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and its Predecessors through
June 1951

VOLUME I: NARRATIVE

DIRECTORATE OF HISTORICAL
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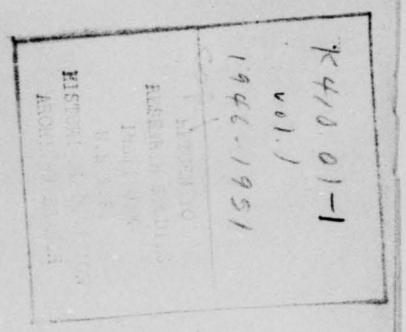

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THE AIR DEFENSE OF THE UNITED STATES

A History of the Work of
the Air Defense Command and its
Predecessors through June 1951

Prepared by the
DIRECTORATE OF HISTORICAL SERVICES
Office of the Air Adjutant General

Headquarters
THE AIR DEFENSE COMMAND

PREFACE

The present volume is a history of the evolution of an air defense system in the United States from approximately the end of World War II through June 1951. The decision to include in the present work an account of the pioneer air defense efforts of its predecessors as well as major developments within the Air Defense Command for the first half of 1951 was prompted by certain important historiographical considerations. Foremost of these was the necessity for placing the present Air Defense Command's air defense effort in its proper historical setting. Unfortunately, there was a year and one half period (June 1947-December 1948) when no history of air defense was written. And while Continental Air Command Histories for the period January 1949-June 1950 contained much information of value, the diversity of missions of that command had the effect of obscuring its air defense contributions as revealed in its official history.

It is frankly admitted that a great wealth of data on certain of the subjects treated herein remains to be exploited. It is also acknowledged that several subjects deserving of treatment were not presented, either for lack of time or because of a paucity of reference data. It is felt, however, that the considerations necessary to an historical appreciation of the complex subject of air defense have been revealed in the present work. In future semi-annual histories and historical monographs any omissions appearing in this volume will be corrected.

The greatest of care was exercised to substantiate all facts and analyses in the history with pertinent documentation. Also, the officers of the headquarters were solicited to read and comment freely on those chapters the subject matter of which was most familiar to them. If, in spite of these precautions, inaccuracies of fact or misleading interpretations are subsequently revealed, immediate correction will be made in all outstanding copies.

Credit for whatever merits the history may have is shared with the historians of the lower echelons and with the many officers of the headquarters who gave so freely of their time to discussions with the historians and to the reading of drafts. Appreciation is extended, also, to Major General Charles T. Myers, Vice Commander, and Colonel Walter W. Robinson, Air Adjutant General, without whose administrative and supervisory support preparation of the history would have been impossible. Finally, to the clerical staff of the historical office - Mr. Albert Fuquay, Editor; S/Sgt Monroe Buehring, Chief Clerk; and Mesdames Marietta Polly and Betty Terry, Clerk Stenographers — acknowledgement is due for the consistency of form and legibility of the manuscript.

Thomas A. Sturm
Denys Volan
George Billias
Howard Stevens.

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* Footnotes are numbered consecutively within chapters. Supporting documents are numbered consecutively throughout the history for ease of reference. Each volume of supporting documents is prefaced with an index of the documents contained therein.

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CHARTS AND MAPS

PART I

THE BACKGROUND

CHAPTER ONE

THE GROWTH OF AIR DEFENSE CONSCIOUSNESS

1933 - 1945

I

The history of the air defenses of the continental United States covers barely two decades. Since 1933 much has been accomplished in establishing a system of military air defense and in integrating into that system the defense capabilities of the entire nation. The progress has not been smooth, being impeded by interservice rivalries and misunderstandings, by national complacency, by constitutional barriers and historical traditions making for lack of inter-agency rapport, and by the maladjustments caused by a second World War and its bewildering aftermath.

That the theory and practice of national air defense is so recent may be attributed in great part to the newness of strategic bombardment aviation in the last two decades and to the parallel growth of bomb-power. If we were to seek an arbitrary date to begin our narrative, perhaps the most persuasive date which would come to mind is the year 1933. That year is significant not only because of the fact that during its course the military planners for the first time considered air defense from a continental point of view, but also because it serves as an

historic date in the development of American foreign policy and in the growth of air power, both of which factors played a most significant role in the history of air defense.

1933 and the years immediately following saw the birth of an irrational force in power politics, Nazi Germany, before which no nation could rest in confidence of international peace. Although much of the United States still reposed in the illusion of geographical isolation, the effect of Nazi saber-rattling was to make substantial inroads on the defense consciousness of American military leaders. Perhaps not entirely without coincidence, the Nazi political resurgence developed apace with the spectacular growth of striking power in military aviation. The appearance of these two forces on the international scene - a hostile nation and a new weapon of disquieting potentiality - combined with their effect on our military preparedness, may be considered a logical starting-point for the story of American air defense.

II

As early as 1932 the rise of fascist militarism centered the attention of the United States on the need for an increase of military readiness to meet any national emergency. To this end the War Department General Staff reorganized its establishment in order to weld its military units into an "integrated machine

capable of instantaneous response to the orders of the President."[1] A major aspect of this process of girding for battle was the consolidation of Army tactical units into four continental field armies. Elaborate defense plans were drawn up; and for the first time in the planning process, the air arm of the Army, having been asked to formulate its concept of air defense, proposed for itself a defense role unprecedented in its history.

The plan, submitted in June 1933 by the Chief of the Air Corps, denied that all air force operations must tie in with ground operations and laid great emphasis on the initial air defense of the coast to a distance of 200 to 300 miles offshore.[2] As protection for seven designated critical defense areas the plan recommended the detail of planes to operate as a coastal defense unit, controlled by a GHQ Air Force and coordinated with a radio communication and alarm system along the coast. Upon the approach of an enemy by land, sea or in the air, proper notice would be given to Air Headquarters ashore. In the meantime, the striking part of the Air Force, consisting of bombardment and/or attack planes, would be held in a state of constant readiness to be used as the situation might demand. Though the plan would distribute portions of the Air Force among the most critical areas at the

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1. Memo for CGs of the Four Field Armies by Gen. Douglas MacArthur, Chief of Staff, 22 Oct 1932, cited in AAF Historical Study No. 25, "Organization of Military Aeronautics, 1907-1935," p. 89 fn 10.

2. AAF Historical Study No. 25, pp. 89-92

beginning of or just prior to a war, it was not intended that the distribution would be a permanent one. It was to be used until the location of the main enemy effort was determined, and then was to be concentrated where the main enemy threat was being made.

The plan submitted by the Air Corps was reviewed subsequently by a board appointed by the Secretary of War, and headed by Major General Hugh Drum, the Deputy Chief of Staff. It was a typical General Staff board, completely dominated by ground officers. The only member representing the Air Corps was its chief, Major General B. D. Foulois. The report of the Drum Board, issued in October 1933, minimized the importance of air power and branded as unsound and fallacious the claims that land-based enemy air forces presented a danger to the defense of the United States.[3]

Shortly after the Drum Board report, a second board, headed by Newton D. Baker, was appointed in the spring of 1934. The purpose of this board was to make a constructive study of the operation, flying equipment and training of the Army Air Corps and to determine its adequacy and efficiency in the performance of its missions "in peace and war."[4] As on the preceding commission, the air officers were outnumbered by the ground men. Like previous boards, the Baker Board stressed the principle of unity of command and disapproved the separation of the air arm

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3. Ibid. 91

4. Ibid. 93-4

from Army operations as violating that principle. Though admitting that aviation had increased the power of the offense where the belligerent countries bordered upon one another and the power of defense where the warring powers were widely separated, the Baker Board pointed out what it deemed to be the "vital limitations and inherent weaknesses of military aviation." These it conceived to be the necessity of either land or floating bases, dependency upon weather conditions, expense and load-capacity of airplanes. In answer to the oft-repeated contention that the United States was vulnerable to air attack, the report declared:[5]

> The "air invasion of the United States" and the "air defense of the United States" are conceptions of those who fail adequately to consider the effect of ocean barriers and other limitations. Aircraft in sufficient numbers to threaten serious damage can be brought against us only in conjunction with sea forces or with land forces which must be met by forces identical in nature and equally capable of prolonged effort.

In spite of pronouncements and decisions such as those of the Drum and Baker boards, the impact of increasing international crisis and the growth of air power in the succeeding months did much to change military opinion in favor of a more positive role for military aviation. Japanese and Italian aggression against China and Abyssinia and the growing belligerency of Nazi Germany made it clear that America's status in international affairs

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5. Ibid., p. 94

was to be commensurate with her military and industrial strength. The civil war in Spain and the large role of air power in that conflict brought home the message sharply that henceforth civilians as well as the military would be subject to enemy attack. Long range flights of aircraft, both civil and military, were made with greater regularity, safety, and load-capacity to distant points. Even the two poles fell before the progress of aviation.

III

In 1935 the Joint Board of the Army and the Navy made the Army responsible for seeing to it that its air component was provided with all types of aircraft primarily designed for ". . . direct defense of the land and coastal frontiers of the continental United States and its overseas possessions, or in repelling air raids against shore objectives, or at shipping within our harbors."[6] The second of these events was the ranking of research in the detection of hostile aircraft over all other items in the War Department development program in 1936.[7]

Having assigned the Army the duty of providing the means of air defense, the Joint Board of the Army and the Navy awarded

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6. The Joint Board of the Army and the Navy, Joint Action of the Army and the Navy, ch. iv, 1935. (DOC 1)

7. United States Air Force Office of Air Force History, The Army Air Forces in World War II, Vol. I, Plans and Early Operations, Jan 1939 to Aug 1942, (Chicago, 1948) 287. Hereafter cited as USAF, I. See also Watson, pp. 43, 50.

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to the air arm of the Army the primary function of operating[8]

> . . . as an arm of the mobile Army, both in the conduct of air operations over the land in support of land operations and in the conduct of air operations over the sea in direct defense of the coast.

As a secondary function, the air arm was to be responsible for[9]

> . . . air operations in connection with the defense of important industrial centers and military and naval installations.

Although a clear cut award of responsibility for air defense of continental facilities and installations was high time in coming, the doctrinal pronouncement of the Joint Board in 1935 was also the starting point of a long and sometimes bitter controversy over the extent of the responsibility of the air forces and the degree of authority necessary to perform effectively the assigned function of air defense. Since this controversy will occupy an important part of the present history, it would be well to set the stage at this point by giving a brief description of the status of the air arm within the War Department during the pre-war era.[10]

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8. Joint Action, ch. iv

9. Ibid.

10. On the organizational history of the Air Corps, see: USAF, I; Watson; AAF Historical Study No. 25, "Organization of Military Aeronautics, 1907-1935" (1944); AAF Historical Study No. 10, "Organization of the Army Air Arm, 1935-1945" (Revised, 1947); AAF Historical Study No. 46, "Organization of Military Aeronautics, 1935-1945" (1946)

The position of the Army air arm as a component of the U. S. Army in 1935 was a far cry from the exalted status of that organization during the later war years.[11] At the time of the assignment of the air defense mission to the Army in 1935, the Air Corps had recently been reorganized with the purpose of giving the air arm greater freedom in the operational control of its own units. The General Headquarters (GHQ) Air Force had been created as the combat command of Army aviation, directly responsible to the Chief of Staff. The Office of the Chief of the Air Corps (OCAC) was organized to supply and service the combat units, being directly responsible also to the Chief of Staff. Both offices were thus on the same level of command, with neither exercising authority over the other. Prior to this time, the tactical units of the Air Corps had been responsible to the commanding generals of the Army Corps areas, with the Air Corps office itself serving

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11. Military aviation commenced in the United States with the establishment of the Aeronautical Division of the Office of the Chief Signal Officer in 1907. In 1914 the designation of this office was changed to that of Aviation Section of the Signal Corps. In 1926 military aviation was incorporated into the Air Corps, given sectional representation in the General Staff, and allotted an Assistant Secretary of War for Air. In 1934 the Baker Board, mentioned in the text, recommended the dropping of the Assistant Secretaryship and the division of the Air Corps into two parts, one for combat, the other for service and supply activities. These recommendations were carried out by the creation of the GHQ Air Force and the Office of the Chief of the Air Corps. In 1939 these branches of the air arm were united, but in November 1940 they were separated again. In June 1941 the two offices were reunited under the new office of the Chief, AAF. In March 1942, the AAF was placed on a coequal status within the WD with the AGF and the ASF.

as a specialized supply arm. In the new structure, the authority of the Commanding General, GHQ Air Force, was increased over his tactical units; but his control over supply was nonexistent, while command of air bases remained with the Army corps area commanders.

Nowadays, a situation such as that just described would be startling. In those days, however, when there existed neither aircraft warning service nor ground control of interception, and when the striking power of aircraft, though growing at an alarming rate, was relatively puerile, the question of air defense was academic. The realities of existing principles of warfare under which the War Department operated in 1935 pointed to the greater advantages of an organization of air power under the field forces, whereby America's striking forces could be kept intact by maximum air defense resources, and in which all capabilities for air defense could be united. Very shortly, indeed, the air forces were to upset these doctrines via the great readjustments of World War II, and were to win their battle to elevate air power in warfare to a co-equal status with the ground forces.[12]

Between 1935 and 1941, as the potentialities of air power became increasingly apparent, a correspondingly grave concern was felt about continental air defenses. In 1936 the War Department

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12. As late as 1939 the air forces were smaller in numbers than the field artillery and less than one-eighth of the whole army. Watson, 279.

ranked research in the detection of hostile aircraft first in its research program, and thenceforward, under the aegis of the Signal Corps in its laboratories at Fort Monmouth, an intensive program of radar research was developed.[13] In spite of these increasing evidences of concern, the first overt step towards a national military air defense system was not taken until November, 1939. At that time Major General Henry H. Arnold, then Chief of the Air Corps, called the attention of the War Department to the complete absence of national air defenses and urged that a unit be established to study the problem.[14]

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13. Watson, 43, 50; USAF, I, 287. The first field radar erected by the Signal Corps was located in Panama, 7 Oct 1940. The true origin of modern radar dates from 1935 when practical microwave sets were developed.

14. USAF, I, 289, OCAC and GHQ Air Force were united under the Chief of the Air Corps in Mar. 1939, but only to be separated again in Nov. 1940. General Arnold's suggestion, therefore, was on behalf of the entire Army air arm.

IV

The result of General Arnold's admonition was the establishment of the Air Defense Command on 26 February 1940.[15] This command, first in the line of three Air Defense Commands,[16] undertook to study the special capabilities of pursuit aviation, anti-aircraft artillery, radio equipment, and passive defense measures, and to formulate the most effective combination of the several means of defense. Under a strict interpretation of air defense, the new organization was not concerned with air striking units, which were designed to seek out and destroy hostile aircraft great distances away, but was concerned only with the problems of attacking planes over the U. S. Since ADC was only a planning body, pursuit aviation remained under the jurisdiction of the GHQ Air Force.

The Battle of Britain provided ADC with an excellent laboratory of air defense operations for its study. Observers returned from England with enthusiastic reports of the effectiveness of

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15. Headed by Brigadier General James E. Chaney and located at Mitchel Field, N.Y., ADC was primarily a planning agency, limited in size to a staff of only 10 officers, and under the administrative authority of the CG First Army. See "History of the Air Defense Command, 26 Feb 1940 to 2 Jun 1941"; also USAF, I, 152-3, 289 ff.

16. The sequence and chronology of the Air Defense Commands is as follows: (1) 26 Feb 1940 to 2 Jul 1941 (2) Mar 1946 to Jul 1950. (From Dec 1948 to Jul 1950 ADC functioned as an operational headquarters under the Continental Air Command) (3) 1 Jan 1951 to date.

British radar devices against the Luftwaffe. In May 1940 the War Department accordingly directed that commanders of armies and overseas departments prepare or revise plans for an aircraft warning service which would include provision for the use of radar detectors.

In its studies, ADC received excellent cooperation from the British, and the friendly relations and common interests of the two countries prompted the mutual exchange of technical equipment and information. Before the end of 1940 the United States began to receive information on airborne interception equipment and early in 1941 was given the prototype of the British VHF radio set. Similarly, the IFF device developed in England was copied by the Signal Corps and was adopted in August 1941 as the standard American equipment.

V

The experience of the Battle of Britain clearly demonstrated one fact to American observers: If the United States were to embark on the creation of a similarly effective air defense system, responsibility for its operation would have to be defined within the military structure. The functions of local air defense, it has been mentioned, were assigned to the Army air arm as early as 1935, but the air arm's disorganized condition in 1940 precluded the award of responsibility to it of the operation of a continent-wide system of air defenses. It will be recalled

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that the Joint Board had given the air forces the primary function of operating "as an arm of the mobile Army." The mission of air defense would inevitably be in direct conflict with this primary assignment. And yet, the air forces were manifestly the logical choice to manage the country's air defenses.

Although the air force organizational structure was weakened by the separation of GHQ Air Force from OCAC in November 1940, in another manner it was strengthened for the burden it was about to undertake. In November 1940 four air districts were created to correspond in territory to the four continental land armies, the purpose of which was to decentralize the GHQ Air Force activities, which were becoming more complex as the rearmament program progressed. Although the air district structure could well serve the purposes of management of the proposed continental air defense system, the absence of unity of command within the air forces was a glaring anomaly, and the missions carried a strong possibility of becoming mutually contradictory. Nevertheless, "time was of the essence" and the choice was made.

In March 1941 the Commanding General, GHQ Air Force, received the mission of organizing, training for, and operating the air defenses of the continental United States.[17] Simultaneously, the War Department created four Defense Commands, corresponding to the four Army areas as "territorial agencies . . . designed

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17. WD Ltr AG 320.2 (3-6-41): "Air Defense," 7 Mar 1941 (DOC 2)

to coordinate or prepare and to initiate the execution of all plans for the employment of Army Forces and installations in defense against enemy action in that portion of the United States lying within the command boundaries."[18] In wartime, it was announced, the Defense Commanders were to be responsible for all defense operations. The responsibilities of the CG, GHQ Air Force were indicated as follows:[19]

> The Commanding General, GHQ Air Force, under GHQ, is responsible for the peace time organization and training for air operations and defense against air attack in the continental United States except:
>
> 1. Operation of aviation attached to ground units.
>
> 2. Operation of antiaircraft artillery assigned or attached to mobile ground units, and technical training of all antiaircraft artillery.
>
> 3. Measures against low flying aircraft with organic means available to ground troops.
>
> 4. Passive defense measures (except those pertaining to GHQ Air Force units and installations.)

At the same time, the four air districts were abolished and replaced by four continental Air Forces, corresponding in territory to the four Defense Command areas. To the new Air Forces were assigned, ". . . for the purpose of defense organization and planning, primary responsibilities under the Commanding

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18. WD Ltr AG 320.2 (2-28-41): "Defense Plans - Continental United States," 17 Mar 1941 (DOC 3)

19. Ibid.

General, GHQ Air Force."[20]

The arrangements of March 1941 clearly awarded air defense responsibilities to the GHQ Air Force - so long as peace prevailed. At the danger point, GHQ's responsibilities were to cease. The critical moment was to arrive, however, much sooner than was expected. Meanwhile, plans for air defense and construction of the first radar network received first priority in War Department considerations.[21]

Because much radar siting activity was soon underway, and many WD agencies were actively engaged in the birth of the air defense system, the War Department deemed it wise to avoid the risk of the Defense Commands' tampering with these activities under their overall planning authority by issuing the following supplementary instructions:[22]

> Current plans and projects for the organization of the means for air defense, to include the location

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20. Ibid.

21. The plan of air defense was officially summarized in: Major Gordon P. Saville, Air Defense Doctrine, 27 Oct 1941. It goes without saying that the decision to adopt the British technique of ground controlled interception was not accompanied by plans to copy British strategic defense organization and deployment of radar and aircraft. The great extent of United States territory precluded a perimeter defense such as existed in the United Kingdom. Of necessity, the Air Defense Command recommended that a system of defense of "strategic areas" be adopted for the United States, on a priority basis.

22. WD Ltr AG 320.2: "Defense Plans - Continental United States," 25 Mar 1941 (DOC 4)

of detector stations and communications and observer systems will be transferred from the Army and other Commanders to the Commanding General, GHQ Air Force or his designated representatives.

For the purpose of ground organization for Air Defense and the allocation of additional responsibilities to Air Force Commanders, boundaries will be prescribed by the Commanding General, GHQ Air Force. These boundaries will not necessarily conform to the boundaries of the Defense Command.

There is no doubt, of course, that GHQ Air Force's mission was awarded to it in the best of faith. Repeated utterances of the Secretary of War in 1941 stated that henceforward it would be WD policy to grant the air forces as much autonomy as possible.[23] If war had not begun so shortly afterward, it is possible that the Army air arm might have established itself in the air defense "business" and acquired the authority commensurate with its extended operations. In the space of time allotted to it, however, the air forces could do little more than initiate action on an air defense system. Meanwhile, air defense capabilities were limited to existing fighter aircraft and antiaircraft artillery. The possibilities of interception without early warning were practically non-existent, while the great areas to be covered in air defense limited the effectiveness of antiaircraft artillery.

The directives of March 1941 revealed a situation replete with troublesome illogicalities. GHQ Air Force was to organize and operate the nation's first air defense system, but

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23. AAF Historical Study No. 10, p. 13

on the verge of war it was told to release its prerogatives to the Defense Commanders. Under the theory of unified command this was not inconsistent, but when coupled with the mandate given to GHQ Air Force to deploy its radars as it saw fit and to redelineate its boundaries in a like manner, the possibility was present that the Defense Commanders would be faced with an accomplished fact which they could do little to alter under pressure of crisis.

On the other hand, in spite of the increased emphasis on defense planning, the entire question of air defense was still generally considered to be an academic one in 1941, as it was to be later, in 1946-1947. Even the air forces themselves were determined to take the developments in stride, as is testified by the apparent lack of controversy over the matter of conflicting defense responsibilities. In truth, the air forces throughout 1941 were too preoccupied with their great expansion program to be overly concerned in this matter. As General Arnold indicated when sympathizers continued to press for air force independence during the early war years, the air force needed the support of the Army's facilities and services in its armament program and the existing crisis was deemed inopportune for such polemics.

In June 1941, meanwhile, the War Department, belatedly recognizing the incongruity of split Air Corps authorities, reunited the Office of the Chief of Air Corps with the GHQ Air

Force (now renamed the Air Force Combat Command) under the new office of the Chief of the Army Air Forces. The new AAF also inherited GHQ Air Force's mission of air defense.

VI

The warning network planned for the United States in the spring of 1941 represented a compromise with the ideal. A perfect arrangement would have depended primarily upon a series of radar stations sufficient in number to assure mechanical detection of any hostile force.[24] But there were not enough radar sets or technicians qualified to man them for coverage of the entire area of the country; and radar had not reached a stage of development which permitted it to operate over land with the same effectiveness it showed over the ocean. No radar equipment in existence in 1941, outside the laboratories, could locate low-flying airplanes without detecting as "permanent echoes" the images of prominent landmarks.[25] Accordingly, the War Department planned to recruit civilians to serve as ground observers to report on the identity and movements of aircraft over land and to use radar to provide a seaward extension of the

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24. The author is indebted for the material in this section to the account of early World War II air defenses in USAF, I, 290-298, and also to the Fourth Air Force Historical Study No. III-2, "Defense Plans and Operations in the Fourth Air Force, 1942-1945," Vol. 1, 146-226. Footnote references in this section are those appearing in USAF, I, 290-298.

25. Report of R. A. Watson-Watt on the Air Defense System of the Pacific Coast of the U. S., Jan 1942, Doc. 40 in 4AF Historical Study III-1.

warning network.

Organization for air defense was strengthened in the spring of 1941 by the creation within each of the new continental Air Forces of interceptor commands which were charged in their areas with control for air defense purposes of air warning equipment, fighters, antiaircraft artillery, and barrage balloons. These so-called active agents of defense were supplemented by such passive measures as provision for civilian air raid warning and blackouts, which were made the responsibility of organizations working under the supervision of an Office of Civilian Defense.

In the six months which immediately preceded Pearl Harbor, the four interceptor commands worked feverishly to create a coastal radar net and a supporting ground observer corps as components of the air defense system. When war came, sites had been picked for thirteen radar stations along the East Coast, and eight of the stations were approaching completion.[26] On the West Coast, there were ten radars to guard the 1,200 miles from Seattle to San Diego.[27] This radar coverage was supplemented on the East Coast by approximately 4,000 ground observer stations and along the Pacific by an additional 2,400. Reports from ground observers had to be processed through filter and

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26. History, I Fighter Command, 1941-1944, p. 104 ff.

27. 4AF Historical Study III-2, p. 146 ff.

information centers, both of which required the services of large numbers of volunteer workers. The interceptor commands had managed to expedite the construction of the basic elements of this complex system, but there had not been time to recruit and train all the personnel required to operate it. Moreover, the network, even when placed in perfect readiness, could have met only the primary need of early warning. The effective control of fighter planes at night or during bad weather would have required the addition of mobile units equipped with the newer radar aids developed in Britain. But in December 1941 the United States had no radar equipment comparable to the GCI set of Great Britain, and fighter planes in this country were still using high frequency - rather than VHF - radio sets. Airborne radar for night fighters was lacking, as was IFF equipment.

In providing a remedy for the recognized deficiencies of the American warning service, the War Department once again was able to draw on the experience of Britain. Immediately after Pearl Harbor, at the suggestion of the U. S. military mission in London, the RAF offered the services of Robert Watson-Watt, Scientific Advisor on Telecommunications to the Air Ministry. Watson-Watt arrived in the United States before the end of December 1941 for the purpose of undertaking a detailed analysis of the peculiar problems of American air defense.

Any vestiges of complacency as to the adequacy of the

American aircraft warning service which may have remained in War Department circles were destroyed by the severely critical report of the air defenses of the West Coast made by Watson-Watt in January 1942. Dangerously unsatisfactory conditions were said to exist, reflecting "insufficient organization applied to technically inadequate equipment used in exceptionally difficult conditions."[28] The British expert found our seaward reconnaissance grossly inefficient because of the total lack of anti-submarine detection equipment and because of the limited number of patrol aircraft of suitable range. The radar screen along the West Coast was based on too few stations, and the equipment itself had inherent defects which made it "gravely unsuitable." Dependable employment of this radar had been made even more unlikely because of mistakes in the selection of sites for its installation. Personnel to operate the radars had not been carefully selected and were inadequate, both in numbers and in training. The United States was found to have repeated an early error of Britain in failing to provide for the training of large numbers of skilled radar technicians.

Officials in Washington accepted the report in the constructive spirit in which it was offered. The director of Air Defense at AAF Headquarters, Colonel Gordon P. Saville, concurred in every detail with the findings and called the study "a damning

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28. Watson-Watt Report in 4AF Historical Study III-1.

indictment of our whole warning service." He also expressed the view that the situation on the East Coast was even worse than the conditions reported along the Pacific. Independent analyses by American officials bore out the general verdict rendered by Watson-Watt.

The hard fact was that many of the measures required for an operationally dependable air defense system could not be improvised. It was not until late 1943 that the continental air defenses were generally equipped with VHF radio and a workable system for controlling interceptions at night.

Helpful to an immediate improvement of continental air defenses were organizational changes which served to clarify responsibilities. The Western Defense Command had been designated a theater of operations on 11 December 1941. With headquarters in San Francisco, the command included an extensive area of nine western states, Alaska, and the Aleutians, and to it three air forces were initially assigned - the Fourth and Second Air Forces along the Pacific Coast and, in addition, the Alaskan Air Force. A similar situation existed on the other side of the continent, where on 20 December the Eastern Theater of Operations was established with headquarters in New York City and with units in the Eastern Seaboard states and in Newfoundland and Bermuda. Two air forces, the First and the Third, were assigned to this theater. Thus, all four of the domestic air forces, which had

been created early in 1941 and had been operating under the Air Force Combat Command, were removed from AAF control and placed under theater commanders. It is not surprising that this arrangement pleased no one: the defense commands found it confusing to have more than one subordinate air force commander, while the AAF felt that its combat training program would be jeopardized if it had no direct control of any of the continental air forces. A compromise was accordingly worked out and announced on 30 December 1941. The essential element of the new plan was a provision which called for moving two of the continental air forces to inland stations and assigning them to the AAF as training Air Forces. To effect this arrangement, the Second Air Force relinquished its coastal stations and was removed from assignment to the Western Defense Command, and air defense duties for the entire Pacific Coast were thereupon assigned to the Fourth Air Force. A similar move within the Eastern Defense Command made the Third Air Force a training unit under the AAF, while the First Air Force took over responsibility for air defense operations along the entire extent of the Atlantic Coast. This arrangement lasted until the fall of 1943, when the danger of air attack had greatly decreased and the First and Fourth Air Forces were reassigned to the AAF.

After the organizational adjustments had been made in the winter of 1941, a defense zone of approximately 150 miles in depth

and extending 200 miles seaward was created along the Pacific Coast by the Western Defense Command. A similar zone was established by the Eastern Defense Command along the Atlantic Coast. Air operations within the western zone were directed by the Fourth Air Force through its subordinate interceptor and bomber commands. The air force provided planes to defend vital targets and to conduct offshore patrols, supplied an aircraft warning service to alert both military and civilian agencies, and through regional commanders integrated all elements of air defense, including units of the Fourth Antiaircraft Command.[29] On the East Coast a similar pattern established the First Air Force as the air arm of the Eastern Defense Command, although its primary concern was in anti-submarine operations along the coast. Radar siting and construction continued at a feverish pace in 1942 only to slow down in 1943 as danger decreased. All told, 65 stations were placed in operation along the West Coast, where defense activity was mostly concentrated, and 34 stations were established on the East Coast at war's end.[30]

VII

Perhaps the most significant steps taken during the war years in the matter of air defense doctrines and responsibilities

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29. See History of the Fourth Antiaircraft Command.

30. 4AF Historical Study III-2, p. 146

came as a result of the overseas experiences of the AAF combat units. The close proximity of these units to hostile air operations made the matter of air defense far more urgent than air defense considerations at home. In almost all overseas theaters, interceptor commands or defense commands or both were established. These overseas experiences in defense organization were to have significant repercussions on future air defense organization and doctrine in the Zone of the Interior.

In April 1942 Field Manual 1-15 was issued by the War Department. This pamphlet, entitled "Tactics and Techniques of Air Fighting," had some very pertinent statements to make about air defense. For the first time under such an authoritative imprimatur, radar detection was given a positive role in military doctrine.[31]

> An aircraft warning service is essential for the employment of interceptor units, force or aviation in local defense. The effectiveness of this defense is vitally dependent upon the nature and extent of the information provided by the warning service and the rapidity with which it can be transmitted to the interceptor units, force or aviation. To assure interceptions, an accurate, timely and continuous flow of information of the approach of hostile air forces must be furnished to the pursuit commander both prior to and after the pursuit leaves the ground to effect interception.

Of much significance for the future relations between

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31. WD FM 1-15, Tactics and Techniques of Air Fighting, 10 Apr 1942, pp. 19-20

the AAF and the Army Ground Forces was the statement that,[32]

> The interceptor command must have operational control over all antiaircraft artillery, searchlights and barrage balloons in the defense area.

Although these statements did much to blaze a path for AAF control of air defense operations, it should be borne in mind that, as yet, no statement had been made placing air power on a co-equal basis with land power, or defining the prerogatives of air power in an integrated combat effort. This deficiency was supplied in July 1943.

Although in March 1942 a War Department reorganization had placed the AAF, AGF and Army Service Forces on a par within the War Department, no doctrinal statement had placed their three functions on a co-equal basis. This condition was altered in Field Manual 100-20, issued in July 1943. Besides the historic announcement that "Land Power and Air Power are co-equal and interdependent forces" and that "neither is auxiliary of the other," this document had important bearings on the question of air defense.[33] Organizationally,

> . . . the normal composition of an air force includes a strategic air force, a tactical air force, an air defense command and an air service command.

Having prescribed an air defense command for theaters of

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32. Ibid., p. 20

33. WD FM 100-20, Command and Employment of Air Power, 21 Jul 1943, p. 4

operation, the manual went on to define air defense.[34]

> Air defense is the direct defense against hostile air operations as distinguished from the indirect defense afforded by counter air force operations. Air defense comprises all other methods designed to prevent, to interfere with, or reduce the effectiveness of hostile air action.
>
> Air defense is divided into active air defense and passive air defense.
>
> (1) Active air defense comprises all measures aimed to destroy or to threaten destruction of hostile aircraft and their crews in the air. Active air defense is provided by fighter aircraft, antiaircraft artillery, and small arms fire; and by obstacles, principally barrage balloons.
>
> The active air defense means for any area may include fighter aviation, antiaircraft artillery, searchlights, barrage balloons and aircraft warning service.
>
> When antiaircraft artillery, searchlights, and barrage balloons operate in the air defense of the same area with aviation, the efficient exploitation of the special capabilities of each, and the avoidance of unnecessary losses to friendly aviation, demand that all be placed under the command of the air commander responsible for the area. This must be done.

The effect of these two statements was to confirm the air defense responsibilities of the air forces, even under a unified command structure such as existed in the combat theaters. It was inevitable that these doctrines, although primarily directed to overseas theaters, should have important effects at home.

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34. Ibid., pp. 12-13

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Late in 1943 the Fourth Air Force, freed of its subordinate relationship to the Western Defense Commander, asked that antiaircraft artillery within its boundaries be placed under its operational control.[35] Under FM 100-20 and FM 1-15 the request appeared to be justified, but the conditions obtaining in the Zone of the Interior were different from those existing overseas. The theater concept in the ZI had been abandoned in the fall of 1943; consequently, no unified command existed at home.

The alternative to this dilemma, which occasioned some bitter controversy between AGF and AAF, was found by resorting to the dormant statement in the March 1941 air defense directive which had given overall planning authority in peace-time to the Defense Commanders, and in making direct allusions therein to the employment of air force units in planning.[36]

> The general mission of Commanding Generals of Defense Commands is redefined as indicated below:
>
> To plan for all measures for defense against external attack by land, sea or air of that portion of United States territory included in the Command boundaries and such adjacent territories or offshore bases as may be specified by the War Department.
>
> To coordinate plans for the employment of units of the Army Air Forces stationed within the limits of the Command or designated to provide air defense when required.

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35. See 4AF Historical Study III-2, pp. 295-346, and History of the Fourth Antiaircraft Command.

36. WD Ltr AG 381 OB-S-E: "Defense of the Continental United States - Defense Commands," 23 Mar 1944 (DOC 5)

The inclusion in the redefined mission of the Defense Commands of the last paragraph apparently provided the assurance the Ground Forces needed. The road was now paved for the award to the Fourth Air Force of operational control of antiaircraft artillery.

On 1 May 1944 the Fourth Antiaircraft Artillery Command was assigned to the Fourth Air Force. Simultaneously, the CG, Western Defense Command, was relieved of the responsibility of providing active air defense of his territory and the mission was given to the Fourth Air Force. However,[37]

> Responsibility for planning all measures for defense against external attack, including air, remains with the Commanding General, Western Defense Command.

This highly intricate scheme of command relationships between the Fourth Air Force and Western Defense Command served in reality to keep the air defense mission in a state of suspension between AAF and AGF. Informally, the two organizations had succeeded in reaching a modus operandi. Legally, however, little had been settled toward a clear-cut definition of air defense responsibilities for the continental United States. Here matters rested until the momentous reorganization of the War Department at war's end.

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37. 2d Ind, 15 Apr 1944 to WD AG 353 OB-S-E: "Combined Air Defense Training in Fourth Air Force," 14 Feb 1944 (DOC 6)

CHAPTER TWO

ADC AND THE AIR DEFENSE MISSION[1]

1946 - 1948

I

With the end of the Second World War, it was inevitable that the great forward strides in air power made during the war years be given formal cognizance in a restatement of air doctrine. After the tempo of occupational activity and demobilization had slackened, the War Department began a reshuffling of its component parts and their responsibilities. In 1945 and 1946 considerable discussion and debate took place within the War Department leading to many changes in its organizational structure. Because of the pressure of time to reorganize the WD mansion to house the peace-time establishment, many of the changes were made without immediate doctrinal restatement.

Within the AAF the pattern of reorganization was based upon the experiences of combat unit organization. Essentially, the new AAF command structure followed the theory of air organization established in July 1943 in FM 100-20. In that document

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1. This chapter owes much to the excellent account of air defense written by Mr. Milton Klein in History of the Air Defense Command, Mar 1946 - Mar 1947, Vol. 1, "The Evolution of the Mission."

it had been stated that the "normal composition of an air force includes a strategic air force, a tactical air force, an air defense command, and an air service command."[2] Following this theory, in the spring of 1946 there were established within the Zone of the Interior the Strategic Air Command, the Tactical Air Command, the Air Defense Command and the Air Materiel Command.

The Air Defense Command was activated in March 1946 at Mitchel Field, New York, and placed under the command of Lieutenant General George E. Stratemeyer. To ADC were assigned three of the wartime continental air forces, the First, Second and Fourth, and three of the overseas air forces as reorganized in the ZI: the Tenth, Eleventh and Fourteenth.

The period immediately following the activation of the Air Defense Command is perhaps the most revealing in the entire narrative of air defense responsibilities. In these formative months practically all of the problems which continued to plague civil and military agencies in the matter of air defense jurisdiction were aired, frequently in heat.

The post-war history of the air defense mission began conspicuously by the awarding to the Air Defense Command of an interim mission which deviated from precedent in several ways. ADC's mission of 12 March 1946 stated that:[3]

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2. WD FM 100-20, Command and Employment of Air Power, 21 Jul 1943, p. 4

3. AAF to ADC: "Interim Mission," 12 Mar 1946 (DOC 7)

> The Air Defense Command will organize and administer the integrated air defense system of the Continental United States; will exercise direct control of all active measures and coordinate all passive means of air defense; will be prepared to operate either independently or in cooperation with Naval forces against hostile surface and undersurface vessels and in the protection of coastwise shipping; . . . to train units and personnel in the operation of the most advanced methods and means designed to nullify hostile aerial weapons; . . . to train units and personnel for the maintenance of the air defense mission in any part of the work.

In at least three instances the ADC interim mission broke ground in air defense doctrine. The first was the statement that ADC "will organize and administer the integrated air defense system of the Continental United States." General Stratemeyer's interpretation of this aspect of his air defense mission was broadly expressed in April as follows:[4]

> 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.

In short, the word "integrated" was pregnant with future controversy in that it presaged an AAF campaign to reach far and wide, possibly beyond its historic sphere of action, in order to carry out its air defense responsibilities.

Secondly, the phrase "will exercise direct control of all

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4. Stratemeyer to CG's, ADC air forces, 26 Apr 1946. Cited in "The Evolution of the Mission," p.8

active measures . . .," although ensconced in FM 100-20 and FM 1-15, was likely to be considered out of place when applied to the static conditions of ZI organization as compared to the fluid command relationships in the combat theaters. It will be recalled that the Fourth Air Force, endeavoring to duplicate the overseas air forces' operational control of antiaircraft artillery within the ZI, had experienced much resistance on the part of the Ground Forces, and had won out only at the expense of increasing the Ground Forces authority in air defense matters. The question of control of "all active measures" presaged a battle royal between the AAF and AGF over control of antiaircraft artillery. As will be seen, AGF was not slow to take up the challenge.

Thirdly, the phrase "will coordinate all passive means of air defense" was novel in its entirety to air defense theory and practice. Although FM 100-20 had defined passive air defense as being provided by "dispersion, camouflage, blackouts, and other measures which minimize the effect of hostile air attack," it had left control over passive measures undetermined. On the other hand, the directive of 17 March 1941 which had initially allotted the air defense mission to GHQ Air Force had specifically exempted all passive air defense measures from air force control, with the exception of those measures pertaining strictly to GHQ Air Force units and installations. Subsequent official correspondence had either consciously or unconsciously differentiated the

terms "active" and "passive" air defense so that in reality AAF was without precedent in its desire to encompass both active and passive air defense authority.

The creation of ADC and the assignment to it of such an ambitious mission was an auspicious step towards greater national security. Unfortunately, these inherent promises remained unfulfilled for several years. Eager to begin its work, ADC sought to prepare for the task ahead by obtaining clear-cut delineation of its authority and the means with which its plans might be implemented, only to be disappointed in both.

II

From the outset it was clear that the execution of the air defense mission of ADC was to be complicated by the intention of Headquarters, AAF, to limit the air defense capabilities of the new command, and, at the same time, to extend its functions in a decidedly different direction - that of training the AAF's civilian components.

The limitation on ADC's role in active air defense arose from the early assignment of the bulk of the existing forces to the Strategic and Tactical Air Commands. Thus, if ADC were to execute the task it publicly announced, that of meeting the first phase of any future hostilities - "to thwart any attempt by an enemy to attack our homeland" - it had to be by means other than

the regular units assigned to it.[5] A natural inference was the view that ADC's tactical strength would flow from the Air National Guard and Air Reserve units, for which training responsibility had also been vested in the Air Defense Command.[6] The assumption 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 the Air Reserve programs" developed from the coupling of tactical defense and reserve training in the Interim Mission. It seemed clear to General Stratemeyer that because of the shortage of regular AAF combat units within the United States, it followed that the task of air national security - and the air defense mission of ADC - would be discharged in large measure through the Air National Guard, and less directly through the Air Reserve.

Clarification from AAF resulted in the realization that the air units of both the National Guard and the Organized Reserves constituted a total AAF reserve; that personnel of these units might well be utilized as fillers for all types of regular AAF units; and that the civilian components would be utilized in an emergency to support the entire AAF, even though air defense would be the paramount concern in national security during an

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5. From an Army Day address by Major General Charles B. Stone, C/S ADC, Apr 1946. Cited in "Evolution of the Mission," p. 5 fn 6

6. "Interim Mission," 12 Mar 1946 (DOC 7)

emergency. Considerations other than those of air defense had apparently entered into the assignment of training responsibilities for the Air Force's civilian components, and ADC's preparations for air defense operations had to be viewed accordingly in this new light. It was patent that the command had received a tactical mission - air defense - without the wherewithal with which to accomplish it, either in the form of regular or reserve forces. Accordingly, the air defense task actually undertaken by ADC became essentially a planning one: the preparation of air defense plans contemplating the reception and utilization by ADC of forces of other AAF commands for utilization in an emergency. Long range plans would go beyond the confines of existing AAF organization in establishing the over-all requirements of the air defense system of the United States in the future. More specific preparations for active air defense, such as unit training, maneuvers, and the development of techniques and tactics, had to remain outside the sphere of ADC activity pending the allocation to the command, either temporarily or permanently, of the forces required to conduct active defense preparations.

Within this broad limitation, the tactical mission of ADC became further circumscribed as active measures were undertaken to prepare plans for the air defense of the United States. From the outset, ADC planning was restricted by the vexing problem of limited authority and control over the forces, personnel, and

weapons it considered vital to a single, integrated air defense system. Further, ADC planning was bound, initially, by an organizational structure of six "air defense areas," imposed by War Department direction,[7] which did not correspond exactly to the requirements of the most effective air defense system. In the process of preparing plans for an air defense providing security in case of air attack in the immediate future, these problems of limited control and territorial organization proved intensely frustrating to ADC personnel.

In spite of the limitations imposed upon the Air Defense Command, General Stratemeyer found himself and his command pitched headlong into two struggles to assert ADC's concept of an "integrated" system both within the AAF structure itself and as the AAF agency in the AAF controversy with the Ground Forces over the operational control of antiaircraft artillery.

In the absence of assigned tactical units, ADC, in its plan for defense in the immediate future, necessarily assumed that regular AAF units, irrespective of command assignments, would be placed at the disposal of ADC air forces for operational purposes. This assumption was in recognition, also, of the non-availability of combat effective reserve units prior to 1948 at the earliest. Although this assumption seemed valid enough from any realistic

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7. WD Circular 138, 14 May 1946, par. 7d

consideration of ADC's own combat strength, official approval of the plan was not forthcoming until 17 December 1947, almost two years after ADC had been awarded the air defense mission. The delay occurred in spite of repeated admonitions by ADC to AAF that ADC had neither the means of its own to accomplish its mission, nor the authority to use the means belonging to its sister commands in an emergency. As early as 10 June 1946, AAF had stated [8] that

> The Joint Chiefs of Staff, in the event of a sustained attack against this country and under existing command and operational procedures, would most probably assess the situation, declare a theater of operations, appoint a theater commander, assign him a mission and allocate suitable forces. It is not likely under present joint procedures, that the Air Defense Commander would be appointed to function as a theater commander and, as such be held responsible for the conduct of theater operations concurrently with the conduct of all air defense measures in protection of the continental United States.

In the ADC commander's opinion, however, this should not have prevented AAF itself from awarding ADC the operational control of the Air Force's air defense capabilities in time of emergency. Indeed, this inference seemed justified because in the same message AAF had stated as follows: [9]

> It is the opinion of this Headquarters that effective coordination can only be achieved through the

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8. AAF to ADC: "Investment of Command Responsibilities of the Land, Sea and Air Forces in Event of an Air Invasion," 10 Jun 1946 (DOC 8)

9. Ibid.

> assignment of operational control of such units of other services to the Commanding General, Air Defense Command, during periods of emergency.

However, even in such a realistic proposal as that of placing AAF air defense resources under ADC during an emergency, ADC ran into frustrating opposition.

General Stratemeyer reported as follows in regard to a conference held at the Headquarters of the Tactical Air Command on 10 August 1946:[10]

> . . . it became apparent that the Commanding General, Tactical Air Command and myself differ in our understanding of my responsibilities for the provision of the air defense of the continental United States. 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.

It was not until 17 December 1947 that this matter was resolved to the satisfaction of ADC. At that time USAF announced:[11]

> Upon directive from this or higher headquarters, or in the event of the detection of potentially hostile forces, the Commanding General, Air Defense Command, will provide for the defense of the United States against hostile air attack. He will initially be

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10. Stratemeyer to CG AAF: "Responsibility of the Air Defense Command," 13 Sep 1946 (DOC 9)

11. USAF to ADC: "Coordination of Air Defense Command, Strategic Air Command, and Tactical Air Command Operations under Emergency Conditions," 17 Dec 1947 (DOC 10)

assigned operational control of such specific units of the Tactical Air Command and Strategic Air Command as have been designated for employment in defense against hostile air attack, such operational control to be terminated by direction of the Chief of Staff, Air Force, or higher authority. For present planning purposes these units will include all fighter units and all aircraft warning units, with their supporting services and such antiaircraft units as may be assigned or attached to the USAF.

Until such time as an air commander for the United States is appointed by the Chief of Staff, Air Force, or the Joint Chiefs of Staff, the Commanding General, Air Defense Command will additionally provide the overall direction of a United States Air Force coordinated defense against enemy attacks, other than air with such units of the three USAF combat commands as are made available for this purpose. The USAF combat commands will be responsible for the provision, operation, and training of the above forces.

The Commanding General of the Air Defense Command in Coordination with the Commanding Generals, Tactical Air Command and Strategic Air Command will prepare, and maintain current, integrated plans for the defense of the United States in conformity with the above principles.

III

The limitations within which ADC's air defense mission was to be accomplished were further evidenced in AAF-AGF relations. A basic conflict concerning defense responsibility arose from the simultaneous assignment by the War Department to AAF of responsibility for the air defense of the United States, and to AGF of responsibility for continental defense "in conjunction with designated air and naval commanders."

A peculiar condition affecting the assignment of the air defense mission to ADC in March 1946 was the fact that, officially, the AAF did not have the mission to delegate to ADC. The WD reorganization was effected in great part without prior resort to doctrinal modifications. AAF, however, proceeded confidently in its assurance that the air defense mission, which up until that time reposed in the hands of the Defense Commanders, would pass to itself. For ADC, however, the assignment of the broadly worded air defense mission without tangible assurances that AAF possessed authority to provide ADC with the teeth it needed, did not arouse commensurate optimism. ADC felt acutely the absence of clearly defined jurisdictions among the components of the War Department in the matter of air defense responsibilities.

The first official indication that air defense doctrine was in the process of redefinition, and that the air defense mission was to be reassigned, was a WD directive of 8 April 1946 addressed to the Army Ground Forces. After rescinding previous instructions to AGF with respect to the latter's defense responsibilities, the War Department announced the defense mission of the AGF to be as follows:[12]

> Under the general plans of the War Department, and in conjunction with designated air and naval commanders, prepare for, and on order, or in imminent

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12. WD to CG AGF: "Defense Missions of Army Ground Forces," 8 Apr 1946 (DOC 11)

emergency, execute planned operations for the defense of the United States.

Coordination. Coordinate ground plans, including coastal defense and antiaircraft projects, with designated air and naval commanders.

The new mission of AGF was greeted with mixed feelings by AAF and particularly by ADC. In one way, the War Department had decided to give AAF the air defense mission, but in a fashion which was extremely galling to AAF it left the ground open for inter-War Department controversy by failing to clarify the manner in which plans would be prepared in conjunction with the AAF, or the manner in which antiaircraft plans would be coordinated by AGF.

ADC's reaction to this anomalous situation was expressed by its A-5, Colonel R. E. Beebe, in a letter to Major General Lauris Norstad of AAF Headquarters.[13]

As far as the record here, ADC is still supporting AGF under the old missions of the Eastern and Western Defense Commands and conducting planning under Army supervision. Actually, we know that this has been rescinded by WD letter 8 April 1946 . . . . Apparently no directive has been issued to AAF or WD as to coordinate or conjunctive planning with specific Naval commanders . . . . The primary mission of ADC in air defense is to operate independently or in cooperation with Naval forces. This leaves our relationship with the Armies unstated . . . . Can we be informed of the following: Has the WD issued the AF a mission similar to that given AGF? Do you plan to direct us to support the Army in its mission of defense, or is there any hope of getting this reversed?

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13. Beebe to Norstad: "Air Defense of the United States," 3 May 1946 (DOC 12)

General Norstad's reply was indicative of the dilemma in which AAF found itself at the time in its relations with the Ground Forces and the Navy.[14]

> Clarification of responsibilities of Air, Army and Navy commanders as to coordination of defense efforts is at this time inseparable from the questions of unification of the armed forces and the missions of the land, naval and air forces. Recommendations for the establishment of clear-cut command and operational responsibilities for employment of joint forces in the defense of the continental United States are now under study by the War Department.
>
> As indicated . . . the AAF will have its air defense activities coordinated with the defense activities of other services under the terms of directives yet to be issued by the War Department.

In May 1946, the War Department had cast a measure of oil on the troubled waters by the issuance of Circular No. 138, which was designed to lend official sanction to the general shakeup of the spring of 1946. The circular was intended to present a tentative doctrine and was scheduled for revision at the earliest possible date. Of special significance to the question of air defense were these functions specifically assigned to the Air Defense Command therein:[15]

(1) Provides for the air defense of the United States.

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14. Norstad to Beebe: "Air Defense of the United States," 13 Jun 1946 (DOC 13)

15. WD Circular No. 138, 14 May 1946

(2) Controls and trains antiaircraft units as may be assigned to this command.

In the more general field of air defense cooperation, the circular directed that the AAF and the AGF cooperate [16] "in the development and determination of such special tactics as are necessary . . . for the use of arms by the Army Air Forces, especially antiaircraft artillery.

> Cooperate with the Commanding General, AGF in the development and determination of the technique of fire at aerial targets, in prescribing military characteristics of weapons and equipment, and in preparation of Tables of Organization and Equipment for units of antiaircraft artillery.
>
> Recommend to the War Department the means, including the necessary antiaircraft artillery units, required for air defense.

During June 1946 the AAF Board met in Washington to attempt a clarification of the thorny problems posed by the division of air defense responsibilities between AAF and AGF. The views of the AAF on Air Defense and Security were placed on record as follows:[17]

> The Army Air Force is charged with the mission of air defense. The Army Air Force has no officially adopted policies with respect to the personnel and organization of air defense. War Department thinking is not crystallized to the point that we know what they will favor. As a result we have drawn up ten proposals. The first involved integration of the antiaircraft into the Air Forces. The

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16. Ibid.

17. ADC Staff Study No. 17: "Responsibilities for Air Defense," Jul 1946, p. 2 (DOC 14)

other nine proposals attempt to attain all the other advantages of integration without that integration and they will require no change if the antiaircraft is ever integrated into the Air Forces.

In this dilemma, General Stratemeyer took a positive position on the matter of prior responsibilities in air defense. The ADC commander was emphatic in his contention that "continuing and primary responsibility . . . for . . . provision of the Air Defense of the Continental United States . . ." rested with the Air Forces, and that no air defense plan prepared under his jurisdiction would subordinate the air force to either ground or naval commanders, except in a theater or similar combat establishment.[18]

The interpretation of War Department directives was more than a matter of semantics. It involved the very meaning of the term "air defense," and it bore directly upon the question of which agency, AAF or AGF, would exercise control of antiaircraft artillery. General Jacob L. Devers, Commanding General of AGF, was quick to assert his command's views. He proposed, on 14 June 1946, an interpretation of his own defense responsibilities that would retain under ground control the employment of AAA units engaged in air defense, and that would limit the definition of air defense to "defense by air." The intent of his suggestion was clearly to revise existing War Department regulations in order to

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18. Lecture, Gen Stratemeyer to Air War College, 15 Oct 1946, in ADC A-5 Proj 28

remove AA units entirely from AAF control.[19] Implicit in the issue raised was also the broader question of future control of ground-to-air guided missiles.

ADC and AAF challenged the ground forces' interpretation, reiterating the principle of single command control of all forces, weapons and means engaged in air defense, including AA, under a single commander. However, it was left to the War Department to resolve the question; and this it did, in somewhat diplomatic fashion, by refusing to modify the definition of air defense enunciated in WD Circular 138, and, in effect, by sustaining the AAF contention that AA should not revert to exclusive Ground Forces control. At most, however, this hedged upon the broader issue involved, and retained the dual assignment of antiaircraft artillery to AAF and AGF previously announced by the War Department. This was hardly the decision necessary to implement the AAF contention of integrated air defense, but the matter was not pressed by AAF, which was apparently looking toward unification of the services to provide a more propitious opportunity to reopen the question.

IV

The most serious restriction encountered by ADC was the shortage of personnel, forces, and weapons with which to accomplish its air defense mission. This situation was not at all

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19. Gen Devers to Gen Spaatz: "Responsibilities for Air Defense," 14 June 1946 (DOC 15)

unknown to AAF, which apparently was reconciled to a limited regular air defense establishment in peacetime, with considerable dependence placed upon the civilian components for "practically all our air defense" in an emergency.[20] ADC planning, however, was based upon less sanguine expectations of the reserve components. Short term plans discounted the ANG as a combat effective force before 1948, while plans for an active air defense in being were based on the utilization of regular units and personnel exclusively.[21] In recognition of the inadequacy of available air units within the United States for utilization in air defense, ADC's "Short Term" plan contemplated the active defense of only one of the five priority areas selected to be defended from air attack. The potentialities of the command with respect to the

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20. Second Interim Report of the Air Board, 4-6 Jun 1946

21. ADC initially possessed two night fighter squadrons, the 425th located at McChord, and the 427th at Mitchel Field. The former was equipped with P-61's and the latter with P-47 aircraft. Shortly thereafter there were formed the 14th and 325th Fighter Groups, both stationed in the East, to act as headquarters for the two squadrons. Until May 1947 this was the sum total of the air defense capability assigned to the ADC. In July 1947, the fighter strength was increased on paper by the assignment at records strength of the 52nd and 78th Fighter Groups. It was not until late in 1948 that these two groups received personnel and equipment to permit active operations. On 31 March 1947 the assigned strength of the 14th Fighter Group was about 50% of authorized; that of the 425th, less than 10%. The operational effectiveness of the units mentioned were estimated at 20-29% and 0-19% respectively. See "ADC Strength" and "Monthly Unit Operational Effectiveness Report," 31 Mar 1947.

operation of an adequate control and warning system were no better than its tactical effectiveness, with no AC&W units assigned, and with only one such group earmarked for allocation to ADC in the near future.[22]

V

It was within the above-mentioned limitations and restrictions that ADC undertook the preparation of plans for the air defense of the United States. Within the first twelve month period of its existence, ADC prepared three plans: the first, essentially a capability study embodying the decision of the command as to its action in case of hostile air attack in the immediate future; the other two in the nature of requirement studies, projecting, and recommending to AAF, the forces, the resources, and the organization required for the air defense of the United States in the future.

In the preparation of the first of these plans,[23] the difficulties engendered by existing interservice relationships, and by command alignments within the AAF itself, were most clearly revealed. Necessarily, in the absence of assigned forces and the non-effectiveness of the reserve components for a period of years, a basic assumption in this short term plan was the

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22. In May 1947 the 505th Aircraft Control and Warning Group was assigned to ADC with personnel of base units hitherto assigned to the Fourth Air Force.

23. ADC "Air Defense Plan (Short Term)" 18 Oct 1946

utilization by ADC air force commanders of tactical units of other AAF commands, the ground armies and the Navy to conduct any type of effective air defense operation. This concept of unified command under the air force area commander loomed large throughout the entire plan, and yet, a month after the plan's appearance, ADC admitted that it "states many things as fact which have not been approved by Army Air Forces or agreed upon between the services."[24]

The completion of the short term plan demonstrated convincingly to ADC the "inability of the AAF to provide an adequate air defense for this country under present conditions, particularly if a surprise attack . . . were to occur."[25] The recommendation of the command to remedy this ineffectiveness came in the form of a requirement study, projecting the permanent assignment to ADC of a sufficient number of regular, tactical air and ground units, together with supporting services, to provide "the framework necessary in any air defense system, and to give the minimum acceptable degree of protection from a surprise attack."[26] With the forces thus available, an effective air defense for five priority areas could be provided in place of the one contemplated in the short

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24. Stratemeyer to Douglass, 18 Nov 1946. Cited in "The Evolution of the Mission," p. 23

25. Stratemeyer to AAF: "Air Defense Plan (Long Term)" 8 Apr 1947, in ADC A-5 Proj 56

26. Ibid.

term plan. This plan for "An Air Defense in Being" contemplated the permanent assignment to ADC of some 12 fighter groups, 2 VHB and 8 AC&W groups, 140 AAA units, and corresponding service and supporting units for "normal garrison" permitting deployment and operation of the air defense system within 24 hours. The organizational pattern suggested was three air forces: the First, to defend the entire East Coast; the Second, the Mid-West; and the Fourth, the West Coast.

The third ADC air defense plan attempted to [27]

> . . . forecast the character of war which may occur in the future . . . establish the methods of defense against that type of warfare . . . determine in quality and quantity the resources required for that defense, and . . . establish a date by which these resources must have been brought into existence.

The requirements of the plan were all-inclusive, if only general in nature.[28] The priority areas to be defended were more extensive than those contained in the "In Being" plan, but were limited to five. Organizationally, the envisaged air defense structure comprised four air defense air forces, covering respectively the Northeast and industrial Mid-West; the South and Gulf Coast area; the West Coast; and the North Central Plains area; all under an overall headquarters, not necessarily the existing Air

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27. A-5 Presentation at ADC Air Force Commander's Meeting, Offutt Field, Neb., 3 Oct 1946, in A-5 Proj 30

28. Stratemeyer to AAF: "Air Defense Plan (Long Term)" 8 Apr 1947, in ADC A-5 Proj 56

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Defense Command, located preferably in the Mid-West. Forces allocated for air defense would be further organized under subordinate divisions and wings. A reorganization of ground and naval commands to correspond with the air force areas was suggested. In recognition of the requirement of supplementing continental United States organization by the inclusion of troops and installations in Canada, creation of a United States Arctic Theater was proposed as an essential element of the air defense organization.

Lacking the forces to effectively perform its defense mission independently, it was inevitable that ADC should indulge in the very broad assumption that units of other services should be made available for air defense operations. Both its Short Term Plan and "In Being" plan were restricted by the necessity of planning for an air defense system within the framework of existing realities. In its long range planning, however, ADC could more validly engage in speculations, and in this respect it envisaged a pattern of air defense freed from direct dependence on ground and sea forces and fulfilling completely the airmen's vision of air power at its best.

That an effective air defense should not have been brought into existence by ADC is not surprising. That ADC should even have initiated and carried through to completion a comprehensive air defense plan in the face of archaic operational doctrines, legislative restrictions, organizational reservations, and its own limited

combat potential, is remarkable. The plans drawn represented accomodations, from the short-range point of view, to the limitations placed upon the Air Forces and ADC by the existing military and naval structure and the command's inadequate combat potential. In compensation a future pattern of air defense was drawn permitting full application of the concepts of air power that past experience and future developments appeared to make realizable.

VI

The nature of the air defense problem was such that "unification" of the Armed Services in the summer of 1947 could do little to alleviate the difficulties inherent in it. In one way, however, unification did much to ease the conscience of the protagonists in the air defense controversy. The arbiter of air defense doctrine in the future was not to be an inflexible Field Manual, but the Joint Chiefs of Staff themselves. No matter how preferable a permanent statement of USAF's prerogatives in air defense operations might be, the creation of the JCS as final arbiters in the controversies between the services was perhaps the next best thing.[29] Here at any rate lay the responsibility for making the crucial decisions in the light of the immediate circumstances of an emergency.

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29. The paramount position awarded to the JCS at Key West was not received with universal optimism as to its efficacy in reconciling inter-service disagreements. See Memo to Gen Stratemeyer by Col R. C. Candee.

The Key West Conference of March 1948, which defined the military responsibilities of the three services, allowed USAF to retain its air defense mission without important modification "subject to the policies and doctrines established by the Joint Chiefs of Staff."[30] Of greater importance to the air defense mission, however, was the stimulus which "independence" gave to the Air Force in streamlining its own organization. The anomalous position of ADC within the USAF command structure had caused concern both to the personnel of ADC and to USAF. Almost at once steps were taken to reorganize ADC for a more effective performance of its air defense mission, but although the urgency of clearing ADC's mission-laden decks was recognized in many official statements, little was done until the formation of the Continental Air Command in December 1948.[31]

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30. Functional Agreement of the Key West Conference, Mar 1948 (DOC 16)

31. In October 1947, USAF established a committee headed by Major General Reuben C. Hood to examine the missions of ADC. It was recommended that the assorted training missions of ADC be assigned to the Air Training Command. None of the recommendations of the Hood Committee bore fruit, however. On 19 December 1947 USAF directed ADC to submit a plan for its own reorganization, to be guided by the "paramount importance of your responsibilities in connection with the defense of the Continental United States." On 29 January 1948 ADC submitted its plan. The primary features of the reorganization were to be the reduction of the numbered air forces from six to four. Although Gen. Stratemeyer believed this would leave ADC well-suited to the accomplishment of its mission so far as the air forces were concerned, he considered additional organizational preparations as essential before ADC could effectively execute its assignment.

(Cont'd on next page)

The pressing question of a greater combat potential for ADC was rather unsatisfactorily answered by earmarking the ANG for the Air Defense Command.[32]

> In performing The Air Defense Mission, the Air National Guard will constitute your major source of Air Defense units . . . . In the event of war or national emergency, initially, all Air National Guard units will be available to the Air Defense Commander, and until other requirements develop which necessitate their employment elsewhere, you will have full use thereof.

In the long run it was the pressure of international crisis which was to break the jam in which the air defense of the United States was tightly locked.

> One of these preparations is the construction of command posts especially suited to meet the requirements of commanders charged with defense against air attack by known and foreseeable weapons. Such installations must be constructed in peace-time at or near the administrative headquarters of Air Defense Command air forces.

The reduction in the number of air forces was accomplished soon thereafter, but the recommendation to construct command posts met a quiet demise. [USAF to ADC: "Reorganization of the Air Defense Command" 17 Dec 1947; ADC to USAF: "Reorganization of the Air Defense Command" 29 Jan 48. (DOC 156)]

32. USAF to ADC: "Air Defense," 17 Dec 1947 (DOC 17) At the same time, USAF provided for ADC emergency use of units assigned to TAC and SAC. See p. 39

SECRET

PART II

THE GROWTH OF AN AC&W SYSTEM

CHAPTER THREE

RADAR: THE YEAR OF DECISION - 1948

I

Although the Air Defense Command had labored long to establish an air defense in being, at the beginning of 1948 ADC was still without adequate capabilities to set up even a token air defense system. The insistent demands by ADC and by key officers in USAF Headquarters that concrete action be taken in behalf of air defense had an inevitable cumulative effect, however. These admonitions, plus the increased freedom of action which "unification" brought to USAF and the growing popular reaction to Russian aggression, brought more vigorous action toward the setting up of an air defense system.

In the summer of 1947 it was determined by USAF that, though a comprehensive air defense system of fighters, radar stations and other necessary facilities might be a long time in coming, a good start might well be made by the establishment of a network of ground radar stations. As a result of renewed vigor in planning and the increased sense of urgency which imbued the entire Air Force establishment at this time, a plan for an extensive radar network was drawn up and approved by the Chief of Staff, USAF, in November 1947 and turned over to the Air Defense Command for its

suggestions.[1]

This radar plan, given the code name SUPREMACY, was dependent for implementation, however, upon Congressional action in making the necessary funds available to USAF for construction of sites. After certain delays caused by the necessity of obtaining concurrence from the other services, the plan was introduced in the 80th Congress in April 1948. There it died, without any action being taken by the legislature.[2]

Although SUPREMACY was abortive, it acted as a catalyst upon both USAF and ADC. On 19 January 1948 ADC was officially apprised of the plan and notified that it had been chosen as the implementing agency.[3] The news of SUPREMACY had an electric effect on ADC. Immediately, ADC began fervently to prepare for the moment when Congress would give the Air Force the green-light. Being writ large in the manner habitually employed by ADC in its own air defense thinking, SUPREMACY was greeted enthusiastically.

As finally determined through an exchange of ideas between USAF and ADC, SUPREMACY was to be implemented in three phases over a period of five years, with a proposed deployment of 374 basic

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1. For the background of these decisions see Major General Gordon P. Saville's presentation on the Interim AC&W system to Secretary Forrestal, 9 Sep 1948 (DOC 18)

2. The history of Plan SUPREMACY is described in the presentation cited in fn 1 above.

3. USAF to ADC: "Aircraft Control and Warning Plan for the United States," 19 Jan 1948 (DOC 19)

radar stations and fourteen control centers manned by a total of 33,526 personnel, and with construction costs alone amounting to $316,595,000. 676 pieces of radar equipment were to be utilized, including early warning radars and height finders. Although coverage for the entire continental United States was not contemplated because of prohibitive cost, the vital industrial areas and atomic plants were covered, with the entire northern border of the United States provided for.[4]

Phase I of SUPREMACY was to result in the construction of 40 basic radars and two control centers, comprising 50 pieces of equipment to be deployed and to be operational within one year from the date of allocation of the necessary funds. The radar stations were to be manned by the two AC&W groups (the 505th and 503d) then authorized for ADC under the FY 1949, 55-group program. Both groups were to be brought up to their fully authorized manning of 2,726 persons when combined. Equipping of Phase I installation was to be achieved from radar present in depots of the Air Materiel Command, which radar was to be replaced with more modern equipment of the AN/CPS-6B and AN/FPS-3 type as that became available. ADC's recommended deployment of these Phase I installations concentrated them in the industrial northeast and in three selected target areas in the vicinity of the West Coast: Seattle-Pasco, San Francisco

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4. ADC, Memo: "A-6 Conference. Early Warning for the Continental United States," 3 Mar 1948 (DOC 20)

and Los Alamos.

Phase II of SUPREMACY was to add to Phase I a total of 44 basic radar stations and six more control centers totalling 61 additional pieces of radar equipment. No time element was determined for this stage of the plan, but deployment of this equipment was earmarked for the industrial northeast, with some augmentation along the West Coast. An additional 5,514 regular troops were to be provided for this phase.

Phase III was to round out the radar system to its full strength of 374 stations and 676 pieces of radar. 11,498 regular troops were to be added for AC&W purposes, making a grand total of 19,738 regular troops in the system. However, during Phase III the total strength of the ANG AC&W units was to be integrated into the system, thus adding an estimated 13,788 personnel for an overall total of 33,526 at the end of the five year period. Deployment of Phase III sites was to fill in the blanks in the perimeter coverage of the continental United States, particularly along the northern international boundary. Radar equipment for Phases II and III of the plan was to be of the latest type, to be procured either at the inception of the plan or in the course of its implementation.

After intensive study of the proposal for Plan SUPREMACY, ADC put forth its own reactions to the plan on 8 April 1948.[5] With

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5. 1st Ind, ADC to USAF, 8 Apr 1948, to USAF to ADC: "AC&W Plan for the United States," 19 Jan 1948 (DOC 19)

characteristic understatement ADC concluded that the plan, in general, provided "a minimum aircraft control and warning coverage for the strategic areas of the continental United States within the inherent capabilities of presently available equipment." ADC pointed out that more need be done to make this radar screen adequate for air defense purposes.

> It is desired to point out that coverage along the coasts must be extended by radar picket boats or airborne early warning stations in order to provide adequate early warning for interception before the bomb release line is reached by high-speed hostile flights. This is particularly true for single airplanes or small flights which can be detected generally only at reduced ranges.
>
> It is essential that the Air Defense Command be connected by reliable communications circuits to the Canadian Air Defense System, Hq. Alaska Air Command, and the proposed Northeast Air Command.

The great increase in manpower foreseen to man the proposed radar network posed an additional problem.

> The expansion of the troops basis for regular aircraft control and warning units in the Air Defense Command, from present actual strength of approximately 700 to a total of 19,738 presents a positive requirement for a suitable air defense training center for training air defense units.

ADC began to gird itself for the big tasks ahead even before it was provided with the funds necessary to the commencement of preparations. The first and most important job was the siting of the new radar stations according to the time-phasing of Plan SUPREMACY. Before the siting teams could be sent out into

the field, theoretical deployment of the radar had to be made. The question inevitably arose of the value of the old World War II radar sites. Modern equipment possessed characteristics different from those of World War II radar, and the old sites would consequently be inadequate. In addition hostile aircraft would be high-powered jets and come from directions different from those anticipated in the earlier period. Furthermore, SUPREMACY was not deemed to be a self-sufficient system but had to fit into the Canadian, Alaskan and Greenland radar systems.[6]

Radar siting team requirements were drawn up by ADC, but no team was dispatched because of the fact that SUPREMACY was never implemented as such.[7] By the summer of 1948 it had become apparent to all concerned that Congressional procrastination had killed any chance of implementing the plan for any part of the current fiscal year.[8] The only hope remaining was that when Congress convened again in January 1949 a new start might be made on the master plan. In the meantime, the year 1948 was not a complete loss.

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6. IRS, Col. Hobart R. Yeager to A-6: "Radar Siting Teams," 16 Apr 1948 (DOC 21) Approximately 65 radar stations had been established on the West Coast in World War II and some 34 on the East Coast. Almost all of these sites had been disposed of by the War Assets Administration.

7. ADC to 1st AF: "Radar Siting Teams," 20 Apr 1948 (DOC 22)

8. Memo, Col. H. R. Yeager, 9 Jun 1948 (DOC 23)

II

While negotiations were underway for the Congressional approval of SUPREMACY, and while ADC was making ambitious plans for implementation, several other factors entered the air defense scene which in part recouped the losses caused by the delays attending the plan. Indeed, before ADC had been given even the opportunity to record its initial reactions to SUPREMACY, the command was directed to establish an air defense in being for the Seattle-Pasco area of Washington and to operate it on a continuous 24-hour basis until notified to the contrary.

As early as the autumn of 1947, suggestions of a possible maneuver scheduled for the spring of 1948 in the New York area had led ADC to plan ahead for such an eventuality. In preparation for this exercise ADC scheduled the transfer of the 505th AC&W Group from the Northwest area to the Northeast for the spring of 1948. When the order came in March to put the air defenses in the Northwest into operation, there was little that ADC could do to establish a realistic air defense for that area. The total AC&W facilities on the West Coast included one AN/CPS-5 radar at Half Moon Bay in California for training purposes, and another at Arlington, Washington (near Bellingham).

Immediately on receipt of the order to establish defenses in the Northwest, ADC directed the Fourth Air Force to set up radar

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stations in the vicinity of Spokane, Hanford, Neah Bay and Portland, using AN/TPS-1B sets drawn from the McClellan AFB depot, and to put the Arlington GCI on a 24-hour operational basis.[9] The 325th Fighter Group stationed at Hamilton Field, and equipped with P-61 night fighters, was to be alerted and deployed at the discretion of the Commanding General of the Fourth Air Force.[10] In addition to the possible use of the 325th Group, the 27th Fighter Group, equipped with P-51 aircraft, was to be borrowed from the Strategic Air Command and stationed at McChord AFB until the end of April 1948 to operate under the operational control of the Fourth Air Force.

The pathetic insufficiency of these arrangements for the defense of the crucial Northwest was all too soon apparent, and the fiasco which inevitably resulted did much to add conviction at the top level of both USAF and ADC that only an intense concentration of effort could rectify the flagrant deficiency in our air defense.

Having duly received the 27th Fighter Group on loan from SAC, and having established radars at Walla Walla, Spokane, Neah Bay and Arlington in Washington, and Seaside in Oregon, the Northwest Air Defense Wing was created as the tactical agency responsible for the overall local defense, with the commanding officer of the

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9. TWX, ADC to 4AF, 27 Mar 1948 (DOC 24)

10. ADC to 4AF: "Air Defense System," 31 Mar 1948 (DOC 25)

27th Group as the wing commander.[11] The 325th Fighter Group did not participate in the maneuver, being marooned at Hamilton Field for want of radar observers.[12] The extremely adverse weather indigenous to the Seattle area rendered the P-51 fighters of the 27th Group all but ineffective as interceptors. These developments, coupled with the fact that the 27th was neither trained in, nor equipped for, ground-controlled interception techniques, made it clear that the Fourth Air Force could make not even a pretense toward the air defense of the Northwest.[13]

The ambitious requirement imposed on the 505th AC&W Group soon led to an almost complete breakdown in its operations. On 14 April, ADC removed the requirement of 24-hour operations and allowed the Fourth Air Force to shut down one radar at all times in rotation.[14] ADC made the following observations to USAF:[15]

> Both personnel and equipment now available in the 505th Aircraft Control and Warning Group are inadequate to maintain 24-hour operation of warning

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11. 4AF to ADC: "Protection of the Seattle-Pasco Area Against Air Attack," 12 Apr 1948 (DOC 26)

12. TWX, 4AF to ADC, 8 Apr 1948 (DOC 27)

13. ADC to USAF: "Status of Continental Air Defense," 15 Apr 1948 (DOC 28)

14. TWX, ADC to USAF, 14 Apr 1948 (DOC 29)

15. ADC to USAF: "Status of Continental Air Defense," 15 Apr 1948 (DOC 30) Some interesting documents relative to this maneuver can be found in: History of the Fourth Air Force, 1948.

> sites for an indefinite period. All personnel already on hand are tired and overworked . . . The portable type equipment now being used also will not stand continuous operation. Sets are frequently out of commission for repairs, and the small portable power units which are the only source of power presently available frequently break down.

III

The totally inadequate air defenses revealed in the Northwest maneuver and the failure of SUPREMACY to receive approval of Congress since its adoption in November 1947 by the Chief of Staff of the Air Force prompted ADC to present the issue squarely to USAF. On 24 April, General Stratemeyer addressed a strongly worded letter to the Chief of Staff outlining his recommendations toward the establishment of an air defense in being with the least delay. With characteristic force,[16] General Stratemeyer stated:

> Adequate defense of the continental United States against air attack is not possible even though the total forces, resources, and facilities presently available to the United States Air Force were placed at my disposal.

The ADC commander went on to press that the Chief of Staff " . . . take a firm decision to establish an air defense system and to maintain air defense in being."

While the Northwest maneuver was continuing, and while ADC was making plans for the establishment of another token defense in being for the Northeast, USAF directed ADC on 23 April 1948 to

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16. ADC to USAF: "Air Defense of the United States," 24 Apr 1948 (DOC 30)

"immediately implement certain portions of our defense plans."[17]

According to this directive USAF's decision to take unilateral action in establishing a continuing air defense in being apparently stemmed from the decisions reached at the Key West Conference in March 1948 which confirmed the provision that the land-based air defense of the United States was a primary function of the Air Force. It will be recalled that prior to the Key West agreement, which put paramount authority into the hands of the Joint Chiefs of Staff, the Air Force had been guided by the temporary statement of air defense authority included in WD Circular No. 138.[18] After unification in September 1947, and until the Key West Conference in March 1948, there was no clear-cut statement of the responsibilities of the Air Force, and its absence thwarted any USAF decision to take the responsibility for a far-flung, ground-based air defense system into its own hands without official authorization.

The directive of 23 April authorized the Air Defense Command to establish with current means aircraft control and warning systems in the following priority:[19]

a. Northwestern U. S. area
b. Northeastern U. S. area
c. Albuquerque, New Mexico, area.

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17. USAF to ADC: "Air Defense of the Continental United States," 23 Apr 1948 (DOC 31)

18. See above, p. 43.

19. USAF to ADC: "Air Defense of the Continental United States," 23 Apr 1948 (DOC 31)

The first step in the implementation of the Northeastern area was to be "the establishment of a model air defense system, initially in the vicinity of New York City." In addition to being an integral part of the air defenses of the area, the model system was to be "utilized to test and develop strategic and air defense tactics and techniques."

More detailed information of priorities within each of the above areas was forthcoming from USAF on 4 May 1948.[20] In the Northwest the following vital installations were listed in order of priority:

a. Hanford Engineering Works, Pasco, Washington
b. Seattle, Washington
c. Renton, Washington
d. Bonneville Hydro Electric Station, Bonneville, Oregon
e. Tacoma, Washington.

In the Northeast the following were listed:

a. Washington, D. C.
b. New York-Newark-Jersey City
c. Philadelphia
d. Westover AFB, Chicopee Falls, Mass.
e. McGuire AFB, Fort Dix, N. J.
f. Hartford, Conn.
g. Boston, Mass.
h. Niagara Falls, N. Y.

And in the New Mexico area, these:

a. AFSWP facility at Sandia, including Kirtland AFB
b. AEC facility at Los Alamos
c. Walker AFB, Roswell.

The necessary manpower to accomplish these defenses was to

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20. USAF to ADC: "Air Defense of the Continental United States," 4 May 1948, and Incl. (DOC 32)

come from the transfer of 587 persons from the Caribbean Defense Command and the additional assignment of personnel to the two AC&W Groups to bring them to their combined, authorized strength of 2,726.[21] As for the indispensable interceptors, USAF indicated that "fighter units, currently assigned to other major commands, will be made available from time to time."[22]

IV

The directive of 23 April 1948 which authorized the Air Defense Command to establish "with current means" AC&W systems for the Northwest, Northeast and Albuquerque areas, indicated a rather desperate predicament. The maneuver in the Northwest in March showed very clearly that America was virtually defenseless against air attack. While it is true that USAF had proposed an elaborate radar system in Plan SUPREMACY, expectations that the authorization would be pushed through Congress in time to do any good in the present situation were not too sanguine. The decision to throw what was available into the breech was apparently the last resort. An indication of this compulsion was the statement in the directive mentioned to the effect that[23]

> Until such time as [funds] are made available,

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21. USAF to ADC: "Air Defense of the Continental United States," 23 Apr 1948 (DOC 31)

22. Ibid.

23. Ibid.

however, it will be necessary to limit the air defense dispositions and operations envisaged herein to such as can be effected without them.

In reality, the process of taking radar of World War II vintage out of moth balls had been resorted to before the April decision. Token radar foundations had been laid in the Northwest in behalf of the March maneuver in that area. Radar deployment in the Northeast had been scheduled as early as the winter of 1947-48 in anticipation of a maneuver scheduled for that area in the spring of 1948. By the end of April 1948, a start had been made in the Northeast by deployment of radars at Montauk, N. Y. and Palermo, while an AN/CPS-6 radar at Twin Lights (N.J.) had been undergoing tests.[24]

Pressure to establish an air defense in being for the Northeast was increased by the arrival of a squadron of Vampire aircraft from Great Britain late in May 1948.[25] As part of the itinerary of these visitors, exercises in ground-controlled interception were

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24. ADC to USAF: "Transfer of Radar Site and Equipment," 2 Jan 1948 (DOC 33) See also: Yeager to Wilson, 10 Feb 1948, for interesting information about the status of various radar projects early in 1948 (DOC 34) For radar activity in the Northeast see: ADC to 1st AF: "Preparation of Installations for Occupancy," 9 Apr 1948 (DOC 35) An excellent summary of the radar situation at this time is in ADC to 1st AF: "Air Defense Activities," 6 Apr 1948 (DOC 36); also, 1st AF to ADC: "Air Defense Activities," 12 Apr 1948 (DOC 37); and ADC to 1st AF: "Radar siting Teams," 20 Apr 1948 (DOC 22)

25. 1st AF to ADG: "Participation of the RAF Vampire Aircraft in Local Air Defense Maneuvers," 18 Jun 1948 (DOC 38); 1st AF to ADC: "Report on Air Defense Maneuvers in the Metropolitan New York Area," 14 Oct 1948 (DOC 39)

prepared for the First Air Force area. During these exercises, held in June 1948, the First Air Force had in operation, besides the AN/CPS-6 at Twin Lights, the following equipment: at Palermo, an AN/TPS-1B radar, with an AN/CPS-5 scheduled for installation by July; at Montauk Point, an AN/TPS-1B with an AN/CPS-5 earmarked for that site. Assorted communications facilities at the designated control center at Roslyn were assembled but were characterized by First Air Force as "totally inadequate." The token Northeastern radar "net" was found to be no better than the one in the Northwest.[26]

The national predicament was appreciated by ADC, but without necessary funds there was little that could be done.[27] In August 1948, General Norstad of USAF Headquarters wired General Stratemeyer that, in view of the delays encountered by SUPREMACY, USAF was struggling to obtain approval from the appropriations committees of Congress so that sufficient funds could be diverted from regular USAF appropriations for construction purposes in the Northeast.[28] ADC was asked to submit with all possible haste detailed estimates for minimum construction costs for both the Northeast and the Seattle-

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26. For attempts to set up an air defense for the Albuquerque area see: TWX, ADC to 4AF, 6 May 1948 (DOC 40); and, ADC to SAC: "Air Defense of the Albuquerque-Roswell, New Mexico Area," 23 Jul 1948 (DOC 41) ADC planned to deploy 3 radars in this area and asked to borrow a fighter squadron from SAC for interception.

27. The strain of earlier preparations for Plan SUPREMACY had already begun to tell on ADC's limited resources. See: IRS, A-5 to AG: "ADC Air Defense Plans and Preparations," 22 Apr 1948 (DOC 42)

28. TWX, Norstad to Stratemeyer, 4 Aug 1948 (DOC 43)

Pasco areas. This time USAF was to go to Congress not to demand hundreds of millions, but to ask for a pittance in order to establish a token network. Even this was to be an unconscionably long time in coming.

V

On 9 September 1948 Major General Gordon P. Saville, one of the most aggressive supporters of an air defense in being policy in USAF, presented to Secretary Forrestal, on behalf of the Air Force, a plan to put into effect immediately an "Interim" AC&W system for the continental United States.[29]

After tracing the history of Plan SUPREMACY and indicating that the "Air Force cannot discharge its responsibilities by continued waiting . . ." General Saville recommended that "immediate and positive action . . . start at once on the establishment of a limited air defense in being - pending final approval on any overall air defense program."

General Saville had nothing but disparagement for the air defenses of the United States.

> It would be utterly impossible for me to overstate the complete inadequacy of this deployment to provide aircraft warning and control in the event of air attack. It is so wholly inadequate that it not only provides negligible air defense capability, but does not even provide a sufficient system for the development of tactics, techniques and procedures involved in any air defense system.

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29. Major General Gordon P. Saville, presentation to Secretary Forrestal on the Interim AC&W Program, 9 Sep 1948 (DOC 18)

General Saville spoke for both USAF and ADC when he reiterated that

> We must have a limited air defense in being if we are to solve the many and varied systems problems involved in any reasonable time. Basic radar stations, control centers, and interconnecting communications inevitably will be the skeleton upon which the whole air defense system is erected. Without that skeleton, we will have nothing to grow on . . . . We can develop new equipment but we cannot have an effective air defense unless and until we have a SYSTEM.

General Saville pointed out that at that time (September 1948) only five AC&W stations were operating. He demanded a minimum of 76 radar stations and ten control centers for a limited air defense in being. General Saville pointed out that he was asking for authorization by Congress not of funds to purchase this equipment but of funds to construct facilities so that equipment on hand or on procurement could be installed.

The extension of radar coverage from five to 76 basic radar stations was to be accomplished in two phases, according to General Saville. Since the Air Force had in its possession nineteen heavy type radars in storage and five more in the field, it was proposed that this total of 24 heavy-search equipments be deployed permanently in sites to be prepared with public works funds provided by Congress. In addition to this total of old-type radars, all the search radars of modern vintage then on procurement (twelve AN/CPS-6Bs and 25 AN/FPS-3s) were to be similarly deployed, thus making a total of 61 basic radar stations. This 61-radar program

was dubbed the Interim AC&W program.

Realizing that the proposed Interim program would still be inadequate in its coverage, General Saville proposed that additional construction be undertaken to house fifteen more radars of the AN/CPS-6B type, which the Air Force would procure out of funds in its FY 1950 budget. This expansion of the Interim program was called by General Saville the "First Augmentation." The Interim program and the First Augmentation, therefore, were to provide a total of 76 basic radar stations and ten control centers. In order to begin work on this system at once, it was proposed to divert $706,000 from Air Force projects of lesser priority and assign this sum to construction.

Approval of the Joint Chiefs of Staff and the Secretary of Defense was granted to this proposal, and the Department of the Air Force then undertook to obtain an authorization bill in the 81st Congress. In this action, USAF slightly modified its construction requirements to provide for 75 sites for search radar equipment and for ten control centers.[30]

On 30 March 1949 Congress passed Public Law 30, authorizing

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30. See remarks by Major General G. P. Saville to the Committee on Armed Services, House of Representatives, 17 Mar 1949 (DOC 44); also answers to questions of the House of Representatives' Committee on Armed Services, 7 Feb 1949; also statement of Maj. Gen. Saville before the Committee on Armed Services, U. S. Senate, 17 Mar 1949.

the Secretary of the Air Force to construct aircraft control and warning facilities to the extent of $85,500,000 for both the United States and Alaska. But - it was not until 29 October 1949 that Congress saw fit to appropriate necessary funds. The predicament of having won its Congressional battle but of having failed to acquire the necessary funds was solved by USAF by the drastic measure of reprogramming $50,000,000 from the aircraft procurement funds for the radar net. Of this amount, however, only $18,800,000 was allocated to the Zone of the Interior radar program, the balance going towards the construction of an Alaskan radar net which was deemed to have first priority.[31] Enough was on hand, however, so that positive steps could be taken to begin construction. What came to be known as the Permanent System was at last on its way,[32] and with good fortune USAF anticipated that it would be in operation by sometime in 1952.

VI

The time between the end of 1948 and sometime in 1952 was

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31. "Summary of Appropriations for the Construction and Operation of Aircraft Warning and Radar Systems," [n, d.] (DOC 45)

32. In this history only two names for radar systems will be used: the LASHUP system and the Permanent System. In reality the programs called by General Saville the Interim program and the First Augmentation when combined constituted what ADC was to call the Permanent System, in order to distinguish the system from the strictly temporary LASHUP system. LASHUP will be discussed in the following chapter.

too long a period to be without an air defense in being even though a calculated risk on a future air defense system were taken. USAF determined in September 1948 to scrape the bottom of its financial barrel and to deploy its old radar equipment at once. Not having sufficient funds to install this radar on operationally desirable sites, USAF came to the conclusion that a compromise with the ideal was inevitable. If this radar equipment was to be deployed at all, it would have to be deployed on land and in buildings which would cost the Air Force an absolute minimum, and this meant installation on Government-owned land. To do this meant that in many instances the maximum operational effectiveness of the radar would have to be sacrificed. An alternative being nonexistent, the decision was made at the end of August 1948. The result was the AC&W system known as LASHUP.

CHAPTER FOUR

LASHUP

I

For almost three years from the time of its inception in the autumn of 1948 the temporary aircraft control and warning system, or LASHUP, bore the brunt of the continental air defense. The Air Force was under no illusion that in bringing World War II radar out of storage and deploying it in locations which cost the government next to nothing it would be creating a realistic air defense. So long as it existed, the temporary system more than fulfilled its primary function of providing a proving ground for air defense systems development. After Korea, though LASHUP's training function was still paramount, its role as America's only early warning and control capability was inevitably thrust forward. By that time, however, the trials and errors of almost two years of operation of LASHUP had produced a system which, although still far short of an acceptable minimum aircraft warning and control system, could still contribute greatly in any war effort involving the defense of the continental United States.

From an historical viewpoint, therefore, LASHUP, though destined to be eclipsed by the Permanent system, must not be dismissed lightly. In the growth and operation of this system there

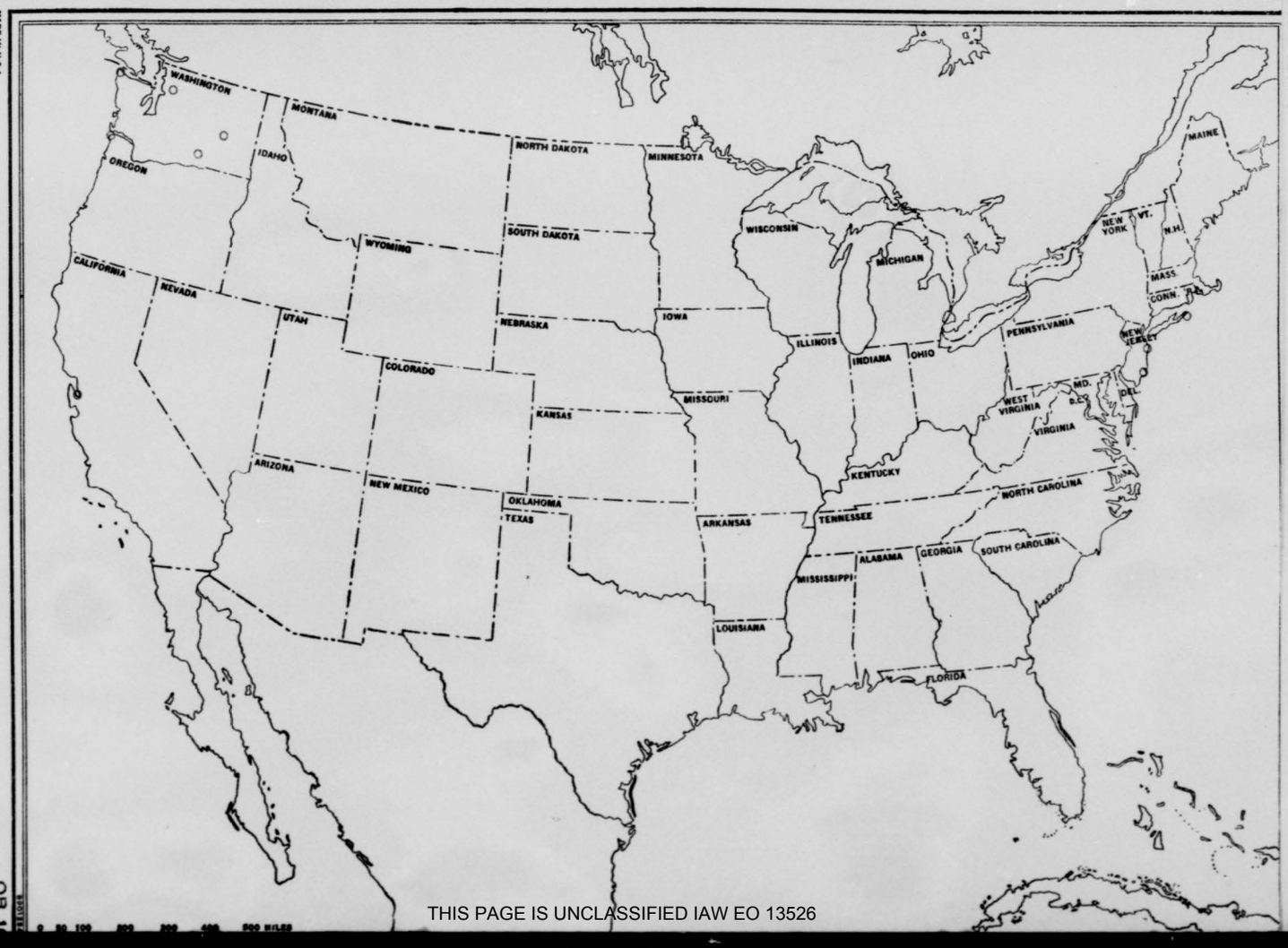
were revealed problems whose resolution helped to clear the path for the more efficient operation of the air defense system which was to follow. It was responsible for sponsoring a pattern of air defense organization which was both peculiar and indispensable to the forging of an entirely new weapon - ground controlled interception. LASHUP's progress evoked clashes of jurisdiction between the armed services and between the Air Force and civil agencies which resulted in greater, not less, harmony among all concerned in national air defense, though much remained to be accomplished in this direction. It brought to light additional inadequacies in the organization and training of the Air National Guard and in the recruiting and training of regular Air Force personnel. It clearly revealed the necessity for the closest relationship in thought and action between the radar operator on the ground and the fighter pilot in the air, and it pointed to the need for an effective system of air traffic control.

II

The problem of setting up a temporary aircraft control and warning system was not as simple as receiving radars from AMC depots and deploying them. Appropriate locations had to be found which would conform to the criteria of negligible cost and maximum operational efficiency. In this siting effort the factors of speed and cost resulted in a compromise with the factor of efficiency.

The announcement by USAF that it intended to deploy its

DEPLOYMENT OF AIR DEFENSE RADAR
(April - June 1948)



DEPLOYMENT OF AIR DEFENSE RADAR APRIL-JUNE 1948

OB 1

available ground radars temporarily was followed immediately by an authorization to ADC in September 1948 to expand the Northeastern radar system by the addition of thirteen more stations.[1] For this purpose the sum of $152,000 was earmarked for construction.[2] By the end of September, thirteen sites had been chosen by the First Air Force to supplement the three stations already in existence at Twin Lights, Palermo and Montauk.[3] For the whole network, a control center was chosen at Roslyn in Long Island, in close proximity to Mitchel Air Force Base.[4]

Although a target date of 15 March 1949 was imposed by USAF for completion of the Northeastern system, delays occasioned by the failure of speedy fund allocation forced the extension of that deadline on several occasions.[5] By June 1949, however, First Air Force was able to announce that its radar had been deployed and the system was operational. The accomplishment of this deployment was accelerated by the announcement by USAF of a scheduled exercise for the

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1. IRS, Air Defense to DO, 13 Sep 1948 (DOC 46)

2. Ibid.

3. IRS, DCE to AirD: "Radar Sites," 14 Sep 1948 (DOC 47) ADC to USAF: "Establishment and Operation of Thirteen Radar Sites for the 503d Aircraft Control and Warning Group," 23 Sep 1948 (DOC 48); TWX, ADC to USAF, 30 Sep 1948 (listing sites) (DOC 49)

4. For sites in operation at end of 1948 and plans for future deployments see: ConAC to AMC: "Logistic Support for Project 'AC&W Defense Plan'" 4 Nov 1948 (DOC 50)

5. TWX, ADC to USAF, 19 Nov 1948 (DOC 51)

Northeastern system to be held in May. When deployment of the radar was delayed, however, the date for this exercise was postponed until the following month.

The exercise which was held for the new Northeastern radar net in June 1949 was known as operation BLACKJACK.[6] Although calibration of the newly installed radar equipment was still in progress, the system was tested in this operation by a series of missions performed in part by SAC heavy bombers and in part by ConAC's own B-26s. A total of eighteen operational radars in the Northeast was divided among five provisional air divisions with control centers operating at Roslyn, Pine Camp, Grenier, Selfridge and Washington, all responsible to an organization established for the period of the exercise and called the Eastern Air Defenses. Results of BLACKJACK were highly informative. Performance of the radars varied considerably, some being just barely operational and others picking up aircraft and tracking them in from surprisingly long ranges. Radar capability at the AN/CPS-6 at Twin Lights, for example, was practically zero, while the AN/CPS-5 at Selfridge, Michigan, after some experimentation in the course of the exercise, gratified observers by painting aircraft solid out to 210 miles.

Another exercise of the Northeastern system was held in

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6. Report of Air Defense Exercise BLACKJACK, 1 - 30 Jun 1949 (DOC 52)

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September 1949.[7] A feature of this maneuver, called LOOKOUT, was the testing of the newly-formed Ground Observer Corps in this area, whose purpose was to extend early warning capability by providing the low coverage needed to supplement the limited coverage of the radar. In this test, three divisions were established, with control centers at Pine Camp, Grenier and Roslyn under the supervision of the newly-established Eastern Air Defense Force Headquarters. Radar performance was characterized as "below the equipments' maximum capability due to location of equipment and state of training of the operating personnel." An important and encouraging result observed, however, was the increased cooperation between pilots and controllers. Techniques of radar maintenance came in for severe criticism, reflecting the acute shortage of skilled technicians in the new system.

Deployment of radar in the Northeast was matched during 1949, although in not so ambitious a scale, by the establishment of a Northwestern radar network and by the provisions of token radar coverage for the important atomic installations in New Mexico. By the end of 1949 emphasis on integrating the radar system shifted from the Northeast, where two exercises had already been held, to the Northwest. By the end of October 1949 radars had been deployed at Whidbey Island (a naval installation),

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7. Report of Air Defense Exercise LOOKOUT, 10 - 16 Sep 1949 (DOC 53); 26th AD to EADF: "Final Report and Overall Evaluation for LOOKOUT," 19 Sep 1949 (DOC 54)

Olympia, Pacific Beach, Neah Bay, Sequim, Moses Lake and Spokane - a total of seven radars. Headquarters of the 25th Air Division was established at the control center for the network at Silver Lake, Everett, Washington.

During the period 4 - 14 November 1949 an exercise called DRUMMERBOY was held in the Northwest under the supervision of the 25th Air Division and the newly-established Western Air Defense Force.[8] Reaction to this test indicated that the Northwestern radar system performed considerably better than had been anticipated. Primary obstacles revealed in the exercise were not so much concerned with radar performance however, but with the organizational confusion which prevailed in the West, and also with deployment of aircraft in the troublesome Cascade mountain area.

By April 1950, LASHUP deployment in the Northwest included the following stations: Spokane, Moses Lake, Pasco, Paine Field, McChord AFB, Vancouver, Neah Bay, Pacific Beach, Seaside (Oregon) and Whidbey Island.[9]

The progress of radar deployment which followed the three maneuvers of 1949 saw the extension of radar into areas hitherto neglected in favor of the Northeast and Northwest. In 1950 major emphasis in deployment of radar was placed upon the establishment

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8. USAF to ConAC: "Special Report of Observation on Exercise DRUMMERBOY," 2 Dec 1949 (DOC 55)

9. "List of Radar Stations, Continental United States," 30 Apr 1950

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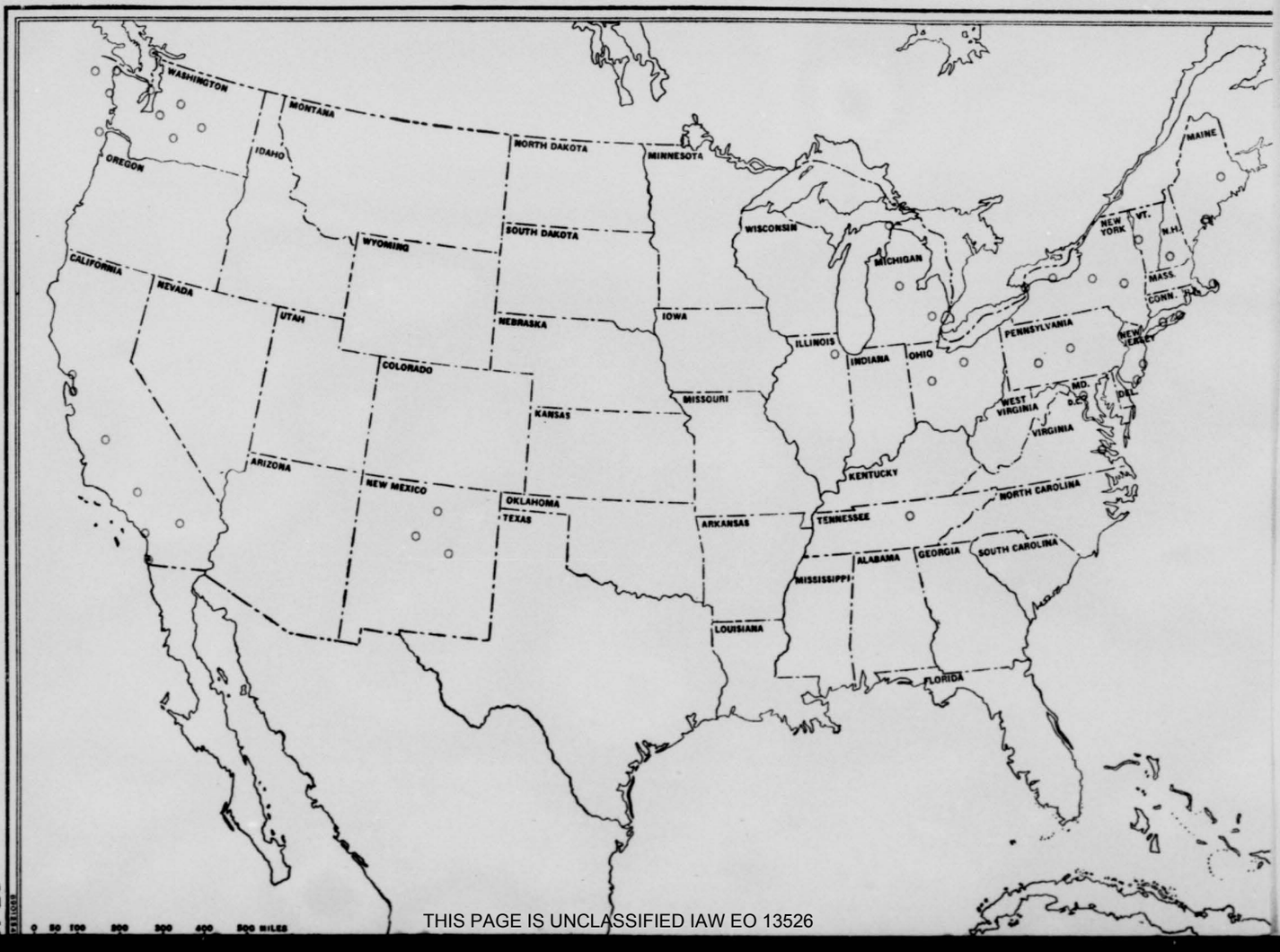
DEPLOYMENT OF AIR DEFENSE RADAR: LASHUP
(April 1950)



DEPLOYMENT OF AIR DEFENSE RADAR - APRIL 1950 (LASHUP)

OB 10

of air defense capabilities in the California area. Prior to 1950 the only radar in the area was that operating at Half Moon Bay. Soon thereafter, radars near Mount Tamalpais, Taft, Muroc, Point Conception, Van Nuys and Fort MacArthur were added.[10] The New Mexico area, hitherto guarded by a solitary radar at Kirtland Air Force Base, was reinforced during 1950 by radars near Los Alamos and Roswell. A single radar at McGhee-Tyson Airport, Tennessee, was set up to provide the nucleus for the future protection of the important atomic project at Oak Ridge. By June 1950, 44 radar stations had been established in the temporary network, and LASHUP was deemed to have been completed so far as deployment of radar was concerned.

The only major test of the AC&W system in 1950 took place in the Northwest. Operation WHIPSTOCK, held during 18 - 24 June, was featured by the extension of early warning by the use of a naval radar picket ship and the use of one Canadian Ames II radar station for the duration of the maneuver.[11] A complete overhaul of the Northwestern radar by AMC prior to the exercise and some changes in deployment of equipment did much to improve radar coverage over the November 1949 exercise. In this, the increasing

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10. Ibid.

11. For a complete collection of documentary material relating to Operation WHIPSTOCK, see: WADF, "History of Operation WHIPSTOCK, 18 - 24 Jun 1950," a special study which may be consulted in USAF Historical Archives. Annex III of the Report of the 25th Division is included in the Appendix as (DOC 56)

experience of operating personnel was clearly evident. Within its inherent capability, the LASHUP radar did as well as could be expected. Major problems revealed by the test were in the realm of GCI operational procedures and in the organization of the various air defense components within the system.

III

Although research and development of radar had continued after World War II, and was stimulated by USAF's determination to set up an ambitious radar network, for practical purposes the only radar available to the Air Force for LASHUP deployment was of the World War II variety. Of this equipment, three types of early warning radar and two types of height-finding equipment were used. Early warning radar included the AN/CPS-5, the AN/CPS-1, the AN/CPS-6 and the AN/TPS-1B sets. The two height-finders were the AN/CPS-4 and the AN/TPS-10A.

The AN/CPS-5, workhorse of the LASHUP system, was an air-transportable, long-range ground radar designed for both early warning and solid search.[12] This set could be employed as a ground control station when coupled with an adequate height-finder such as the AN/CPS-4. The maximum range of the set was in the neighborhood of 150 miles, while for solid search it could

12. For a description of the AN/CPS-5 see: ADC Communications and Electronics Digest, Apr 1951; also, Watson Laboratories, Survey of Major USAF Ground Radars for Interim Air Defense System, 15 Jun 1949.

perform at a maximum of 60 miles. Although this equipment was susceptible to permanent echoes which cluttered up the scope when sited in mountainous terrain, modification of the set by the addition of the AN/GPA-7A Moving Target Indicator made possible tracking of targets through cluttered areas of the scope screen. So modified, and coupled with the AN/CPS-4 height-finder, the AN/CPS-5 had a reasonably good GCI capability. In early plans for the Permanent system, use of the CPS-5 set was included for gap-filling purposes.

The AN/CPS-1, generally considered the best of the LASHUP radar, was an air-transportable, early warning radar with a range somewhat similar to that of the CPS-5. The equipment had the advantage of having a high traffic handling capacity and was relatively free from siting difficulties. The internal operational capabilities of the set were similar to those of the AN/CPS-6B, although it did not possess the built-in height-finder which was the characteristic of the latter.[13]

With the CPS-5, the AN/TPS-1B radar bore the brunt of LASHUP deployment.[14] A long-range portable radar with a maximum early warning capability of 150 miles, the set had the disadvantage, like the CPS-5, of being very sensitive to siting difficulties. For best results this set required a level reflecting

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13. Watson Laboratories, Survey of Major USAF Ground Radars for Interim Air Defense System, 15 Jun 1949

14. Ibid.

surface of at least 1000 feet radius and had to be sited at low altitudes. The special disadvantage of the TPS-1B was the fact that it was not built for sustained operation.

Perhaps the most troublesome equipment problem which LASHUP faced in its career was the matter of height-finders. Not that this problem was unforeseen. As early as in the fall of 1948 General Saville had made it clear to the Secretary of Defense that there would be serious deficiencies of height-finding radar.

The importance of height-finders to a radar network employing World War II equipment and scheduled for ground control operations could not be overemphasized. With the exception of the experimental AN/CPS-6 radar at Twin Lights, and at Ft. Meade, Md., no radar set in LASHUP possessed GCI capability unless the search radar was coupled with a height-finder. The importance of the problem is made clear when it is observed that of height-finding equipment only the AN/CPS-4 set, of which fifteen sets in all were available to the Continental Air Command and its successor, ADC, was adequate.

The AN/CPS-4 radar, although limited in range for use with the new equipment destined for the future AC&W system, was adequate for use in the LASHUP GCI network. The AN/TPS-10A, another height-finder of which eleven were available for use, was deemed thoroughly unsatisfactory. Maximum possible range of this equipment was no more than 60 miles with a maximum height indication of only

35,000 feet, and numerous design shortcomings and maintenance difficulties made the set a constant source of worry to the user. Reports from AC&W detachments in the field were unanimous in their condemnation of the set.[15] However, since it was a premise of the LASHUP system that expenditures on its behalf would be drastically restricted in favor of the projected Permanent system, the TPS-10A was perforce retained.

IV

As soon as the radar equipment of LASHUP was deployed, the anticipated problems of operation and maintenance inevitably arose. The primary obstacle in this respect was the insufficiency of skilled personnel. Drastic post-war demobilization had released the vast majority of trained electronics personnel from armed service, and the resulting shortage was acutely felt by the Air Force. In view of the existing shortage and the failure of recruiting methods to induce skilled technicians to return, the only normal recourse available to ConAC and ADC was to make the best of what they had by the use of demonstration-instruction techniques and reliance upon the Air Training Command to provide them with basically skilled personnel. Neither of these measures could alleviate the almost complete absence of skilled instructors and operators, and

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15. ConAC to Watson Labs: "Unsatisfactory Performance of TPS-10 and TPS-10A Radar Sets," 6 May 1950; also 1st AF to ConAC: "Inadequacies of AN/TPS-10A . . . ." 23 May 1950 (DOCs 57 58)

experts in systems operation. Drastic measures were called for.

The only source of skilled electronics personnel available to USAF in an emergency was the civilian public, and to this source the Air Force turned.[16] In the AC&W system established in the postwar Far East Air Force, the experiment of employing civilian technicians to instruct in radar operations and maintenance had been tried with much success. Both General Ennis C. Whitehead and Colonel Hobart R. Yeager, ADC's Director of Communications and Electronics, had served with the Far East Air Force and it was only natural that they would turn to this prior experience as a temporary solution to the personnel problem which now concerned them. In March 1948, consequently, nine civilian electronics engineers were obtained by contract with the Philco Corporation. Three of these technical representatives were assigned for service with the 505th AC&W Group, three with the 503d AC&W Group and three with the Alaska-bound 531st AC&W Group.

With the coming of the Korean War and the consequent expansion of the air defense system, the number of civilian technicians was greatly increased. By the summer of 1951, approximately 300 Philco field engineers were on duty within the ADC AC&W system. An additional feature of the expansion was the increasing need for communications personnel. The answer to this

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16. Information about the civilian technical representatives was obtained by interview with Mr. G. L. Ashby, Philco Supervisor, Hq ADC.

problem was solved temporarily by recourse to the same expedient which brought electronics personnel into the system. A contract with the Radio Corporation of America resulted in ADC's acquisition of 150 communications specialists who took their places beside the Philco representatives in the field.

By the beginning of 1951 ADC's requirements for skilled technicians had increased to such an extent that it was estimated that an additional levy of civilian technicians was necessary to bring the total of field engineers to 648 through FY 1953.[17] Requesting a total of $4,680,234 for FY 1952, ADC was disappointed to learn that USAF saw fit to allot only $2,600,000. An immediate protest by ADC noted that[18]

> It is inconceivable that any consideration would be given toward curtailing the Contractor-Technician program to the extent that the present available funds would dictate. The importance of the uninterrupted functioning of this program in the present stage of development of the AC&W network is heightened by the low level of experience prevalent in the electronic field. The operator type personnel presently available to this command must be trained in the operation and maintenance of the highly technical and expensive electronics equipment if the AC&W program is to function properly. Any retarding of the Contractor-Technician program at this time would prove financially as well as operationally unsound from the standpoint of resultant breakdowns necessitating costly replacement of equipment.

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17. TWX, ConAC to USAF, 5 Jul 1950 (DOC 59).

18. USAF to ADC: "Contracts for Technicians," 16 Aug 1951 and Ind (DOC 60)

By mid-1951 ADC was determined to leave no stone unturned in order to ensure the continued expansion of the program of civilian technicians in the AC&W system. This determination was prompted by the failure of measures available within the military establishment to make provisions for adequate personnel.

V

One of the primary reasons for the difficulties which both ConAC and ADC experienced in obtaining skilled military personnel for the AC&W system was the paramount emphasis given during 1948 - 1949 by USAF to the manning of SAC units and overseas units. So long as this overriding priority prevailed within USAF, air defense had to be content with getting what personnel was left, if any. Early in 1950, however, emphasis on the air defense mission increased to the point where air defense was awarded equal precedence with SAC in manning schedules.[19] As SAC manning reached the saturation point, new sources were made available to ADC and the personnel problem was considerably alleviated. By the end of 1951, it was estimated, the entire AC&W system would achieve 100% manning. But this was considerably different from the ideal goal of 100% effective manning. As General Whitehead pointed out to the Air Defense Forces, full manning did not mean that the system would function any better. A continuous training program was

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19. Whitehead to Barcus, 4 Mar 1950, quoted in: History of the 26th Air Division, 1 Sep - 31 Dec 1950, p. 1.

indispensable in order to achieve that goal.[20]

As soon as LASHUP was determined upon, plans were drawn up for an extensive training program in the basic principles of radar operation and air defense procedures.[21] Early in February 1949, and again in March 1949, conferences at Mitchel AFB and at Orlando, Florida, were held to prepare training standards and SOPs and to clarify basic doctrines of training and operation. As concluded in these meetings, the requirements of both the present and projected radar systems called not so much for individual training as for team training. The plan decided upon was to train radar teams and control squadrons in a precise schedule geared to the expected production of equipment and to the rate of construction of sites in the radar system. Early in 1949, consequently, plans were made to establish an AC&W systems training school at Orlando.[22] The function of this school would be to receive trained technicians from the Air Training Command and basic trainees from other sources and to organize them into teams for training. Lack of funds and jurisdictional problems involving the Air Training Command prevented the accomplishment of this worthwhile project. Meanwhile, team training had to be provided by the actual operation

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20. ConAC to WADF: "Airmen Manning of AC&W Units," 25 Oct 1950 (DOC 61)

21. History of the Continental Air Command, 1 Dec 1948 - 31 Dec 1949, III, 61-65

22. Ibid., p. 64

of LASHUP.

To ensure that the specialized component parts of the air defense system might be harmonized into an effective air defense, unit commanders were instructed at an early date to arrange for exchange of personnel visits. Though this fraternization helped somewhat to break the psychological barrier between the ground personnel and the fighter pilots, it did not take the place of actual systems training. That training was hindered by the inexperience of the radar personnel. The result was that it was not until late in 1949 that regular systems training could be begun and adhered to. In this training program, the exercises held to test the system helped considerably, although some commanders protested that preparations for these exercises retarded rather than accelerated the training effort. Nevertheless, few begrudged the importance or the necessity of the exercises in view of the important experiments involved in them for determining the proper relationships between controller, pilot and commander and in revealing flaws in radar coverage.

VI

The decision to create an air defense in being by the deployment of radar in temporary locations decreed that steps be taken simultaneously to adopt a procedure for the calibration of

the ground radar.[23] The experience of the air forces during World War II had made it sharply clear that no matter how efficient radar equipment was, unless that equipment was calibrated with accuracy to correspond to that of the rest of a radar network, confusion would inevitably result which would mean loss of precious time in the relay and synthesis of vital information. In June 1948, consequently, steps were taken to activate the 12th and 7th Radar Calibration Units at Mitchel Air Force Base and at Hamilton Air Force Base, respectively. Early in 1949 the 11th Radar Calibration Unit was also established at Hamilton AFB on the West Coast. The reorganization of 1 December 1948 which placed TAC under the Continental Air Command permitted also a limited use of the 5th Radar Calibration Unit of TAC for LASHUP calibration. In late 1949 the 7th Radar Calibration Unit was established at Griffis AFB, New York. In spite of the fact that there were three such units under ADC, the 7th, 11th and 12th, the total number of B-29 aircraft assigned to the three units was eight, a number which was woefully inadequate considering the vast expanse of territory they had to cover in calibrating the LASHUP radar. Another problem was the fact that maintenance and housing for these units was

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23. The following sources give a good account of the calibration effort: History of the 7th Calibration Unit, 1 Oct - 31 Dec 1950; History of the 7th Radar Calibration Squadron, 1 Jan - 31 Mar 1951, and 1 Apr - 30 Jun 1951; History of the 11th Calibration Squadron, 1 Jan - 31 Mar 1951, and 1 Apr - 30 Jun 1951; also, History of the 12th Radar Calibration Units, 1 Oct 1950 - 31 Jan 1951.

provided generally at TAC bases, by TAC personnel and facilities which were not prepared for B-29 maintenance. A third important problem was that AMC support capability for B-29s was limited so that the flying hours of the calibration B-29s were restricted far below the total flying time required for air defense calibration.[24]

In June 1950 the calibration requirements of the Air Defense Forces reached the point where drastic action had to be taken soon. General Whitehead demanded of USAF that the three calibration units be integrated into two full squadrons totalling twenty B-29 aircraft and that, in addition, a ground calibration team be established in each AC&W Group within the command.[25] Not until January and February 1951 was the desired action taken by USAF. The results were gratifying. Two squadrons, the 7th and 11th, were created with a strength of eight planes for the 11th on the West Coast and twelve planes for the 7th on the East Coast. Furthermore, each squadron was placed under the respective Air Defense Force Commander to use as he saw fit. Fully equipped maintenance sections in the new squadrons were now self-sufficient for aircraft maintenance, which proved to decrease the AOCP rate for the aircraft. In addition, AMC was prevailed upon to increase

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24. TWX, EADF to ADC, 21 Jun 1951; and TWX, ADC to EADF, 25 Jun 1951 (DOCs 62 63)

25. ConAC to USAF: "Radar Calibration Squadrons," 7 Jun 1950 (DOC 64)

its B-29 support capabilities so that more flying time was possible for these aircraft.

The importance of an efficient and adequate calibration system for air defense radar could not be overestimated. Constant calibration was necessary because of the urgency of faultless continuous tracking of aircraft from sector to sector and for accurate interceptor control. Until the Permanent system was fully calibrated, its capability would be small and LASHUP would be prevented from demobilizing and merging its potentialities with the new system.

VII

By the end of 1950 progress on the construction of the Permanent AC&W system had reached the point where plans for the disposition of LASHUP equipment had to be made. Early in December, a meeting between General Whitehead and General Edwards of USAF Headquarters resulted in a decision to leave the redeployment of lightweight LASHUP equipment in the hands of ADC.[26]

As concerned search radar, ADC deemed it feasible to retain only the lightweight AN/TPS-1B set in the Permanent system as backup equipment for the AN/FPS-3 at the lower priority sites. It was thought that by speeding up the delivery schedules for the new prime search radar it would be unnecessary to rely on the heavier AN/CPS-5 and AN/CPS-1 sets for use in the Permanent system. Where

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26. Memo, Edwards to Whitehead, 15 Dec 1950 (DOC 65)

height-finders were concerned, however, the Air Defense Command could not afford to be so optimistic. Both the scarcity of and tardy delivery dates on new equipment demanded that the AN/CPS-4 height-finder be dispatched to first priority AN/FPS-3 sites, but unforeseen logistical problems delayed this transfer. As for the AN/TPS-10A height-finder, ADC was glad to let that equipment revert to control of USAF.[27]

The phasing-out of the LASHUP radar network was geared to the development of the Permanent system. Primary consideration in this conversion program was the premise of continuity in air defense capability. Only when the new Permanent sites were fully calibrated and their capabilities were fully known was LASHUP to cease operations. The process inevitably was to be a gradual one with individual LASHUP sites being decommissioned one by one until the whole network disappeared. It was estimated that the conversion would be complete sometime late in 1952.

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27. Ibid.

CHAPTER FIVE

THE PERMANENT AIRCRAFT CONTROL and WARNING SYSTEM

I

The decision to create the Permanent radar system was the outcome of a year of alternating expectancy and disappointment. As told in Chapter Three, USAF, in January 1948, gave its indorsement to Plan SUPREMACY, which was to create an extensive network of ground radar stations. That plan did not materialize because of the failure of Congress to concur in the necessity for such an elaborate system at the time. While action was pending in Congress on SUPREMACY, USAF made a feeble effort to set up a token air defense system by deploying its existing radar equipment, but the shortage of construction funds proved the effort abortive. In September 1948, USAF broached the suggestion that enough public works funds be allocated to deploy "permanent type" radars on hand and on order. This suggestion, then called the Interim program, was to be supplemented by the permanent installation of additional modern radar equipment. The Interim program and the First Augmentation program just alluded to, were to result in the establishment on permanently constructed sites, chosen for maximum operating effectiveness, of a total of 75 basic radar stations and ten control centers. In time this program was popularly referred to

as the Permanent AC&W program to distinguish it from the temporary LASHUP program.

Having received the approval of the Joint Chiefs of Staff, USAF began work on the Permanent program immediately, in anticipation that Congress would provide the necessary funds.[1] In October 1948 ADC presented to USAF its recommendation for deployment of the radar in the Permanent system and made provisions for the assembly of radar siting teams to choose the actual locations for the equipment.[2] By the beginning of 1949 two siting teams had been chosen and were on their way.

The problems incident to selecting site locations for the Permanent system may be illustrated by the experiences of the Western siting team headed by Colonel James R. McNitt.[3] This team was instructed to select the best possible locations within a 25 to 30 mile radius of geographical points already selected by ConAC.[4]

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1. USAF to ADC: "Interim Program for Employment of Aircraft Control and Warning Radar," 20 Oct 1948 (DOC 66); also, "Brief Fiscal History of the AC&W Facilities Construction Program," 26 Jun 1950 (DOC 67)

2. ADC to USAF: "Recommended Final Deployment of Radars for the Interim Plan Plus First Augmentation," 26 Oct 1948 (DOC 68)

3. ConAC to 4AF: "Radar and Control Center Sites," 22 Oct 1949, and Inds (DOC 69)

4. USAF to ConAC: "Detailed Cost Data on Programmed Aircraft Control and Warning Systems in Continental United States and Alaska," 23 Dec 1948 (DOC 70) This document contains a list of approximate locations which were to guide the siting teams. See Tab E.

Verbal instructions were given this team to select high sites wherever possible.

Supporting criteria for the selection of high sites for radar stations were established as follows: (1) selected sites were to be capable of low angle coverage; (2) the Moving Target Indicator (MTI) destined for auxiliary use with the proposed radar equipment was assumed to be successful, thus permitting the siting team to disregard permanent echoes and clutter and consequently to select high locations, and (3) it was assumed that improvements in free-space radar beam performance would negate the need for a ground reflecting surface.

Cost of installation was another factor in the selection of sites. Many possible locations were disregarded by the siting team because of excessive access road building construction cost estimates. In selecting locations for the proposed control centers, the availability of communications was a factor of prime importance. The availability of communications, though desirable for the radar stations also, was a consideration which did not enter frequently into the selection process, because much of the Western area was sparsely populated and cities were far apart.

Another siting problem which was to cause considerable difficulty in a later period arose from the decision to ignore the proximity of living accomodations as a siting factor. In one instance, at least (at Colville, in northeastern Washington), this

resulted in the locating of a living site three airline miles distant from the radar equipment.

Unlike the selection of LASHUP sites, maximum utilization of existing permanent Air Force facilities was not a high factor on the list of criteria. However, in the case of the control centers, all were recommended for location on permanent military installations.

The selection of sites by either siting team did not always result in a permanent choice being made at first try. In several instances, re-study made it advisable to relocate chosen sites. In this matter, the original instructions to choose high sites came in for discussion. The controversy which resulted was based on the value of MTI and the need for a reflecting surface for some ground radars. With the experience gained in the operation of LASHUP radars in 1949, it was confirmed that the need for reflecting surfaces was obviated in certain sets then in use, e. g., the AN/CPS-1. A test conducted at the Neah Bay site in August 1949 revealed that MTI did much to eliminate tracking difficulties through scope clutter caused by permanent echoes, but not sufficiently to warrant disregarding fixed echoes entirely, especially in landed areas.[5]

The difficulty of establishing fixed criteria for siting was inherent in the dependency of ground radar equipment upon its

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5. ConAC to USAF: "Additional AN/CPS-5 MTI Equipment Kits," 8 Dec 1949 (DOC 71)

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topographical location. Compromise with the ideal was inevitable. For instance, the site at El Vado in the north central area of New Mexico at an elevation of 8,000 feet and well below the surrounding terrain, was selected to give warning to the important Albuquerque area. Many considerations precluded the selection of a higher site, even though many were available. MTI sub-clutter visibility, the fact that radar equipment was not designed to operate at altitudes above 8,000 feet, the high cost of construction, unstable weather conditions, and maintenance and morale problems contributed to the compromise which resulted in the locating of this station at a site which kept the ground clutter down to an average of 20 or 30 miles without excessive screening and which was yet in a fairly livable location.[6]

The problem of siting sensitive radar equipment was heightened by the fact that more than one agency was concerned with the end product. The Corps of Engineers of the Army (OCE) was to supervise actual construction, and the Air Materiel Command was to install the equipment.[7] Unilateral action by any one of the three agencies was very likely to result in a conflict with one or both of the other participants in the work on the Permanent system -

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6. Speech, Col. Haskell Neal, at ADC Commanders meeting, 26 Jan 1951

7. Chidlaw to Whitehead, 5 Apr 1950, and 3 Incls (DOC 72)

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and frequently did.[8] In August 1950 the problem was resolved by the decision of USAF to have AMC's prior approval before any site plans were submitted to USAF.[9] In 1950, when ConAC was engaged in the effort of siting the Canadian radar net, USAF made it mandatory that the OCE be represented on all siting teams.[10] Although much of the confusion over siting was in time straightened out, suggestions were voiced that a siting board composed of experienced experts in electronics, communications and engineering might well be the best insurance against future acrimony.[11]

The construction of 85 permanent sites, having an overall deadline of 1 July 1952 for completion, made it necessary to allot construction priorities to the separate projects. In October 1949 it was decided at a conference between OCE and ADC to establish a first priority group of 24 stations.[12] These stations were slated for early construction because of their strategic position in the target areas and the high traffic density in those locations. In

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8. USAF to ConAC: "Air Installations Support for Communications Projects," 20 Mar 1950 (DOC 73)

9. ConAC to EADF and WADF: "AMC Approval of AC&W Preliminary Site Layout Plans," 16 Aug 1950 (DOC 74); and, ConAC to USAF: "AMC Review of AC&W Site Layout Plans," 15 Sep 1950 (DOC 75)

10. TWX, USAF to ConAC, 9 Sep 1950

11. TWX, Stimson to Yeager, 20 Sep 1949 (DOC 76)

12. ConAC to USAF: "Initial Priorities for Engineering Construction, Permanent Air Defense Plan," 2 Nov 1949 (DOC 77)

January 1950 ConAC informed OCE of the locations of sites of two additional priority groups.[13] General Whitehead made it entirely clear, however, that priorities were established as a guide to the OCE in cases where there was a conflict because of shortages of materiel or other reasons, and that the target date of July 1952 was still firm for the entire system.[14] For the most part, construction dates were met, although some delays extended the estimated target date several months.

Actual construction on the Permanent system began in March 1950 after a preliminary period in which siting was completed, real estate requests forwarded to USAF, rights of entry obtained, leases secured, preliminary site plans approved, construction directives issued, bids advertised and contracts awarded.

By the end of June 1951 construction had been completed on nineteen of the 85 sites. Most of the other sites were more than 90% completed, and only five sites were less than 90% completed.[15] All in all, the construction program adhered reasonably well to the target dates imposed in 1949, and completion of the last site contract was anticipated by 1 August 1951.

Even though construction was not entirely completed in all

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13. ConAC to USAF: "Construction Priorities, Permanent Air Control and Warning System," 4 Jan 1950 (DOC 78)

14. Col. Bowman to Gen. Whitehead, 16 Mar 1950 (DOC 79)

15. ADC, Command Data Book, 30 Jun 1951. See Reference Supplement

85 sites, the ADC was enabled to move in AC&W personnel in "beneficial occupancy" of the sites to ensure security and utilities maintenance. By the end of June 1951, 76 of these sites were thus occupied by ADC, with the command personnel assisting in the installation of the communications and electronics equipment and thereby familiarizing themselves with their new tools. By the end of June, seventeen sites were reported by AMC as having reached technically equipped status.[16]

The pending completion of the Permanent system resulted in the decision in 1951 to occupy those sites whose locations would duplicate LASHUP coverage and to phase out the superfluous LASHUP sites. However, in view of the fact that in many such cases new equipment was not as yet installed, and that in all cases calibration had not taken place, it was decided to move some LASHUP radar equipment to certain permanent sites. The result was the emergence of a hybrid radar station known as an LP (LASHUP-Permanent) site. By the end of June the following LP sites were in operation:[17]

45 - Camp Hero, N. Y.	33 - Klamath, Calif.
9 - Navesink, N. R., N. J.	37 - Hill Peak Rd., Calif.
54 - Palermo, N. J.	40 - Saddle Mt., Wash.
56 - Ft. Custis, Va.	51 - Moriarty, N. Mex.
20 - Selfridge AFB, Mich.	60 - Colville, Wash.
66 - Sault Ste Marie, Mich.	74 - Madera, Calif.
31 - Elkhorn, Wisc.	69 - Finland, Minn.

16. Ibid.

17. Ibid.

80 - Caswell, Me.
67 - Ft. Custer, Mich.
6 - Mt. Bonaparte, Wash.
7 - Gonzales, N. Mex.
2 - Cambria, Calif.
8 - El Vado, N. Mex.
16 - Keweenaw, Mich.
32 - Condon, Ore.
61 - Port Austin, Mich.

II

The AN/CPS-6B, the ground radar set which was scheduled to bear the brunt of the GCI effort in the Permanent system, was in the process of development long before the decision was made by USAF to implement the Interim radar plan.[18] During the later stages of World War II radar development had reached the point where a practical method of combining early warning and height finding radar in one set had been evolved. These advances were incorporated in a set known as the AN/CPS-6, of which about a half dozen were in actual operation at war's end, three of them in the Zone of the Interior. The CPS-6, however, was never deemed to be a piece of equipment in a finished form, ready to take its place in prolonged operations. Work in improving the model continued immediately after the war, and in time many improvements over the existing models were blueprinted. These improvements consisted in the addition of MTI, better reception, an increased scanning rate,

18. On radar development during and after World War II see: AAF, Scientific Advisory Report on Radar and Communications, May 1946; Watson Laboratories, Survey of Major USAF Ground Radars for Interim Air Defense System, 15 Jun 1949; Air Proving Ground, Projects Summaries, 1941 through 1948. On recent post-war trends in ground radar research and development see: Watson Laboratories, New Developments of Defense Radar Equipments, 16 Oct 1950.

the addition of video mapping, improved scope performance, and a radome to house the antenna for the latter's protection.[19] In 1947 a joint development-production contract was let with the General Electric Company, and sixteen of the new AN/CPS-6Bs were ordered, with complete delivery scheduled by the end of June 1950.

The proposal for the Interim Radar System, made in September 1948, envisioned twelve of these sets for that system within the continental United States.[20] The First Augmentation plan, which supplemented the Interim program, earmarked another fourteen sets for the Zone of the Interior, thus resulting in a total of 26 AN/CPS-6Bs destined for continental defense.[21]

The unique characteristic of the AN/CPS-6B was not only an increased search performance, but the combination of early warning and height finding capabilities.[22] This combination, plus the elaborate internal operational facilities which enabled it to have a large traffic handling capability, made it theoretically ideal for operation as a GCI station. It was discovered,

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19. Watson Laboratories, Survey of Major USAF Ground Radars for Interim Air Defense System, 15 Jun 1949, p. 32

20. Maj. Gen. G. P. Saville, presentation on the Interim AC&W System to Secretary Forrestal, 9 Sep 1948 (DOC 18)

21. Ibid.

22. ADC, Communications and Electronics Digest, Jun 1951 (see article on the AN/CPS-6B)

however, as a result of the experience gained in LASHUP operations by ConAC personnel, that the use of MTI seriously limited the early warning capability of search radars, but that, on the other hand, for solid and meticulous close-in search operations, so necessary to GCI work, MTI was indispensable in mountainous terrain. This realization prompted ConAC to request of USAF and AMC in February 1950 that modifications be introduced in production so that the conflict between early warning and GCI be eliminated, thus enabling the set to operate both as an early warning station and a GCI station simultaneously.[23] Although USAF was loath to impede production schedules for this sorely-needed equipment, a development project was undertaken at General Electric Laboratories in Syracuse, New York, in this matter. The result of this work was the decision to modify the set by the introduction of an auxiliary early warning search set, to the existing production model of the 6B, which would work independently of the other components.[24] This modification involved the addition of a third antenna solely concerned with early warning transmission, the other two antennas being concerned with solid search and height finding.

An additional modification of the 6B resulted when the

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23. ConAC to USAF: "Requirement for Simultaneous GCI with MTI and Long Range Early Warning Using AN/CPS-6B and AN/FPS-3 Radars," 3 Feb 1950 (DOC 80)

24. ADC, Communications and Electronics Digest, "Auxiliary Search Set for the AN/CPS-6B," Jun 1951

decision was made to retain the large version of the model for areas where traffic was dense and where enemy intrusion was most likely. For areas of lesser traffic density, a reduced-scale version of this set, with fewer controller positions, was determined upon and dubbed the AN/CPS-6B(M) and later the AN/FPS-10.

By the end of 1950 it appeared that the original delivery schedules would slip considerably. By that time fourteen of the 6B sets had been delivered into the hands of AMC for eventual installation in the permanent sites. Completion of the total delivery schedule was anticipated by the end of June 1951.[25]

Although the AN/CPS-6B was theoretically the last word in ground radar development, there were some who were quite skeptical as to the ability of the set to continuously operate in the face of anticipated parts shortages and inexperience of maintenance personnel. In June 1951, Major General Frederic H. Smith Jr., Commanding General of the Eastern Air Defense Force, expressed his misgivings on this score and recommended that LASHUP equipment be redeployed to sites utilizing the AN/CPS-6B and the AN/FPS-3 as backup equipment to insure continuous operation in case of breakdown of the prime radar.[26] Unfortunately, world-wide shortages of radar equipment made this solution impossible, according to ADC, especially in view of the requirements of the

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25. Speech, Col. Haskell Neal, at ADC Commanders meeting, 15 Feb 1951

26. Smith to Whitehead, 29 Jun 1951, and Ind

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expanded ANG program.[27] Late plans, however, anticipated that sufficient quantities of a lightweight search radar, the AN/TPS-1D, would be available for backup in view of the relative inexpensiveness of this lightweight portable equipment as compared to the heavier AN/CPS-5. For height finding backup it was anticipated that the AN/TPS-10D would also be available for similar reasons.[28]

The following locations in the Permanent system were scheduled to receive the AN/CPS-6B equipment:[29]

P-1A at McChord AFB, Wash.
P-9 at Navesink, N. J.
P-10 at North Truro, Mass.
P-13 at Brunswick Naval Air Station, Me.
P-14 at Bellevue Hill, Vt.
P-20 at Selfridge AFB, Mich.
P-21 at Shawnee, N. Y.
P-30 at Mud Pond, Pa.
P-31 at Elkhorn, Wisc.
P-35 at East Farmington, Wisc.
P-38 at Mt Tamalpais, Cal.
P-34 at Empire, Mich.

The following fourteen stations were scheduled to receive the smaller version of the 6B, the AN/FPS-10:[30]

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27. Ibid.

28. Speech, Col. Haskell Neal, at ADC Commanders meeting, 15 Feb 1951

29. ADC, "Air Defense AC&W System," Jun 1951. This is part of a series of detailed charts issued monthly by ADC Hq and an excellent source of information on the status of the AC&W program.

30. Ibid.

P-15 Santa Rosa I., Cal.
P-42 Cross Mt. Tenn,
P-46 Birch Bay, Wash.
P-47 Hutchinson NAS, Kans.
P-52 Tinker AFB, Okla.
P-53 Belleville, Ind.
P-58 Mather AFB, Cal.
P-59 Atelia, Cal.
P-64 Sublette, Mo.
P-77 Bartlesville, Okla.
P-78 Duncansville, Tex.
P-79 Ellington, Tex.
P-80 Caswell, Me.
P-81 Waverley, Iowa

The distribution of the AN/CPS-6B, as indicated on the map on the following page, reveals the bulk of the deployment as falling in the industrial northeastern section of the United States, with the smaller version of this equipment occupying the central belt, with some concentration in the localities of the Seattle and California areas.

Another radar equipment which was well on the development road in the immediate post-war period was the AN/FPS-3.[31] This set was originally developed as an improvement of the AN/CPS-5, which was in extensive use during the end of the war and which was redeployed as the basic search radar in the LASHUP system. Ultimately, however, development progressed to the point where the basic system was extensively altered so that it bore little

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31. On the AN/FPS-3 radar set, see: ADC, Communications and Electronics Digest, May 1951; and, Watson Laboratories, Survey of Major USAF Ground Radars for Interim Air Defense System, 15 Jun 1949.

resemblance to the CPS-5 radar. Like the CPS-6B, the FPS-3 incorporated post-war improvements such as accelerated scanning rate, video mapping, MTI, and antenna radome as well as increase in the effective radiated power over the CPS-5.[32] Unlike the CPS-6B, however, the FPS-3 was designed as a basic early warning search radar, without the built-in height-finder which characterized the 6B set. Consequently, in order to operate as a GCI station, the FPS-3 required an auxiliary height finding radar. A joint development-production contract with the Bendix Corporation promised production of this set for sometime in the spring of 1950, but delays in production extended this target date well into 1951. A separate contract with Airborne Instruments Laboratory provided for production of the antenna.

Originally it was anticipated that 24 FPS-3 radars would be deployed in the Permanent system, but in August 1950 USAF informed ConAC that additional quantities of this set were scheduled for the Air Force, and that ultimately 49 sets would be available for air defense purposes.[33] This news occasioned a change in ConAC's plans for radar deployment. It had been planned that the CPS-5 set would be deployed on 23 Permanent sites, but the increase

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32. Ibid.

33. ConAC to USAF: "Equipments for the Permanent Aircraft Control and Warning Program," 25 Sep 1950, and Ind

in FPS-3 procurement made this unnecessary since it was now possible to use the FPS-3 for this purpose. The tardy delivery schedule for the FPS-3, however, made it necessary to consider the use of some CPS-5 sets, to be deployed on those sites destined later to receive the FPS-3, as an interim measure. As in the earlier proposal to employ the CPS-5 pending installation of the CPS-6B, this proposal was frowned upon by USAF, although in several instances exceptions to the rule were permitted.[34]

The FPS-3 promised to be of much value to the AC&W capability because of its long range characteristics. At a distance of 300 nautical miles it was anticipated that a B-29 type bomber could be spotted, while a jet fighter of the P-80 type could be picked up at 125 nautical miles, provided they were above the radar horizon. The set was also equipped with large plotting boards for tracking purposes.[35]

As planned in October 1950 the ultimate disposition of equipment in the TYPE II sites (FPS-3) of the Permanent system envisaged the use of the power FPS-6 height-finder and two backup equipments, the lightweight AN/TPS-1D and the AN/TPS-10D height-finder. Locations for these FPS-3 stations were scheduled as

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34. USAF to ConAC: "Redeployment of LASHUP Radar Equipment," 26 Oct 1950, and Ind. See also: IRS, 15 Mar 1951, in ADC AAG 413.44 (c)

35. ADC, Communications and Electronics Digest, May 1951

follows:[36]

P-2	Cambria, Cal.	P-50	Schuylerville, N. Y.
P-6	Mt. Bonaparte, Wash.	P-54	Palermo, N. J.
P-11	Yaak, Mont.	P-55	Quantico, Va.
P-12	Reedsport, Ore.	P-56	Ft. Custis, Va.
P-17	Leaf River, Minn.	P-57	Naselle, Wash.
P-18	Moulton, Minn.	P-60	Colville, Wash.
P-19	Antigo, Wisc.	P-61	Pt. Austin, Mich.
P-24	Del Bonita, Mont.	P-62	Brookfield, Ohio
P-25	Simpson, Mont.	P-63	Blue Knob Prk, Pa.
P-26	Opheim, Mont.	P-65	Charleston, Me.
P-27	Fortuna, ND	P-66	Sault Ste Marie, Mich.
P-28	Velva, ND	P-67	Ft. Custer, Mich.
P-29	Finlay, ND	P-68	Fordland, Mo.
P-32	Condon, Ore.	P-70	Belleville, Ill.
P-33	Klamath, Cal.	P-71	Omaha, Neb.
P-37	Pt. Arena, Cal.	P-72	Olathe NAS, Kans.
P-39	San Clemente Isle, Cal.	P-73	Bellefontaine, Ohio
P-40	Saddle Mt., Wash.	P-74	Madera, Cal.
P-43	Guthrie, W. Va.	P-75	Lackland AFB, Tex.
P-44	Bohokus Peak, Wash.	P-76	Mt. Laguna, Cal.
P-45	Montauk Pt., N. Y.	P-82	Ft. Knox, Ky.
P-49	Watertown, N. Y.	P-85	Hanna City, Ill.

The difficulties experienced with height finding radar in the LASHUP system motivated both ConAC and ADC to take precautions that similar difficulties would not be experienced in the Permanent system, In this respect the most important problem which faced these commands was that of gearing modern type height-finder production to the estimated delivery dates of the AN/FPS-3 long-range search radar. In view of the fact that production of the new AN/FPS-6 height finding radar was not foreseen before July 1951, there appeared a strong possibility that the many FPS-3 stations would be denied a GCI capability until FPS-6 production

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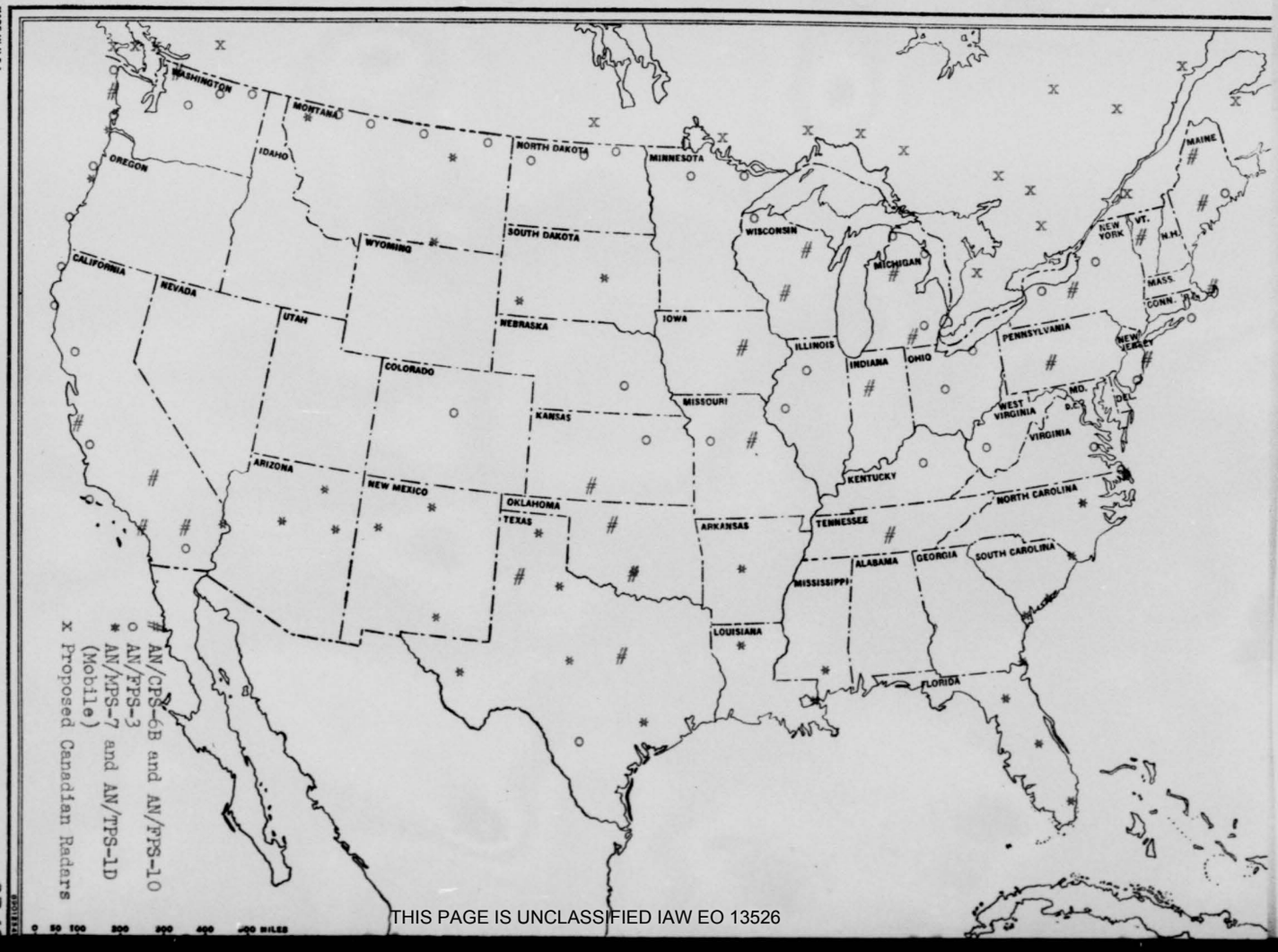
36. ADC, Chart, "Air Defense AC&W System," Jun 1951, issued by P&R

THE PERMANENT AC&W RADAR
SYSTEM AND MOBILE DEPLOYMENT
AND ADJACENT CANADIAN RADARS



MADE IN U.S.A.

THE PERMANENT AC&W RADAR SYSTEM, MOBILE DEPLOYMENT, AND ADJACENT CANADIAN RADARS

OB 10

was well underway. Although the possibility of using LASHUP height-finders in the Permanent system as a temporary measure occurred to ConAC and ADC, the fact remained that only fifteen AN/CPS-4s were available in the LASHUP system, and to destroy LASHUP GCI capability before the Permanent system was fully calibrated was a risk that was deemed far too great. The other LASHUP height-finder, the AN/TPS-10A, was totally inadequate for air defense purposes.

To counter the threat of a time lag between delivery of the FPS-3 and its companion height-finder, the FPS-6, ConAC, in May 1950, took the drastic step of suggesting that USAF intercede with the Navy in order to obtain 24 AN/MPS-4 radars in production for the Navy by Hazeltine Corporation.[37] Of this number sixteen were allotted to ConAC. By authorizing unlimited overtime for the manufacturer, it was possible to speed up delivery of this equipment so that both USAF and the Navy could be satisfied. The plans for utilization of height-finders in the Permanent system included provision for a lightweight, medium-range height-finder known as the AN/TPS-10D, of which there were 75 on order in January 1951. Plans called for the use of this radar as backup equipment at all of the sites in the Permanent system, as well as prime equipment

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37. ConAC to USAF: "Procurement of AN/MPS-4 Height Finders for the Air Defense of the United States," 25 May 1950 (DOC 81); also, AMC to USAF: "Procurement of Height Finding Radar Equipment," 26 Jun 1950 (DOC 82)

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for a few sites.[38] Thus, by ensuring that height finding equipment would be on hand to enable full calibration of the permanent stations according to schedule, a great load was lifted from the shoulders of ConAC and ADC. After delivery of the FPS-6 was completed, provision for use of the MPS-4 as height-finders for the mobile stations in the AC&W program could be made, thus endowing every station in the entire network with a GCI capability. The Permanent system was not to experience the greatest difficulty experienced by LASHUP - the inadequacy of height-finders.

III

In his briefing to Congress on the Permanent system in early 1949, General Saville had intimated that the Permanent system would be complemented in time by a number of gap-filling ground radars.[39] Shortage of ground radar equipment, and the preoccupation with construction of the Permanent system and the deployment and operation of LASHUP delayed activity on the gap-filler program, however.

In mid-1950, a requirement to provide for the security of SAC bases prompted renewed consideration of the gap-filler program. In view of the vital importance of SAC bases for the national

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38. Speech, Col. Haskell Neal, at ADC Commanders meeting, 15 Feb 1951

39. Answers to questions of the House of Representatives Committee on Armed Services, 7 Feb 1950

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security, decision was made to provide each of these installations with EW ground radar and concentrated antiaircraft artillery support. In this matter, the provision of EW capability for SAC bases was fortunately well suited to ADC plans to provide coverage for those areas not provided for by the Permanent system. In most cases SAC bases were distributed in those parts of the country where population concentration was less heavy than in the Northeast and West Coast areas, especially in the Southwest and Southeast. Early Warning radar on SAC bases would have the advantage not only of providing a measure of independence for those bases, but also of providing a measure of radar coverage for the exposed portions of the United States.

The decision to provide radar coverage for the SAC bases prompted reconsideration of an enlarged program of gap-filling radar to complete a perimeter coverage for the United States. To this end 44 mobile type radars were programmed for the soft "underbelly" of the United States, and for those areas in the north where a greater defense in depth was desired. This plan, however, ran into complications. To request additional public funds from Congress for site construction meant the inevitable delays which had attended the Permanent system. In view of the accelerated radar production since 1949, it was decided to circumvent the construction cost obstacle by deploying mobile ground radars in the desired areas and on SAC bases. Fortunately, a mobile version of

the AN/FPS-3, the AN/MPS-7, was practicable, while the Air Force had begun procurement of a lightweight and portable set known as the the AN/TPS-1D, in production for the Navy, which also was entirely adequate for gap-filler purposes. With the provision of prefabricated, movable shelters, an entirely adequate EW installation was made possible without the necessity of extensive building on the premises. By June 1951, 34 out of the 44 programmed gap-filler sites had been selected.[40] (See chart). A GCI capability was made possible for many of these mobile sites by the release of MPS-4 HFs from the Permanent system once the latter had been provided with the new FPS-6 HF.

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40. ADC, Chart, "Air Defense AC&W System," Jun 1951, issued by P&R

SECRET

PART III

FIGHTER AIRCRAFT IN AIR DEFENSE

CHAPTER SIX

FIGHTER UNITS AND AIR BASES

I

The first post-war Air Defense Command gave frequent warning that there were not enough trained and equipped fighter units in the Zone of the Interior to protect the nation against air attack. Possessed of extremely limited fighter resources of its own, ADC contracted for use of the fighter units of the other major Air Commands in the event of emergency. It also strove to organize and train the fighter units of the Air National Guard for an air defense role. But these arrangements lacked realism; the fighter units of the other major commands were too occupied with training in their primary missions to engage to any great extent in air defense training; and the ANG units were, for the most part, too poorly equipped and organized and, oftentimes, too affected by politics to inculcate confidence in the Air Defense Command concerning their M-Day capabilities.

The extent of the weakness of fighter resources for air defense in the United States during the period the air defense mission was invested in the first post-war ADC was sharply revealed by the Northwest maneuver of April 1948.[1] To insure

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1. See above, Chapter Three.

against as poor a display of fighter protection against enemy bombers as had been made against friendly attacking aircraft in the maneuver, the ADC Commander, following the maneuver, pressed the Chief of Staff to "take a firm decision to establish an air defense system and to maintain air defense in being" by assigning to ADC three of SAC's and two of TAC's fighter wings and the 36th Fighter Wing of the Caribbean Defense Command to supplement ADC's meager fighter resources.[2] In the event a direct assignment of these wings was not possible, it was recommended that they be given the secondary mission of air defense and deployed to stations whose locations would serve air defense requirements.[3]

It was late in 1948 before additional fighter resources were provided the major Air Force Command charged with the air defense mission. In December of that year, USAF Headquarters elected to increase the fighter strength of the air defense system from within its own resources, as had been suggested earlier by General Stratemeyer. This fait accompli was brought about in a slightly different manner, however, from that envisaged by the ADC Commander. A new major Air Force Command, the Continental Air Command, was formed, and the Air Defense and Tactical Air Commands were reduced from major command status to operational air commands

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2. ADC to USAF: "Air Defense of the United States," 24 Apr 1948 (DOC 30)

3. Ibid.

subordinate to this organization. The fighter units formerly possessed by ADC and TAC were reassigned to ConAC. At the same time, three of SAC's four fighter wings were reassigned to the new command.

Following the above reorganization, practically all of USAF's fighter resources in the Zone of the Interior were pooled in ConAC. Of the ten fighter wings assigned ConAC, four were the units formerly possessed by the Air Defense Command: the 14th and 78th Fighter Wings and the 52d and 325th Fighter All-weather Wings.[4] The 14th and 78th Fighter Wings each had three squadrons, and both the 52d and 325th Fighter All-weather Wings had two squadrons. With the exception of one squadron of the 325th, the squadrons of each of these units were stationed on the same base as their parent headquarters.[5] All the former ADC units retained air defense as their primary mission and were assigned fighter-escort as a secondary mission.[6]

The three fighter wings transferred from TAC to ConAC were

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4. For purposes of convenience fighter units will be discussed in terms of wing and squadron throughout this section of the history. The fighter wing is composed of four groups: air base group, maintenance and supply group, medical group, and tactical group.

5. The third squadrons of both the 52d and 325th Fighter All-weather Wings were on overseas assignment.

6. See: History of the Continental Air Command, Vol. III, "Operations and Training," 1 Dec 48 - 31 Dec 49.

the 1st, 20th, and 31st.[7] The 1st was assigned the primary mission of air defense and the secondary mission of fighter-escort. This wing was composed of three squadrons, all of them located on the same base as the wing headquarters. The other two units retained the primary mission of tactical support and were scheduled to enter into air defense operations and training when commitments to the Army were such as to free them for such activities, which, as events proved, was very seldom.

From SAC the Continental Air Command obtained the 56th, 4th, and 33d Fighter Wings. Each of these units consisted of three squadrons, all of which were stationed on the same base as their wing headquarters. The former primary mission of these units, bomber-escort, was made a secondary mission and operations and training for air defense became their primary duties.

Thus, the fighter force assigned the air defense system was more than doubled in December 1948, expanding from four wings, ten squadrons, to eight wings, 22 squadrons (excluding the 20th and 31st Fighter Wings from consideration as air defense units). This was a force considerably less than the one the Air Defense Command had asked for in 1947 to provide defense for what it called the five "most vital areas" in the nation.[8] Yet, this

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7. Certain additional units equipped with fighter type aircraft were transferred from TAC to ConAC at this time. These units never figured into the air defense structure, however.

8. ADC Staff Study, "Establishment of an Air Defense in Being," 22 Nov 46. See above, Chapter Two.

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was more fighter strength than had ever before been available in the postwar period for air defense. Possession of these units, events were to prove, enabled ConAC to embark on the program of building a fighter-interceptor force equipped with aircraft suited to air defense operations, and deployed on bases from which it could best defend critical target areas.

The above resources constituted, for the most part, ConAC's fighter strength during the two year period that command was charged with the air defense mission.[9] By making air defense the primary mission of the majority of these units, USAF served notice of its support of the thesis broached by the first Air Defense Command that in the event of hostilities air defense would be the first role the fighters stationed in the ZI would be called on to perform. At the same time, by assigning secondary missions to these same fighter units, USAF made clear that it was not ignoring fighter requirements for other combat purposes. Until additional fighter resources could be provided, the ZI fighter force was to assume the appearance of an all-purpose organization. At a later date, when aircraft especially designed for air defense operations appeared, this all-purpose fighter force concept would be abandoned. But so long as

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9. On 2 Oct 1949 the 14th Fighter Wing was deactivated. In Jul 1949, the 81st Fighter Wing was received from PAC. The 1st Fighter Wing, following its assignment to ConAC from TAC, was, in Mar 1949, reassigned to SAC. In early 1950, this unit returned to the air defense fold. The 82d Fighter Wing was reassigned from SAC to ConAC in Aug 1949 but was inactivated in October of the same year.

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an aircraft could perform fighter duties in addition to its primary duty, the crew of that aircraft was expected to be conversant with the talents required for carrying out secondary missions of either fighter-escort or fighter-bomber.

II

During the period the air defense mission resided in the Air Defense Command (March 1946-December 1948), deployment of fighters to bases from which they could best protect the nation's most critical targets was limited. The reason for this was that there were too few fighter units assigned the air defense mission to permit ADC to initiate any sort of deployment program on a large scale. In November 1948, elements of the 325th Fighter All-weather Wing were moved from Hamilton Air Force Base in California to Moses Lake Air Force Base to:[10]

> . . . plug the blind spot in the aerial defenses in the Northwestern United States and to further the protection of the Atomic Energy Commission's plants located on the outskirts of Richland and Pasco, Washington, the Boeing Airplane Factory at Seattle, plus that of the many power dams (Grand Coulee, Rock Island, etc) providing electricity for industry and irrigation for reclamation and farming in this state.

The need for all-weather fighters in the Northwest had been revealed by the April 1948 maneuver in that area. Following that exercise ADC had recommended to USAF that the ADC "be given the

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10. See: History of Fourth Air Force, 1 Jan - 30 Nov 1948, Part 2, p. 25.

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right of entry into Moses Lake Air Force Base on a tenancy basis . . . " to permit immediate movement of the 325th Fighter All-weather Wing to that base.[11] USAF, however, rejected this request on the ground that "utilization of Moses Lake Air Force Base [could not be effected at that time] due to the lack of jet fuel and to the inability of the Air Materiel Command to provide the necessary base services."[12] A storm of protest greeted this reply when it arrived in ADC Headquarters. "We cannot accept [this] reply as a final answer. To do so would be to accept that a defense in being is not possible of achievement," the Deputy of Operations of ADC Headquarters stated.[13] As noted above, ADC finally succeeded in placing the 325th on the Moses Lake base, but it took six months to accomplish the move.[14]

Concurrent with the move of the 325th to Moses Lake, the 78th Fighter Wing then at record strength was transferred from Mitchel Field to Hamilton Field in California and there equipped to three squadron strength to fill the void created by the departure of the 325th. That left the 14th Fighter Wing at Dow Field,

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11. ADC to USAF: "Status of Continental Air Defense," 15 Apr 1948 (DOC 28)

12. Ibid., 1st Ind, USAF to ADC (DOC 28)

13. IRS, DO to DAD, 13 May 1948 (DOC 28)

14. The wing headquarters and one squadron were located at Moses Lake AFB. At the same time, the 318th Squadron of the 325th Wing was located at McChord Field.

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Maine, and the 52d Fighter All-weather Wing on Mitchel Field on Long Island to provide fighter protection for the East Coast. While ADC made plans for extensive deployment of all fighter units in the ZI, regular as well as reserve, in the event of hostilities,[15] the above moves constituted the extent of actual deployment of fighter units for air defense during ADC's two and one-half years of existence.

Under ConAC, deployment of fighter units for greater air defense protection commenced slowly. In November 1949, ConAC, perturbed over the difficulty the 25th Air Division was having meeting its responsibilities for intercepting unidentified aircraft over the Northwest area,[16] informed USAF Headquarters that it was "essential to Northwest Air Defense . . . that fighter units be disposed both east and west of the Cascade Range."[17] With USAF's permission, ConAC set out to rectify this problem. In April 1950, the 81st Fighter Wing at Kirtland Air Force Base in New Mexico was moved to Moses Lake. To ensure the continued protection of atomic energy installations in New Mexico, the 81st left one of its squadrons behind at Kirtland. At the same time,

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15. ADC to C/S USAF: "Survey of Naval Air Stations for Possible Location of Air Defense Units," 31 Mar 1948 (DOC 83)

16. WADF to ConAC: "Jet Aircraft for the 25th Air Division Area," 27 Dec 1949 (DOC 84)

17. ConAC to C/S USAF: "Realignment of the Northwest Air Defense System," 2 Nov 1949 (DOC 85)

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the 325th Wing Headquarters and one of its squadrons was moved from Moses Lake to McChord. The 319th squadron of the 325th, which had returned from overseas in July 1949, remained at Moses Lake to afford all-weather protection for the area east of the Cascade Mountains.

Separation of squadrons from their parent wing headquarters in this manner complicated somewhat the logistical support of the squadrons.[18] However, this type of deployment procedure enabled ConAC to strengthen the Northwest defenses and, at the same time, did not deprive the atomic energy installations in New Mexico of fighter protection. Deployment by squadron was soon destined to become the rule rather than the exception.

III

In April 1950 the Commanding General of the Eastern Air Defense Force, Major General R. M. Webster, requested permission to move the Fourth Fighter Wing up from Andrews Field in Washington D. C. to either Rome or Pine Camp airdromes in New York to strengthen EADF's defenses in the Northeast area.[19] ConAC refused this request but at the same time made known that it had a plan before USAF which, if "bought" by the latter headquarters, would permit ConAC to deploy fighter squadrons on a large scale

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18. USAF to ConAC: "Planned Organization of the 93d Fighter-Interceptor Squadron," 1 Mar 1950, and 1st Ind, ConAC to USAF, 16 Mar 1950 (DOC 86)

19. EADF to ConAC: "Effective Employment of the 4th Fighter Wing in Active Defense," 11 Apr 1950 (DOC 87)

to bases separate from the stations on which their wing headquarters were located. The intent of the plan was to plug just such gaps in the continental air defenses as existed in the EADF area.[20]

The above proposal called for the immediate deployment of the 23 squadrons which ConAC possessed over the following fourteen bases: McChord, Larson, Kirtland, McGuire, Otis, Selfridge, Hamilton, George, Griffis, Westover, O'Hare, Andrews, New Castle, and Dover. Additionally, it made provisions for the further deployment of ConAC's 23 squadrons to Suffolk County, Niagara, and Greater Pittsburgh, and McGhee-Tyson Municipal Airports and Paine Field and Oxnard Flight Strip as soon as arrangements could be made and facilities rehabilitated to permit occupation of these sites by jet fighter aircraft units.[21]

The plan also made provisions for the deployment of the fighter squadrons ConAC had been informed it would receive as a result of the USAF expansion programs. Under the terms of the 58-wing Air Force, ConAC was to receive four additional fighter wings, or twelve squadrons, which added to the 23 squadrons already assigned ConAC would make for a total of 35 squadrons in the air defense system. These squadrons ConAC planned to deploy onto 30 bases. Under the 69-wing Air Force plan, the fighter-interceptor

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20. Ibid., 1st Ind, ConAC to EADF, 28 Apr 1950 (DOC 87)

21. ConAC to C/S USAF: "Plan for Separate Deployment of Interceptor Forces," 4 Jul 1950

force was to consist of 48 squadrons. ConAC listed 40 bases onto which these 48 squadrons would be deployed. Finally, when the USAF reached 95-wing strength, scheduled for sometime in 1953, the air defense fighter force was to total 61 squadrons deployed onto 52 bases.

The 61-squadron, 52-base structure was established as the final fighter-interceptor force expansion and deployment figure in the "Package Plan," the program for ConAC's phased establishment of radar and fighter facilities for air defense.

By mid-1950, the 23 squadron portion of the above deployment plan had been concurred in by USAF, with minor modification,[22] and higher headquarters had informed that action was underway to secure the sanction of the Joint Chiefs of Staff on the 61-squadron, 52-base program which ConAC had recommended be the fighter plan for air defense under the 95-wing Air Force.[23]

IV

Shortly after USAF confirmed ConAC's plan to deploy its 23 squadrons to fourteen bases and gave the go-ahead signal on that project, war broke out in Korea. Immediately, ConAC recommended that the fighter-interceptor force be strengthened beyond the 23 squadron figure. According to the time-schedule of the

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22. TWX, USAF to SAC, MATS, and Hq CMD, Jul 1950 (DOC 88)

23. ConAC to C/S USAF: "Immediate Redeployment of Interceptor Fighter Forces," 4 Jul 1950 and 1st Ind, USAF to ConAC, 17 Jul 1950 (DOC 89)

58-wing USAF Expansion Program, the air defense system was to have 35 squadrons by the end of June 1951. This was to be accomplished by the activation of four regular fighter-interceptor units.[24] However, this was too slow an augmentation, ConAC considered, when at any moment the war in Korea might break out into a world-wide conflict.

In a letter to the Chief of Staff, USAF, in July 1950, General Thatcher, Deputy for Operations, Headquarters ConAC, expressed the concern of ConAC over the relatively weak fighter-interceptor force assigned the air defense system and requested that higher headquarters take action to federalize twenty Air National Guard squadrons and assign them to ConAC. "The capabilities of the Continental Air Command to provide an active air defense [could] be greatly strengthened by the call to active duty of . . . these squadrons at their home stations . . ." General Thatcher stated.[25]

Higher headquarters did not endorse this first request of ConAC for strengthening the air defense system by recalling squadrons of the ANG. USAF felt that the deployment of ConAC's 23 squadrons, and the scheduled increase of the fighter-interceptor force by four wings during fiscal year 1951 and the deployment of these squadrons to bases from which they could provide maximum

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24. USAF to ConAC: "Air Base Requirements for FEAF Augmentation and 58 Wing Program," 7 Aug 1950 (DOC 90).

25. General Thatcher to C/S USAF: "Air Defense Augmentation," 15 Jul 1950 (DOC 91)

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protection to the nation were sufficient preparations at that time to ensure the maintenance of the air defense system.[26]

As the Korean conflict increased in intensity, greater demands were made on the Air Force at home in support of FEAF operations. In November 1950, the air defense system was seriously weakened in the Baltimore-Washington-Philadelphia area when the 4th Fighter-Interceptor Wing was assigned to FEAF on TDY for combat in Korea. As a consequence, ConAC reiterated its request to USAF for federalization of certain ANG fighter units to augment the air defense system until additional regular fighter resources were activated. This time, USAF was receptive to the proposal.

In December, in a letter bearing the signature of General Whitehead, ConAC forwarded USAF a roster of fifteen Air National Guard fighter squadrons which were stationed on bases listed among the stations scheduled for housing air defense fighter squadrons in the 52-base "Package Plan." ConAC requested that these units be federalized immediately since they could be fitted without delay into the fighter-interceptor defenses. An additional list was furnished of 23 ANG squadrons which were operational to the degree that they could immediately strengthen the air defense system. Since these latter squadrons were not located on bases included within the permanent fighter base plans, however, it was suggested that federalization of these units be delayed until

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26. Ibid., 1st Ind, USAF to ConAC, 1 Aug 1950 (DOC 91)

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additional permanent bases could be readied for occupancy by these units.[27]

Higher headquarters approved the above presentation and action was commenced for federalizing the fifteen ANG squadrons which were located on bases scheduled for permanent retention in the fighter-interceptor program. It was not intended that federalization of these units would take the place of regular Air Force units scheduled for activation and assignment to the air defense system under the terms of the USAF Expansion Program. The build-up of regular units was to continue concurrently with the training of the federalized ANG fighter units and as rapidly as possible. Activation of the ANG squadrons would "buy time" until additional regular fighter-interceptor squadrons could take their places on the line.

V

On 1 January 1951 the Air Defense Command was reestablished as a major Air Force Command and the air defense mission reassigned from ConAC to the new organization. At the same time, the fighter-interceptor wings formerly assigned ConAC were transferred to ADC.

ADC inherited eight fighter-interceptor wings from ConAC, totalling 23 fighter squadrons. These were the 1st, 4th, 33d, 52d, 56th, 78th, 81st and 325th Wings. Of these units, all but the 4th

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27. ConAC to C/S USAF: "Use of Air National Guard Units in the Air Defense of the United States," 6 Dec 1950 (DOC 92)

were available to the ADC for air defense purposes during the first six months of 1951; that wing with its three fighter squadrons was, as has been noted, assigned to temporary duty with FEAF. Location of the remaining twenty squadrons and their wing headquarters on 1 January 1951 is shown on the map which follows.

By the end of June 1951, the ADC's fighter strength had increased to fifteen wings, or to a total of 44 squadrons. This increase was brought about by the activation in January 1951 of a new regular fighter-interceptor wing, the 23rd at Presque Isle, Maine,[28] and the federalization of 21 Air National Guard squadrons, fifteen of which were called to active duty in February and six in March.

The fifteen ANG fighter squadrons and the four ANG fighter wing headquarters federalized in February 1951 and their locations at the time of federalization were as follows:[29]

Unit	Base At Which Federalized
101st Fighter Wing, Hqs	Dow AFB, Bangor, Maine
132d Fighter Squadron	Dow AFB, Bangor, Maine
133d " "	Grenier AFB, Manchester, N.H.
134th " "	Burlington Municipal Airport, Vt.
113th Fighter Wing, Hqs	Andrews AFB, Washington D. C.
148th Fighter Squadron	Reading Municipal Airport, Penns.
121st " "	Andrews AFB, Washington D. C.
142d " "	New Castle County Airport, Del.

28. Hq EADF G. O. #3, 9 Jan 1951

29. ADC G. O. #13, 6 Feb 1951

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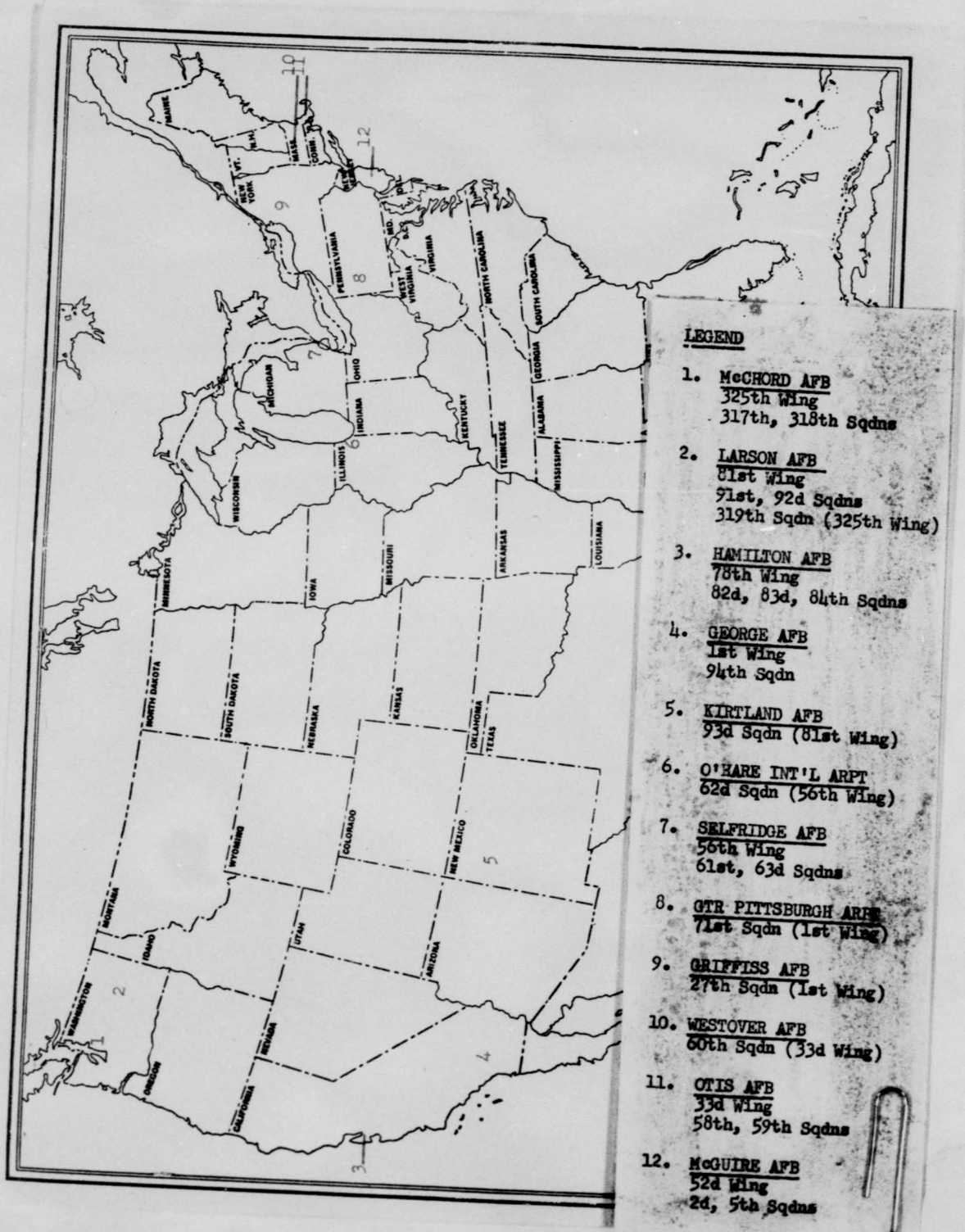
FIGHTER-INTERCEPTOR SQUADRON DEPLOYMENT
(January 1951)



LEGEND

1. McCHORD AFB
   325th Wing
   317th, 318th Sqdns
2. LARSON AFB
   81st Wing
   91st, 92d Sqdns
   319th Sqdn (325th Wing)
3. HAMILTON AFB
   78th Wing
   82d, 83d, 84th Sqdns
4. GEORGE AFB
   1st Wing
   94th Sqdn
5. KIRTLAND AFB
   93d Sqdn (81st Wing)
6. O'HARE INT'L ARPT
   62d Sqdn (56th Wing)
7. SELFRIDGE AFB
   56th Wing
   61st, 63d Sqdns
8. GTR PITTSBURGH ARPT
   171st Sqdn (1st Wing)
9. GRIFFISS AFB
   27th Sqdn (1st Wing)
10. WESTOVER AFB
    60th Sqdn (33d Wing)
11. OTIS AFB
    33d Wing
    58th, 59th Sqdns
12. McGUIRE AFB
    52d Wing
    2d, 5th Sqdns

Unit	Base At Which Federalized
122d Fighter Wing, Hqs	Stout Fld., Indianapolis, Ind.
113th Fighter Squadron	Stout Fld., Indianapolis, Ind.
163d " "	Baer Fld., Ft. Wayne, Ind.
166th " "	Lockbourne AFB, Columbus, Ohio
128th Fighter Wing, Hqs	Gen. Mitchell Fld., Milwaukee, Wisc.
176th Fighter Squadron	Truax Fld., Madison, Wisc.
172d " "	Kellogg Fld., Battle Creek, Mich.
118th Fighter Squadron	Bradley Fld., Windsor Locks, Conn.
116th " "	Geiger Fld., Spokane, Wash.
123d " "	Portland Airport, Portland, Ore.
188th " "	Kirtland AFB, Albuquerque, N. M.

The three Air National Guard fighter wings and the six ANG squadrons federalized in March 1951 and the bases at which they were federalized were:[30]

Unit	Base At Which Federalized
103d Fighter Wing, Hqs	Brainard Fld., Hartford, Conn.
142d Fighter Wing, Hqs	Geiger Fld., Washington
133d Fighter Wing, Hqs	Holman Fld., St. Paul, Minn.
175th Fighter Squadron	Municipal Airport, Sioux Falls, S. D.
109th " "	Holman Fld., St. Paul, Minn.
179th " "	Municipal Airport, Duluth, Minn.
126th Fighter Squadron	Gen. Mitchell Fld., Milwaukee, Wisc.
105th " "	Berry Fld., Nashville, Tenn.
136th " "	Niagara Municipal Airport, N. Y.

Almost immediately after federalization of the above units, a regrouping of squadrons under wing headquarters other than the ones to which they had been assigned while under state control began. At this time a new word crept into ADC's organizational

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30. ADC G. O. #21, 2 Mar 1951

vocabulary: ANG squadrons placed under regular Air Force wing headquarters and regular Air Force squadrons placed under ANG wing headquarters were considered as "attached" to those wings even though the latter wings assumed administrative, logistical, and operational control over these squadrons. In other words, while the "attached" squadron was considered an integral member of the wing under which it was grouped for air defense, that squadron was at the same time considered as remaining organically a component of the wing of which it had been a part prior to the federalization of the ANG units. To eliminate this schizophrenic situation ADC Headquarters sought permission from higher headquarters to directly assign ANG squadrons to the regular Air Force wings under which they operated for air defense and to directly assign the regular Air Force squadrons "attached" to ANG wings to those wings, but, as of the end of June 1951, this request had not been approved. The objection to ADC's carrying out this reassignment appeared to be that such action would destroy the historical continuity of World War II combat relations between certain squadrons and groups. Organization charts in Part IV illustrate the extent of the somewhat confusing organizational structure which existed in the fighter-interceptor program at the end of June 1951.

The Air National Guard squadrons federalized in the first half of 1951 did not immediately assume an air defense capability

commensurate with that of the regular Air Force squadrons who for the past two years, under ConAC's tutelage, had engaged in air defense operations and training. They first ran through an intensive 120-day training and organization period. This was necessary, for the majority of the ANG pilots were not "checked out" in jet aircraft and even those units equipped with jet F-84s were not sufficiently versed in ground controlled interception procedures to permit them to assume immediately an air defense role.

With these units in its possession, however, ADC could and did proceed full-speed ahead with its programmed fighter conversion and deployment programs.

VI

In January 1951 USAF Headquarters published SEEDCORN, a document setting forth the programmed expansion of the major Air Force commands in accordance with the overall expansion of USAF. According to this program guide, ADC was scheduled to possess 45 squadrons at the end of fiscal year 1951.[31] These squadrons were to be deployed onto 39 of the permanent bases included in the 52-base "Package Plan."

The activation of the 21 ANG squadrons made it possible for ADC to reach 44 squadron strength by the end of June. However, ADC was not able to place each of these squadrons onto its

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31. Hqs ADC, Current Planning Activities Report 1-51, 22 Jan 1951

permanent base. ADC fighter squadrons were located on 34 bases at the end of June: but twelve squadrons were located on interim bases, some of which were temporary bases, others of which were included in permanent bases plans. It was estimated in early 1951 that work on most of the permanent bases would be completed late in that year.[32] However, planning estimates at the end of June 1951 were that it would be late in 1952 before all the fighter squadrons would be situated on a permanent base.[33]

The 39 bases scheduled in January 1951 for occupation by fighter-interceptor units at the end of June and the number of fighter elements to be stationed on each base were:[34]

Base	F-I Deployment	Base	F-I Deployment
Westover	0/1	Presque Isle	1/1
Otis	1/2	Rapid City	0/1
McGuire	1/2	Geiger	0/1
Andrews	0/1	Oscoda	0/1
Dover	0/1	Wright-Patterson	0/1
New Castle	1/1	Suffolk County	1/1
Selfridge	1/1	Youngstown	0/1
O'Hare	1/1	Burlington (Vt)	0/1
Kirtland	0/1	Hanscom	0/1
George	1/1	Langley	0/1
Niagara	0/1	Offutt	0/1

32. ADC to EADF: "Facilities for Federalized Air National Guard Units," 5 Jan 1951 (DOC 93)

33. Air Defense Fighter Interceptor Program, 1 Jul 1951

34. Hqs ADC, Current Planning Activities Report, 22 Jan 1951. In explanation of the cryptic code employed under F-I Deployment: the figure in front of the slash-mark indicates the number of wing headquarters at the base; the figure behind the slash-mark indicates the number of fighter squadrons to be stationed on the base.

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Base	F-I Deployment	Base	F-I Deployment
Greater Pittsburgh	1/1	Wichita	1/1
McGhee-Tyson	0/1	Oxnard	0/1
Truax	1/2	Paine	0/1
Duluth	0/1	Scott	0/1
Wold-Chamberlain	1/1	Kinross	0/1
Hamilton	1/2	NAS Hensley	0/1
McChord	1/2	Portland, Ore.	0/1
Larson	1/2	Travis	0/1
Griffis	0/1		

Several changes were made in the above plan in the six month period following its publication. In several instances, USAF suggested that bases on which facilities were already existent be substituted for bases scheduled in permanent fighter base plans at which extensive rehabilitation would have to be made in order to ensure effective fighter-interceptor operations. In other instances, certain of the bases originally selected were subsequently found to be crowded, and less crowded stations were substituted for them in the permanent base plans. During the whole of the first six months of 1951, Air Defense Command installation officers devoted unceasing study to the matter of selecting permanent fighter-interceptor bases. The tactical advantages the location of a site afforded, the ability of a base to support jet fighter operations, and the cost of construction and rehabilitation were the major criteria by which bases were considered as permanent stations for fighter-interceptor units.[35]

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35. The best documents illustrative of these changes in the programming of bases for permanent occupancy by fighter-interceptor units were the monthly Fighter-Interceptor Program charts, prepared by Hqs ADC Operations and sent to all elements of ADC for information purposes and for planning guides.

FIGHTER-INTERCEPTOR SQUADRON DEPLOYMENT
(June 1951)

ADC FIGHTER SQUADRON DEPLOYMENT AS OF 30 JUN 51

1st	George AFB, Cal.	94th					27th 71st	Griffiss AFB, NY. Gtr Pitt Aprt, Pa		188th	Long Beach M/A, Cal
23rd	Presque Isle AFB, Me	74th	75th							134th	Burlington M/A, Vt.
33rd	Otis AFB, Mass.	58th	59th		60th	Westover AFB, Mass					
52nd	McGuire AFB, NJ	2nd	5th							105th	Berry Fld, Tenn.
56th	Selfridge AFB, Mich	61st			63rd	Oscoda AFB, Mich.	62nd	O'Hare Aprt, Ill.	172nd		
78th	Hamilton AFB, Cal.	82nd	83rd	84th							
81st	Larson AFB, Wash.	91st	92nd				93rd	Kirtland AFB, NM		116th	Geiger Fld, Wash.
101st	Grenier AFB, NH	133rd			132nd 136th	Dow AFB, Me. Niagra Falls, NY	134th	Burlington M/A, Vt		27th 71st	Griffiss AFB, NY Gtr Pitt Aprt, Pa.
103rd	Suffolk Co/Aprt, NY	118th									
113th	New Castle, Del.	142nd			121st 148th	Andrews AFB, Md. Dover AFB, Del.					
122nd	Baer Fld, Ind.	163rd			113th 166th	Scott AFB, Ill. Lockbourne AFB, O.					
128th	Truax Fld, Wis.	126th	176th				172nd	Selfridge AFB, M.			
133rd	St. Paul, Minn.	109th			175th 179th	Sioux Falls, SD Duluth Aprt, Minn.					
142nd	O'Hare Aprt, Ill.								62nd	97th	Wri-Patt AFB, Ohio
325th	McChord AFB. Wash.	317th	318th		319th	Larson AFB, Wash.				123rd	Portland M/A, Ore.
							97th	Wri-Patt AFB, O.			
							105th	Berry Fld, Tenn.			
							116th	Geiger Fld, Wash.			
							123rd	Portland M/A, Ore.			
							188th	Kirtland AFB, NM	93rd a/		

The actual location of fighter wing headquarters and fighter squadrons at the end of June 1951 was as follows:[36]

Base	F-I Deployment	Base	F-I Deployment
McChord	1/2	Wright-Patterson	0/1
Portland, Ore.	0/1	McGuire	1/2
Larson	1/3	Nashville	0/1
Geiger	0/1	Grenier	1/1
Hamilton	1/3	Dow	0/1
George	1/1	Niagara	0/1
Kirtland	0/1	Presque Isle	1/2
Long Beach	0/1	Burlington	0/1
Baer	1/1	Otis	1/2
Lockbourne	0/1	Westover	0/1
Wold-Chamberlain	1/1	Suffolk	1/1
Sioux Falls	0/1	Griffis	0/1
Duluth	0/1	Pittsburgh	0/1
Truax	1/2	New Castle	1/1
Selfridge	1/2	Andrews	0/1
Oscoda	0/1	Dover	0/1
O'Hare	1/1	Scott	0/1

The squadrons located at Long Beach, Baer, Lockbourne, Sioux Falls, Nashville, Dow and Grenier were scheduled for ultimate redeployment to Oxnard, Grandview, Youngstown, Rapid City, McGhee-Tyson, Langley and Bedford air bases. Additionally, squadrons sharing permanent bases with other squadrons at the close of the period were to be ultimately relocated on the following bases: Paine, Travis, Kinross, and Offutt. One of the squadrons at Hamilton Field was also scheduled for eventual redeployment to Geiger, increasing the strength at the latter base to two squadrons.[37]

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36. Air Defense Fighter Interceptor Program, 1 Jul 1951

37. Ibid. The 449th Fighter-Interceptor Wing, assigned to the Alaskan Air Command, was scheduled for reassignment to ADC and deployment to Hensley Naval Air Station in February 1952.

Air National Guard units reporting to active duty at bases other than those listed in the "Package Plan" were provided only the minimum facilities they required for operations. The facilities provided at these bases were, for the most part, those which the ANG units formerly occupied plus sufficient additional barrack space to house the men not living within reasonable driving distance, and whatever additional mess facilities they required. Air National Guard units federalized at stations included in the permanent fighter base program were provided additional barrack and mess space immediately to ensure operations. At the same time, work went forward as rapidly as possible to provide them with complete facilities.[38]

VII

The ADC's fighter base construction program during the first six months of 1951 was only a part of a tremendous USAF expansion program nation-wide. While the 61-squadron, 52-base, fighter-interceptor expansion program was the goal on which ADC had set its sights, there was really no way for ADC to know precisely what size its fighter-interceptor force would eventually attain. This was only natural since USAF itself was not certain how large it would ultimately grow. There were rumors at the end of the period that USAF would have to have 163 groups or more if

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38. ADC to EADF: "Facilities for Federalized Air National Guard Units," 5 Jan 1951 (DOC 93)

it was to be equipped to perform the tasks that would come its way in the event of hostilities.

In consideration of the fact that it might increase in size far beyond the programmed 95-wing structure, USAF constantly stressed to its major subordinate commands the necessity for the maintenance of flexible plans for development of bases.[39] And because of the great necessity for conserving funds against the requirement for even greater expansion, it was absolutely mandatory that every precaution be taken against wastage in rehabilitation and construction programs. Consequently, during this period, "no frills, adornment, decorative refinements, elaborate recreational facilities,"[40] or other non-operational construction appeared in ADC's or the other major commands' expansion programs. The replacement of existing facilities was limited to those whose retention would have resulted in making operation cumbersome or which would have created unhealthy living and working conditions and excessive maintenance costs.[41]

General Vandenberg stated clearly the problems inherent in the great expansion project the Air Force would be engaged in

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39. USAF to ADC: "Supplemental Planning Data on Bases Included in Initial Increment of Proposed Air Force Expansion Program," 15 Jan 1951 (DOC 94)

40. TWX, ADC to Defense Forces, 1 Mar 1951, repeating a message received from USAF (DOC 95)

41. Ibid.

implementing during the remainder of 1951 and during 1952. USAF was going ahead, General Vandenberg said, with the 95-wing program as the Air Force objective. All planning and action was to be geared to this concept and any barriers that impeded the attainment of an Air Force of this size were to be immediately attacked. The following problems were those selected as contributing most to delays in the USAF construction program during the first half of 1951:[42]

Lag in developing criteria for non-standard projects;
Unwillingness to accept standard and preliminary plans without extensive and frequently non-essential refinements;
Unnecessary changes in master plans to incorporate refinements;
Delays in selecting sites;
Placing conflicting and confusing requests on District Engineers;
Attempting to enlarge project scopes or deviate from authorized construction programs.

Elimination of these snags from the overall USAF construction program portended to be a major task for ADC and the other major Air Force Commands in the ZI for the remainder of 1951 and until the USAF had reached combat strength.

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42. TWX, personal from General Vandenberg, 31 Mar 1951 (DOC 96)

CHAPTER SEVEN

AIRCRAFT FOR AIR DEFENSE

I

The fighter aircraft is the "mailed fist" of the air defense system. One day our scientists may evolve a pilotless projectile capable of intercepting and destroying invading enemy bombers. As to when such a lethal weapon will appear, however, no one knows. Consequently, the hopes of the United States at the present time for escaping annihilation as a result of a concerted atomic attack from the air appear to be irrevocably invested in the successful establishment of a powerful fighter interceptor force.

The experts on strategic bombing, the Strategic Air Command, have expressed their concurrence in the thesis that the enemy will strike at night with his bombers or during periods of inclement weather.[1] At least, were SAC to be ordered on the offensive it would choose these conditions to dispatch its own bombers to minimize the extent of enemy interceptor capabilities; there is no reason to assume that the enemy will be less prepared to apply the same tactics.

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1. Major General Thomas S. Power, Deputy Commander, SAC, to Brigadier General Herbert B. Thatcher, Deputy for Operations, ConAC, 10 Nov 1949 (DOC 97)

Spurred on by the above dire prediction, the Air Force commands entrusted with the air defense of the United States in the post World War II era have pressed for arming the fighter interceptor units with all-weather aircraft -- jet aircraft equipped with adequate electronic, anti-icing, and other equipment to enable them to operate on a 24 hour schedule regardless of climactic conditions.

Until 1950 these pleas went totally unheeded so far as actual assignment of all-weather aircraft or even a competent night performer, to the fighter interceptor units was concerned. This does not say that higher authority was unaware of this need or that all-weather aircraft were not in the process of development prior to this date. Sufficient funds just were not provided to permit USAF to initiate large-scale production of all-weather aircraft and to step-up research, development, and production of the intricate radar equipment so essential to all-weather fighter operations.

During the period March 1946 - October 1950, the fighter interceptor units were equipped with (1) World War II vintage night fighters, conventional aircraft[2] outfitted with a modicum of electronic aids, and (2) non-electronic equipped jet and standard engine airplanes which could be used during hours of daylight only.

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2. As used throughout this chapter the term "conventional aircraft" denotes propellor type airplane, in contradistinction to jet propelled aircraft.

Late in 1950, through a little technological slight-of-hand, a jet model aircraft was rigged with radar equipment and put into use as a night fighter. By June 1951, the conventional night fighters had been displaced by the new model; by that date, also, two additional squadrons had transitioned from their non-electronic equipped jet fighters to the new jet night fighter. The preponderance of the aircraft in the air defense system at the close of June 1951, however, still did not possess night fighting capabilities.

Consequently, throughout the entire post-war period the concept of a dual fighter interceptor force, one for day and one for night and foul weather operations, obtained. Available night fighters were located in the areas where muggy weather prevailed the majority of the time and where the operational capabilities of the strictly day fighters would be reduced to a minimum in the event of an attack. Of course, experiments were made to analyse the possibilities of utilizing day fighters for night and inclement weather operations in case of an emergency. Data obtained from these tests would have undoubtedly proved beneficial had the non-electronically equipped aircraft been forced into service as night and all-weather fighters; however, the results were not conducive to an optimistic evaluation of the merit of day fighters for use at other times.[3] All in all, the post-war period has been

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3. For information on this subject see the following: ADC to WADF, "Night Interceptions by Day Fighters", [Jan] 1951; and Memo from the 52d F-I Gp Operations Officer to his Commanding Officer, "Evaluation of Night Interception by Day Fighters," 17 Jan 1951. (DOC 98)

one of trepidation from the standpoint of the adequacy of fighter interceptor resources.[4] Had the enemy struck at any time prior to the completion date of this history with modern bombers and at a time when the day fighter force could not have operated, there would have been little chance of turning him from his target.

II

While a truly adequate all-weather fighter interceptor was never assigned the air defense system during the period March 1946 through June 1951, the quality of aircraft which were utilized for air defense did perceptively improve. Perhaps the best way to illustrate this favorable advance would be to recount briefly the several types of aircraft assigned the air defense system during the post-war period and the individual success of these airplanes as fighter interceptors.

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4. General Whitehead summarized the combat readiness status of ConAC fighter units in July 1949 as follows: "As of 30 June 1949 only 10 Groups of the 53 in United States Air Force had a combat effectiveness of 80% or more. Of these 10 Groups, 5 were in FEAF, 4 were in SAC, and 1 was in Alaska. There were none in ConAC". Reason for ConAC's poor showing were: "The two F-82 Groups have had a rough time from the supply and maintainence standpoint. The transition of all ConAC fighter groups from conventional to jet fighters before jet fighters were available in sufficient quantity to fully equip these groups has been another contributing factor. Turnover of personnel has interferred. The above for the most part were beyond the control of ConAC excepting the decisions made late in 1948 to convert to jets before they knew whether or not sufficient jet fighters would be available. [General Whitehead to Major General John E. Upston, CG 4th AF, 26 July 1949 (DOC 99)]

The 14th Fighter Wing was initially equipped with F-47 "Thunderbolts". In November 1947, this unit transitioned into F-84s, becoming the first post-war unit to be equipped with this type aircraft and the "guinea pig" of the Air Force in experimentation to learn its fighter potentialities. The 325th and 52d Fighter-All-weather Wings were equipped with P-61s initially, the twin fuselaged, propeller driven aircraft known as "Black Widows" by World War II fighter pilots. The remaining fighter wing assigned the first post-war Air Defense Command, the 78th, was equipped with F-84s at the time of its activation. These were the type fighter planes assigned the air defense mission from March 1946 through November 1948.

While the above models of airplanes, excluding the F-84, had earned staunch approbations for their performance during World War II, they were definitely not the type of airplanes to be assigned a fighter interception mission. The minimum requisites of a fighter interceptor, air defense leaders pointed out time and again, had to be (1) a high rate of speed, particularly on the climb and in closing with the enemy, and (2) an all-weather capability. Each of the above type aircraft fell far short of satisfying these needs.

The inadequacy of the aircraft then available for air defense was well demonstrated in the Northwest maneuver in May 1948. It will be recalled that during this maneuver the 27th Fighter

Wing of SAC, flying F-51s, had participated, as had F-61s of the 325th Fighter All-weather Wing and F-80s of the 71st Fighter Squadron of the 1st Fighter Wing, then assigned to TAC.[5] In analysing this maneuver, General Upston, Commander of the 4th Air Force, reported to General Stratemeyer as follows:[6]

> The limitations of the defensive fighters in adverse weather conditions were emphasized during the maneuver. The P-61 fighter is of no practical value. Its speed and altitude limitations make it ineffective against today's bombers Deficiencies in electronic equipment, both ground and airborne, along with the inexperience of operators and pilots, further limited the effectiveness of the P-61 under adverse weather conditions in the mountainous terrain. The P-80s were not equipped to penetrate an overcast. Replacement of instruments to relieve this limitation is in progress. The ground controller could not pick-up, track, and direct a P-80 with sucess . . . The operation of the P-51s was hindered by adverse weather in the mountainous terrain. These points have emphasized the need for modern all-weather fighter aircraft in this area.

Thus, the principal criticism of fighter interceptor capabilities for air defense emanating from this maneuver was that F-61s were not fast enough for night fighter operations and that F-80s, while adequate from the standpoint of speed, were hamstrung in their operations by the fact that they had no radar equipment for night and all-weather fighter operations. This was a condition that continued unabated until late 1950: the only type of aircraft really suited for interceptor operations were jets,

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5. See Chapter Four, LASHUP.

6. Major General Upston to General Whitehead, "Report on Maneuvers", 27 May 1948. See History of 4th AF, 1948 Part II, Appendix III.

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but the jet models available were not electronically and otherwise rigged for night and all-weather flying.

The formation of ConAC witnessed the assignment of F-80s,[7] the first American jet propelled fighters to become operational, directly to the air defense system. During 1949, this airplane put in more flying hours than any other type of aircraft assigned to the command. Because of the long period this plane had been in use, most of the "bugs" had been worked out of it prior to its advent into the air defense system. It was an excellent aircraft from the standpoint of simplicity of design, ruggedness of construction, and ease of maintenance. With a speed of approximately 575 miles per hour and an extreme ceiling of 45,000 feet, it was a reliable performer. It remained, of course, strictly a day fighter because it did not carry radar equipment.[8]

The F-84 was the second most used aircraft in the air defense system during 1949. As a fighter-bomber this plane gave a good account of itself; as a fighter interceptor, however, it had serious shortcomings. Additionally, it had many structural defects, particularly in the wing areas, which gave great maintenance

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7. For a brief but excellent description of USAF fighter aircraft, both interceptor and fighter-bomber, see the article "Modern Weapons in Today's Air Force", by Major General David M. Schlatter, CG Research and Development Command, which appeared in the August 1951 edition of the Army Information Digest.

8. The volumes on Supply and Maintenance in the 1949 and 1 Jan-30 Jun Histories of ConAC contain detailed information on the fighter aircraft utilized for air defense during those periods.

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difficulties and restricted use of these planes on many occasions.[9]

During the latter part of 1949, the first North American F-86 Sabre Jets were assigned the fighter interceptor units. This airplane, with a top speed of approximately 670 miles per hour, and the ability to climb rapidly and operate safely at a ceiling between 50,000 and 60,000 feet, soon proved itself the best interceptor yet developed. It was not long before it became the favorite of the interceptor units. By 30 June 1950, there were almost as many F-86s in the air defense system as there were all other types of aircraft. By the end of that year, the F-86 had come to be the workhorse of the air defense fighter interceptor system for daylight operations.

At the close of 1950 the F-80s had been phased out of the air defense system and action was underway to get rid of the F-84s. This left the F-86 as the predominent day fighter interceptor. At this time, plans were afoot to replace even this faithful performer. What was wanted was an airplane which could operate as successfully as the F-86 but which could work at night and in foul weather as

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9. Of the capabilities of the F-84 ConAC had the following to say in November 1950: "The F-84D aircraft have little value as a fighter-interceptor . . . in view of the continued wing failures that have been encountered and general inherent characteristics of the airplane". /TWX, ConAC to Director of Maintenance, USAF, 6 Nov 1950. For additional information on this subject see: 78th F-I Gp to CG WADF, "Wing Failures on F-84 Aircraft", 14 Aug 1950. (DOC 100)/

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well as during daylight hours.

III

In 1949, the F-82 "Twin Mustang" replaced the F-61s in the 325th and 52d Fighter All-weather Wings. A complicated conventional aircraft, the F-82 not only gave much maintenance difficulty but it was soon obvious that it did not have sufficient performance to cope with modern bombers of the B-50 type.[10] Jet propelled all-weather aircraft were in the experimental stage but the date when they were scheduled to come off the assembly lines for assignment to the fighter interceptor units was too far in the future to meet the immediate need for them.

Late in 1949 the Lockheed Aircraft Corporation came up with an idea which portended to resolve if not the need for an all-weather aircraft at least the requirement for an adequate night fighter. It was suggested that electronic equipment be installed in the T-33, a jet trainer aircraft, and that this aircraft be put into service as a night fighter. The T-33 was the only jet aircraft then available which could be renovated in such a manner for the simple reason that it was the only two-place jet in production. USAF gave the green light to this project, the refitted T-33s were dubbed F-94As, and on October 1949 an Air Force accepting

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10. By mid 1950 these aircraft went out of construction with the result that ConAC had much difficulty obtaining parts for those F-82s still in operation in the fighter all-weather units.

board went on record as follows concerning the completed job:[11]

> The configuration of the F-94A airplane is not satisfactory for the procurement of more airplanes than is necessary to fill the interim need. Incorporation of features, such as thermal de-icing and improved armament installations such as, a six gun nose with automatic pneumatic gun charges, provisions for blind landing, and any other features which will contribute to making the airplane a more effective all-weather fighter, are necessary to take the airplane out of the interim class.

As revealed by the above, the Air Force was fully cognizant that the initial model of the F-94 could not be considered more than a night fighter because it lacked adequate protective devices to permit cold weather operations. However, subsequent models, it was intended, would include equipment to allow for all-weather operations. A refined model of this "makeshift" airplane, it was hoped, would fill an interim bill until production of airplanes especially designed for all-weather operations could be accelerated.[12]

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11. Communications and Electronics Digest, prepared by the Director of C&E, Hqs ADC, May 1951, pp 5-6.

12. Ibid. The F-94A is powered by a single centrifugal compressor type turbo-jet engine, J-33-A-33, incorporating an afterburner to augment thrust for climb and combat. The aircraft has a limiting Mach No. of 0.80, the same as the F-80. It is equipped with an E-1 fire control system incorporating the A-1CM gun-bomb-rocket sight and computer with the AN/APG-33 radar. This fire control system allows the pilot to track and fire either visually or blind. Armament consists of four caliber .50 M3 machine guns with ammunition containers for 300 rounds per gun. A hot-mike intercemmunication system is used between the radar observer and the pilot to enable them to converse without the necessity of pushing mike buttons.

In February 1950 USAF informed ConAC that it had scheduled for the shipment of 39 F-94As to the 56th Fighter Wing at Selfridge Field. After thoroughly studying its air defense requirements, ConAC recommended that these planes be assigned to the 325th Wing at Moses Lake and McChord in Washington State initially. The operations analyses of the two 1949 air defense maneuvers DRUMMER-BOY and LOOKOUT, in which the great need for all-weather fighters in the Northwest and Northeast was pointed up, played the large factor in ConAC's reaching this decision.

USAF "bought" ConAC's recommendation and in late February the Air Materiel Command informed that the 325th's F-82s would be replaced with F-94As commencing about June 1950. The first thirteen F-94As to roll off the assembly line were to go to the 325th's squadron at Larson Air Force Base. The next thirteen were to go to the Alaskan Air Command.[13] The next 26 were then to go to the two remaining squadrons of the 325th at McChord Air Force Base.

The drastic shortage of radar observers which existed at this time was the reason for the decision to allocate only thirteen F-94As to each squadron of the 325th.[14] ConAC was in favor of an initial allocation of 25 per squadron in spite of the fact that there were not enough radar observers to man this number. ConAC

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13. TWX, AMC to ConAC, 24 Feb 1950 (DOC 101)

14. 1st Ind, USAF to ConAC, to ConAC to DCS/O, USAF, "Composition of Certain Fighter Wings," (DOC 102)

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recommended that F-94As for which there were no radar observers available be provided without radar equipment. These planes could then be operated as day fighters until additional radar observers could be trained or otherwise procured, at which time the radar equipment could be installed. USAF turned thumbs down on this proposal, however, on the grounds that it was too expensive. Too, USAF felt that the denuded F-94As would not be nearly so good for day operations as were F-86s of which there were ample numbers.

The 325th commenced to transition into F-94As in the second quarter of 1950.[15] By June 1951, the changeover from F-82s in this unit to the new model jet night fighter had been completed. Additionally, delivery of F-94As to the 52d Fighter All-weather Wing commenced in October 1950 and by the close of June 1951 the two squadrons of that unit had completely transitioned into the new jet night fighter. Two additional squadrons, one each from the 33d and 56th Fighter Interceptor Wings, had, by the above date, exchanged their day fighter jet aircraft for F-94Bs, a

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15. See History of 325th F-I Gp, April-June 1951, p 1.

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refined version of the F-94A model.[16]

IV

The total number of fighter aircraft assigned the newly activated Air Defense Command on 1 January 1951 was 365. 236 or approximately 65 per cent of the total were F-86s. There were 26 F-82s (used primarily for tow-target purposes), 43 F-84s, and 60 F-94s. By the end of June 1951, this aircraft inventory had more than doubled, totaling 813. The primary reason for this increase was, of course, the recalling to active duty of the ANG squadrons in the early months of 1951. The following chart indicates the numerical increase in assigned fighter aircraft which occured

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16. The following is from the DC&E Digest for May 1951, p 9: "Six major changes incorporated in the F-94B over the F-94A are as follows: (1) ILS glide path and localizer receiver plus the zero reader have been installed to make possible an approach under lower weather minimums than presently /is/ possible with GCA equipment. The ILS and zero-reader equipment permits simultaneous handling of more than one aircraft on final approach, thus providing a more rapid system for the recovery of aircraft. All future interceptors will have ILS receivers and zero-readers for this purpose. (2) The cockpit pressure differential of the F-94B has been raised to 5 PSI differential. This enables the pilot to fly in an altitude environment lower than the actual altitude that the aircraft is flying. (3) Provisions have been made for windshield anti-icing equipment. (4) A high pressure oxygen system similar to the one installed in early World War II aircraft has been installed in the F-94B. By using the high pressure oxygen system, space, which is a critical item in an aircraft utilizing a large amount of electronic equipment, is saved in the aircraft. (5) The hydraulic system pressure has been increased from 1000 PSI to 1,500 PSI. This increase in pressure allows much faster action relative to landing gear, speed brake control, and aileron boost control. (6) Wing revisions provide for external fuel tanks to be center line mounted instead of previously being suspended from the wing tanks. The net gain is larger feed capacity and less aero-dynamic drag".

during the period January - June 1951:[17]

TYPE	Jan	Feb	Mar	Apr	May	Jun
Conventional Fighters						
F-47	0	54	107	102	97	96
F-51	0	133	194	176	193	213
F-82	26	29	27	26	21	19
Jet Day Fighters						
F-80	0	17	30	35	37	41
F-84	43	119	122	119	118	103
F-86	236	238	239	239	242	255
Jet All-weather Fighters						
F-86D	0	0	0	0	0	0
F-89	0	0	0	0	0	4
F-94	60	57	72	83	83	82

While additional F-94s and F-86s were on hand at the end of June 1951, the major increase in the fighter-interceptor inventory was in obsolescent F-47s and F-51s. At the same time, large numbers of F-84s and F-80s reentered the air defense system with the recalled Air National Guard units. Utilization of these out-moded fighters for air defense, ADC hoped, would last only until increased production could effect their replacement with all-weather airplanes.

Specifically, ADC's fighter interceptor squadrons were equipped with three general types of aircraft at the end of June 1951: Jet airplanes equipped with radar to permit night and limited

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17. See Reference Supplement: Air Defense Command Data Book, June 1951 (Compiled from Daily Combat Readiness Reports, RCS: ADC-DC-C1)

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all-weather operations; jet fighters not equipped with radar and, consequently, suited for day operations only; and conventional airplanes. Five squadrons had converted to F-94As and two squadrons to F-94Bs for a total of seven squadrons capable of night and limited all-weather operations. Twenty-three squadrons were flying non-electronically equipped jets, and these comprised the major part of the actual combat capability of the fighter interceptor force.[18] The remaining fourteen squadrons possessed F-47s and F-51s.

It was planned that by the end of 1952 and early 1953 the fighter interceptor squadrons would all be equipped with all-weather airplanes. Twelve squadrons were scheduled to be equipped with refined models of the F-94; eleven squadrons with F-89s; and fifteen with F-86Ds.[19] The chart on the following page illustrates the type of aircraft each squadron in the air defense system was equipped with at the end of June 1951, the type each was to receive in the near future to enhance its combat capabilities, and,

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18. Fourteen squadrons were equipped with F-86s, six with F-84s, and two with F-80s. The 84th Squadron of the 78th Fighter Interceptor Wing was in the process of converting from F-84s to the new F-89s at the close of June 1951.

19. The 81st Fighter Interceptor Wing was scheduled for a tour of duty in England commencing in August or September 1951. The 113th Wing was scheduled to depart for reassignment to the Alaskan Air Command in February, 1952. The 449th Squadron, equipped with F-94s, was to be reassigned from the Alaskan Air Command to ADC in February, 1952. [See reference, Chapter Six, to Fighter Interceptor Program Charts.]

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RE-EQUIPPING SCHEDULES FOR AIR DEFENSE
COMMAND FIGHTER INTERCEPTOR SQUADRONS

SECURITY INFORMATION

Squadron	Wing	Type A/C 30 June 51	Type A/C to Convert to on These Dates
123d	325th	F-51D	F-86E on Nov 51; F-94C 4th quarter
317th	"	F-94A	F-94C Nov 51
318th	"	F-94A	F-94C Jan 52
319th	"	F-94A	F-94C 2d qtr 52
91st	81st	F-86A	(overseas to England)
92d	"	F-86A	(overseas to England)
116th	"	F-86A	(overseas to England)
82d	78th	F-84D	F-89C Oct 51
83d	"	F-84D	F-89B Aug 51
84th	"	F-84D/F-89B	
94th	1st	F-86A	F-86D Dec 51
93d	"	F-86A	F-86D Jan 52
188th	"	F-51D	F-86E Oct 51; F-86D 4th qtr 52
113th	122d	F-51H	F-86E Jan 51; F-89D 3d qtr 52
163d	"	F-51D	F-86A Nov 51; F-89D 3d qtr 52
166th	"	F-84C	F-89C Dec 51
(449th)	"	F-94C	
109th	133d	F-51D	F-86A Jan 52; F-89D 3d qtr 52
175th	"	F-51D	F-84C Dec 51; F-89D 3d qtr 52
179th	"	F-51D	F-86A Dec 51; F-89D 3d qtr 52
126th	128th	F-80A	F-89C Nov 51
176th	"	F-51D	F-80A Nov 51; F-89C Jan 52
61st	56th	F-94B	F-94C Jan 52
63d	"	F-86A	F-94C Nov 51
172d	"	F-51D	F-86E Jan 52; F-94C 3d qtr 52
62d	142d	F-86A	F-86D Jan 52
97th	"	F-86E	F-86D 2d qtr 52
2d	52d	F-94A	F-94C Mar 52
5th	"	F-94A	F-94C 2d qtr 52
105th	"	F-47D	F-94C 3d qtr 52
132d	101st	F-80C	F-86D 4th qtr 52
133d	"	F-47D	F-86E Feb 52; F-86D 4th qtr 52
136th	"	F-47D	F-86E 2d qtr 52; F-86D 4th qtr 52
74th	23d	F-86E	F-86D Jan 52
75th	"	F-86E	F-86D 1st qtr 53
134th	"	F-51D	F-86E Feb 52; F-86D 1st qtr 53
58th	33d	F-86A	F-94C Jan 52
59th	"	F-94B	F-94C Feb 52
60th	"	F-86A	F-86D Jan 52
118th	163d	F-47N	F-86E 2d qtr 52; F-86D 4th qtr 52
27th	"	F-86A	F-86D Feb 52
71st	"	F-86A	F-86D Feb 52
142d	113th	F-84C	F-94B Aug 51 (scheduled for Alaska)
121st	"	F-84C	F-94B Aug 51 " " "
148th	"	F-84C	F-94B Aug 51 " " "

SECURITY INFORMATION

finally, the model each was to be assigned by early 1953.[20]

Of the two new models of all-weather aircraft scheduled for assignment to the fighter interceptor units by 1953, the F-89 and F-86D, the former is a two-place type fighter manned by a pilot and a radar observer; the latter, however, combines pilot and radar observer in one man and is a single seater.

The decision to purchase the Northrup F-89 "Scorpion" was made late in 1948.[21] This airplane is a mid-wing type powered by two jet engines in which an after-burner is incorporated for short take-off runs and swift climbs. It was originally conceived as a night fighter only and the original specifications were drawn up according to this conception. However, the change of concept from a fighter interceptor force consisting of a day and a night and inclement weather team as separate entities to a single all-weather force demanded a revision of these original specifications. Since

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20. ANG squadrons equipped with standard engine airplanes at the end of June 1951 were scheduled to convert to F-86Es prior to their being equipped with all-weather aircraft. The F-86E is basically the same as the F-86A. The main change is in the control surfaces in the tail section. Movement of the stick to forward and rear position will move the horizontal stabilizer to increase or decrease the angle of attack. The elevator is always streamlined with the horizontal stabilizer. Since only small change of angle of attack is necessary when actuating the stabilizers at high speeds, this will prevent large movements of the elevators into the slipstream which at present is the main cause of elevators on the F-86As shredding at high speed. The other main change is the rerouting of the fuel venting system. /See: IRS, Dir of Tng to DO, WADF, 24 Oct 1950 (DOC 103)/

21. ADC to Numbered Air Forces, "Monthly Letter, Commanding General, Air Defense Command," 10 Nov 1948. (DOC 104)

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the prototype model had already been constructed and tested at the time this decision was made, production on this model had to be delayed until the engineering changes were made and tested.[22] At a conference at Edwards Air Force Base early in 1951 the decision was made to put the F-89 into service as rapidly as possible.[23] By the end of June 1951, four of these planes had been assigned the 78th Fighter Interceptor Wing at Hamilton.

The F-86D has been a highly controversial weapon and eventual acceptance of it as an interceptor will probably depend on its proving itself after it has been in service for awhile. Many pilots with night fighter experience are of the opinion that a pilot is unable to do the job of radar search, lock-on, and tracking in addition to his normal flying of the aircraft. The persons on the other side of the argument voice the opinion that with suitable equipment to relieve the pilot of primary flying, such as a good automatic pilot, the pilot will have ample freedom to devote himself to radar observer duties. In addition, automatic tracking after lock-on, it is estimated, will allow the pilot to fly the final attack portion of his mission to successfully make the kill.

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22. An excellent descriptive article on the F-86D, from which this brief account was taken, is that prepared by Major D. L. Rodewald, Requirements Division of the Directorate of Plans and Requirements, Hqs ADC, in the July issue of the DC&E Digest, pp 20-25.

23. Report of Headquarters ADC Staff Briefing, 17 Mar 1951. (DOC 105)

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The F-86D is a low wing, 35 degrees swept wing type, very similar in configuration to the F-86A Sabre Jet. It has one feature considerably different from the latter type. Its nose is a streamlined radome, 30 inches in diameter where it connects to the fuselage. Below the radome and slightly aft is a large in-take duct for the engine.

Test models of the F-86D were received starting in March 1951 and testing was scheduled to be completed on this aircraft before the end of June 1951. ADC furnished personnel to help conduct the test. While results of the test had not been published at the time the history was completed, plans were firm for assigning this aircraft to the fighter interceptor units.[24]

V

The demand for new aircraft to replace the battle weary jets in Korea, slowness of production of all-weather aircraft, and requirements for modifying aircraft already in use in the air defense system combined to delay the reequipping of the fighter interceptor units with aircraft better suited for the air defense mission.

In 1950 it had been planned that all the squadrons in a group would trade in their old airplanes for all-weather aircraft as the latter came off the production line. As one group completed

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24. Ibid.

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its conversion another group would commence the process. Because of the slowness of production, however, and the other factors enumerated above, ADC changed this conversion concept early in 1951. Rather than attempt to equip all squadrons of a group at one time with jet all-weather aircraft, ADC elected to spread these planes through the system by equipping single squadrons in each group with them. While this action portended to complicate materiel and personnel matters, it was considered necessary in order to spread the limited all-weather capability to the maximum number of critical areas. This explains why only one squadron each of the 33d and 56th Fighter Interceptor Wings possessed F-94Bs at the end of June 1951.[25]

The limitation on the number of all-weather aircraft of the F-94, F-89, and F-86D models which could be initially assigned per squadron also led ADC into interim by-ways of procedure. The USAF World-wide Conversion and Equipping Program released in January 1951 informed that ADC squadrons would be limited by production to twelve jet all-weather aircraft per squadron initially.

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25. Hqs ADC, Current Planning Activities Report, 29 Jan 1951. These are reports of a committee composed of the Directors of Plans and Requirements, Materiel Planning, Personnel Planning and Management, and Budget. The responsibilities of this committee are to, "assure improved coordination in the accomplishment of ADC missions and tasks and to assure that the objectives and procedures of the major staff divisions are harmonized to facilitate accomplishments of these missions and tasks". / ADC Staff Memo 11-23, 15 May 1951/

Official sanction had been given in 1950 to the proposal that fighter-interceptor squadrons be equipped to 25 jet all-weather aircraft per squadron. However, this new development required a revision of plans and the initiation of a procedure which would guarantee against the squadrons being under-equipped until they could be manned to full complement with the new aircraft.

Accordingly, ADC requested that the squadrons converting to jet all-weather aircraft be permitted to retain enough old model aircraft to keep their aircraft inventory at 25. This was necessary if proficiency training of air crews and a capability against massed raids were to be sustained. At the same time it made this request, ADC recommended that every effort be taken to accelerate the production of new aircraft.[26] USAF granted the request and promised to do all within its power to speed-up the flow of jet all-weather aircraft into the air defense system.

A requirement to reequip one squadron of the 4th Fighter Interceptor Wing in Korea with 25 F-86Es arose late in the first six months of 1951 and portended to further delay the conversion of the ANG squadrons from standard engine aircraft to jets. In June, USAF informed that all F-86Es produced by North American during July and August and the first three produced in September

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26. ADC to Director of Operations, USAF, "Interceptor Aircraft Inventory", 21 May 1951 (DOC 106)

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would be delivered to FEAF.[27] In turn, FEAF was to release 17 F-86As for return shipment to meet continental United States air defense requirements.[28] These returned aircraft were to be modernized and assigned to the fighter interceptor units. This action would obviate the necessity for ADC having to relinquish its own F-86As to the factories for renovation and ameloirate somewhat the delays resulting from the loss of the F-86Es to the Korean levy. The re-routing of F-86Es originally scheduled for assignment to the fighter interceptor force to Korea would seriously delay the conversion program discussed previously, but it was not expected that it would alter it drastically.[29]

As a result of the change in delivery schedules of F-86Es, plans for equipping squadrons with this model airplane were changed somewhat. Instead of assigning 25 F-86Es to any one squadron at one time, as originally planned, twenty were to be provided each squadron initially. After each squadron scheduled to receive them possessed this number, ADC then planned to return

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27. TWX ADC to Air Defense Forces, 20 June 1951. (DOC 107) The "wing slats" in all F-86As bearing the production number 48-254 and below did not afford the maneuverability necessary for combat operations. It was vitally essential that the newer models of the F-86, in which this condition had been corrected, be furnished those units competing with the Russian built MIG-15s for air supremacy in Korea.

28. TWX, AMC to ADC, 22 Jun 1951 (DOC 108)

29. TWX, ADC to AMC, 27 Jun 1951 (DOC 109)

to the head of the list and make distribution of the additional five.[30]

The necessity for factory modification of F-84s threatened to reduce the combat capabilities of the 78th Fighter Interceptor Wing to zero for a six week to two month period during the latter half of 1951. It was originally planned that the 78th would turn over all its F-84Ds to the factory in July 1951 for modernization at one time.[31] ADC objected strenuously to this for the reason that it would be mid-September or October before the first modernized aircraft would be returned for duty. Had the 78th been able to plan on receiving additional F-89s its training and other commitments would not have been too seriously prejudiced by the loss of the F-84s during this long period. But it could not count on such a contingency and, consequently, the end result would have been the reduction of the 78th's aircraft inventory far below an acceptable level during the time the F-84s were being refitted.

ADC recommended that F-84s be released for modification on the basis of either (1) one non-modified F-84 for one which had been modified, or (2) one F-84 for one F-89, this exchange to obtain until 26 F-89s were assigned.[32] USAF, in response to

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30. Hqs ADC, Current Planning Activities Report, 9 Apr 1951

31. Ibid.

32. Hqs ADC, Current Planning Activities Report, 17 Apr 1951

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this request, directed that the 78th' deliver up its F-84s to Republic according to ADC's first recommendation. A higher priority was given at this time for modernizing the 78th's F-84s than was given to TAC's 20th Wing, whose F-84s were also scheduled for modernization.

At the end of June 1951, then, F-89s were scheduled for delivery to the air defense system as rapidly as they could be produced.[33] Delivery of F-86Es, on the other hand, was to be temporarily postponed to meet FEAF requirements. The assigned number of F-86Es was to increase as a result of the modification line turning out these aircraft without ADC having to release any of its own for modernization. And factory modification of the 78th's F-84s was to proceed on a one-for-one basis.

VI

The number of aircraft assigned a unit is a relatively meaningless figure; it is the percentage of these "on-hand" aircraft that are in a flyable condition and ready for combat[34] that is the truly vital statistic.

During the first six-months of its operations, ADC set the figure of 75 per cent of assigned aircraft in-commission as

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33. Ibid., 30 Apr 1951

34. The following is ADC's definition of combat ready aircraft: Aircraft in commission and possessing the combat equipment allocated. The equipment must be operational.

the performance goal for unit maintenance and supply staffs to shoot toward. On the whole, the in-commission rate for the command compared quite favorably to this figure during the period 1 January through 30 June 1951. The following table indicates the monthly percentage of aircraft out of commission and the reasons therefore:[35]

CAUSES	Jan	Feb	Mar	Apr	May	Jun
Number of Aircraft On-Hand	378	610	802	800	790	811
Miscellaneous	2%	1%	2%	4%	3%	2%
Tech Order Compliance	1%	2%	1%	2%	1%	1%
Lack of Parts	7%	7%	8%	7%	9%	10%
Maintenance	13%	16%	15%	15%	14%	14%
TOTAL	23%	26%	26%	28%	27%	27%

From the foregoing statistical table it will be seen that maintenance difficulties played the major role in keeping airplanes on the ground during the first six months of 1951. Assignment of new models of aircraft with the attendant necessity for training mechanics in the skills necessary for maintaining these aircraft contributed to the maintenance workload. In certain instances, because of training and deployment requirements, units were required to perform maintenance at several sites. This also increased

35. See Reference Supplement, ADC Command Data Books for months of January and June 1951, prepared by the Directorate of Programs and Costs, Office of the Comptroller, Hqs ADC.

the maintenance workload. Also, the great emphasis placed on making the fullest use possible of all available aircraft to permit ADC to carry out its tremendous training program served to increase the maintenance load.

Parts shortages played a secondary role to maintenance as a cause for grounding aircraft but the extent of these shortages reached major proportions at times. Especially severe was the shortage of parts and ground handling equipment in the newly recalled Air National Guard squadrons.[36] In order to ready these units for combat ADC had to reequip them as well as effect their reorganization and increase their training.

ADC, in its efforts to overcome aircraft parts shortages, closely monitored parts and equipment programs throughout the command. Increased supply discipline was stressed and every effort was made to correct supply deficiencies. Regular staff and stock control visits were made to all units. Finally, equipment was redistributed to where it would be put to the greatest use, and firm directives on stock control, aircraft grounded for lack of parts, aircraft lacking combat equipment, and other supply procedures were published.[37]

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36. See the following for an explicit enumeration of the items that were in particular short supply: ADC to AMC, "Shortages of Supplies Affecting Operational Effectiveness of Air Defense Command", 18 Apr 1951. (DOC 110)

37. General Myers to Lt. General Benjamin W. Chidlaw, CG AMC, 18 May 1951. See also, ADC to WADF, "High AOCP Rate at Larson AFB", 21 Jun 1951. (DOC 111)

The increased utilization of F-47s and F-51s plus the loss of maintenance personnel imposed a serious maintenance burden on the ANG units equipped with these aircraft. Additionally, parts for these airplanes were extremely difficult to obtain. The out of commission rate for F-47s and F-51s was on the increase at the end of June 1951 and there was every indication that an increasing number of these aircraft would be grounded during the ensuing months. While these standard engine type aircraft would be of no value as interceptors during a night attack, and of dubious value even as day interceptors, it was very necessary that they be kept in flyable shape until they could be replaced with more modern aircraft, if only to permit crews to maintain their flying proficiency.[38]

A serious maintenance problem during the first half of 1951 in the 52d Fighter Interceptor Wing reduced ADC's already feeble all-weather potential. In January, the F-94As of that unit were knocked out of commission, except for active air defense emergencies and local visual flying, because of malfunctioning float valves in the fuel system.[39] As a consequence, these planes had to be reported as non-combat ready to be used only in the event

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38. AMC informed ADC in January 1951 that there were no replacements available for the F-51s, F-80s, and F-84s and that parts to be obtained through reclamation and salvage of storaged aircraft for F-51s and F-47s would be available for only a maximum period of eighteen months. [Interview, Historian with R. W. Dalton, Office of Aircraft Distribution, Hqs ADC]

39. TWX, 52d FW to AMC, 6 Mar 1951. (DOC 112)

of a red or yellow alert.[40] This condition lasted into March at which time a complete replacement of the valves then in use was made. This action did not "fix" the condition, however, and trouble with fuel lines and fuel pumps continued to restrict the usability of these aircraft. After much investigation, at the expense of an extremely low in-commission rate, it was deduced that the fuel in use was contaminated.[41] Consequently, in May, use of contaminated JP-3 fuel was discontinued in favor of 100/130 fuel. The consensus at the end of June was that all the F-94As of the 52d would have to have their engines replaced as well as all other parts, fuel lines, tanks, etc., which had come into contact with the contaminated fuel.

The squadrons of the 56th and 33d Fighter Interceptor Wings which converted to F-94Bs were also plagued by their share of maintenance troubles. Lack of sufficient test equipment slowed down maintenance on these airplanes. Further, after a pilot of the 33d Wing was killed when a released tip tank smashed back into the tail assembly of his F-94B, all F-94Bs were restricted from further flight with tip tanks.[42] This action increased the

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40. TWX, EADF to ADC, 20 Mar 1951. (DOC 113). There are three types of alert: (1) RED — attack imminent; (2) YELLOW — hostile aircraft approaching; and (3) WHITE — all clear. See Chapter Thirteen, Air Raid Warning Systems.

41. IRS, Dir of Maint to DM, Hqs ADC, 7 May 1951. (DOC 114)

42. TWX, AMC to All Major Commands, 17 May 1951. (DOC 115)

number of flights required to conduct training and operations.

According to a 33d Fighter Interceptor Wing Historian, continued maintenance difficulties could be expected on the F-94B.[43] The shortage of engines for this model airplane, as well as for all the new jet all-weather types, which obtained at the end of June was expected to further cripple the efforts of the mechanics to keep these planes in action.[44]

The in-commission rate of the T-33 training aircraft was at a low ebb at the beginning of 1951. Shortage of parts and the failure of commanders to place proper emphasis on the maintenance of T-33s were the major causes behind this problem. In March, General Whitehead personally directed that action be taken to increase the utilization of each T-33 from 30 hours to 60 hours per month and that greater attention be given to keeping these aircraft operational. The result of this action was a reduction in the out-of-commission rate for these airplanes from 46 per cent in January to 39 per cent at the end of June. At no time, however, was the 60 hour utilization rate achieved. Since none of the ANG

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43. History of the 33d F-I Gp, January - March 1951, p 4.

44. The shortage of engines for F-94s restricted their utilization throughout the first six months of 1951 as well as increased maintenance on this model airplane. /See Reference Supplement, Command Data Books for January and June 1951/ This Shortage resulted from AMC's inability to supply the necessary reserve five J-33-35 jet engines per squadron per month for the F-94s. /History of the Aircraft Supply Division, Hqs ADC, January 1951/

squadrons possessed these aircraft the rate of transfer of the training airplanes from one squadron to the other remained high during the first six months of 1951. This was a factor which contributed to the continued low utility rate of the T-33s.[45] The shortage of parts problem also remained critical throughout the period for this particular model of aircraft.[46]

In June 1951, ADC had 47 T-33s. Scheduled transfers of these aircraft from the command to support Air Training Command programs threatened to leave ADC with only 26 in the ensuing months. At the end of June USAF was reviewing T-33 requirements among the several major commands in an effort to permit ADC to retain at least 32 of them. It was hoped that eventually each fighter interceptor squadron would be assigned one T-33.[47]

VII

During the first half of 1951, as in the past, programs were continually underway to incorporate, either in production or through retrofit, improvements to increase the combat capability

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45. Hqs ADC, Command Data Book, March 1951

46. Ibid., April 1951

47. Current Planning Activities Report, Hqs ADC, 27 Jun 1951. ADC was scheduled to transfer approximately 25 T-33s, 41 F-84Bs, 23 F-86As in the latter part of 1951 and early 1952 to the Training Command to augment the fighter Combat Crew Training School to be established in the last half of 1951. Additional requirements to support that school with aircraft from production was an additional factor which threatened to retard the equipping schedule of the fighter-interceptor units.

of the fighter interceptors.

A prime defect in the F-94, the only aircraft which could possibly be developed into an all-weather fighter among those assigned the Air Defense Command in June 1951 was its lack of de-icing equipment as well as other safety features to protect the aircraft from the ravages of ice, snow and cold. The F-94As were not designed to be all-weather fighters, as was told previously, and, consequently, anti-icing and de-icing equipment was omitted on them. Future all-weather fighters were to be provided with this equipment at the factories, but so long as the Air Defense Command had to rely on the F-94A as its basic night fighter and possibly as an all-weather fighter it was vitally interested in seeing it refitted with anti-icing and de-icing equipment. AMC informed in February 1950 that it planned to equip at least a few of ADC's F-94s with this equipment before the winter of 1951.[48] But by February of the latter year this action had not been taken. At that time ADC reiterated its anxiety on this subject by recommending to AMC that, "action be initiated immediately on a research program through which a satisfactory winterization and climatizing project can be made possible for these aircraft".[49]

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48. TWX, AMC to USAF, 20 Dec 1950. (DOC 116)

49. ADC to AMC, "F-94A General Icing Conditions", 27 Feb 1951. (DOC 117)

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Whether or not future models of the F-94 will have an all-weather capability depends upon the ability of the engineers to outfit them with de-icing equipment. The following report from AMC reveals the work that was being done on this project:[50]

> The F-94C series aircraft have been designed as all-weather aircraft provided that adequate de-icing equipment can be designed for the wings and empennage surfaces. Pneumatic boots or a thermally heated wing have been found inadequate and electrically heated blankets are currently under investigation by the airplane contractor. In the event that adequate anti-icing equipment is developed it will be provided for F-94C series aircraft to provide adequate protection for all-weather flying.

The equipping of fighter interceptors with adequate identification and radar assist electronic equipment has been another problem which has long perturbed those in charge of establishing an air defense system. In May 1950 General Whitehead reiterated the problem as follows to General Chidlaw of AMC:[51]

> I have a serious operational problem on my hands in relation to IFF /Identification Friend or Foe/ and Radar Assist Beacons in the Air Defense System. . . . Our present radars do not "see" jet fighters very well at any distance so we cannot control fighters to interceptions or navigate them above an overcast. If we had the AN/APX-6 IFF Transponder in operation, most of these difficulties would be overcome.

It was General Whitehead's request at this time that, "no stone . . . remain unturned in an effort to start retrofitting AN/APX-6's immediately and to speed up production of the necessary ground

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50. 2nd Ind, Hq AMC to CO Larson AFB, 8 Nov 1950, to Larson AFB to AMC, "01-L F-94A Aircraft," 29 Aug 1950. (DOC 118) See also: 1st Ind, USAF to ADC, 12 Feb 1951 to Ltr ADC to USAF, "Supervision of Pilot Proficiency Training," 4 Jan 1951. (DOC 119)

51. General Whitehead to General Chidlaw, 9 May 1950 (DOC 120)

equipment".[52]

USAF as well as ConAC, and later ADC, was well aware of the necessity for this identification and radar assist equipment in the fighter interceptors. In January 1950 that headquarters had stated:[53]

> It has been noted . . . that the operational effectiveness of jet fighter groups, both in operational readiness tests and in maneuvers, is adversely affected by the lack of a suitable airborne beacon.

USAF had then explained what the basic action was to be in providing this equipment:[54]

> In accordance with the JCS policy on IFF, the Armed Forces are committed to the Mark X System of beacon and interrogator; this system to be operational by 1 July 1952. The primary function of this system to provide beacon assist in the tracking and control of high speed aircraft. Currently [as of January 1950] the Air Force is committed to the implementation of this program, and the procurement of beacons has been adjusted accordingly.

In reply to this pronouncement, ConAC informed that a test of the operational suitability of identification and radar assist equipment available in early 1950, of which the AN/APX-6 was one, had revealed that neither the AN/APX-6 nor the other types were truly adequate. At that time, ConAC had advised that "steps be taken at once to perfect and produce a beacon which

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52. Ibid.

53. USAF to ConAC, "USAF Procurement Plan for IFF Beacons", 24 Jan 1950. (DOC 121)

54. Ibid.

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adequately fulfills the radar assistance function necessary for fighter aircraft".[55] At the same time, ConAC had pointed up the primary difficulty which, in its opinion, was going to inhibit USAF's good intentions to supply the air defense system with adequate identification and radar assist equipment:[56]

> Since the Mark X Beaconry and IFF System will not be available as a complete facility until ground interrogator-responser units are available for ground radars, request every effort be made to obtain the delivery of ground components, test equipment and spare parts of the Mark X system concurrently with the 1950 airborne retrofit program. Without this ground equipment the APX-6s in the aircraft are useless.

ConAC then stated that while the Mark X system was deficient in many respects that there was a firm requirement that it be placed into use until a more satisfactory system had been designed and produced.

Agreed that Mark X IFF was the system toward which the air defense system was to work, ConAC and USAF set about putting it into operation. ConAC, however, at the same time, established the policy that Mark III IFF would be made operational in all combat aircraft having that system installed during the period of transition to Mark X IFF. All combat aircraft within the ConAC in July 1950, with the exception of the F-80s and F-84s, were equipped with SCR 695 Mark III IFF components and could be made

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55. Ibid., 1st Ind, ConAC to USAF, 2 Mar 1950.

56. Ibid. [underlining added]

operational by organizational and field level maintenance within Wing-Base organizations. By installing AN-95C antennas all of the F-80s and approximately 50 percent of the F-84s could be equipped for Mark III operations. It was planned to outfit the remaining F-84s for this work by retrofitting.[57]

After the outbreak of the Korean War the seriousness of the lack of this equipment was summarized by General Whitehead:[58]

> At the present time, without airborne beacons and ground interrogators, it is not possible for GCI controllers to properly control and vector jet type interceptor aircraft. Although this deficiency has been recognized and procurement action initiated, the schedules as presented by the Director of Requirements, Headquarters, United States Air Force, indicate 1 July 1952 as completion date and are therefore unacceptable. The current world-wide situation makes imperative immediate and strenuous efforts to accelerate delivery of this essential equipment. . . . To summarize, the provision of effective beaconry through immediate retrofit of interceptor aircraft and immediate procurement of minimum essential ground interrogators with mimimum associated equipment is a matter of the utmost urgency. <u>This problem, although related to the IFF requirement, is of more immediate importance.</u>

Consequently, the Mark III IFF System, even in an interim capacity, would not do, would not provide the beacon assistance absolutely necessary to permit ground radar to control the flight of the interceptors. In view of the need for an effective air

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57. IRS, Comm to DM, O&T, DAD, DO, Hqs ConAC, "Field Conditions Existing With Regard to Airborne Components of the Mark III IFF Systems", 13 Jul 1950. (DOC 122)

58. General Whitehead to General Vandenberg, "Radar Equipment for Air Defense", 17 Jul 1950. (DOC 123) [underlining added]

defense system at that time, it was mandatory that corrective action be taken, not by 1952 but a year earlier.

Retrofit of the fighter-interceptors with Mark X IFF transponder APX-6 commenced 10 September 1950 with the F-86s of the 81st Fighter Interceptor Wing at Larson AFB in Washington.[59] It was planned that all the F-86s would be refitted with this piece of equipment first, followed by the F-84s. The F-94s were being delivered from the factory with this item already installed. A deadline date of 31 December 1950 was set by AMC for the complete retrefit of the fighter interceptor aircraft in the air defense system. At the same time, steps were taken to attempt equipping the Lashup III radar sites with Mark X ground IFF equipment by the same date.[60]

AMC was unable to meet the above deadline but by April 1951 approximately 80 per cent of the fighter interceptors in the air defense system were equipped with APX-6 Mark X IFF. At that time, 10 per cent of the aircraft were still equipped with SCR-695 Mark III IFF. The remaining 10 per cent were not equipped with any type of beacon assist, identification equipment. The ANG squadrons recently activated were not included in that estimation. The recommendation was made at that time by ADC that

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59. ConAC to AMC, "Supply and Maintenance of AN/APX-6", 18 Sep 1950. (DOC 124)

60. IRS, Comm to O&T, "Mark X IFF and SII System", 7 Oct 1950. (DOC 125)

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since the Mark X IFF System would reasonably assure provisions for adequate beaconry coverage by the latter part of 1951 that the Mark III IFF system be discontinued completely.[61] In May, it was resolved that the Mark III IFF would be taken out of commission effective 1 July 1951 and all equipment of this type which could not be converted over to Mark X IFF be dismantled.[62]

VII

Thus the end of June 1951 found the Air Defense Command still in search of additional fighter interceptor aircraft, especially those equipped for all-weather operations. While firm plans had been drawn up as to where the new model aircraft would be emplaced once procured, these plans appeared destined for revision at the close of the period. The demands of the Korean War especially and the inability of production to keep pace with requirement threatened to push back the 1953 date the air defense system had hoped to keep for fully outfitting its fighter interceptor units.

In the design of aircraft eventually scheduled for assignment to the air defense system the Air Defense Command was advocating an increase in armament and in combat radius or endurance. The latter changes would be especially necessary once the air

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61. IRS, C&E to VC, "Staff Study", 10 Apr 1951. (DOC 126)

62. ADC to Air Defense Forces, "Mark III IFF, System Policy", 22 May 1951. (DOC 127)

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defense ground system was extended in depth by the addition of ground radar, picket ships, and airborne early warning.[63] Higher headquarters affirmed that it was taking these suggested improvements into consideration and that it intended to translate as many of ADC's aircraft requirements into actuality as possible so long as these changes did not interfere with or slow down production schedules.[64]

In the meantime, the Air Defense Command was struggling along with what it had — a few night fighters, a pretty capable day fighter interceptor force, and a bevy of obsolescent airplanes good only for enabling pilots to keep their hands in at their trade. All in all, the fighter interceptor picture was a bleak one at the close of June 1951. It was a better scene than ever before in the history of post-war air defense, but it was still an inadequate one for purposes of defending the nation if matters came to a showdown.

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63. ADC to USAF, "Requirement to Increase Combat Capability of Interceptors", 17 Jul 1951. (DOC 128)

64. Ibid. 1st Ind, USAF to ADC, 31 Jul 1951.

CHAPTER EIGHT

FIGHTER CREWS AND THEIR TRAINING

I

The Air Defense Command, we have seen, planned to equip each of the 45 fighter interceptor squadrons it was scheduled to possess in early 1953 with 25 jet all-weather aircraft. Concommitant with these plans, provisions had to be made to insure that enough trained crews would be available by that date to operate these aircraft on a 24-hour combat basis. It was estimated that 1,200 pilots and an equal number of radar observers to man the F-94s and F-89s, and 1,050 pilots to operate the F-86Ds would be needed to support the 1953 fighter interceptor program. These figures were based on the assignment of two crews to each aircraft.[1]

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1. Gen Fairchild, early in 1950, requested Gen Whitehead to estimate the number of combat crews per assigned aircraft ConAC would require to operate 25 aircraft per squadron on a 24-hour combat basis. ConAC studies of this matter, prepared at Gen Whitehead's direction, stated that to provide air defense, train, and at the same time not overwork crews to the point where their morale would be threatened, 2.8 crews per aircraft would be the minimum figure required. In December 1950, USAF scaled this figure down to 2 crews per aircraft. See the following documents: Memo, Gen Whitehead to Gen Thatcher, DO, Hqs ConAC: "Number of Combat Crews Required in Fighter Squadrons for Air Defense Mission," 17 Feb 1950 (DOC 129); IRS, DO to O&T, 10 Feb 1950, and attachments (DOC 130); and USAF to ConAC: "Air Defense Combat Crew Requirements," 2 Dec 1950 (DOC 131)

If the number of jet all-weather crews was to be increased from the less than one hundred assigned ADC in June 1951 to the figures given above, ADC was going to require all the procuring and training assistance USAF and the Air Training Command (ATRC) could give in the forthcoming year and one-half. The ideal arrangement for ADC would be for crews to be fully trained in the rudiments of jet all-weather operations and radar observer skills by ATRC prior to their assignment to fighter interceptor units. In the past, the major Air Force commands invested with the air defense mission conducted the majority of this training within their own households. But the mounting complexity of crew training and the growing necessity for maintaining an active air defense required that action be taken to relieve ADC of some of its training burdens. General Whitehead expressed ADC's sentiment on this subject as follows:[2]

> In these days of complex high speed jet aircraft, the attaining of /combat crew proficiency/ is a specialized task. Aircraft must be operated with the precision of a guided missile under weather conditions beyond the capability of the average pilot. Furthermore, attacks must be pressed home with skill and determination under all circumstances. This requires specialized instruction with proper facilities. It cannot be done on a shoe-string or as an overload on resources provided to do my primary mission.

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2. ADC to C/S USAF: "Specialized Training for Air Defense Combat Crews," 16 Apr 1951 (DOC 132). This letter was dispatched when it looked as if the ATRC all-weather crew training school would be struck from the fiscal 1952 funding program. See also: TWX, USAF to ADC, 7 Apr 1951 (DOC 133); TWX, USAF to ADC, 11 Apr 1951 (DOC 134)

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The urgencies of the air defense mission require me to provide a defense of the United States right now. This presupposes an air defense system in being and combat crews in readiness 24 hours a day. Untrained crews cannot do this job. 20% of my night fighters and 10% of my all-weather fighters are now committed to this readiness condition. This figure will be increased as my all-weather resources are increased.

II

Actual plans for procuring and training the jet all-weather pilots who would be needed to support the fighter interceptor program when it came of age in 1953 commenced at least as far back as early 1950. At that time, ConAC convinced USAF of the need for an ATRC Combat Crew Training School (CCTS) as a post-graduate course for pilots emerging from Advanced Single Engine School. As planned, this school would consist of (1) a day jet interceptor course to provide jet transition, gunnery, instrument and GCI training, and (2) a jet all-weather course to provide transition training into F-94s/F-89s, more extensive instrument training, scope work, and training in the use of airborne intercept radar.

The outbreak of the Korean war caused the abandonment of this plan and the postponement, until January 1951, of any ATRC training facilities for all-weather pilots.[3] In the latter month, an All-Weather Fighter Interceptor School for Training F-94/F-89

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3. 3d Ind, ConAC to WADF, 31 Dec 1950 to 78th F-I Gp to ConAC: "Reduction of Service Requirements for School Eligibility," 24 Oct 1950 (DOC 135)

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pilots was established at Tyndall Air Force Base and ADC was given a quota to this school of five per class.[4]

In March 1951, ADC recommended that the pilot output of the All-Weather School be increased. One way of doing this would be for ATRC to transition newly recalled ANG pilots in jet aircraft and then assign them directly to the All-Weather School. This would kill two birds with one stone: It would assist in preparing the former ANG units for receipt of jet aircraft and would increase the total number of jet all-weather pilots assigned to ADC. USAF concurred in this proposal and established 6 August 1951 as the date when this accelerated program would go into effect. On that date, a two-week (20 hours) course for transition of conventional pilots into jet aircraft would commence at Tyndall. ADC would be given a quota of four pilots per week to this course. Upon graduation from the transition course, these pilots would go directly into the All-Weather Fighter Interceptor School.[5] Commencing on 1 October, a quota of five pilots from other major Air Force commands for attendance at the All-Weather School would be established. This number, plus the four ADC sent to the jet transition course, plus the jet pilots ADC sent to the All-Weather

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4. Hqs Flying Training Air Force, Course Outline - All Weather Jet Aircrew Training (Interceptor), 11 Jul 1951

5. ADC to USAF: "Quotas for Transitioning Fighter Pilots to Jet Type Aircraft," 12 Apr 1951 and 1st Ind, USAF to ADC, 17 May 1951 (DOC 136)

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School would result, by 1 July 1952, in a gain of about 500 jet all-weather pilots and an overall strength increase of 160 pilots. Beginning 1 July 1952, students for this school would come from the Advanced Engine School.[6]

A plan existed, at the end of June 1951, for the establishment of an ATRC F-89 interceptor training course in December of that year. By April 1952, this course was scheduled to reach a yearly maximum production rate of approximately 400 pilots. This accelerated program was to continue until the air defense requirements for F-89 pilots had been met. At the same time, it was planned to open an F-86D crew training school within the ATRC in January 1952. By ADC's calculations, fifteen pilots per week would have to emerge from this school commencing in January 1952, if F-86D pilot requirements were to be met by 1953.[7]

The F-94/F-89 interceptor training program conducted within the ATRC, then, was designed to give maximum assistance to ADC in converting jet and conventional fighter pilots to jet all-weather aircraft. Additionally, sufficient numbers of pilots had to be graduated from this school to provide instructors for the F-89 and F-86D training schools to be opened in late 1951 and early 1952. Once ADC's jet and conventional type aircraft crews had been trained for all-weather aircraft operations, the principal

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6. Hqs ADC, Current Planning Activities Report, 4 Jun 1951
7. Ibid.

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source of students for these schools was to be the Advanced Single Engine School.

Radar observers as well as pilots, of course, had to be procured and trained if the requirements of the 1953 fighter interceptor program were to be met. The decision had been made in 1950 that pilots would not be trained as radar observers. In September of that year, ConAC recommended that upon the establishment of the ATRC all-weather school the Radar Observer School be discontinued and training of radar observers be made a part of the all-weather school. That ConAC's thinking on the subject was clearly along the lines of training pilots as radar observers is exemplified by the following recommendation:[8]

> . . . the course of the All-weather School [should] be sufficiently comprehensive in all its phases so that graduates are capable of flying instruments under minimum weather conditions, day or night; that they are completely familiar with GCI control in all its aspects; that they are capable of performing all required duties of an 0520; that they be qualified in aerial gunnery, visually and after "locking on" with existing radar fire control equipment.

In other words, ConAC was of the opinion that all fighter pilots should be prepared not only for performing radar observer duties in F-94s and F-89s but also for flying F-86Ds, or similar type aircraft where the pilot performs both pilot and radar observer duties.[9]

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8. ConAC to USAF: "Fighter Pilots Career Program," 9 Sep 1950 (DOC 137)

9. Interview, the Historian with Captain R. Dingledein, Office of Personnel Plans and Management, Hqs ADC, 30 Oct 1951

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USAF, however, was not in favor of combining the two occupations at that time. Production of one-seater type all-weather aircraft of the F-86D type was not in effect and pilot shortages and training considerations dictated the inadvisability of attempting to train pilots as radar observers.[10] Consequently, the majority of the students for radar observer training, ADC knew at the time of its reactivation, were going to have to come from sources outside the command.

In January 1951, ADC's quota for furnishing students to the Radar Observer School at Keesler Air Force Base was six per class. In February, USAF informed that commencing in April of that year enrollment to the radar observer course would be increased to fifteen per class, the increased quota to be supported from ADC resources.[11]

While ADC agreed that the "proposal . . . to increase

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10. USAF to ConAC: "Air Defense Combat Crew Requirements," 2 Dec 1950 (DOC 131). The historian of the 52d Fighter Group reported that pilots serving as radar observers in that unit were not pleased with that assignment. The 52d transitioned six radar-observer/ pilot observers in the F-94 during the first quarter of 1951. However, that unit would have preferred to qualify them simply as all-weather pilots for the following reasons: (1) Pilots were not content to act as radar observers, resulting in lowered morale; (2) there was a group shortage of pilots; and (3) it was difficult for radar /observer/ pilots to maintain their 60-2 requirements in base aircraft and also remain proficient in their radar observer duties. 52d Fighter Group History, 1 Jan - 31 Mar 1951

11. USAF to ADC: "Training of Radar Observers, All-Weather Fighter," 16 Feb 1951 (DOC 138)

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enrollment to fifteen per class /was/ a definite requirement and should be continued on a permanent basis at least until March 1953,"[12] it also noted:

> . . . if the required expansion of the Air Defense System /was/ to meet with any measure of success, it /was/ essential that a pipeline source of Radar Observer Students be established immediately, since internal sources of eligible officers for this course /were/ rapidly being depleted.

To effect an increase in radar observer students from sources other than its own units, ADC recommended that ROTC graduates who volunteered for such training be called to active duty. ADC also favored the establishment of an aviation cadet program similar to the pilot, navigator programs for procuring and training of radar observers.[13]

USAF's thinking on this score was similar to ADC's. In April 1951, higher headquarters notified that it planned to recruit non-rated officers throughout the Air Force for radar observer training. Student officers eliminated from pilot training were to be eligible for radar observer schooling under this category. Additionally, USAF was favorably disposed toward the idea of ordering to active duty those ROTC officers who volunteered for this training. Finally, USAF planned to initiate a cadet program for radar observers. Persons selected for this training would be processed through Officer's Candidate School to guarantee their qualification

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13. Ibid. (DOC 138)

for a commission. To make the program as attractive as possible, it was planned to award an aeronautical rating and permanent flying status to officers successfully completing the radar observer school.[14]

III

Statistical charts for the first six months of 1951 revealed a considerable amount of growth in the number of fighter interceptor crews assigned ADC. In January there was a total of 380 crews assigned the command; at the end of June this figure had more than doubled, totaling 823. This large increase was due to the same reason as that for the numerical growth in units and aircraft during the same period - the federalization of the ANG squadrons. Consequently, crew increases were primarily in the F-47, F-51, F-80, and F-84 categories. Crew increases in the F-86 and F-94 classes, however, were very slight.

Of the crews assigned in January, approximately 80 per cent were combat ready. About 75 per cent of them were combat ready in June. This high figure, both at the commencement and at the end of the six month period, spoke well for the degree of training of the ANG squadrons at the time of their recall to active duty. At the same time, however, the low status of the combat potential of the air defense fighter interceptor system throughout the period is revealed in the combat ready statistics. It will

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14. Hqs ADC, Current Planning Activities Report, 30 Apr 1951

be noted on the chart which follows that the lowest status of combat readiness was in the F-86 and F-94 squadrons.

Thus, in spite of the high combat readiness average reflected in the statistical summaries, the fighter interceptor crew situation within the ADC during the first six months of 1951 actually remained at an extremely low level. Levies on pilots for combat replacements in Korea, for instructors in the ATRC all-weather school, and for other permanent change of station requirements, struck where they hurt the most, at the units' experienced and combat trained all-weather or jet day interceptor pilots. A continuing high "absentee" rate of pilots temporarily assigned to schools, gunnery training, on leave, for reasons of illness, etc., contributed its share to the dangerously low combat capability which obtained in the jet fighter units, both day and night, during the first six months of 1951. These losses of experienced pilots, both permanently and temporarily, not only affected ADC's ability to maintain an active air defense, but also seriously reduced its capacity to provide instruction to the newly recalled reserve pilots, the newly graduated pilots from basic flying school, and the newly federalized ANG pilots who formed the majority of the replacements for the out-going experienced pilots.

The loss of experienced pilots since the outbreak of the Korean war was an extremely serious matter to air defense leaders,

COMBAT CREWS IN AIR DEFENSE COMMAND
(January - June 1951)

COMBAT CREWS IN AIR DEFENSE COMMAND*
1 January - 30 June 1951

Type	Jan O/H	Jan C/R	Feb O/H	Feb C/R	Mar O/H	Mar C/R	Apr O/H	Apr C/R	May O/H	May C/R	Jun - O/H	Jun - C/R
Conventional Fighters:												
F-47	0	0	42	34	67	63	89	55	99	77	79	69
F-51	0	0	189	139	277	173	272	218	267	217	231	195
F-82	24	18	21	18	15	15	9	9	2	2	4	4
Jet Day Fighters:												
F-80	0	0	13	0	43	14	44	28	43	19	40	35
F-84	55	44	136	89	119	87	141	90	151	109	127	95
F-86	278	219	257	213	240	198	216	154	301	177	290	174
Jet A/W Fighters:												
F-86D	0	0	0	0	0	0	0	0	0	0	0	0
F-89	0	0	0	0	0	0	0	0	0	0	0	0
F-94	23	18	28	18	38	31	28	24	45	40	52	40

O/H - - Combat Crews On Hand
C/R - - Crews Combat Ready

*Source: ADC Command Data Book, June 1951 (compiled from Daily Combat Readiness Reports: ADC-DO-C1)

**ADC's interpretation of a Combat Ready Crew:

PILOT: A pilot possessing either SSN 1058 or 1059 may be reported as combat ready when he has accomplished the prescribed unit transition program in UE aircraft, or a pilot not possessing SSN 1058 or 1059 may be reported as combat ready when: (1) he has flown 50 hours in UE aircraft; (2) he has completed a total of 12 aerial gunnery missions, of which two will be above 20,000 feet, and has achieved a minimum of 10% hits on one or more missions; (3) he has flown three hours of night time in UE aircraft; (4) he has led three successful GCI missions; (5) he possesses a current instrument card, and has demonstrated the capability to fly instruments in UE aircraft.

AIRCREW: An aircrew assigned to a fighter-all weather unit may be reported as combat ready when: the pilot satisfies the minimum prescribed above, has accomplished five hours of airborne intercept training and the radar observer, in the opinion of the unit commander, is capable of performing his combat mission.

as the following report from WADF, in October 1950, indicates:[15]

> . . . during the last three months more qualified personnel have been transferred out of the units than have been trained within them. The recent assignment of recallees has not provided an appreciable increase of our capability due to the considerable amount of refresher and qualification training needed by each pilot. There is no apparent trend towards a greater degree of stabilization in evidence; in fact, the opposite is true. Overseas requirements and school quotas of the past have made a very unequal experience level distribution in the fighter squadrons.

For ConAC Headquarters, in late 1950, "the loss of qualified personnel . . . experienced by all tactical units of Continental Air Command [had] been a matter of concern . . . for some time."[16]

The loss of pilots temporarily to schools and other such duty, also, was not a new experience for those who had been associated with the air defense system for any period of time. The following summary indicates the past status of this problem at the time of ADC's reactivation:[17]

> For the 7 month period ending 31 January 1951, approximately 29 per cent of the total pilot assigned strength was not available for duty or training in their parent unit. Out of an average monthly pilot strength of 625 assigned pilots . . . only 449 pilots were on hand to their parent unit at any one time. Since unit training requirements were based on assigned pilot strength, each group had to consistently over-fly all available pilots to meet the total flying hour program each month.

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15. WADF to ConAC: "Operational Effectiveness of WADF Units," 10 Oct 1950 (DOC 139)

16. Ibid., 1st Ind, ConAC to WADF, 25 Oct 1950 (DOC 139)

17. Hqs ADC, Command Data Book, January 1951, See Reference Supplement.

The discontinuance of the policy of training pilots as radar observers would serve to reduce the drain of experienced pilots from the fighter interceptor units. Another such action, the intent of which was to reduce the number of experienced pilots lost to the units for reasons of schooling, was the reduction of pilot quotas to the controllers school, during the first six months of 1951, from 30 to 10 per class.[18] An additional effort taken by ADC to ameliorate the affect of experienced pilot losses in the units was a request to higher headquarters that the policy (AFR 36-25) whereby pilots newly graduated from flying school could not be selected for schooling for a year's period be removed in those evident instances where such schooling would definitely contribute to the career advancement of these individuals. This requirement, while it had permitted new pilots to engage in uninterrupted unit training for that period, had forced commanders to fill all quotas with their more experienced personnel.[19] USAF granted this latter request, stating:[20]

> Authority is granted to send any second lieutenant to schools which will directly contribute to the development of his pilotage qualifications. Provided the school assignment involves a permanent change of station, concurrence of this headquarters will be obtained before movement of a regular officer whose permanent grade is second lieutenant /is made./

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18. Ibid. (DOC 139)

19. ADC to USAF: "Utilization of Graduates of Advanced Pilot Schools," 16 Apr 1951 (DOC 140)

20. Ibid., 1st Ind, USAF to ADC, 4 May 1951 (DOC 140)

1950

Late in 1950 the requirement that pilot graduates of the controller's school had to spend a year with an aircraft control and warning unit after graduation from this school had been lifted. The importance of this decision to the ability of the fighter interceptor units to retain their experienced pilots is best revealed by a brief history of this particular program.

The program of cross-training pilots as controllers was initiated in early 1950, at ConAC's request. The intent of the program was to familiarize potential fighter interceptor group and wing commanders with controller operations. In implementing this program, fighter wing commanders had been instructed to fill Controller School quotas with only their most highly qualified pilots. After completion of the controller course, these pilots were to serve a year with a ground radar unit. At the very outset of the program, difficulty was experienced because of the serious shortage of qualified fighter pilots. Commanders felt that the loss of these pilots for the period of time required for the school would not materially affect their operational readiness; however, their loss for a period of one year following graduation threatened the ability of these pilots to retain their flying proficiency. Because of the latter affect of this program, unit commanders were opposed to it.[21]

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21. Hqs ADC, Current Planning Activities Report, 14 Feb 1951. For further information on this subject see: ConAC to WADF: "Pilots in the AC&W System," 10 Nov 1950; (DOC 141) and WADF to ConAC: "Controller Experience for Fighter Pilots," 13 Dec 1950 (DOC 142)

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Accordingly, in order that the plan could be carried out to a limited extent, the authority to waive the provisions of AFR 35-570, thereby permitting the return of fighter pilots trained as controllers (SSN 1014) to their parent fighter organizations prior to the completion of their one year tour as controllers, was requested and obtained from higher headquarters. This authority was then delegated to the air defense force commanders.[22]

Aside from pressing for release from certain school and reassignment quotas, as discussed above, however, ADC was not able to do much to reduce the losses of combat trained jet pilots. All in all, the probability of ADC's being able to resolve this problem in the near future was slight at the close of June 1951. Headquarters ADC's planning committee expressed its feelings on this subject as follows:[23]

> The constant drain of experienced pilots out of this command is aggravating an already serious shortage of trained pilots. It appears that the situation will become worse during the next six to eight months until relief is obtained by crew production of the Air Training Command.

IV

Crew proficiency training in the Regular Air Force fighter interceptor units during the first six months of 1951 was conducted under training directives and standards prepared by ConAC in 1950.

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22. Hqs ADC, Current Planning Activities Report, 14 Feb 1951

23. Hqs ADC, Current Planning Activities Report, 16 Jul 1951

ConAC Training Directive 10-9 established the minimum training requirements for all-weather crews. The F-86 pilots trained in consonance with the provisions of ConAC Training Standard 10-10. In June and early July 1951, these directives were rewritten and published under the imprimatur of Headquarters ADC.[24]

The federalized ANG squadrons, immediately upon their assignment to ADC, were placed on an extensive 60 to 90 day training schedule, dependent upon their degree of training at the time of their recall to active duty. Later this period was extended to 120 days. Training of the ANG squadrons during this period was conducted in accordance with ADC Training Program Number 1, published expressly for the purpose of bringing ANG pilots and ground personnel up to date on overall Air Force policies as well as on air defense operational standards.[25]

The major problems affecting training during the first six months of 1951 were, as was told previously, (1) the loss of experienced pilots to Korea and their replacement with inexperienced

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24. See the following: (1) ADC Unit Proficiency Directive 10-1, "Fighter Interceptor Unit (AI Equipped)," 11 June 1951 (DOC 143); (2) ADC Unit Proficiency Directive 10-2, "Fighter Interceptor Unit (Non AI Equipped)," 11 June 1951 (DOC 144); and (3) ADC Training Standards, 10-1 thru 10-7, 2 July 1951 (DOC 145). These documents indicate the training and proficiency required of ADC pilots in the several types of fighter aircraft assigned the air defense system. Statistics contained in the ADC Command Data Book for June 1951 reveal the extent and degree of accomplishment of flying training during the first six months of 1951 by unit.

25. ADC Training Program No. 1, "Fighter Interceptor Unit (Accelerated)," Jan 1951 (DOC 146)

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pilots who required extensive training before they could be qualified as fighter interceptor pilots, (2) the conversion of units from conventional aircraft to jet day and night fighters, and (3) the shortage of T-33 aircraft. Other major factors which served to retard training programs were: lack of adequate training facilities and equipment; adverse weather during the early months of the year; and flying hour restrictions (because of engine shortages) on the F-94s.[26]

An outstanding training problem not previously discussed was the continued shortage of adequate gunnery facilities which obtained during the first six months of 1951. The requirement for additional ranges, an old problem, persisted, as did the need for improved tow targets and tow aircraft.[27]

The reassignment of air-to-ground gunnery to fighter interceptor units in late 1950[28] plus the need for improving the air-to-air gunnery skill of the interceptor pilots (training which pilots did not receive in ATRC schools) pointed up the continuing lack of adequate gunnery ranges. In March 1951, representatives from ADC, TAC, and SAC met with USAF officials at ADC Headquarters

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26. See the following for information on flying hour allocations: ADC to EADF: "Aircraft and Flying Hour Allocations for Fiscal Year 1951," 23 Feb 1951 (DOC 147)

27. Hqs ADC, Command Data Books, Jan-June 1951

28. USAF to ConAC: "Air-to-Ground Gunnery Training," 20 Nov 1950 (DOC 148) Also: ConAC to Air Defense Forces: "Air-to-Ground Gunnery Training," 21 Dec 1950 (DOC 149)

to study this problem and to attempt to establish working policies on use of present ranges and on the reopening of new ones.[29] A spirit of cooperativeness on this problem was the keynote of the conference.[30] At the end of June, higher headquarters and the major tactical Air Force commands were cooperating closely on ways and means of resolving this problem.

Unsatisfactory performance in gunnery training during the first half of 1951 also resulted from the continued lack of suitable tow targets and tow aircraft. Targets used had to be dragged behind the tow aircraft, with the result that both the aircraft and target were frequently damaged on the take-off. Also, the limited endurance of the jet fighters used as tow aircraft greatly reduced the time available for firing on the ranges. AMC informed that an improved polyethylene banner target suitable for towing at high altitudes and speeds was under development and would be available by July 1951. A carrier for launching targets after the tow aircraft was airborne was also being devised. It was expected that these improvements would greatly improve ADC's actual aerial gunnery training programs.[31]

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29. Minutes, Bombing and Gunnery Range Conference, Hqs ADC, 22 Mar 1951 (DOC 150)

30. Interview, the historian with Major G. W. Engel, Directorate of Operations and Training, Hqs ADC, 9 Nov 1951

31. Minutes of ADC Staff Briefing, 17 Mar 1951

Camera gunnery training was handicapped by the lack of adequate assessing equipment, film, and the inability to properly mount the camera. An interim solution to the camera gunnery problem was sought by mounting the camera on top of the A-1 gunsight head. This make-shift reticle camera photographed pictures as the pilot saw them. A serious disadvantage of this temporary "fix," however, was that the pilot's forward vision was partially blocked by the camera. This, of course, created a hazard to safe flight operations. Outstanding camera gunnery requirements at the end of June 1951 were for a reticle camera and for equipment that would allow complete, accurate processing and assessing of color film at squadron level.[32]

Another training problem, peripheral perhaps to the particular subject of flying training but one which played a major role in the ability of fighter units to convert to new models of aircraft, was the shortage of Mobile Training Detachments (MTDs) for training mechanics.[33] The basis of issue of MTDs in January 1951 was one for each 150 aircraft. For ADC's purposes, this was not

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32. Hqs ADC, Command Data Book, Mar 1951

33. During equipment conversion, factory familiarization trains key personnel in advance of first equipment delivery for approximately 10 per cent of the Air Defense Command's requirements. As initial equipments are delivered, ATRC establishes temporary specialized courses to train an additional 20 per cent. The balance, or 70 per cent, must be trained by Mobile Training Detachments and on-the-job training. See the following: ADC to ATRC: "J-48 Training Program," 10 May 1951 (DOC 151); and ADC to USAF: "Special Training, F-86E Aircraft," 14 Mar 1951 (DOC 152)

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adequate. The deployment of fighter units by squadrons and the equipping of the all-weather units with only twelve aircraft per squadron initially made the assignment of MTDs according to total aircraft inventory an unreal policy. It was ADC's opinion that MTDs should be assigned on the basis of one per wing.[34]

USAF changed the basis of issue of these items to one per two wings. But in May, ADC informed higher headquarters that this was still inadequate. At that time, ADC requested that a minimum of two MTDs be assigned to every three wings.[35] This request, however, was denied; while USAF agreed with ADC that it would be desirable to have a mobile training detachment available for each squadron three months prior to its conversion to new equipment, the assignment of such a large number would mean a great surplus of them after the converting units had completed their transition requirements.[36]

Thus, due to fund limitations, accelerated aircraft production, and the squadron deployment plan, there would not be enough MTDs to meet the demand. ADC's operational proficiency, therefore, was dependent primarily on an aggressive on-the-job

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34. ADC to USAF: "Mobile Training Detachments, Fighter-Interceptor and Fighter-All Weather," 2 Feb 1951 (DOC 153)

35. ADC to USAF: "Mobile Training Detachments, Fighter-Interceptor and Fighter-All Weather," 8 May 1951 (DOC 154)

36. Ibid., 1st Ind, USAF to ADC, 25 May 1951 (DOC 154)

training program for ground maintenance personnel. Outlines for these programs were published during the first half of 1951.

V

Firm plans were in existence, then, at the end of June 1951, for assuring that by 1953 there would be available the 2,200 jet all-weather pilots and 1,200 radar observers ADC would need to support its 1953 fighter interceptor program. However, between the middle of 1951 and the latter part of 1952 and early 1953, crew production would lag considerably behind all-weather jet aircraft production. ADC expected to remain about 40 per cent below the required number of all-weather fighter crews required to man its assigned aircraft during this period. This, coupled with the fact that ADC also expected to be called upon to continue to meet overseas fighter pilot replacement requirements for an indefinite period, presented a problem of the first magnitude. At the end of June 1951, ADC was pressing hard for an increase in combat trained pilot strength, both to conduct its air defense mission and to support what in reality was a refresher training program. Until that was done, the operational capability of ADC portended to remain at a dangerously low level.

SECRET

PART IV

ORGANIZATION FOR AIR DEFENSE

CHAPTER NINE

THE EVOLVING PATTERN OF AIR DEFENSE ORGANIZATION

I

Although the old Air Defense Command had expended most of its energies for air defense in trying to get the tools with which to accomplish its mission, there had been much activity in planning for the ideal organization of air defense. It will be recalled that the Air Defense Command was originally organized into six territorial air forces - each of which was charged with the execution of all of ADC's responsibilities in its respective area.[1] Early in ADC's history it was realized that this six air force structure was unsuitable for air defense purposes.[2] Not only did each air force reflect ADC's own dilemma in being saddled with so many missions, but the actual territorial areas of the subordinate air forces bore little or no relation to the location of priority defense areas. In both its "Air Defense in Being" and "Long Term" plans ADC sought to rectify this deficiency. In the former plan ADC recommended the defense of five vital target areas by an organizational arrangement of only

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1. See above, pp. 48-51.

2. Ibid.

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three air forces. These air forces were to be responsible respectively for: the East Coast; the Mid-West; and the West Coast.[3] ADC's "Long Term" plan, assuming that there would be a greater build-up of air defense capabilities in the distant future, recommended a four air force organization distributed for defense of the following areas: the Northeast and Industrial Mid-West; the South and Gulf Coast areas; the entire West Coast; and the North Central Plains area. A feature of this latter plan was the recommendation that each air force be further subdivided into divisions and wings.[4]

ADC frequently sought AAF permission to reorganize its air forces to conform to its air defense plans, but it was not until early 1948 that it found USAF receptive to this suggestion.[5] It had been a feature of War Department policy to have the numbered air force boundaries correspond in area with the six continental armies. After unification, USAF continued to adhere to this policy in theory, though making concessions to ADC's needs.[6]

Early in 1948, USAF agreed to allow a reduction in the

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3. Ibid.

4. Ibid.

5. USAF to ADC: "Reorganization of the Air Defense Command," 17 Dec 1947

6. ADC to USAF: "Plan for Reorganization of Air Defense Command," 30 Jun 1948, and 1st Ind (DOC 155)

number of ADC's air forces from six to four.[7] The reduction took place in mid-1948. In his original request for a reduction, General Stratemeyer had recommended that a "command post" be constructed in each air force area. Exactly what was involved in this suggestion is not clear from the pertinent correspondence. At any rate USAF did not act upon it, and the matter was dropped.[8]

The reduction in the number of ADC air forces and the rectification of their boundaries did much to enable ADC to embark with confidence on preparations for the establishment of an air defense in being in 1948.[9] As soon as the earliest phases of this effort were implemented, however, new organizational problems affecting air defense were born. The Northwest maneuver of March-April 1948 saw the hurried merger of fighter and AC&W resources into a Northwest Air Defense Wing (Provisional), responsible to the Fourth Air Force for the defense of the Seattle-Hanford area.[10] This temporary organization left much to be desired in its composition and procedures, and the end of the maneuver saw its demise.

It had been realized by ADC and all concerned with air defense operations that the very nature of those operations required

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7. Ibid., 1st Ind. (DOC 155)

8. ADC to USAF: "Plan for Reorganization of the Air Defense Command," 29 Jan 1948 (DOC 156)

9. See above, Chap. III.

10. Ibid.

agencies new in the experience of the Air Defense Command. The necessary synchronization of fighter and ground radar capabilities demanded the formation of local operational headquarters to operate these resources in unison. Any such organization would have to be injected between the numbered air force and its fighter and AC&W components. By mid-1948 provision was consequently made by USAF for the eventual activation and assignment to ADC of a number of air divisions for that purpose.[11]

The gradual build-up of an AC&W network in the Northwest and Northeast during 1948 made certain innovations necessary in the matter of AC&W organization. In the early months of 1948 only one AC&W Group existed within the Air Defense Command - the 505th. The growth of a ground radar network in the Northwest occupied its full attention, however, necessitating the acquisition of an additional AC&W Group for the East Coast area. In May 1948 the 503rd AC&W Group was activated in the First Air Force area.[12] Both AC&W Groups were responsible for the operation of the nascent ground radar system in their respective areas.

The decision of the United States Air Force to embark upon the LASHUP and Permanent Systems in September 1948 necessitated

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11. USAF, "Department of the Air Force Troop Program," 1 Jun 1948

12. USAF to ADC: "Constitution and Activation of the Hq. 503d Aircraft Control and Warning Group. . . ." 19 May 1948

greater activity in the matter of air defense organization. In that month ADC pressed USAF for the immediate activation of two air divisions to operate the defenses of the Northwest and Northeast areas.[13] In consequence, the 25th and 26th Air Divisions were activated and assigned to the Fourth and First Air Forces respectively in the following month.

II

The beginning of large-scale air defense activity in the fall of 1948 was paralleled by a major change in USAF organization. On 1 December 1948 the Continental Air Command was formed, and ADC and the Tactical Air Command were placed under it as operational headquarters. The administrative and logistical functions of the two subordinate headquarters were assigned to the territorial air forces, also under the overall authority of ConAC. The reorganization of December 1948 was of considerable benefit to air defense in that it brought directly under ConAC's authority the total air defense resources of the two commands. This amalgamation was particularly welcome not only because three fighter wings were added to air defense, but also because ConAC acquired a number of sorely-needed personnel experienced in aircraft control operations.

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13. ADC to USAF: "Preliminary Action for Activating Air Defense Division Headquarters," 25 Aug 1948 (DOC 157); and, ADC to USAF: "Request for the Activation of an Air Division Headquarters," 28 Sep 1948 (DOC 158)

Although the reorganization of December 1948 was generally of much benefit to air defense, it introduced into the air defense picture a situation which was to cause considerable misunderstanding in the immediate future. The concept of a major command which was solely an operational headquarters was a novel one. Although ADC was nominally a major USAF command, with a general officer in charge, its position in the ConAC hierarchy throughout its short existence was an incongruity.[14] In theory, ADC was to be the operating agency of the entire continental air defense system under ConAC, and it was to exercise authority through two regional headquarters subordinate to it. As an operational headquarters it was not to possess command authority over any air defense element, but was to operate the system with the resources placed under its operational control from time to time at the discretion of the Commanding General of ConAC.[15] Misunderstanding was inherent in such a situation. The anomaly was further emphasized by the fact that the Commanding General of ADC was at the same time Deputy for Air Defense on the staff of the Commanding General, ConAC, so that it was frequently uncertain in what capacity he spoke.[16] ADC was to remain in this unfortunate position until

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14. ConAC, G. O. #2, 1 Dec 1948. The Commanding General of ADC was Maj. Gen. Gordon P. Saville.

15. ConAC Reg. 25-1, "Organization and Mission of the Air Defense Command," 31 Jan 1949 (DOC 159)

16. ADC to ConAC, 28 Dec 1948 and IRS correspondence inclosed as Document 51 in: History of the Continental Air Command, 1 Dec 1948 - 31 Dec 1949.

July 1950, when it was eliminated as a major command.

III

As the new AC&W system, or LASHUP, came into being, the process of creating a hierarchy solely concerned with the operational control of air defense was accelerated. To the air divisions which had been activated in the autumn of 1948 were now added ADC Headquarters itself and two regional headquarters subordinate to it. These latter organizations, called "Air Defense Liaison Groups," were established in close proximity to the headquarters of the First and Fourth Air Forces which were to support them administratively.[17] The implementing agencies of the two Air Defense Liaison Groups (ADLG) were the two air divisions: the 25th and the 26th. The two divisions, however, were assigned directly to the air forces in whose area they operated. The relationship between ADC and the air divisions was nebulous indeed in view of the fact that throughout 1949 major air defense activity lay in construction and deployment of radar, rather than in air defense operations. In theory the divisions had a dual allegiance to the air forces and to the operational hierarchy headed by ADC headquarters.

Thus, as 1949 progressed, two organizational hierarchies

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17. ConAC to WADLG: "Mission and Responsibility of the Western Air Defense Liaison Group," 23 Mar 1949 (DOC 160); and, ConAC to EADLG: "Mission and Responsibility of the Eastern Air Defense Liaison Group," 23 Mar 1949 (DOC 161)

were revealed, one concerned with operational matters and the other with administration and logistical support of the air defense elements. Although the number of air forces had been reduced to four in the summer of 1948, the reorganization of December 1948 had raised this number to six again by the addition of two air forces brought into ConAC by the Tactical Air Command.[18] The number of ConAC air forces remained at six until a further reorganization in July 1950 reduced the number once more to four.

The air forces were also placed in an anomalous position as a result of the growth of an operational hierarchy within ConAC. Although in March 1949 ConAC saw fit to transfer air defense responsibilities from the air forces to ADC and to the two liaison groups, for almost a year thereafter the air forces still were the only organizations within ConAC capable of administering and supporting the field units. By their possession of experienced engineering and installations personnel, and by their control of air base facilities for logistical purposes, the air forces were the logical agencies to supervise the construction and deployment effort of both the radar networks in progress.

Lest it be understood that the existence of two command hierarchies so inextricably intermeshed was the result of mismanagement, it must be pointed out that the necessity of integrating

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18. See: History of ConAC, 1 Dec 1948 - 31 Dec 1949, Vol. I, pp. 30 ff.

so many special military and civilian air defense capabilities posed requirements which the existing air force structure was incapable of meeting. The need for sector and regional control of GCI operations demanded a controlling hierarchy familiar with the requirements and operation of this highly specialized activity. The key points in this air defense operation were the control centers and the GCI stations, and it was at these points that skilled commanders were required to operate, unencumbered with administrative and logistical burdens. The existing air forces were trammelled with responsibilities inherited from the old ADC, which made it difficult for them to grant to the air defense mission the degree of effort called for. Consequently it was quite realistic to leave the air forces responsible for what they could accomplish with their resources, and to create an operational air defense hierarchy side by side with the existing organization.

The necessities which prompted this unique juxtaposition of old and new organizational structures within ConAC, while self-evident to those who planned their development, was not understood too well in the field, and confusion in thought was rife. Fortunately, this confusion affected administrative matters, and did not prejudice the air defense effort during 1949 to any appreciable extent. That it did not do so to a greater extent was perhaps due to the fact that active air defense operations were limited by the greater logistical effort of deployment and construction.

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IV

The program for implementing the organizational structure of operational control of the air defense system called for the activation of two operational regional headquarters.[19] As has been seen above, two air defense liaison groups had been organized in March 1949 as a temporary measure pending the activation of the T/D units which were to perform this function permanently. The two liaison groups had been formed by detaching certain key air defense experts from the staffs of the First and Fourth air forces. As has been noted above, the implementing agencies for the decisions of these two liaison groups were the two existing air divisions. The fact that the two liaison groups were made responsible for the operation of the total ConAC air defense effort, meant that this mission was delegated in reality to the two divisions. In the case of the 25th Air Division the assignment of air defense responsibility for the entire western half of the United States caused misgivings to its commander, Colonel Casey R. Vincent. This officer remonstrated that his responsibility was not commensurate with his ability to meet it, especially since he did not even possess direct telephonic communications with the New Mexico defenses.[20]

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19. ConAC to 10th AF: "Air Defense Responsibilities," 1 Feb 1949 (DOC 162)

20. TWX, 25th AD to ADC, 8 Jul 1949 (DOC 163)

The dilemma in which Colonel Vincent found himself reflected the transitional nature of air defense organization in 1949. If the situation was so perplexing to Colonel Vincent, it can be no surprise that unindoctrinated USAF Headquarters personnel sent to inspect the West Coast defenses during operation DRUMMERBOY in 1949 were left wondering at the state of organization in the west.[21]

The way in which the dilemma of the 25th Air Division was resolved gives an excellent insight into the problems facing ConAC Headquarters in this thorny question of air defense organization. General Whitehead recognized the predicament in which his subordinates found themselves. He immediately gave the Commanding General of the Fourth Air Force the additional assignment of commanding the western air defenses with the exception of those in the state of New Mexico.[22] The latter area was placed under the operational control of the Commanding General of the 12th Air Force, in whose territory the Albuquerque defenses lay. This arrangement in effect placed the western area under one commander for both logistic and operational purposes, although retaining the fiction of a dual hierarchy. Similarly, the New Mexico area was to be operated and supported by one commander, although it was

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21. USAF to ConAC: "Special Report of Observation on Exercise DRUMMERBOY," 2 Dec 1949 (DOC 55)

22. TWX, Whitehead to Upston, 8 Jul 1949 (DOC 164)

impossible in his case to grant him two titles.

In the eastern part of the United States confusion of the two hierarchies was mitigated by the proximity of ConAC Headquarters to the eastern air defense effort. Furthermore, the critical importance of the Northeast and the relatively advanced state of radar deployment there necessitated a permanently established operational hierarchy. This had been achieved at an earlier date than in the west by transferring a goodly number of ADC Headquarters personnel into an organization known as the Eastern Air Defenses Headquarters, commanded by Major General Robert Webster, hitherto Commanding General of the First Air Force.[23] The 26th Air Division was not presented with the same dilemma which had faced the 25th Air Division because of the fact that the former's area of operation was not so extensive as the latters.

It will be recalled that the two air divisions had assumed responsibility for air defense in their areas at the time the air forces were relieved of that responsibility in March 1949. As a result of the "shake-up" of July 1949 described above, the two air divisions were again reassigned to the air forces. In general, the effect of the reorganization of responsibilities in July 1949 was to place all air defense elements in the field directly under the air forces. In the west, the Fourth Air Force commander was

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23. IRS, Saville to Whitehead, 5 Jul 1949 (DOC 165)

in effect in full control of the entire air defense complex. In the east, much the same prevailed, with the First Air Force commander in control, except that a group of experts had been created in EAD Headquarters which worked closely with him. Although the new arrangement appeared to be even more complicated than that which existed previously, it had the advantage of crystallizing responsibility and authority in one man in each area. These arrangements, however, were not intended to be permanent. General Whitehead made it clear that the operational hierarchy would resume its identity and responsibilities with the activation of the two regional air defense headquarters late in 1949.[24]

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In September 1949 the two regional air defense headquarters came into being under the names of the Eastern and Western Air Defense Forces. Their activation, however, did not mean an immediate end to the problem of command jurisdiction. A question arose again in the west as to whether integration of the WADF with the Fourth Air Force was warranted or not. The decision was made, however, to retain WADF as a separate headquarters, though based in close proximity to headquarters of the Fourth Air Force at Hamilton Air Force Base, California.[25] There was little controversy

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24. TWX, Whitehead to Upston, 8 Jul 1949 (DOC 164)

25. IRS, P&O to DAD, "Organization of Hq and Hq Sq Western Air Defense Force," 6 Sep 1949, and draft of study attached (DOC 166)

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involving the advantages of separation in the east, where the separation had been found to be successful.

While these organizational adjustments were being made, the deployment of LASHUP was progressing rapidly and nearing completion. This latter factor meant that the day of full-scale active operation of the air defense system was drawing near, and that clearly-defined lines of responsibility would have to be drawn soon.

The complicated ConAC structure of six air forces and two operational commands, which included missions concerning the Air National Guard, the Air Reserve, tactical air support of ground forces, air defense and a wide variety of other missions, was far too unwieldy to satisfy General Whitehead and his staff.[26] Early in 1950 ConAC suggested to USAF that a major reorganization of the United States Air Force take place which would see a redistribution of ConAC's many missions among other major commands. ConAC recommended that air defense be reserved as its primary mission. Although USAF failed to consent to ConAC's suggestions, it did agree that a reorganization within the Continental Air Command might be the answer to ConAC's problems. Two additional factors which spurred ConAC to reorganize its household were the decision to redeploy its fighter resources, and the outbreak of war in Korea.

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26. ConAC to TAC: "Long Range Planning in Hq ConAC," 6 Apr 1950 (DOC 167)

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The decision to redeploy ConAC's fighter resources reflected the growing maturity of the LASHUP system and experience in air defense operations.[27] The completion of LASHUP in mid-1950 called for a closer integration with that system of fighter capabilities, and this meant an extensive redistribution of aircraft strength. It was consequently decided to divide ConAC's fighter resources into 23 separate squadrons and deploy them separately upon 14 bases.[28] This redeployment of fighter squadrons implied a far-reaching readjustment in the conventional relationship of fighter squadron to parent wing headquarters. As this deployment was made, the increased reliance of the fighter squadron upon the air division in operational matters created a corresponding loss in the authority of wing over squadron. In addition it meant a loss in the authority of the numbered air force over fighters and bases, since these units were directly assigned to the numbered air forces.

By mid-1950 a gradual build-up of the operational hierarchy within ConAC's air defense system had witnessed increased manning in the two Air Defense Forces and the establishment of additional air divisions and AC&W Groups. The completion of LASHUP and the completion of engineering preparations and site selection for the Permanent System had deprived the air forces of much

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27. On the 23 Sq Plan, see Chap VI.

28. See Chap VI.

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of their former responsibility to the air defense effort. In consequence of these developments ConAC determined to separate its air defense function from its many other activities.

To this decision the outbreak of war in Korea contributed. Immediately on commencement of hostilities, ConAC's entire establishment was galvanized into extra efforts.[29] The recall of reservists and federalization of ANG units put a strain on all staff activities, particularly within the air forces. The need for tactical support units in the Pacific drained off much of TAC's strength and involved great logistic effort on the part of all to ship fully equipped units overseas. The air defense system based on LASHUP was converted overnight from a token or "model" system to a full-scale air defense system on the alert for an imminent attack. The strain was immediately felt in ConAC Headquarters where all these responsibilities converged.

The separation of the air defense function from ConAC's other chores was made in July 1950.[30] As a result, the Air Defense Forces were metamorphosed into completely self-sufficient organizations and came into full logistical, administrative and operational authority over the air divisions, AC&W Groups and fighter wings. Headquarters ADC was abolished and its functions

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29. See ConAC Historical Study, "The Continental Air Command and the Korean War, Jun 1950 - Dec 1950."

30. ConAC to USAF: "Proposed Internal Reorganization of the Continental Air Command," 2 May 1950 (DOC 168)

incorporated into ConAC headquarters itself.[31]

To a great extent this reorganization eliminated the overlapping authority of command functions within the air defense system - but not entirely. The troublesome concept of operational control still existed to plague some divisional commanders in their relationship with the fighter elements.[32] The divisions, it is true, had been given continuous operational control over all fighters in their areas, but these fighter units had been assigned directly to the Air Defense Forces for command. A further complication arose from the fact that the air division, being an operational headquarters primarily, was not designed to render logistic support to the AC&W units under its control. This latter function was performed by the fighter wings which, by controlling air base resources, could render this support.

Another important factor in the continuing controversy over air defense organization arose over the status of fighter and AC&W groups. The dispersal of fighter squadrons away from group headquarters made the tactical fighter group headquarters an anachronism, and there were many within ConAC who advocated

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31. For a collection of pertinent documents dealing with the reorganization of Jul 1950, see: History of ConAC, 1 Jan 1950 - 30 Jun 1950.

32. See remarks of Col C. R. Vincent, Commander of the 25th Air Division in Report of Operation WHIPSTOCK. See WADF monograph on Operation WHIPSTOCK, Jun 18-24, 1950; also, Smith to Myers, 6 Jun 1951 (DOC 169)

the complete elimination of the fighter group.[33]

A similar problem arose concerning the AC&W group. Originally the AC&W groups had been independent organizations, responsible for the operation of the ground radar under their control. With the formation of the air divisions, however, the group and division headquarters had been integrated into one organization, though retaining the fiction of separate identities.[34] So long as one AC&W group performed its function alone in a division area, the necessity of retaining a separate AC&W group headquarters was seriously questioned.[35] However, the influx of manpower into the AC&W system after Korea, and the expansion of the system itself to include more radar stations, resulted in the activation of a number of new AC&W groups, with the result that in several instances in 1951 two groups handled the AC&W function within one divisional area. This complicated the suggestion to eliminate the AC&W group headquarters as unnecessary.[36]

As a direct product of the Korean conflict, the process of air defense organization was given a great forward impetus. At

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33. EADF, Memo, "Recommended Organization for Fighter-Interceptor Wing in Air Defense," 16 May 1951 (DOC 170)

34. See: History of the 25th Air Division, Oct - Dec 1949; and, History of the 26th Air Division, Oct - Dec 1950.

35. EADF to ADC: "Plan for Reorganization of the Air Division (Defense) 12 Jan 1951 (DOC 171)

36. EADF to ADC: "Organization for Air Defense," 31 May 1951

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SECRET

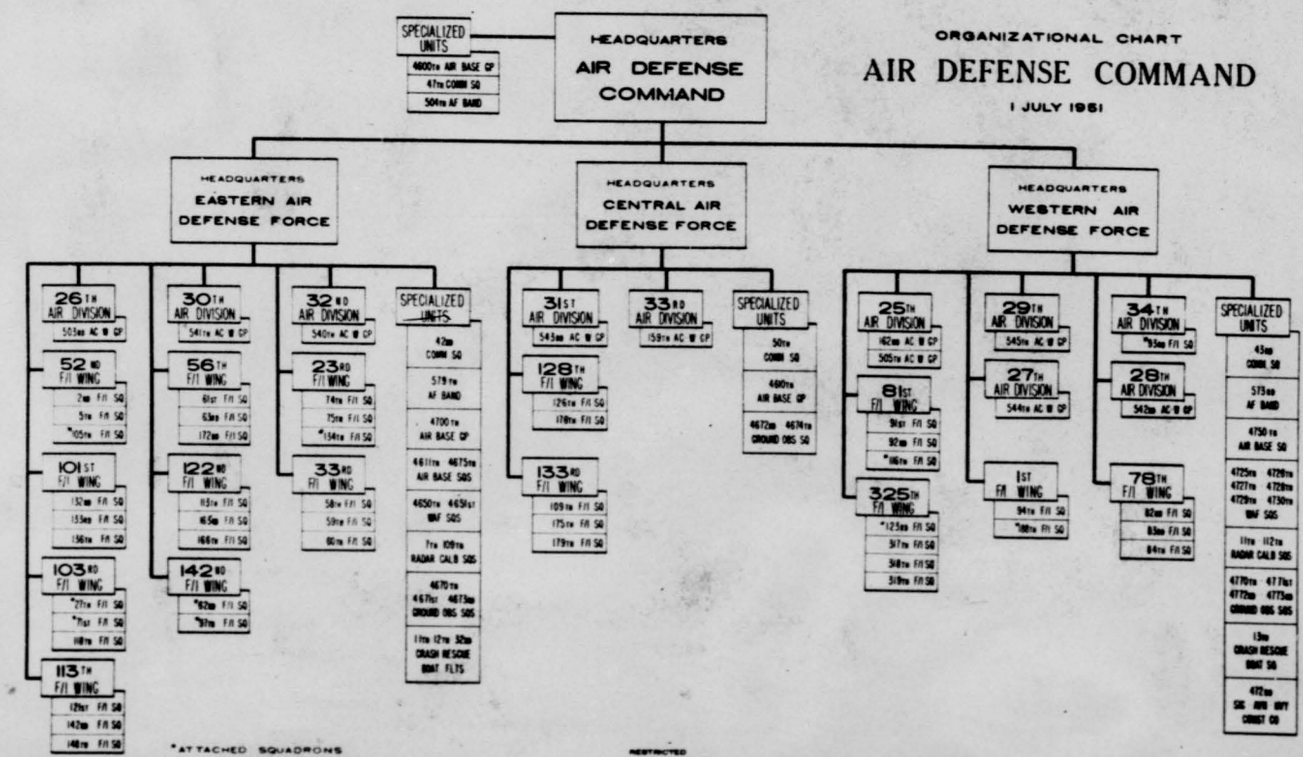
ORGANIZATIONAL CHART: AIR DEFENSE COMMAND
(1 July 1951)

RESTRICTED

ORGANIZATIONAL CHART

AIR DEFENSE COMMAND

1 JULY 1951



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the end of 1950 the Continental Air Command was split into three components, each of which became an independent major command. On 1 January 1951 the air defense hierarchy of ConAC was incorporated into a new command bearing the familiar title of the Air Defense Command.[37] Its sole mission was that of providing for the air defense of the United States. The Tactical Air Command was also reestablished as a separate command. ConAC was left with its air force structure and the Air Reserve and Air National Guard missions.

Early in 1951 a commanders' conference was convened at Headquarters, ADC, to consider the many problems of air defense organization which remained after the reorganization of ConAC. In view of the many imponderables in the situation and the conflicting views aired, it was determined that a period of experimentation by each air defense force commander would do much to help determine the best form of organization. By June 1951 the experiment was still continuing.

A feature of the organizational growth of the new Air Defense Command early in 1951 was the establishment of a third Air Defense Force to operate the air defense of the central and southeast

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37. AF Reg 23-9, 15 Nov 1950, and, ADC G. O. #2, 1 Jan 1951

portions of the United States.[38] This organization became known as the Central Air Defense Force, with headquarters located at Kansas City, Missouri.

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38. ConAC to USAF: "Establishment of a Central Air Defense Force," 27 Jul 1950 (DOC 172); ConAC to USAF: "Location of Headquarters of Proposed Central Air Defense Force," 6 Sep 1950; USAF to ConAC: "Establishment of a Central Air Defense Force," 5 Oct 1950 and 1st Ind (DOC 173); USAF to ConAC: "Establishment of a Central Air Defense Force," 13 Dec 1950 (DOC 174); USAF to ADC: "Assignment of Central Air Defense Force," 5 Feb 1951