. It was to exercise direct control of all active, and to coordinate all passive, means of air defense. Lt. Gen. George E. Stratemeyer, ADC's commander, quickly discovered that he did not have the means for fulfilling such a mission. In fact, the means for establishing an effective air defense system were not available throughout the Air Force. For the present, ADC found that without operational forces its principal role was one of planning.

Lacking both mission directive and forces, ADC was handicapped in its attempts to plan for air defense. To fill this void, Stratemeyer pressed Headquarters, AAF during 1946 for a mission directive, for a statement of responsibilities, and for operational forces. Pending an end to the struggle for unification and a buildup of its forces, Headquarters, AAF could grant none of his requests. Nevertheless, ADC drew up three plans: a short term plan which was a capability study to indicate what the command could do if called upon to set up an air defense in the immediate future; a plan for an air defense in being; and a long term plan that was a requirement study based on future forecasts. Although none of these plans were approved by higher headquarters, they were used for planning purposes for some time to come.

A major stumbling block that had prevented the AAF from granting many of Stratemeyer's requests was overcome on 26 July 1947 with the creation of the United States Air Force. No longer would Air Force planners have to consider the effect of their actions on the pending unification legislation. With independence a reality, Headquarters USAF could take definite steps toward establishing an air defense system. One of the most important of these steps was its approval of a plan—known as SUPREMACY—for an AC&W network costing $388,000,000 and consisting of 411 radar stations in the United States and Alaska. Also, late in 1947, Headquarters USAF granted ADC a definite mission directive assigning the air defense—in an emergency and for planning purposes—of the United States to General Stratemeyer. This clarification of the role of ADC in air defense

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was followed, in March 1948, by the Joint Chiefs of Staff assigning to the Air Force primary responsibility for air defense. And, while these significant actions were taking place, an awakening public interest in air defense could be seen.

In the midst of these rather halting USAF efforts to begin an air defense system, international events dictated an attempt to set up an active air defense. In March 1948, with the "Cold War" threatening to become a war in fact, General Carl Spaatz, Air Force Chief of Staff, ordered the establishment of an active air defense in Alaska and in the Northeast and Northwest sections of the United States. Although air defense personnel took prompt action to comply with Spaatz' directive, the means were not available to establish an effective defense. By the time the tense March-April period ended, the futility of attempting to defend the nation without sufficient personnel or materiel had been well illustrated.

Now that at least skeleton air defense systems were in place, Headquarters USAF directed ADC to retain the systems and to set up a similar system in the Albuquerque, New Mexico, area. In order to assure that the nation would not be completely without air defenses in the future, Headquarters USAF also attempted to obtain congressional sanction for Plan SUPREMACY. Despite efforts by the Department of the Air Force, Congress adjourned in June 1948 without acting on the plan.

With consideration of SUPREMACY delayed at least until the next session of Congress and the need for air defense becoming more acute, Headquarters USAF reviewed the air defense situation in the summer of 1948. An Air Defense Division, headed by Maj. Gen. Gordon P. Saville, was established in the Directorate of Plans and Operations to study the problem. General Saville's staff concluded that until an over-all air defense program was decided upon, some action had to be taken to establish an air defense system and that such action would be limited to the deployment and installation of radar equipment. Therefore, terming the air defense picture "certainly shocking," Saville presented to Secretary of Defense James Forrestal a plan calling for an Interim Program consisting of 61 radars and 10 control centers and a First Augmentation of 15 radars. Termed the Modified Program it would require about $86,000,000 and was scheduled to be operational by 1952. A bill based upon the Modified Program was presented to Congress early in 1949. Finally, in mid-March, this measure—considered by Saville as essential to the security of the nation—was approved by Congress. Although the "Permanent System" provided for in the Modified Program would be inadequate against future threats, the Air Force was at last authorized to begin construction of a radar network.

Since neither SUPREMACY nor the Modified Program would furnish early warning immediately, the nation would remain virtually defenseless against air attack. In order to provide some protection, air defense personnel decided to establish a temporary network, the installation of which was code-named LASHUP. Approval for LASHUP was received from Secretary of Defense Forrestal in October 1949, and preliminary work on the network began by the end of the year.

While plans were being made for establishing an AC&W network, air defense was strengthened by another major reorganization of the Air Force. In October 1948, President Harry S. Truman called for greater emphasis on the organization and training of all reserve components. One of the results of this presidential directive was the formation of Continental Air Command, with General Stratemeyer as commander. ConAC was assigned the air defense mission and Air Defense Command and Tactical Air Command were reduced to "operational" status. For air defense, this reorganization meant that all ADC and TAC units would be placed under one commander and could be used in whatever role the situation demanded.

In the fall of 1949, continental air defense received new emphasis following the Soviet atomic explosion which occurred several years before the time predicted by most American experts. No longer could the nation depend solely upon its atomic stockpile as a deterrent against aggression. Henceforth, strong defensive measures to augment the offensive striking force would be required. But there was little that the Air Force could do immediately to strengthen air defenses. Nevertheless, several significant steps, including issuance of a directive to begin construction of the radar sites for the Permanent System were taken.

Despite the efforts by Headquarters USAF to improve the air defense system, Lt. Gen. Ennis Whitehead, the Commanding General of ConAC,

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was not satisfied. Because continental air defense was his responsibility, he began to urge Headquarters USAF to provide the means for an effective air defense. During the first half of 1950, USAF did all that it could to grant Whitehead's requests; but, as had been the case since the end of World War II, the Air Force did not have the resources to satisfy simultaneously all of its commitments.

Continental air defense assumed added significance on 25 June 1950, when the North Koreans invaded the Republic of Korea and the United Nations, led by the United States, moved to stop the Communist aggression. With hostilities taking place, a major conflict, which would undoubtedly include air attacks on the United States, might easily be touched off.

Outbreak of the Korean hostilities did not bring about any immediate augmentation in personnel or materiel for the air defense system because, naturally, the Far East Air Forces were accorded a higher priority. However, the air defense system benefited in other ways. Attempts were made to place the AC&W network on a 24-hour operational basis, and authority was received to make active interceptions of hostile aircraft. Furthermore, fighter forces for air defense were increased by federalization of Air National Guard units.

At the same time, the Korean war meant a great increase in the responsibilities of ConAC. This factor, in addition to the increase in fighter forces and the progress being made in construction of the Permanent System, led to the re-establishment of the Air Defense Command. With the formation of ConAC, late in 1948, ADC had become an operational headquarters. On 1 September 1949 it had been reduced to record status and a year later had been abolished completely. Now, at the end of 1950, a new Air Defense Command came into being with one mission—provision of continental air defense.

The Air Defense Command appeared at a time when Headquarters USAF was adopting a new concept. According to this "weapon system" concept, the future Air Force could perform its missions best by use of air defense, strategic, or tactical weapon systems. In each system all elements were to be combined around an airframe. Until the elements for these systems were developed, interim systems were required. The Air Defense Command immediately undertook completion of the air-defense interim system.

Since the Permanent System was not scheduled for completion until 1952, erection of a temporary (LASHUP) radar network had been undertaken. By mid-1950, the 44 LASHUP stations were operational. Construction had also progressed slowly on the Permanent System. Priorities had been established for the 85 stations, with completion of the first group scheduled for 1 July 1952. Because completion by that date might not be soon enough in view of the Soviet atomic explosion late in 1949 and the outbreak of hostilities in Korea in June 1950, beginning in 1950 Headquarters USAF tried to accelerate the program. Despite Department of the Air Force and congressional efforts, however, factors outside of the control of USAF, such as strikes and shortages of radar equipment, continued to delay installation of the network. The Permanent System was not fully operational until April 1953.

Successful operation of the radar network depended upon the quality of the radar equipment employed. Consequently, efforts had been made as early as July 1945 to write military characteristics for improved early-warning radar sets. By 1947 production of two improved sets—AN/CPS-6B and AN/FPS-3—was underway, with delivery of the first sets scheduled for 1949 and 1950. Because these sets, although great improvements over previous models, still did not meet future requirements, research and development was continued on more powerful models.

The delivery program for improved search radar was delayed from the beginning, and despite efforts to accelerate the program, the Permanent System was not completely equipped with the sets until April 1953. In the meantime, the Air Force had contracted with the Western Electric Company for a project to investigate improvements on the existing radar network. This project, known as CADS (Continental Air Defense System), recommended a number of changes which, when adopted, improved the ground environment of the interim air defense system.

A major weakness of the Permanent System was its inability to afford adequate low-altitude coverage. Although it was anticipated that improved radar sets in a future network might remedy this defect, the Air Force had to depend upon a corps of ground observers to spot low-flying aircraft and fill gaps in the radar coverage. However, it was not clear during the immediate postwar years that the Air Force had the author-

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ity to organize a Ground Observer Corps (GOC). By June 1949, ADC had only been given planning authority for a GOC; nevertheless, it began setting up a ground observer system. Not until February 1950 was the formation of a GOC authorized by Headquarters USAF.

Because the GOC was to be composed of volunteers, its success depended upon public interest. From the first recruiting lagged badly and interest proved difficult to sustain. Although almost 350,000 volunteers were enrolled in the GOC by mid-1954, only 130,000 were considered active. These observers manned some 5,400 of the 16,000 posts deemed necessary by the Air Defense Command. The Ground Observer Corps remained a weak element in the interim air defense system.

At the heart of the future air defense weapon system would be the interceptor aircraft. However, an aircraft with the required performance characteristics would be many years in development. World War II experience had illustrated that an all-weather interceptor was essential to air defense, and by 1944 an American night fighter (P-61) had been developed. To replace the P-61 during the postwar period, the AAF planned a jet aircraft, and two models, XF-87 and XF-89, were selected for investigation. While these aircraft were being developed, an interim interceptor was needed, and the P-82 "Twin Mustang" was selected. Even though some 225 P-82's were operational by the end of 1948, they were soon to be replaced by jet aircraft, principally the F-86D and F-94C. At about the same time, the F-89 was selected over the XF-87 as the interim interceptor. These three aircraft were destined to form the bulk of the air defense fighter force for the interim air defense system.

While these interceptors were being phased into the system, the aircraft designed to constitute the heart of the weapon system in the future was being developed. From a design competition begun in 1950, a contract for the "1954 Interceptor" was awarded to Convair. When it appeared that this interceptor would not be operational until the 1955-56 time period, another interim aircraft was needed. To meet this need, a decision was reached to produce the airframe of the Convair 1954 Interceptor as the F-102A; the ultimate aircraft was designated the F-102B. By mid-1954 the F-102A tests had been completed but the aircraft was not scheduled for production until the end of the following year.

During the years 1951-54, while the interim air defense system was being completed, efforts were being made to expand the system. Because it appeared quite certain that any future air attack would come across the polar regions, continental air defenses had to be oriented northward. At first, the meagerness of air defense resources dictated that a line of defense be established around the most vital areas. By 1952, however, the Air Defense Command had adopted the "double perimeter" concept whereby the defended areas would be protected by two lines of radar. The means with the greatest potential for completing and augmenting the double perimeter included mobile and gap-filler radar sets, airborne and seaborne early-warning radar, and a ground environment which would afford more automatic data-handling.

The method undertaken initially to strengthen the Permanent System was expansion of the existing land-based system. This augmentation would be accomplished in four phases, the first three of which would consist of 98 radar sets in the Mobile Radar program. Installation of these radar sets had been approved and given a high priority by Headquarters USAF by mid-1954. For low-altitude coverage and gap-filling, Headquarters USAF had also approved a program calling for 323 small automatic radar sets. Addition of these radars to the Permanent System promised to improve greatly the land-based AC&W network.

Northward extension of the early warning network was made possible by a combination of factors. The Alaskan Air Command and the Northeast Air Command possessed early warning potential and were integrated into the continental air defense system. The PINETREE chain of radars in southern Canada was installed by the cooperative efforts of the American and Canadian air defense commands, and the Mid-Canada line was being completed primarily by the Canadians.

These northern extensions would be helpful, but there was a need to move the early warning line as close as possible to the potential aggressor. A radar line across the arctic regions of Canada would fulfill this requirement. The decision to build such a Distant Early Warning (DEW) line with American funds was reached by the Department of Defense during a period when

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public awareness of the nation's vulnerability to air attack was increasing. In mid-1951 the Massachusetts Institute of Technology had released to the Air Force the report of Project CHARLES and had organized Project LINCOLN to investigate air defense. During the summer of the following year, the LINCOLN Laboratory organized a special study group to review continental air defense. Most startling of the recommendations of this special study group—the Summer Study Group—was one for the immediate erection of a DEW line at a cost of $370,000,000 and an annual maintenance cost of $100,000,000. Although the Group's report was not approved officially by the Air Force or the Department of Defense, it was presented to the National Security Council by the Chairman of the National Security Resources Board. These agencies received the report with enthusiasm and President Truman was apprised of the Summer Study Group's findings.

In essence, the report of the Summer Study Group called for a crash program in the erection of a DEW line. Neither the Air Force nor the Department of Defense agreed that such a program was feasible at that time. In the opinion of the Air Staff, development of the radar equipment needed for a DEW line was not far enough advanced. Furthermore, the Air Force believed, any available funds could be more effectively used to improve the existing AC&W network. Despite these objections, on the last day of 1952 President Truman approved construction of the DEW line. During the next two years, while the question of the feasibility of a DEW line was being discussed in the public press, testing of equipment proceeded on schedule.

The entire question of the amount and type of continental air defense required also came under discussion during this period. When the Summer Study Group and Project EAST RIVER (Civil Defense) reports highlighted the nation's vulnerability to air attack, the National Security Resources Board and the National Security Council pressed President Truman for action. The President responded by ordering a review of all air defense programs and, when the review revealed unsatisfactory conditions, by appointing the Kelly Committee to study the air defense problem. Also, each service was called upon by the Joint Chiefs of Staff to submit a plan to cover the defense situation as it was expected to be on 31 December 1955. By mid-1953 the plans had been prepared and were being considered by the Joint Chiefs.

While these plans were under consideration, the Kelly Committee submitted a report which opposed a crash DEW program. Since this report indicated that a difference of opinion still existed on air defense, the National Security Council appointed a new (Bull) committee which, on 22 July 1953, reported that the continental defense programs, current and future, were inadequate. Shortly thereafter the Bull Committee's conclusions took on added significance with the 12 August Soviet H-bomb explosion. Therefore, on 25 September, President Dwight D. Eisenhower approved a new policy statement calling for increased emphasis on continental defense. By early 1954 another policy statement had lessened the emphasis; and by the middle of the year, outside of the Air Force, defense seemed somewhat less urgent. Approval of the defense plans was being delayed by the divergent views which still existed between the services on certain phases of air defense. It was hoped that formation of a joint air defense command then being considered would aid in resolving those interservice differences.

In addition to the northward expansion of the land-based network, a seaward extension was necessary. Three devices were adopted to provide seaward extension: airborne early warning (AEW) aircraft, picket ships, and "Texas Towers." Some difference of opinion existed as to whether the Navy or the Air Force was to provide AEW aircraft, but this was resolved in October 1953 by an agreement between Admiral Robert B. Carney, the Chief of Naval Operations, and General Nathan F. Twining, the Air Force Chief of Staff. Carney and Twining agreed that the Air Force would provide the AEW aircraft and the Navy would furnish picket ships. These seaward extension forces would be augmented off the Atlantic Coast by stationary platforms called "Texas Towers." By July 1954, operations by these devices for seaward extension were being delayed mainly by the lack of materiel.

The third factor—in addition to the land-based and seaward extensions—in the improvement of the air defense network was the development of the ground electronic environment. Air defense planners had long realized that a future defensive system would require as near automatic op-

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eration as possible. When the LINCOLN scientists undertook the problem, they devised both a "Quick Fix" system as an immediate solution and a plan for a "Future System." The LINCOLN Quick Fix was deemed "operationally undesirable," however, and an intermediate solution—LINCOLN'S Transition System—was proposed. The Transition System was accepted, with the first prototype due to be operational by January 1957. Adoption of the Transition System, in conjunction with the programmed improvements in the air defense system and the formation of a joint command for air defense, promised an increased kill potential for the air defense forces.

Formation of a joint air defense command had long been considered by air defense personnel as an ultimate goal. Although Headquarters, AAF had assigned the air defense mission to the Air Defense Command upon the latter's activation early in 1946, air defense was not confirmed as an Air Force mission until the meeting of the Joint Chiefs of Staff at Key West in March 1948. As a result of the Key West decisions, air defense became a unilateral responsibility of the Air Force, with the Army and Navy having collateral functions. Thus, the Air Defense Command remained an Air Force organization and continued to negotiate with the Army and Navy for the use, in an emergency, of any forces possessing an air defense potential. In the absence of a joint command, interservice agreements were the only devices available to ADC.

As early as 1946, the War Department was considering a plan for a joint continental air defense command. During the years that followed, various proposed plans came to naught, largely because of divergent interservice views. By 1953 the Air Force position on the question of the joint command concept was based upon maintenance of the status quo—an Air Defense Command directed by the Chief of Staff and depending upon interservice agreements for emergency forces. However, on 6 August 1953 the Joint Chiefs of Staff agreed to the establishment of a JCS specified command for continental air defense. USAF continued to object to a change, but early in 1954 reversed its position.

With the Air Force taking a favorable attitude toward a joint command, several interservice differences of opinion were ironed out during the first half of 1954; and on 1 September Continental Air Defense Command was activated, substantially as proposed in May by ADC's commander, General Benjamin W. Chidlaw. CONAD, a joint command, "for the air defense of the continental United States," was placed above the existing ADC structure, with the Department of the Air Force as executive agent. The Air Defense Command, the Army Antiaircraft Command, and naval forces of the contiguous radar coverage system were allocated to CONAD. The Commanding General (Chidlaw) of the new command was given operational control of all assigned forces and of all augmentation forces made available during periods of emergency. Although the USAF retained the dominant position in the new joint command, henceforth the responsibility for continental air defense would be shared by the three services.

The new joint command came into existence at the end of a nine-year postwar period during which a solid framework for air defense had been built. From the days of 1946-1949 when the nation was practically defenseless, a nation-wide integrated air defense system had become a reality. The Permanent System of early-warning radars was operational and interceptor strength had been increased. Antiaircraft artillery and the Ground Observer Corps had taken their places in the system. Also, in an emergency, all available forces would be used to counter an air attack. Nevertheless, the Continental Air Defense Command took over an interim system. Much remained to be done before the nation's defenses would afford the protection needed.

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Footnotes

Chapter 1

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2. R&R AC/AS-OC&R to Chief, Management Control, subj: Organization for Continental Air Defense Commands, 6 Jun 45, in USAF HD 145.86-70.

3. R&R AC/AS, M&S, Air Installations Div to AC/AS-OC&R, Req Div, subj: Fighter Control Center, Los Angeles, California, 19 Jun 45, in Case History of the Aircraft Control and Warning System, Hist Div, AMC, Feb 52, doc 3.

4. Ltr, Brig Gen W. F. McKee, DAC/AS, OC&R, subj: Aircraft Control and Warning System, 4 Apr 45, in Case Hist AC&W System, doc 1.

5. Ltr, Hq CAF to CG AAF, subj: Defensive Communications and Electronics in the Postwar Period, 21 Jul 45, in Case Hist AC&W System, doc 4.

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7. R&R AC/AS-OC&R to Chief, Management Control, subj: Organization for Continental Air Defense Commands, 6 Jun 45, in USAF HD 145.86-70.

8. Ltr, Hq CAF to CG AAF, subj. Formation of an operational air force in the United States, 20 Jun 45, in Hist CAF, 15 Dec 44-21 Mar 46, doc 52.*

9. *Ibid.*

10. Tab A to ltr, Hq CAF to CG AAF, subj: Formation of an operational air force in the United States, 20 Jun 45, in Hist CAF, 15 Dec 44-21 Mar 46, doc 52.

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19. WD FM 100-20, "Command and Employment of Air Power," 21 Jul 43.

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27. LaMotte Cohu, "'Paper-Bag' Air Force," in *Air Force*, XXX, no 3 (Mar 47), 12.

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The Air Force historian who attempts to tell the story of post-World War II air defense is presented with an abundance of material. This material is divided mainly among four repositories: Directorate of Plans, Headquarters USAF, Departmental Records Branch, Alexandria, Virginia; Directorate of Historical Services, Headquarters Air Defense Command; and Archives Branch, USAF Historical Division, Maxwell Air Force Base, Alabama. These files contain correspondence, reports, memorandums, and other documents useful to the researcher.

In addition, the semiannual reports of the Continental Air Defense Command, its predecessors, and its subordinate air forces were used extensively. Information was also obtained from histories of the various staff sections of Headquarters USAF and from semiannual reports of USAF major commands, principally Air Research and Development Command and Air Materiel Command.

A number of monographs prepared by other historians in the USAF historical program contain useful information. These include monographs written by the Directorate of Historical Services, Air Defense Command, and case histories compiled by the Historical Division, Air Materiel Command.

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Appendix

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SIGNIFICANT DATES IN THE DEVELOPMENT OF CONTINENTAL AIR DEFENSE

1946

27 March - Air Defense Command activated at Mitchel Field, New York as part of AAF reorganization.

25 April - Air National Guard organized.

1947

21 May - First postwar AC&W organization—505th AC&W Group—activated at McChord Field, Washington.

26 July - United States Air Force created as coequal of the Army and Navy.

21 November - USAF Chief of Staff approved Plan SUPREMACY.

17 December - Headquarters USAF informed ADC that in an emergency Air National Guard and fighter and radar units of SAC and TAC would be made available for air defense.

1948

1 January - President's Air Policy (Finletter) Commission reported.

11-14 March - Key West Conference resulted in assignment of air defense mission to USAF.

26-27 March - ADC ordered to set up emergency air defense system in Northwest United States and Alaska and place it on 24-hour operation.

6 April - Continental United States Planning Group formed in the Defense Department.

23 April - ADC ordered to set up AC&W systems in Northwest, Northeast, and Albuquerque, New Mexico areas.

27 May - SUPREMACY introduced in Senate (introduced in House of Representatives 2 June). Congress adjourned without taking action.

1 July - Air Defense Division, headed by Maj. Gen. Gordon P. Saville, formed in Headquarters USAF.

9 September - General Saville presented Modified Program to Secretary of Defense James Forrestal.

October - Secretary of Defense Forrestal approved use of funds for LASHUP.

25 October - First air division (25th Air Division) activated at Silver Lake, Washington.

1 December - Continental Air Command activated; ADC made operational command under ConAC.

1949

1 March - Six ConAC air forces relieved of air defense responsibilities. Eastern and Western Air Defense Liaison Groups formed (succeeded by Eastern and Western Air Defense Forces).

3 March - Louis Johnson replaced Forrestal as Secretary of Defense and instituted economy program which led to B-36 investigation.

21 March - President Truman signed bill authorizing AC&W system (Modified Program).

1 September - Eastern and Western Air Defense Forces activated.

23 September - President Truman announced that atomic explosion had taken place in Russia in August.

2 December - Headquarters USAF ordered Office of Chief of Engineers to proceed with construction of first 24 sites of Permanent System.

1950

3 February - Headquarters
authorized ConAC to set up
Corps.

8 April - Headquarters USAF a
to begin armed interceptio
Energy Commission insta
East Coast.

1 June - LASHUP considered c

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25 June - Hostilities broke out in Korea.

1 July - Air Defense Identification Zones created in vital areas of the United States.

1 August - Agreement between General J. Lawton Collins, Army Chief of Staff and General Hoyt Vandenberg, USAF Chief of Staff gave air defense commander operational control of Army Antiaircraft.

24 August - President Truman authorized interception and engagement of aircraft anywhere in the United States.

30 August - Secretary of the Air Force Thomas K. Finletter ordered Permanent System radar site construction expedited.

1 October - Northeast Air Command activated.

1951

1 January - Air Defense Command reestablished.

1 February - 15 ANG fighter squadrons federalized and assigned to ADC.

1 March - Central Air Defense Force activated.

14 April - President Truman approved Radar Extension Program (PINETREE).

21 April - ADC reached agreement with TAC for use of TAC forces in emergency air defense.

23 May - ADC reached agreement with SAC for use of SAC forces in emergency air defense.

10 July - Mobile Radar Program approved by USAF.

26 July - Project LINCOLN Laboratory chartered by USAF, Army and Navy.

1 August - Project CHARLES group submitted its report.

1952

16 January - ADC proposed double perimeter plan for air defense system.

14 July - SKYWATCH (fulltime operation of GOC posts) began.

27-28 August - Summer Study Group reported to the Defense Department.

23 September - First picket ship placed on 24-hour operation.

1 October - Project EAST RIVER (Civil Defense) reported.

4 December - Kelly Committee set up to study continental air defense programs (reported early in 1953).

31 December - President Truman approved National Security Council policy statement calling for strengthened continental defense.

1953

10 April - USAF decided to adopt the LINCOLN Transition System. Later renamed Semi-Automatic Ground Environment (SAGE).

13 April - Permanent System became fully operational.

22 July - Continental Defense (Bull) Committee reported that defense programs were inadequate.

12 August - Thermonuclear explosion took place in Russia.

25 September - President Eisenhower approved statement calling for increased emphasis on continental defense.

1 October - First airborne early-warning squadron activated at McClellan AFB, California.

22 October - General Nathan F. Twining, USAF Chief of Staff, and Admral Robert Carney, CNO, agreed that USAF was to provide AEW aircraft; Navy to provide picket ships and lighter-than-air aircraft for air defense (agreement not signed until 24 December).

3 November - Canada agreed to construction of the Mid-Canada Line.

1954

11 January - USAF approved the construction of five Texas Towers.

22 January - JCS agreed to establishment of JCS command for continental air defense.

1 August - Airborne early-warning operation began off West Coast.

1 September - Continental Air Defense Command activated at Ent AFB, Colorado.

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Glossary

AA	Antiaircraft Artillery
AAC	Alaskan Air Command
AAF	Army Air Forces
AC&W	Aircraft Control and Warning
ADC	Air Defense Command
ADC HD	Directorate of Historical Services, Air Defense Command
ADES	Air Defense Engineering Services
ADIS	Air Defense Integrated System
ADIZ	Air Defense Identification Zone
ADSEC	Air Defense Systems Engineering Committee
AEC	Atomic Energy Commission
AEW	Airborne Early Warning
AGF	Army Ground Forces
AMC	Air Materiel Command
ANG	Air National Guard
APGC	Air Proving Ground Command
AUL	Air University Library
CADS	Continental Air Defense System
CAF	Continental Air Forces
CHARLES	A short term study project at the Massachusetts Institute of Technology for reviewing the air defense problem (1951)
ConAC	Continental Air Command
CONAD	Continental Air Defense Command
CORRODE	A project for developing and installing radar equipment in the Arctic for use in early warning lines (originally called COUNTERCHANGE)
CUSDPG	Continental United States Defense Planning Group
DEW	Distant Early Warning
DRB	AGO Departmental Records Branch, Alexandria, Virginia
EADF	Eastern Air Defense Force
EAST RIVER	A project organized in 1952 to study the problem of Civil Defense
FEAF	Far East Air Forces
GOC	Ground Observer Corps
JCS	Joint Chiefs of Staff
KCRC	Kansas City (Missouri) Records Center
LASHUP	The temporary radar early warning network erected between 1948 and 1950
LINCOLN	A laboratory established in July 1951 at the Massachusetts Institute of Technology to study air defense problems
MSG	Military Study Group (United States and Canada)
NBC	Newfoundland Base Command
NEAC	Northeast Air Command
NSC	National Security Council
NSRB	National Security Resources Board
OPD	Directorate of Plans, Headquarters USAF
OSD	Office of the Secretary of Defense
PINETREE	A chain of radar stations built by joint Canadian-American efforts along the Canadian-American border
PJBD	Permanent Joint Board on Defense (United States-Canada)
PPI	Plan Position Indicator
RAND	A nongovernmental, nonprofit organization dedicated to research and development for the nation's welfare and security

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RCAF	Royal Canadian Air Force
RDB	Research and Development Board, Headquarters USAF
SAC	Strategic Air Command
SKYWATCH	24-hour operation of Ground Observer Corps begun in 1952.
SUPREMACY	An Aircraft Control and Warning plan approved by the Air Force 21 November 1947 but not passed by Congress
TAC	Tactical Air Command
USAF	United States Air Force
USAF HD	Archives Branch, USAF Historical Division, Maxwell Air Force Base
VHF	Very High Frequency
WADF	Western Air Defense Force
WDGS	War Department General Staff

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