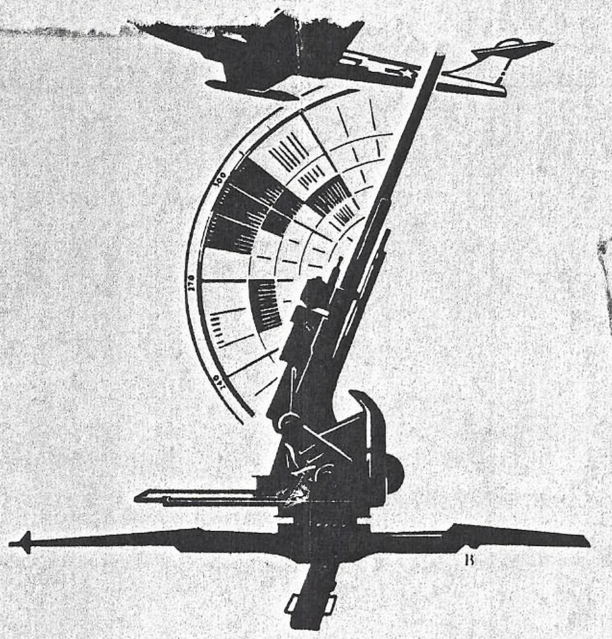

ARMY ANTIAIRCRAFT IN AIR DEFENSE

1946-1954

Directorate
of
Historical Services
Headquarters ADC

AF-ADC-COLO. SPRINGS, COLO.

[redacted]

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HISTORICAL STUDY
NO. 4

ARMY ANTIAIRCRAFT
IN
AIR DEFENSE
1946 to 1954

DIRECTORATE OF HISTORICAL SERVICES
HEADQUARTERS ADC
COLORADO SPRINGS, COLORADO
30 June 1954

[redacted]

FOREWORD

The purpose of this study is to describe the development of the continental antiaircraft system from 1946 to 1954. It is not concerned with strictly intra-organizational problems such as might be discussed in a conventional history; the approach taken has rather been from the viewpoint of antiaircraft's participation in air defense. For this reason, this study has been restricted to an examination of such aspects as doctrine, resources, operational and administrative organization, and tactical disposition.

The first two chapters are concerned with the period from 1946 to 1950, during which the chief problems revolved around doctrinal difficulties: was the mission of air defense to be unitary? were AA units assigned to ground armies to be under air operational control? How was operational control to be exercised? The ensuing chapters are concerned with the physical buildup of the antiaircraft system after the basic doctrine had been agreed upon by the Army and the Air Force. Thus, chapters on the Army Antiaircraft Command -- organization, mission, and the like -- on deployment and resources, on operations and rules of engagement, and upon NIKE and the future antiaircraft system follow in that order.

For the most part, documents concerning the period from 1946 to 1950 were found in the Historical Reference Files of this office. From the latter date, the work of Defense Force historians, together with that contained in the histories prepared by this office, contributed much of the information contained herein, as a check of the

documents cited in the reference notes will show.

For recent periods, however, and especially for information concerning the NIKE program, the writer is indebted to several officers in G3, Headquarters ARAACOM. They contributed vitally necessary information, and also took time to carefully read and comment upon this study while it was in draft form. The writer would like here to express appreciation for the willing and gracious aid of the following officers: Colonel E. T. Ashworth, Chief of the Plans, Programs and Organization Division, and his assistants Lt. Colonel J. R. Meacham and Major G. A. Chapman; Lt. Colonel S. J. Butler, Chief of the Operations and Training Division; and Major G. M. Ludwig, Executive, G3. Information on administrative matters and other equally important aid was given the writer by 1st Lt. W. N. Hicks, Adjutant General.

The writer assumes without qualification responsibility for all errors of fact or interpretation, and notification of such errors is hereby solicited.

Robert Lloyd Kelley
Historian

Colorado Springs
30 June 1954

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CHAPTER ONE

THE LEAN YEARS, 1946 - 1948

I

Within a few months after the end of the Second World War, the War Department took the first step toward creation of a peacetime air defense system in the continental United States by establishing an Air Defense Command. Activated in March of 1946 at Mitchel Field, New York, and placed under the command of Lieutenant General George E. Stratemeyer, this organization, with Strategic Air Command and Tactical Air Command, constituted one of the three major commands through which the Army Air Forces were to discharge their peacetime missions.[1]

The doctrinal basis for the creation of these three commands lay in War Department Field Manual 100-20, Command and Employment of Air Power, which the War Department had promulgated in July 1943. This document 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] The same pronouncement had also had a good deal to say about the mission of an air defense force, particularly the latter's relationship with antiaircraft artillery. When AA* operated in rear areas -- where ground armies were not actively engaged in carrying on combat operations, that is--

* Throughout this study the abbreviation "AA" will be used to denote Army antiaircraft artillery.

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and in the air defense of the same area with aviation,[3]

> 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.

Taking its cue from this pronouncement, and from ample wartime precedent, the Army Air Forces proceeded in March of 1946 to give General Stratemeyer a mission which included ADC control over anti-aircraft artillery assigned to air defense. He was instructed to "organize and administer the integrated air defense system of the Continental United States," and "exercise direct control of all active measures ... of air defense ...."[4]

Two months later, the War Department confirmed this mission. In May of 1946, in War Department Circular 138, the Air Defense Command was instructed to provide for the air defense of the United States, and to control and train such antiaircraft units as might be assigned to it. To provide the Army Air Forces with the requisite powers to carry out this mission, the War Department directed that the Ground Forces and Air Forces cooperate in developing AA tactics, in deciding upon the types of weapons required, and in drawing up manning and equipping documents for AA units. Finally, the Air Forces were charged with recommending to the War Department "the means, including the necessary antiaircraft artillery units, required for air defense."[5]

In early June 1946, a meeting in AAF Headquarters of the Air Board and Air Staff took up the problem of antiaircraft. Moving quickly to carry the War Department's May pronouncement to its logical conclusion, the Air Forces decided to present a proposal to the War

Department that antiaircraft be integrated into the Army Air Forces.[6] Later in the month, in the course of instructing ADC to work up emergency defense plans with the other services, AAF commented that there should be no difficulty in securing operational control over elements of other services during an emergency. "There is apparent agreement," AAF concluded, "among the services on this matter at the present time."[7]

Within a few days, however, Army Ground Forces reopened the whole question of air control over antiaircraft. On the 14th of June 1946, General Jacob L. Devers, Commanding General of Army Ground Forces (AGF), sent to General Carl Spaatz, Commanding General of AAF, a study which AGF had prepared upon the problem of air defense. Proposing, in effect, that the air defense mission be divided in two, with AGF taking over the mission of providing local air defense and AAF providing air defense beyond the range of ground weapons, this study touched off a controversy which resulted in the most comprehensive statements of the ground and air viewpoints to be encountered during all of the post-war period.[8]

The Ground Forces, in their study, took the position that assigning AA to air control during the Second World War had had unfavorable results. The AA commander, charged with defending his area from air attack, had been under the galling restriction that another authority could order him to withhold his fire; he was, AGF asserted, given a heavy responsibility without requisite authority. Furthermore, the "fact that the air forces can restrict fire at will has militated against adequate enforcement of known procedures for identification of friendly aircraft."

The Air Forces also tended to under-rate the effectiveness of ground fire, AGF went on. "Large numbers of AA guns have been held silent because of the presence of a single or few fighters in the area." Aircraft had been restricted to defending limited areas and points, thereby losing their mobility and range of action and disregarding their true function, area defense. Indeed, aircraft performed their air defense mission best not by operations over friendly territory, the study asserted, but by "offensive action primarily over enemy territory." The spheres of action for AA and air power were described as being totally separate. While aircraft operate at great distances from defended targets, ground weapons go into action after attackers have eluded friendly air. When attackers approach their targets, "sole reliance should be placed on ground means."

The Ground Forces recognized three other arguments advanced by air proponents. These concerned joint use of radar, safety of friendly aircraft, and selection of the most adequate means to meet an attack. These arguments were accounted fallacious. While admitting the great utility of the Air Forces' radar, it was pointed out that AA had been forced to rely upon its own equipment for target acquisition because of the inadequacy of the Air Force's air warning system. As for the safeguarding of friendly aircraft, "This is considered," AGF remarked acidly, "an avoidance of the problem of recognition and identification." After listing the means available to achieve identification, AGF insisted that the identification problem "is capable of solution..." AGF took the firm position that AA was the best means for air defense of local targets, and should be used to the exclusion of fighter

aircraft. "Within range of its weapons," AGF asserted, "an adequate antiaircraft defense is the most effective protection of a defended point or small area against enemy air attack."

Finally, AGF went on to point out that AA is a versatile and multi-purpose weapon which loses much of its effectivenes when confined for long periods to static defense. It should be kept trained and mobile to the point where it can be used with moving armies. Ground Forces control was necessary, therefore, to provide rotation of units, keep them trained in all roles, and "permit the rapid displacement from one area to another and prompt conversion from one role to another as circumstances demand, without reference to several other headquarters." In any future war, the demand for AA on the home front would decline after the initial attacks, requiring eventually a major conversion of AA to its ground role.

Applying these arguments to continental defense, the Ground Forces proposed that they be given the mission of providing the air defense of ground targets within the range of their weapons. AGF would perform this mission by allotting AA weapons to the Continental Armies, establishing priorities for defense upon the basis of directives from higher authority, and informing the Air Forces of the locations of ground defended areas. Within these areas, friendly aircraft would be permitted to operate provided the defenses were advised of their approach. When an attacking airplane reached the defended area, AA would open fire and fighter aircraft would break contact to wait until the enemy aircraft emerged once again from the confines of the ground defended area.

Summarizing, Army Ground Forces recommended that "air defense" be redefined as "defense by air." Possibly conceiving of this as essentially border defense, AGF went on to amplify this by stating that the purpose of "defense by air" would be "to deny the enemy access to the airspace over friendly territory." Within the range of ground weapons, the action should be defined as "antiaircraft defense," and assigned to the Ground Forces.

These sweeping proposals produced equally comprehensive counter-proposals. A long list of objections was very shortly raised by the Army Air Forces.[9] The chief point brought up was one insisting that for a single mission there should be a single command. The speed and range of modern aircraft, AAF commented, together with the great destructive power they wield, made any attempt to divide the single mission of air defense between two separately-operating agencies a prospect fraught with disaster. One commander must have authority over wide areas. He must have instantaneous sources of communication, tapping all agencies, and the power to allocate resources as he sees fit. A split in command would mean duplication of communications and electronic countermeasures, two detection systems, and slow coordination of actions which should be swiftly carried out. One suspects also, although it was not stated, that AAF could not regard tranquilly the prospect of Ground Forces reassigning AA to ground operations -- "without," as the AGF study had commented, "reference to several other headquarters" -- leaving the Air Forces scrambling about to plug gaps in defenses theretofore covered by the Ground Forces. The difficulty of planning future actions with no knowledge when the partner in the

operations might withdraw his forces, was manifest.

These assertions were accompanied by many arguments designed to meet those raised by the AGF study. AAF felt that the Ground Forces emphasized overmuch the experiences gained during the recent war when the Allies had overwhelming air superiority, and freedom from air attack in rear and home areas allowed AA to move on with ground armies. Fighter aircraft were never tied to the defense of fixed points, as the AGF study had charged, but carried on operations over fixed points if the tactical situation made such operations sound. The Ground Forces seemed not to recognize that future developments in ground-launched missiles might render these weapons far different from normal antiaircraft, both in range and characteristics. To limit aircraft to the sphere outside the range of ground-launched weapons when guided missiles reached an advanced state of development would very probably be tactically unsound.

As for the statement that an "adequate" AA defense, within range of its weapons, was the best type of air defense, AAF replied that the same qualifying adjectives could be provided to any type of weapon defense with the same result. An "adequate" fighter defense, within its range, would be the best type of air defense, if there was need to select one means to be used. Each weapon, however, had its own role to perform, and according to circumstances one or the other would be the best weapon to utilize.

The AGF study had taken the position that ground action "against any adversary is basically a ground responsibility." To this the Air Forces retorted that the mission of a weapon was the more important consideration, and not the point in space from which it was launched.

The recent war, it was asserted, had proved unmistakably that the mission molded forces; joint operations, under the direction of the force chiefly concerned with carrying out the mission, had become the order of the day. For that matter, AAF went on to point out, if ground control over ground weapons was the theory, how could AGF countenance, as it did in the study, the air component having control over ground radar stations?

With regard to the mobility of AA, and the Ground Forces' dictum that it should be so used as to retain its multi-purpose character, AAF felt that the Ground Forces had been "unduly influenced" by this secondary role. Antiaircraft existed for one reason alone, to destroy aircraft, and should be used in that mission to the exclusion, if necessary, of secondary or tertiary roles.

Identification, AAF went on, was not a soluble problem. No system had yet been devised whereby identification could be achieved in an acceptable percentage of cases.* Furthermore, no defense system could be based upon voluntary exchange of information between the AA radar system and that of the air warning service. These agencies must be under one commander.

The recently-created Air Defense Command, in its study of the problem, added several other objections to those raised by AAF. Defense

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* Later experience was to prove this comment more true than was probably realized at the time. The AGF study as well as the AAF answers were concerned mainly with combat theaters, and neither seemed to recognize the large identification and rules of engagement problems which would be produced by the operation of an air defense system in peacetime, when air traffic was heavily civilian and not amenable to central direction.

in depth was made necessary by the speed of modern aircraft, and local defenses as such might very well be eliminated in future air defense arrangements. Air attack might be sudden and without warning, so that in-being forces, under one commander, were a requisite in peacetime. While recognizing the need for Ground Defense Zones in addition to Air Defense Zones, ADC felt that these zones should be designed according to weapon capability, and not assigned without qualification to particular commands. ADC did not commit itself to rules of engagement for such zones, and made no comment concerning those described by the AGF study. Summarizing, ADC recommended that General Devers' principles be applied only within a single force, and that air defense be defined to embrace all measures designed to prevent or lower the effectiveness of air attack. In what might have been a plea more to AAF Headquarters than to the Ground Forces, ADC went on to assert that not only should air defense be under one commander, it should be provided by forces in-being. This latter point was to illumine much future controversy between ADC and AAF.

In late September of 1946, the War Department agreed with AAF that the air defense mission should be unitary.[10] Decisions as to the future role of guided missiles in air defense were consciously withheld, in order to "maintain service-wide doctrinal flexibility in the use of this arm...." However, it was believed "neither feasible nor desirable" to change Circular 138, issued the previous May, which provided for a single command charged with the complete responsibility for carrying out the active defense of the United States against air attack. While AA employed with the ground forces was of primary concern to the Ground Forces, AA assigned the mission of air defense would come under the control of the Air Forces.

The War Department then proceeded to list the tasks which AGF and AAF should perform to fulfill the responsibilities thus delineated. Both should submit to the War Department their AA requirements for the next three to five years. The Air Defense Command was to arrange to make its staff an integrated one, incorporating AA elements, and insure that AA assigned to it was trained in ground combat missions, not to interfere with the fulfillment, however, of the primary air defense responsibility. The Ground Forces, on their part, would continue to provide technical training for all AA units.

The doctrinal controversy in its most crucial aspect -- whether the mission of air defense, as regards antiaircraft, was to be unitary, and who would have it -- was never again seriously re-opened. Operating from this position, the Air Forces were able in time to secure for themselves almost every other corollary doctrinal principle.

II

Within a very short time after the War Department had made its doctrinal decision, Army Air Forces asked ADC for recommendations as to the number of antiaircraft units required for air defense. On the 19th of October 1946, ADC sent forward the information that 140 battalions -- seventy of them to be gun battalions, and seventy to utilize automatic weapons -- were desired.* 11

It was not long, however, before the War Department realized that antiaircraft units were not to be available for assignment to air

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* Neither disapproval or approval for this plan was ever received by ADC. ADC to C/S, USAF, "Air Defense of the Continental United States," June 2, 1948 (DOC. 5).

defense.* Accordingly, on the 9th of December the War Department directed the Ground Forces to train their AA units in static air defense and prepare for their use as necessary in a "coordinated air defense..."[12] Shortly thereafter AAF Headquarters gave its official blessing to a program of formulating joint agreements with other services which ADC had set in motion in the early spring of 1946.[13]** These agreements, according to an earlier Air Defense Command instruction, were to contain provisions assigning command of Ground Forces AA units to the ADC Air Force responsible for air defense of the area.[14]

First Air Force soon encountered First Army opposition to this scheme. During negotiations they found that the December War Department directive had contained provisions which led First Army to refuse to grant operational control of its AA to the air commander in the event of an attack. The directive, after stating that the Ground Forces would train their units in static air defense, had gone on to comment that AAF and AGF had been directed to prepare plans for the use of AGF-assigned AA in air defense, with the provision that Ground Forces units would remain under the operational control of the appropriate ground commander.

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* At this time the only AA units in existence were one gun battalion and one AW battalion at Fort Bliss, and one gun battalion and one AW battalion at Orlando, Florida. These units were at cadre strength with a combat effectiveness of zero. The National Guard was the chief source of potential strength. AGF to CG's, Continental Armies, "Defense of the Continental United States (Revision No. 1)," 10 June 1946 (DOC. 6).

** It is important to note that these agreements were concerned with actions to be taken after an attack, and not before. They did not provide for the creation of an in-being air defense.

"It is difficult," First Air Force observed," to see how we can insist upon operational control of such units as long as the First Army has such a directive." The latter organization took the position, First Air Force went on to explain, that joint agreements would have to wait upon plans to be drawn up by AAF and AGF Headquarters, and that in any event operational control would not be given to the air commander.[15]

The Air Defense Command immediately appealed to AAF Headquarters for aid. In doing so, ADC pointed to the fact that Sixth Army had already agreed to give operational control over its AA to Fourth Air Force. Replying on the 22nd of April 1947, AAF Headquarters was able to state that the War Department was instructing all agencies that operational control by appropriate ground commanders was "merely a point to be considered and is not to be construed as an expression of policy."[16] This approach had been rendered clearer, meanwhile, by AGF's approving an agreement between Fourth Army and Tenth Air Force which would place Fourth Army's AA under air control immediately upon attack.[17]

First Army remained adamant in its refusal to grant operational control, however, and ADC in early May 1947 requested AAF Headquarters to work out the problem by direct negotiations with Army Ground Forces Headquarters.[18] In July, an agreement was reached between the two Headquarters.[19] Before the designation of an overall theater commander, when AGF AA units were utilized in air defense:

> ADC would set up communications to the Anti-Aircraft Operations Centers (AAOC).
>
> AGF AA would follow procedures drawn up by ADC governing the assignment of targets, opening and ceasing fire, conditions of alert, and minimum manning requirements.

Before advent of an emergency, AGF commanders would insure that their units were familiar with ADC procedures.

The extent to which AGF AA units would participate in air defense, however, and the areas they would defend, would remain a matter for joint agreement between Army commanders and the corresponding Air Force commanders. While the problem of operational control once the units were utilized in air defense had received clarification, it was still up to the individual Army commander to decide whether his AA units, when he got them, would be used in air defense. The only Armies known to have concluded joint agreements upon this basis were the Fourth, Sixth, and First Armies.[20]

III

One problem which may have operated to retard such joint agreements was reported by Second Air Force in December of 1947. Going to Fifth Army to work out arrangements for control of AA, Second Air Force was confronted with a request for the SOP's which the July AGF-AAF agreement had stated ADC would prepare. When Second Army turned to ADC for information, the latter replied that SOP's were under study, and were to be published soon. Such, however, was not to be the case. A year and a half later the Eastern Air Defense Liaison Group had to inform Fifth Army that no SOP's could be published until differences at the Joint Chiefs of Staff level were resolved.[22] Not until July of 1950, two and a half years after Second Air Force's query, was final agreement reached between the Army and the Air Force upon operational rules.

This doctrinal log-jam grew partly out of the unification of the Armed Services which took place in July of 1947. Preparing for this action had absorbed the energies of top command levels since the ending

of the Second World War. A great public debate, featuring countless conferences, Congressional hearings, Executive discussions, and newspaper editorials, finally culminated in the passage on the 26th of July 1947 of the National Security Act. By this Act, the War Department was abolished, the Department of Defense was created, and the United States Air Force became a separate and co-equal service under this agency with the Army and the Navy.[23]

Unification required re-definition of roles and missions. Through the summer, fall, and winter of 1947 discussions on these subjects took place within the National Military Establishment, but no conclusions were reached. Eventually, Secretary of Defense James Forrestal made it known that he intended to bring about final settlement of outstanding doctrinal disputes in a special conference of the Joint Chiefs of Staff to be held outside Washington, D. C. To prepare for this meeting, the Air Force created an Air Defense Policy Panel to draw up the Air Force position on air defense doctrine. Reporting in February of 1948, this Panel recommended that antiaircraft be integrated into the Air Force. The "present assignment of AAA and ground-to-air missiles to the Army," the Panel asserted, "is contrary to good organization and to the most efficient utilization of the weapons in air defense."[24]

In March of 1948, Secretary Forrestal took the Joint Chiefs to the naval base at Key West, Florida, to work out their differences. The meeting lasted from the 11th to the 14th of March 1948. The delineation of functions which was drawn up at this meeting clarified, to a certain degree, the role of AA in air defense. The Air Force's insistence upon integration of AA into the Air Force was rejected.

Antiaircraft continued in its assignment to the Army, but that agency was assigned definite responsibilities in air defense. It was charged with organizing, training, and equipping antiaircraft units, and providing them "as required" for air defense. These units, however, were to be employed "in accordance with joint doctrines and procedures approved by the Joint Chiefs of Staff."[25] As it turned out, the Joint Chiefs were never able to agree upon such joint doctrine and procedures. The Army and Air Force waited over two years for an approved document, and were finally forced to meet the problem bilaterally in the Collins-Vandenberg Agreement of July 1950.[27]

The Air Force, on its part, was given the mission of air defense, and was charged with formulating joint doctrines and procedures, "in coordination with the other Services," concerning air defense. Such doctrine would not become authoritative until approved by the Joint Chiefs of Staff.[26]

During the following fall, a panel of officers under Major General Gordon P. Saville -- who had been a major figure in air defense since early in the Second World War -- gathered at Air Defense Command Headquarters to draw up the required air defense doctrine.[27] After their labors were completed, the other Services were contacted for comments and approval. In June of 1949, despairing of securing joint approval of the doctrine thus formulated, USAF proceeded on its own to publish the "United States Air Force Policy on Doctrine and Procedures for the Air Defense of the United States."[28] With regard to AA, this unofficial policy stated that the Army would provide AA units for air defense in accordance with JCS allocations, and would place all such

units under ADC operational control. Moreover, the Army would make available to ADC for air defense all other such units in the United States so long as such action did not interfere with their primary missions.

Though this doctrinal statement was not binding upon the other Services, it is interesting to note that ADC's subordinate echelons were able to use it with outstanding success as a basis for negotiations with other services. Two years after its publication, Eastern Air Defense Force commented that the USAF doctrine had provided "a firm basis for inter-service relations and conduct of operations...."[29]

IV

The Air Force found itself, however, working largely in a vacuum. These years, 1946 through 1949, were marked by a complete lack of antiaircraft resources. During these years few concrete steps were taken toward erecting an antiaircraft defense because there were practically no antiaircraft artillery units with which to work. In the spring of 1946 the Ground Forces had only four cadre-strength battalions; two years later, at the time of the Key West agreement, there was but one provisional unit in existence. It was stationed at the Antiaircraft School at Fort Bliss, Texas, and had a strength of less than one battalion.[31] Two years after Key West, in February of 1950, the commander of the Eastern Air Defense Force reported to his superior that the First Army had "no regular antiaircraft battalions...."[32] These conditions go far to explain why four years were to pass with relatively little progress toward working out precisely how the antiaircraft element was to fit into the peacetime air defense structure.

From the doctrinal standpoint, these years saw important points settled, but they were few in number. It was decided that the mission of air defense was unitary in character, and that it was to be carried out by the Air Force. The Army, on its part, was to provide units "as required" for air defense, but only in accordance with JCS-approved joint doctrines and procedures which did not appear. Under the War Department it had been decided that AA units assigned to ground combat would come under air operational control when assigned to air defense missions, but the Army commanders were under no obligation to so assign them. A few agreements had incorporated this doctrine, but they were agreements which envisaged actions to be taken after air attack, and not before. As 1949 and 1950 were to show, the Army had not come around to the point where it would agree to give operational control over its AA to the Air Force prior to an attack. The Air Force, lacking AA units assigned primarily to the mission of air defense,* was without the means for securing an in-being air defense system.

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* With the exception of guns emplaced at Hanford in March of 1950, AA units assigned primarily to continental air defense were not to be made available until 1951.

CHAPTER TWO

THE CONTROVERSY OVER OPERATIONAL CONTROL, 1949 - 1950

I

When the Joint Chiefs of Staff and Secretary Forrestal gathered in Key West, the world was in the midst of the crisis of 1948. Czechoslovakia had fallen victim to a massive Communist coup d'etat the previous month; reports from China forecast grim occurrences in that unhappy land; during preparations at Eniwetok atoll for the second series of atomic tests there were sightings of a possibly hostile submarine; General Lucius D. Clay wired from Germany that he feared war was imminent; the British reported that the Russians were making belligerent gestures toward Finland and Norway; Italy and Greece were both teetering on the brink of the Communist abyss; and before the summer of 1948 came the United States found itself battling to feed Berlin.[1]

As these ominous portents of war unfolded, serious preparations for erecting an air defense system in the United States got in motion. For two years General Stratemeyer had been urging his superiors to erect an in-being air defense system,[2] and by the fall of 1947 USAF Headquarters had finally agreed with him. In October 1947 General Spaatz, USAF Chief of Staff, informed General Stratemeyer that "more emphasis would be placed on air defense," and in November of that year Plan SUPREMACY, which called for the construction of a nation-wide radar system, was approved by Headquarters USAF.[3] In December, USAF instructed ADC to reorganize itself to better perform its air defense mission,[4]

and gave it authority to require other USAF commands to provide their aircraft as augmentation forces in the event of an attack.[5]

During March of 1948, President Truman identified Russia for the first time as the "one nation" blocking peace, and called successfully upon Congress to re-institute the draft.[6] The Air Force, taking its cue from national policy, directed the Air Defense Command to immediately erect an air defense system in the Northwest. The following month this order was expanded to include creation of radar systems not only in the Northwestern United States but in the Northeastern and New Mexico areas as well. Within a few weeks a detailed listing of targets within these areas to be protected was furnished to Air Defense Command.[7] By November of 1948 plans had progressed to the point where the creation of Defense Forces, Air Divisions, and the LASHUP radar system -- utilizing World War II radars upon government land -- had been set in motion.[8]

Similar movements were underway in the Army. After two years and more of meager antiaircraft resources, the summer of 1948 saw a program of antiaircraft expansion set in motion. The Army began a program of creating and training twenty-six battalions, to be formed into nine groups and three brigades. It was a year and a half, however, before these units were ready to take up their positions.[9]

So far as the Army viewed the matter, these units were not destined for assignment to the air defense mission. They were to be assigned to the Continental Armies for the air defense of their units. When a representative of the Air Defense Command went around to First Army in October of 1948 to discuss the antiaircraft problem, he found

the Department of the Army assuming that air defense AA units would be provided from the Air Force's own manpower authorization. Since the Air Force had made no subvention to the Army of manpower spaces to cover AA for air defense, no units would be made available by the Army. All that the Air Force could expect, it seemed, was incidental air defense of vital targets which were near the Continental Armies.[10]

Not until the creation of the Eastern Air Defense Liaison Group (EADLG) in March 1949 could the matter be followed up. Representatives of this body conferred with the Continental Armies and found that from the Air Force point of view AA doctrine had retrogressed in the roughly two years since the AGF-AAF agreement of July 1947. As the EADLG historian described it,[11]

> All the Armies, especially the 4th Army, insisted that operational control over antiaircraft artillery was strictly a matter of Army jurisdiction, while the EADLG was equally adamant in claiming that this was primarily an Air Force function. Agreements were attempted and compromises were made by both sides, but no final agreement could be promulgated.....

II

By the end of summer 1949, First Army came to the decision that in any event commonly agreed-upon rules of engagement should be arrived at with Eastern Air Defense Force, the successor to EADLG. Accordingly, EADF was asked for its suggestions. The initial reply given by EADF was that such rules would have to wait upon decisions by the Joint Chiefs of Staff as to procedures and doctrine. To this, First Army replied that at the very least some interim procedures should be drawn up.[12]

This led to a controversy which, once started, was to involve all levels of command and not be resolved until after months of

discussions. Major General Robert Webster, commander of Eastern Air Defense Force and earlier commander of First Air Force, drew up rules of engagement which excited the disapproval of ConAC Headquarters, and a joint agreement which aroused equally strong disapproval on the part of First Army.

The two documents came out on the 27th and 28th of December 1949;[13] the SOP on rules of engagement was the earlier, apparently to tacitly indicate that prescription of procedures was wholly within the prerogative of EADF. As described in the SOP, antiaircraft artillery would defend targets selected by EADF, and be utilized in Gun Defended Areas and in Inner Artillery Zones to be decreed by EADF. Within a Gun Defended Area (GDA) minimum restrictions would be placed upon AA fire, and strict limitations upon friendly aircraft. Antiaircraft would engage all aircraft entering a GDA unless they were identified as friendly, or unless the air commander had ordered "Hold Fire." Such an order would apply to specific aircraft, and would be utilized only: if hostiles were approaching at altitudes and speeds where AA would be ineffective, allowing fighters to continue pressing attacks; to allow friendly fighters to pass through on their way to press attacks against hostiles not yet in a GDA; and when friendly aircraft happened inadvertantly to pass through GDA's.

Within Inner Artillery Zones (IAZ), the air commander would exercise no operational control whatsoever, according to EADF's proposal. Antiaircraft would engage all aircraft entering such a zone, unless the local AA commander elected to hold his fire. IAZ's would normally be created outside of fighter-defended areas. At the end of

the SOP the observation was made that "Friendly aircraft are responsible for proper utilization of the prescribed procedures of both identification and recognition to establish their own friendly character."

To re-capitulate, EADF took the position that prescribing rules of engagement was wholly within its prerogative, and then proceeded to draw up rules which would appeal to First Army in order not to excite Army objections, hoping thereby to remove from contention the principle that rules of engagement were an Air Force concern. AA, under this construction, would be used only in special gun-defended regions, within one of which all aircraft would be fired upon unless identified as friendly, while within the other all aircraft would be fired upon without qualification. The burden would be upon the air defense system to identify all aircraft and notify AA of the character of all aircraft approaching GDA's, and upon friendly planes to stay out of Inner Artillery Zones.

The proposed Joint Agreement adopted two themes: readiness is the keynote of air defense; and all participation in air defense should be coordinated and controlled by one air defense commander. This commander (EADF) would promulgate rules of engagement to be followed by AA in GDA's and IAZ's, prescribe alerts, select the objectives to be defended and indicate their priorities, approve plans for establishing AA defenses, prescribe the type of AA defense to be utilized (GDA or IAZ), and initiate action to deploy or re-deploy all forces. First Army, on its part, would by this agreement set up AA defenses as prescribed by EADF, and assign operational control over such units when they were in tactical positions to EADF.

[redacted]

The proposed rules of engagement apparently appealed to First Army, for within a few days the Joint Defense Planning Committee met, at Army's request, to embody them in formal joint doctrine. They were only proposals which were shortly to be completely disapproved by EADF's superior headquarters, ConAC, but by the time ConAC learned of them and communicated its disapproval to EADF, the die was cast. By early January 1950 the Continental Armies had received from the Joint Defense Planning Committee a communication which stated in effect that joint agreements with the Air Force would be drawn up on the basis provided by the rules of engagement suggested by EADF.[14] It was to take six months before ConAC could secure top-level aid in its attempt to remove from consideration the rules of engagement proposed by EADF in December of 1949.

ConAC first learned of these rules when it sent around to General Webster for his comments a proposed statement of ConAC policy concerning the integration of AA into air defense. In reply, General Webster sent along his two proposals, which contained principles diametrically opposed to ConAC policy.[15] Staff members in ConAC Headquarters pointed directly to the basic fallacy in the position taken by both EADF and Army that aircraft should be fired upon unless identified as friendly.[16] The AC&W system, as then constituted or as it was to be constituted in the future, would never have the capability of carrying every friendly track, especially in metropolitan areas where air traffic was heavy. It could not, therefore, undertake to warn AA when friendlies would be entering its area. The proposals, moreover, called for the AC&W system to be able to tell AA of the route of travel, altitude, and

[redacted]

time of travel for every such friendly aircraft. To be able to do so would require impossible peacetime restrictions upon friendly aircraft. They would have to be required to stay out of Inner Artillery Zones altogether, and keep the air commander apprised at all times of their locations and future course. This was manifestly impossible under current laws, and was impracticable from an operational standpoint. From necessity, the AC&W system only carried hostiles; in fact, in some areas all flights originating within particular regions were considered friendly and not even identified.

These comments required major revisions in the rules of engagement proposed by EADF. AA could not be free to fire at all aircraft not identified as friendly, but would have to be in a constant "Hold Fire" status until released to fire at a particular aircraft by the air commander. This position, once taken, was never abandoned by ConAC, and it eventually became the over-riding consideration in the use of AA.

There were other objections posed to EADF's proposals. For the few guns that would be available, for some time in the future, it was felt that it would be uneconomical to restrict airline, USAF, and other travel in the areas which GDA's and IAZ's would have to cover. Furthermore, interceptors should not be kept out of IAZ's, for it was felt that they would probably be more effective than AA.

Again, the Agreement and the SOP both repeatedly stated that EADF would prescribe rules of engagement only for AA in GDA's and IAZ's. This misrepresented the picture, in ConAC's view, for AA would not necessarily be used only in GDA's and IAZ's, and wherever used would have to be under air control.

SECRET

Brigadier General Herbert B. Thatcher, ConAC Deputy for Operations, wrote General Webster that it was ConAC's policy to keep all AA in air defense in a "Hold Fire" status, except possibly over AEC installations. Commenting that he realized EADF was making concessions in order to get Army agreement, and was retaining "Hold Fire" authority so as to get what was wanted by the "back door," General Thatcher observed that it "would appear more direct, and in line with ConAC principles of control, to boldly state the rules for 'release-to-fire' rather than the rules for 'hold-fire'. Thus," General Thatcher went on, "the Army would not be falsely led to believe that they are normally in a 'release-to-fire' condition." Furthermore, all references to GDA's and IAZ's should be deleted from the proposals.[17]

Within the week, ConAC published its formal statement of policy upon the use of AA.[18] Recognizing that Defense Force commanders needed latitude in their work with other services, ConAC nonetheless directed that the policy it was enunciating be followed as closely as possible "consistent with its acceptance as an understanding by the interested services."

ConAC, this policy stated, would determine the objectives requiring air defense, and recommend the scale of AA defense for each of them. Defense Forces would promulgate "the agreed procedure for coordinating and controlling the fire of AAA." Agreement upon these procedures would be reached with Army commanders on the basis of the following considerations:

> The presence of AA within a warning system should not result in restrictions on flight to the extent of forbidding it; nor would the presence of AA necessitate special approach procedures for military and commercial aircraft.

SECRET

> Outside a warning system, an IAZ would be justified if the objective to be defended was extremely vital to the nation's security, no other means of defense was available, and the zone was outside of routes of normal air traffic.
>
> Antiaircraft fire would be best controlled by the GCI station having the best coverage of the area defended by AA.
>
> Antiaircraft "should be in a hold fire status until notified to the contrary by the Air Division commander or his delegate." If an aircraft were identified as hostile or so evaluated, AA would be released to fire, regardless of other aircraft in the vicinity, unless a fighter attack was to be pressed in the area.

Both ConAC and EADF, in their proposals, had recognized that the Army's AA, as the situation then existed, was not primarily assigned to air defense, and that the Army was therefore under no obligation or directive to place it's AA in an air defense system. Vital concessions to the Army point of view had to be made. EADF felt that the concessions should be made in the rules of engagement, while holding fast to the principle that deciding upon rules of engagement was wholly within the Air Force prerogative. ConAC, on the other hand, felt that concessions should be made in the principle of who had the authority to draw up rules of engagement by agreeing that they should be arrived at jointly, while holding fast to certain basic restrictions upon AA fire.

General Webster immediately protested ConAC's policy, insisting that operational control -- that is, the authority to prescribe rules of engagement -- must never be made subject to joint authority. When he had first seen a draft of the letter, he had pointed out that if operational control were to be kept wholly within Air Force prerogative, then "This SOP ... will remain in effect only until we change it."[19] Later, when the letter was formally published, he wrote:[20]

> I hasten to advise you that [this policy is] ... diametrically opposed to the concept held by this headquarters.... I do not expect to concede in my conferences with Army commanders that procedures or rules for the engagement of AAA, are matters for joint agreement. ... If knowledge of the paragraph in question reaches the Army, I believe that any hope we now may have of reaching a joint agreement at this level will be entirely destroyed.

He concluded by requesting that the letter be recalled and corrected "without delay." His objections, however, met with ConAC's refusal to modify the letter's provisions.[21]

Conferences with First Army found that agency equally antipathetic to EADF's proposals. First Army objected to the fact that the Joint Agreement posited "units to be assigned to the Combat Mission of Air Defense in the Continental United States. We have no precedent," they went on to comment, "no instructions, nor JCS agreement on policy pertaining to AAA units assigned the primary mission of air defense in the ZI." The agreements should therefore be concerned only with organic First Army AA, which had as its primary mission the protection of First Army units from air attack, whether in the United States or overseas. As regards these units, First Army insisted that it be placed in coordinating status with regard to the making up of rules of engagement.[22]

In late February 1950, EADF drew up and submitted another proposed joint agreement to First Army. In this document EADF was to have full authority over procedures and targets in the "integrated air defense system," but for all First Army forces not assigned the combat mission of air defense EADF would coordinate such matters as objectives, priorities, and approval of plans for AA defense with First Army.[23] This proposal was never returned by First Army.[24]

While these events were taking place, equally difficult problems concerning the use of AA were arising on the other side of the continent. In December of 1949 the 25th Air Division, charged with the air defense of Washington, Oregon, and Idaho, made an agreement with the 31st AAA Brigade which envisaged the creation of an IAZ around the Hanford, Washington, atomic installation. When created -- AA units would not begin occupying tactical positions at Hanford until mid-March of 1950 -- friendly aircraft would be forbidden from flying through the Zone, with the following exceptions: controllers could request clearance for friendly aircraft; the AEC could do likewise; and when fighters were engaging hostile aircraft, the air commander would permit them to continue to do so. This agreement then went on to Western Air Defense Force for comments and approval.[25]

Meanwhile, a new factor entered the situation. Beginning in January of 1950 the 25th Air Division was authorized to institute 24-hour operations over the Hanford works. To aid this effort, the Division commander asked for approval to enlarge the prohibited area -- not to be confused with IAZ or GDA -- around Hanford. This was approved by WADF and ConAC, but both were silent upon the earlier proposal for establishment of an Inner Artillery Zone.[26]

As matters stood, such AA as would operate at Hanford would follow the rules of engagement prescribed by WADF for its interceptors, which stated that only those aircraft committing hostile acts or identified as hostile would be fired upon. With the date for moving to tactical positions drawing near, the commander of the 2nd Infantry Division communicated his disapproval of the rules of engagement

situation to Sixth Army. He was skeptical as to the 25th Air Division's ability to identify hostile aircraft, and felt that if hostile acts had to be waited for, the purpose of defense would be lost.[27]

In March, Sixth Army turned the problem over to WADF, "Inasmuch," Sixth Army commented, "as the U.S. Air Force has the primary responsibility for the air defense of the Continental United States and AAA units allocated thereto are to be placed under the operational control of the USAF...."[28] WADF, in turn, sent the problem on to ConAC with a supplementary query concerning establishing an IAZ within the continental United States in peacetime.[29]

The reply soon forthcoming from ConAC was that there was no legal authority for establishing an Inner Artillery Zone in peacetime, with its inherent danger to friendly aircraft, both military and civilian. WADF abrogated the December 1949 agreement between the 25th Air Division and the 31st AAA Brigade, and informed Sixth Army of its action.[30] Shortly thereafter, WADF issued a directive allowing AA to "be released to fire by the responsible Air Division (Defense) or Air Defense Area Commander only: or when aircraft have committed overt acts...."[31]

This brought a heated protest from the commander of Sixth Army, Lt. General A. C. Wedemeyer.[32]

> Under Department of the Army directives, I am charged with providing antiaircraft defense at Hanford within the means made available to me. In good faith and in a spirit of mutual understanding and cooperation, the local agreement... was put into effect pending decision and promulgation by the Joint Chiefs of Staff of the "Joint Doctrine and Procedures for the Air Defense of the United States." On my own responsibility I sought to invest this agreement with maximum effectiveness by placing on-site antiaircraft artillery under your operational control.

> It is axiomatic that antiaircraft artillery can be effective in an Air Defense mission only when its employment is in consonance with its capabilities and limitations. Careful study of your letter and of the SOP ... published by your headquarters, convinces me that acceptance of the conditions you arbitrarily seek to impose would preclude the possibility of an effective antiaircraft defense for the critical Hanford installation. Accordingly, because of the seriousness of this matter, I am referring it to the Department of the Army with the request that it be brought to the attention of the Joint Chiefs of Staff. Pending instructions to the contrary from higher headquarters, I consider the agreement of 21 December 1949 remains effective and binding between our commands.

The rules of engagement impasse halted all action toward finding an area of agreement. Second Army proposed an agreement wherein the normal status of AA was to be "Release Fire," and EADF, after rejecting the agreement in late April 1950, heard nothing more from Second Army.[33] WADF, in mid-June, turned down a similar proposal from Fourth Army for the same reasons.[34] Doctrinal pronouncements of influence among antiaircraft people were made at an Artillery Conference in early May 1950, held at Fort Bliss, Texas. Some 250 officers, including men from the Navy, USAF, Canada, and Great Britain, heard reiterations of the long-held view that Gun Defended Areas and Inner Artillery Zones were essential to AA operations. Moreover, the Artillery School went on to assert that during the Second World War the fire of AA units had been reduced in effectiveness by about one-quarter because of insufficient early warning and "unnecessary restriction of fire."[35]

III

The log-jam was broken in early July 1950. USAF Headquarters and the Department of the Army for several months had been discussing a bilateral solution of the antiaircraft doctrinal controversy,

pending formal JCS decisions.[36] Within a few days after the outbreak of the Korean War, which made it imperative that outstanding differences be cleared up rapidly, a message went out to the Continental Armies to follow the ConAC policy on release of fire. ConAC immediately instructed the Defense Forces to revise outstanding SOP's and joint agreements to include the rule that there would be "no engagement unless aircraft /were/ positively and without question identified as having /committed/ or about to commit a hostile act."[37] Within a few days EADF prepared a new "Interim Joint Agreement for the Air Defense of the Eastern United States," to be presented to First Army,[38] and published a new SOP governing rules of engagement.[39] In the former, EADF had to give up almost entirely the position it had taken six months earlier. Rules of engagement, the designation of objectives to be defended, and prescription of the type of AA defense to be established were to be coordinated with the Army Commander, giving the latter the power to object and force higher levels to make the decisions. Inner Artillery Zones were not to be established until after an act of war.[40] First, Third, and Fourth Armies agreed to these proposals.[41]

On the 1st of August 1950, USAF and the Department of the Army rendered nugatory EADF's brisk efforts by publishing the Memorandum of Agreement between General Hoyt S. Vandenberg, Air Force Chief of Staff, and General J. Lawton Collins, Army Chief of Staff.[42]

The Memorandum gave to the Air Force commander charged with the air defense of the United States the authority to announce states of alert and the basic rules of engagement. These rules were to allow the greatest possible flexibility to AA units, and prescribe "Hold

Fire" only when necessary and then for as short a time as possible. AA could fire at aircraft committing hostile acts regardless of "Hold Fire," such hostile acts to be defined by the Air Force commander working in collaboration with appropriate AA commanders. AA could also fire at aircraft "recognized or identified as hostile," and at aircraft over prohibited areas except when "Hold Fire" was passed for the protection of friendly aircraft.

The targets to be defended would be decided upon by the Departments of the Air Force and the Army working together, in the absence of a JCS plan. The location of local AA defenses would be "prescribed geographically" by mutual agreements between the Air Force and Army, and tactical dispositions would be made by antiaircraft commanders. Within each Division, the Air Force commander would exercise operational control over AA "insofar as engagement and disengagement of fire is concerned..."

The Air Force agreed to accept at each echelon of air defense an Army officer with an appropriate staff to serve as the AA element on the Air Force commander's staff, and as principle AA adviser to the air commander.

To recapitulate, formulation of rules of engagement was given wholly to ConAC. In any event, aircraft would be fired upon only if committing a hostile act or if identified as hostile. The operational control given to the USAF element over AA was strictly limited to directing engagement or disengagement of fire. The selection of targets was lifted out of the purview of ConAC and the Continental Armies and given to the top levels of command. Tactical disposition

within these defended areas was placed wholly within the prerogative of the antiaircraft commander.

In November, a new Agreement between EADF and First Army was signed.[43] As was to be true with all future agreements between ADC and AA agencies, the Agreement consisted principally of the text of the Collins-Vandenberg arrangement. Doctrinal controversies were ended by this bilateral Agreement. The way was cleared for the integration of antiaircraft into the growing air defense system.

CHAPTER THREE

THE ARMY ANTIAIRCRAFT COMMAND

I

Since at least early 1950, the Department of the Army had been aware that its organizational framework for the employment of AA in air defense was inadequate for the task. There were serious weaknesses in a system which assigned AA units to the Continental Armies and required them to enter individually into negotiations with the Air Defense Forces. First, there was no overall supervision or lateral coordination of planning. Secondly, the geographical areas assigned to the Armies and the Air Defense Forces were not coterminous, so that each agency was forced to negotiate agreements with two or more other agencies. Finally, such a structure did not provide for Army representation at all levels exercising operational control over AA units.[1]

For a short time in 1946 it appeared that the reorganizations and doctrinal rearrangements of that year would see this problem solved once and for all. General Stratemeyer, commander of the Air Defense Command, on several occasions advanced the proposal that the organizational problem of antiaircraft in air defense be solved by integrating AA into the Air Defense Command. When queried by the War Department as to how he would implement this policy, he replied that he would assign AA units directly to air defense wings, subject to the same operational and command control as other ADC units. Each ADC headquarters having AA as a component element of its forces would have AA officers on its

staff "to assist the commander in dealing with the employment and personnel and logistic administration, of his antiaircraft artillery units." There would not be a joint command arrangement, with all air units in one command and all AA in another. "The Air Defense Command," General Stratemeyer asserted, "should be a single command and its staff a single staff."[2]

The conditions of the time, however, combined to prevent anything further being done on the problem. There were no AA resources, and two years passed before a decision was made to recreate the anti-aircraft element. The buildup of forces set in motion by this decision reached the point in early 1949 where once more the command problem required examination. In mid-February 1949, a Panel on Air Defense considered the problem and, among other things, recommended to General of the Army Omar Bradley, Chairman of the Joint Chiefs of Staff, that the situation be met by creating an antiaircraft staff section in Headquarters Air Defense Command, to be manned by AA officers. This section would exercise "both command and staff functions pertaining to AAA allotted to the Air Defense Command." The latter would have only operational control over AA units allocated to air defense by the Joint Chiefs of Staff.[3] In essence, this recommendation forecast the arrangement which was eventually adopted.

During early January of 1950, a joint Air Defense Conference was held to work out planning and operational control problems. Army representatives found that planning was very difficult to carry out when six Continental Armies were on the Army side and ConAC upon the other. They came away with the conviction that the time had come for

the creation of a new organizational structure, and recommended as much to the Department of the Army.[4]

In early March 1950, a study of the problem at Department of the Army level came up with the assertion that the creation of an AA command was essential. The current system provided no means to exercise command over AA units when they were in air defense. They operated as individual battalions or groups looking to the Air Force for operational control, and to the Continental Armies for logistical and administrative support. Also, as earlier noted, there was no system for lateral coordination of AA planning among the Continental Armies. On the other hand, the study pointed out, there was ample doctrinal precedent in the February 1949 policy approved by General Bradley for assigning AA officers to ADC to perform staff and command functions. Also, the principles of operational control, as conceived of by the Air Defense Command, and organizational integrity, as insisted upon by Army doctrine concerning joint forces, were not mutually conflicting. It was possible to create an Army command and staff structure operationally under the control of ADC without violating organizational integrity.[5]

The study concluded that a command structure to have authority over all AA units assigned the air defense mission should be created. It would be directly under the Department of the Army, levy upon the Army Field Forces for the technical training of antiaircraft personnel and units, receive administrative and logistic support for its AA units from the Continental Armies, and require its units to adhere to policies mutually agreed to by ADC and ARAACOM. Its structure would parallel that of ADC, having appropriate headquarters at each air

defense echelon. Such headquarters would provide personnel for separate AA staff sections with ADC, Defense Force, and Division headquarters.[6]

Three advantages would be gained by creating such a chain of command. It would allow flexibility in planning and in operations. It would insure that AA units complied with ADC's operational orders. Finally, it would create a clear channel for protests to the Department of the Army if they were necessary to protect the Army's interests.[7]

This recommendation was still under study in the Department of the Army when the Communist army of North Korea invaded South Korea. Within a few days a chain of events was set in motion which was to catapult the United States and the Western nations into a major war, and greatly increase the speed and scope of the United States' military buildup. Within a few months, thousands of reservists were recalled, Air National Guard fighter units were summoned to active duty, Tactical Air Command's units were drained of men to provide overseas forces, and the air defense AC&W system was transformed overnight from a day-time, under-manned radar net into a full-time system flooded with new men. Before the end of 1950, the decision was made to recreate the Air Defense Command as a major and independent organization reporting directly to the Chief of Staff, USAF.[8]

The Department of the Army likewise moved quickly to buttress the nation's defenses. Rocket and guided missile programs were speeded up, new antiaircraft units were activated, and forty National Guard AA battalions were brought into Federal Service and sent to training camps preparatory to moving into the air defense system. And, the

final decision was made to create the Army Antiaircraft Command.[9]

On the 11th of July 1950, Major General Willard W. Irvine -- who had long been in Army AA planning and was then serving as the Army's liaison officer with ConAC[10] -- was instructed to assume command of the Army Antiaircraft Command (ARAACOM) which had been established at the Pentagon by a Department of the Army order four days after the North Korean invasion. He was informed that his command would be directly under the Army Chief of Staff, and was instructed to create subordinate Army Geographical Area Headquarters. He would represent the Army Chief of Staff, the directive went on, at lower than Departmental level on all air defense matters of interest to the Army which were beyond the authority of the Army Field Forces, to include air defense planning beginning at a date to be later announced. He was to coordinate with Navy agencies concerning the artillery support of harbor defense by AA units.[11]

His organization would perform numerous important functions. It would develop detailed plans for the tactical disposition of AA units allocated for continental air defense, and recommend desirable changes in such plans as had already been devised for over-all AA employment. Together with the Army Field Forces, the Command would maintain close cognizance over the training and readiness status of all AA units potentially available for air defense, and make appropriate recommendations to the Field Forces when necessary. At a date later to be announced by the Department of the Army, General Irvine's command would assume responsibility for antiaircraft defense in the areas currently guarded by the Continental Armies. When directed by

the JCS, or in the event of air attack upon the United States, General Irvine would assume command of those AA units allocated to air defense.[12]

General Irvine was further directed to support the Commanding General of ConAC "on the basis of joint agreements between the Department of the Army and the Department of the Air Force" -- a reference to the Collins-Vandenberg agreement soon to be published -- and prepare his command to participate in air defense as the Army element of a joint force.[13] He would wear two hats: one as commander of ARAACOM; and the other as chief AA advisor to the Air Force commander.

By the end of August, Eastern and Western Army Antiaircraft Commands had been created, and by the end of the following month their commanders -- Brigadier General Paul W. Rutledge, Eastern, and Brigadier General Robert W. Berry, Western -- had taken their posts.* On the 1st of November 1950, General Irvine moved his headquarters from Washington to Mitchel AFB to be closer to ConAC Headquarters. Not yet having been delegated over-all planning and command authority, he and his subordinate commanders served initially as chiefs of the AA elements on the ConAC and Defense Forces staffs.[14] **

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* Central Army Antiaircraft Command was not activated until 24 April 1951. It would control only two battalions, and was authorized a colonel. It was commanded by Colonel Donald J. Bailey. Command Report: 1951, Army Antiaircraft Command, p. 7.

** The AA staff sections, component parts of the Air Force staffs and separate from the antiaircraft headquarters, were maintained as separate entities until early June 1952. They were then abolished as an uneconomical use of manpower, and the officers formerly provided by ARAACOM to man them placed on duty with such ADC staff agencies as Plans and Requirements, Intelligence, and Operations and Training. From that date ARAACOM Headquarters and its regional command headquarters were considered the AA staff sections for ADC and the Defense Force headquarters. This gave the AA commanders their entire headquarters staffs to aid them in performing their duty as chief AA advisor to the counter-

II

The relationship between ADC and the Army Antiaircraft Command was from the start a close one. This state of affairs without doubt drew in part from the fact that General Irvine had been working directly with ConAC before being given this command. The consciousness of a shared mission, together with other factors, may also have been operative. In any event, ARAACOM's historian could well remark, after two and a half years of joint efforts, that the relationship between the Army and the Air Force components of the air defense system was "on a highly satisfactory plane."[15]

The doctrinal basis for this relationship had been well established in the developments which had culminated in the Collins-Vandenberg Agreement of July 1950. No difficulty of a doctrinal nature was to arise thenceforth that could not be resolved by reference to this Agreement. Possibly for this reason, it was almost two years after ARAACOM's creation before mutual agreement was drawn up with ADC as to how the two headquarters would carry out their joint mission.

The agreement covered familiar ground. Operational control was defined exactly as it was stated in the Collins-Vandenberg Agreement, which specified the limited conditions under which the appropriate Air Defense Commander would control the fire of anti-aircraft weapons. It was agreed that AA units would pass to the limited operational control of the appropriate Air Force Commander

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(Cont'd) part ADC commanders, and allowed staff agencies in each headquarters to coordinate at the working level with their counterparts. Command Report: 1952, Army Antiaircraft Command, p. 2.

[redacted]

when deployed to tactical positions, and that such control would be exercised through local AA commanders. Defended areas would be determined by mutual agreements between the Departments of the Air Force and the Army. ARAACOM's responsibilities were agreed to include: ascertaining ADC's AA requirements and attempting to fulfill them; preparing detailed plans; providing AA advisors; making available all tactically-deployed AA units for ADC limited operational control; and prescribing conditions of readiness. ADC, on its part, was to be responsible for all identification, for prescribing alerts, for the establishment of Gun Defended Areas -- to be "prescribed as soon as practicable" -- and for the establishment, "in coordination with" ARAACOM, of the basic rules of engagement.[16]

The general administrative trend has been toward integration of staffs. In December of 1952, learning of instances where staff officers had been exchanged and ADDC's and AAOC's physically integrated, ADC approved these practices enthusiastically. It issued a directive urging all echelons to integrate freely, to include[17]

> movement of administrative and tactical antiaircraft headquarters to the same locations as ours, physical integration of ADDC's with AAOC's, a more coordinated effort on utilization of antiaircraft radars within the AC&W system, exchange of staff officers, and a closer coordination between PIO's in the development of cooperatively-produced press releases.

The only proviso to be observed in such arrangements was whether they would achieve "improvement in the operational capability of the air defense system."[18]

[redacted]

In the fall of the following year, 1953, ADC-ARAACOM cooperation moved a step further in the establishment of the Joint ADC-ARAACOM Planning and Coordination Committee. Major General Frederic H. Smith, Jr., ADC Vice Commander, directed in late October 1953 that such a body be created, and its first meeting was held on the 21st of December 1953. Indicative of the important function to be performed by this agency was the subject matter of the first meeting, the objectives to be defended by antiaircraft weapons. The upshot was the creation of a new jointly-approved objectives list.[19]

III

Until April of 1951, the organization of ARAACOM was relatively simple. There were four small headquarters, one commanding the other three. Their commanders served as the chief AA advisors to the ADC commanders, and prepared for the assumption of command over AA units assigned to air defense.

On the 10th of April 1951, ARAACOM assumed command of all trained AA units allocated to the air defense of the United States.[20] It thereupon took on an organizational character of a complexity similar to that of the Air Defense Command itself. Brigades, groups, battalions and batteries moved into the air defense system alongside the air divisions, defense wings, groups and squadrons of the ADC chain of command.

For air defense purposes, an organization scheme was adopted similar to that utilized at the top two command levels. Below the regional antiaircraft commanders, who advised Defense Force commanders and controlled all AA within a Defense Force region, Senior

Antiaircraft Commanders were appointed. These officers served as chief advisors to air division commanders, and were responsible for all AA within air division sectors. The Senior Antiaircraft Commander was the AA Defense Commander, and could be a brigade, group, or battalion commander, depending upon his resources. He provided tactical and operational control, and administrative supervision over all assigned or attached units. He accomplished his liaison with the air division commander by placing an officer on duty at the division headquarters.[21]

ADC's limited operational control over ARAACOM units was exercised at the lowest level. Antiaircraft Operations Centers (AAOC) the battle headquarters of each AA defended area, were associated with the local Air Defense Direction Center (ADDC) having authority over the subsector. The AAOC functioned as the communications center and provided the facilities for tactical control of all AA in the area. Here all information available to the AA defense was collected, evaluated, and sent out to associated battalions as intelligence. Through this agency, the local air division commander exercised control over all elements of the AA defense, insofar as directing the engagement or disengagement of AA fire was concerned. As the ARAACOM manual commented, "It is at the ADDC-AAOC level, in day-to-day operations, that the AAOC is linked to the AC&W System, and the fire power of the antiaircraft weapons is integrated into the air defense system."[22*]

The administrative organization of the AA system, below regional headquarters, passed from brigade through group and battalion to battery.

*In 1954 the abbreviation AAAOC replaced AAOC.

The brigade, commanded by a brigadier general, was the chief organization through which ARAACOM and the regional commands exercised their control. It consisted of a headquarters and headquarters battery only -- that is, a tactical headquarters without guns -- and commanded from two to five groups, according to the brigade's mission. Groups, commanded by colonels, also were solely tactical headquarters. Under their command could be from two to five battalions, each normally commanded by a lieutenant colonel. An operations detachment -- to operate the AAAC[redacted] -- commanded by a major, was assigned to either a brigade or a group headquarters, one to each defended area.[23]

The next lower echelon, the battalion, was both tactical and administrative. It consisted of a headquarters and headquarters battery, and four firing batteries, each with four guns, commanded by captains. The batteries had from 138 to 162 men, depending on the weapons assigned, the type of unit, and whether they were on a wartime or peacetime manning basis. A battalion, then, could have anywhere from 721 to 800 men. With a group containing two or more battalions, and a brigade containing two or more groups, a brigade could vary in strength from a minimum of 3,500 men to a maximum of about 8,200.[24]

IV

As of March of 1954, Lieutenant General John T. Lewis -- who had succeeded General Irvine on 1 May 1952 -- was Commanding General of ARAACOM. His subordinate commanders at Eastern, Central, and Western Army Antiaircraft Commands, respectively, were Brigadier General H. F. Meyers, Colonel Donald J. Bailey, and Brigadier General

[redacted]

J. G. Devine.[25]

Commanded directly by ARAACOM were four brigades formerly assigned to EASTARAACOM. These units in May of 1954 were removed from that assignment for purposes of economy of manpower and efficiency of operations.[26] The 56th Brigade controlled the AA defenses of Boston, New York, and Niagara; the 53rd Brigade those at Philadelphia and Pittsburgh; the 45th Brigade was responsible for the AA defenses of Chicago, Detroit, and Sault Sainte Marie Locks; and the 35th Brigade commanded those defenses at Baltimore, Washington, and Norfolk.[27]

CENARAACOM commanded only one AA unit, the Skysweeper battalion allocated to Ellsworth Air Force Base, Rapid City, South Dakota. WESTARAACOM, in May of 1954, remained the only regional command still in command of a large number of AA units. Two brigades were under its authority. The 31st Brigade was responsible for the AA defenses at Seattle, Hanford, and Fairchild AFB, while the 47th Brigade controlled those at Los Angeles and March AFB. Directly under WESTARAACOM's purview were the defenses at San Francisco, and Travis and Castle Air Force Bases.[28]

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CHAPTER FOUR

DEPLOYMENT AND RESOURCES: 1950-1954

I

The first important task that ARAACOM undertook was to join forces with the several agencies which for months had been engaged in drawing up a list of the vital targets in the United States for which antiaircraft protection was required.

During the years when antiaircraft resources were practically nonexistent, little thought had been given to this perplexing problem. Furthermore, it was not known where the responsibility lay for making such important decisions. Also, planners were without knowledge as to how many AA units would be made available for air defense, leading them to solve the knotty problem of which cities would be left without protection by simply asking for enough to take care of all. When the Air Defense Command was queried in 1946 and 1948 as to its AA requirements, it asked for staggering numbers of units. In late 1946, when the world situation was still not yet as tense as it soon would be, ADC asked for 140 battalions,[1] more than twice the number which was ultimately made available in 1950. During the crisis of 1948, when military planners were working at feverish haste and expecting the worst at any moment, ADC asked for 325 battalions of guns and automatic weapons, together with eighty-three guided missile groups. At the time there were only two AA battalions in the entire United States Army.[2]

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In the fall of 1948, with the buildup of military forces underway, the targets problem was approached upon the basis of known AA resources. Plans needed to be devised for the deployment of those AA units which were to be made available for air defense. Headquarters USAF queried ADC as to its recommendations, and was informed that the following general areas should receive AA support: Seattle-Pasco; Kirtland-Sandia; Sault Ste. Marie; and the Northeast.[3]

During the following year, 1949, ConAC Headquarters, under which ADC had been placed in December 1948, began work on a series of air defense plans. This work was accelerated after September of 1949, when President Truman announced that the Soviet Union had succeeded in exploding an atomic bomb.[4] In late January 1950, ConAC Operation Plan 1-50, "Air Defense of the United States," went to the Defense Forces. It contained a listing of targets which were to be defended by AA.[5] This list, however, was solely a ConAC production.

In late March 1950, a conference upon objectives was held at the Pentagon. Representatives of ConAC, Headquarters USAF, and the Department of the Army examined one another's proposals, found that agreement could not be reached, and returned to their headquarters to re-study all requirements.[6] In May, ConAC sent along its revised requirements.[7] In June, further studies of the problem were made by the Army-Navy Liaison Section in Headquarters ConAC, headed by General Irvine. In that same month Headquarters USAF asked for another formal and detailed statement of AA requirements. Almost two months were spent upon the preparation of this plan, which went off to USAF in early August. A little more than a week before this, the Collins-Vandenberg Agreement had cleared up the problem of how the objectives list would

be formulated. Vital areas to be defended by AA, this Agreement stated, would be decided upon by the Departments of the Army and the Air Force working together.[9]

By the 1st of December 1950, when the responsibility for planning the AA defense of vital objectives was given to ARAACOM,[10] an approved list of objectives was ready. Embodied in a revision to the Department of the Army Operations Plan for 1950 (DA-OP-US-1-50), this list set forth twenty-three targets to defend. They were specifically listed alphabetically, not in order of priority, and were to be defended "to the extent appropriate units are available...."[11] The list was as follows:

Baltimore	Norfolk
Boston	Philadelphia
Chicago-Gary	Pittsburgh
Detroit	Sandia-Kirtland
Hanford	San Francisco
Los Alamos	Seattle
New York City-Brooklyn	Sault Ste Marie Locks
Niagara Falls	Washington, D. C.
	Seven SAC Bases

In the fall of 1951, this list was altered by the removal of Sandia-Kirtland and Los Alamos, and the insertion of Los Angeles in their place.[12]

II

Provided with the list of targets to be defended, and the number of units which would ultimately be available for air defense -- sixty-six battalions -- ARAACOM proceeded in late 1950 to draw up a master deployment plan. By the end of December, the "Operation Plan for the Antiaircraft Defense of the United States (AA-OP-US-1-51)" was completed. It envisaged gun defenses for fifteen targets, and

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automatic-weapon defenses for the Sault Sainte Marie Locks and seven SAC bases.[13] They were to be constructed as follows:[14]

New York-Brooklyn	seven 90mm gun bns	three 120mm gun bns
Washington	three 90mm gun bns	three 120mm gun bns
Chicago	three 90mm gun bns	two 120mm gun bns
Detroit	four 90mm gun bns	
Seattle	two 90mm gun bns	one 120mm gun bn
San Francisco	one 90mm gun bn	two 120mm gun bns
Philadelphia	three 90mm gun bns	
Boston	three 90mm gun bns	
Niagara Falls	three 90mm gun bns	
Hanford		four 120mm gun bns
Pittsburgh	three 90mm gun bns	
Norfolk	three 90mm gun bns	
Sandia-Kirtland	two 90mm gun bns	
Los Alamos	one 90mm gun bn	

For Sault Ste. Marie and the following Air Force Bases, there was allocated one automatic weapons battalion each: Rapid City, Fairchild, Limestone, Carswell, March, Travis, and Castle.

During the next three years, several changes were made in this initial deployment of antiaircraft units. By March of 1954, Washington, New York-Brooklyn, and Chicago had all had one 120mm battalion replaced by a NIKE battalion; San Francisco's allotment had been changed to two 90mm and one 120mm battalions; Philadelphia gained a 90mm battalion while Niagara lost one; Sandia-Kirtland, Los Alamos, Limestone AFB, and Carswell AFB were no longer scheduled to receive AA protection; and Baltimore and Los Angeles had been added, with both being assigned three 90mm units.[15*]

III

The original plan, calling for sixty-six battalions, went off to the Department of the Army in mid-March of 1950 and was promptly approved.[16] At the same time, the Department of the Army delegated authority to

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* See following pages for deployment maps.

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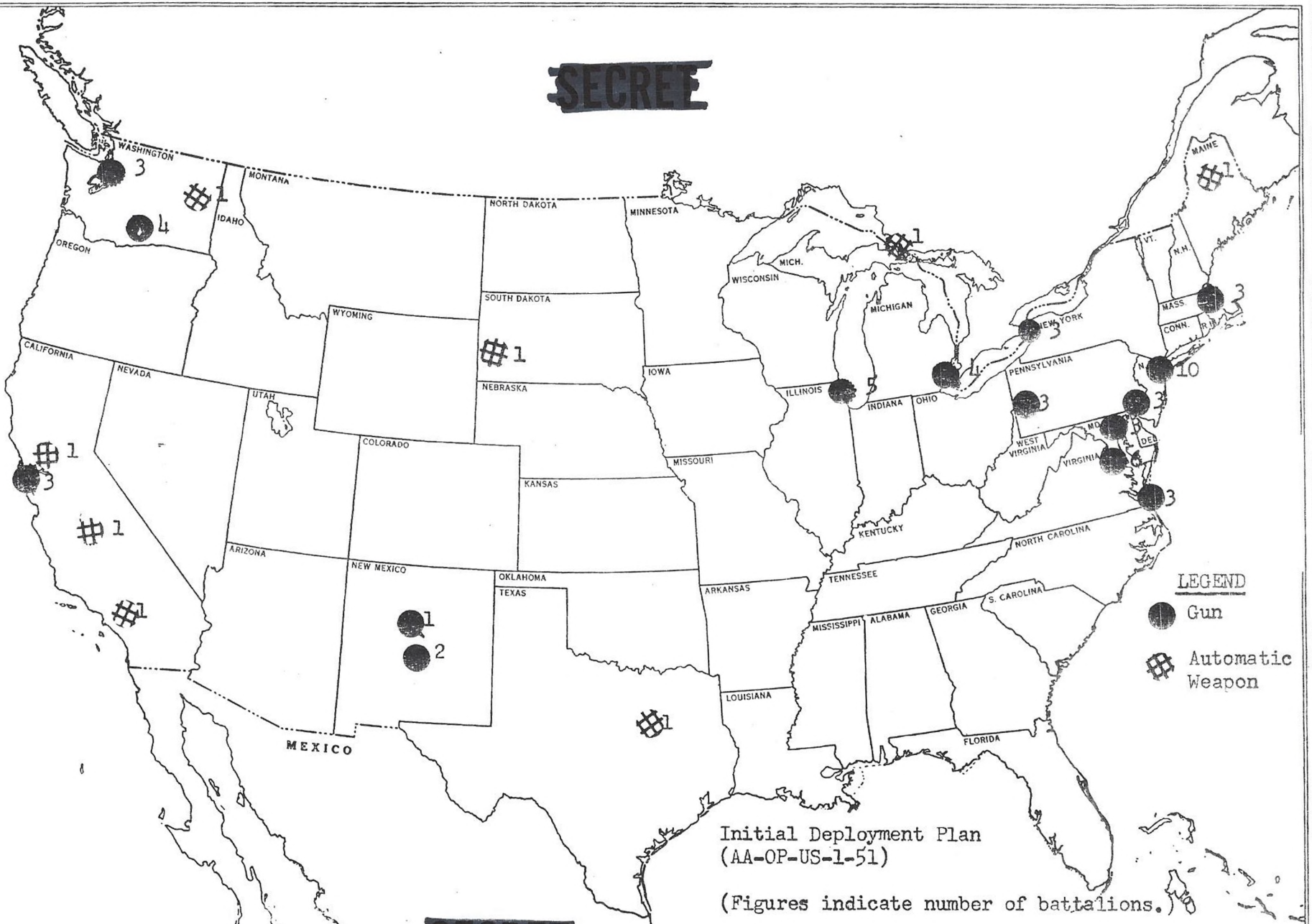

Initial Deployment Plan
(AA-OP-US-1-51)

(Figures indicate number of battalions.)

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SCALE IN MILES

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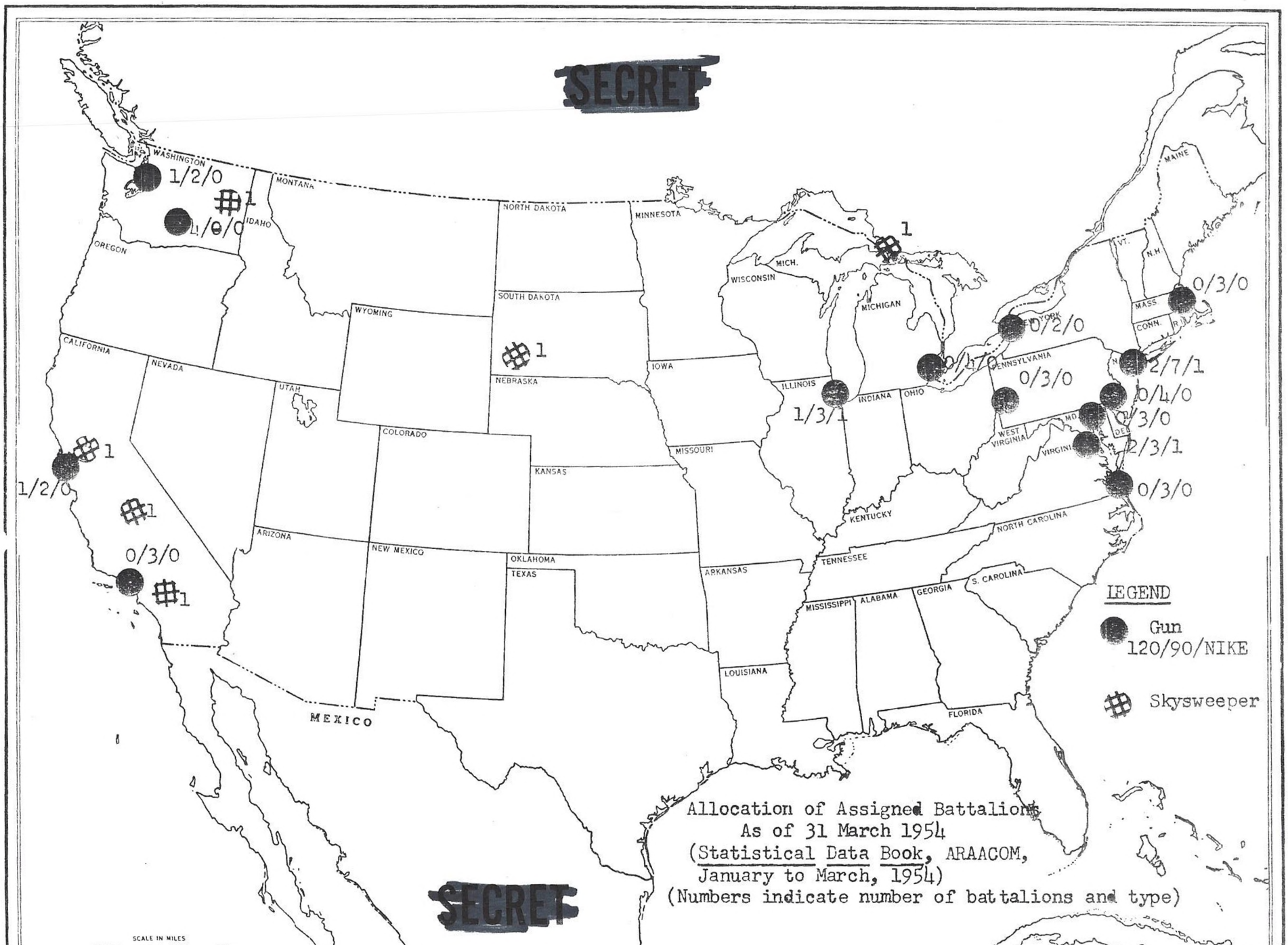

Allocation of Assigned Battalions
As of 31 March 1954
(Statistical Data Book, ARAACOM,
January to March, 1954)
(Numbers indicate number of battalions and type)

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ARAACOM to approve detailed tactical plans for the deployment of AA weapons in each defended area.[17]

Two months earlier, ARAACOM had instructed both Eastern and Western Army Antiaircraft Commands (EASTARAACOM and WESTARAACOM) to draw up detailed tactical plans for each AA defense. This directive had set in motion weeks of activity in the regional commands.[18] Detailed planning included "Picking out the specific locations for every gunsite, making the necessary radar and radio tests at every gunsite, to check reception, cover, and clutter, to see whether our planned defenses would actually work...." As one staff officer in WESTARAACOM commented, "That detailed planning is no easy job."[19]

The first task undertaken in formulating a detailed tactical plan for a particular area was to define the defended area and measure its dimensions.[20] In Washington, D. C., for example, a circle of 4,000 yards, centered on the Jefferson Memorial, was seen to encompass the points to be defended: the White House, Capitol, Pentagon, Navy Annex, Naval Ordnance Gun Factory, and key railroad and highway bridges. To this circle another 2,000 yards were added to take into consideration the destructive force of an atomic bomb. By then applying probably altitudes and speeds of attacking aircraft to the calculation, a bomb release line was computed and drawn around the area at a distance of 7,000 yards out from the central point. To bring fire to bear upon attackers before this line, guns were then placed around an optimum gun ring.

The Chicago situation presented a much more difficult problem, since the city fronts upon Lake Michigan. Aircraft approaching from

the east to attack Chicago could not be fired upon until they came in range of guns placed along the shore-line. Large guns, 120mm, were closely spaced along the lake front to partially alleviate this problem, but "at best," General Irvine commented in May of 1951, "there is only 20 seconds firing time before the plane reaches the bomb release line." Arrangements were made with the Navy to place six ships upon six hour notice at an optimum gun ring out on the lake, but the guns carried were not considered to be of large enough calibre.

The New York area, to be defended by ten gun battalions -- 160 guns -- presented a special problem because of the great size of the vulnerable area. Ports, industrial areas, and other fixed installations were relatively centralized, but after working hours great numbers of people pour out of the downtown areas to their residences. A rectangular area was established, 9,000 yards wide by 12,000 yards long, centered upon Washington Square in downtown New York.

The Hanford atomic works presented a tactical problem different from that afforded by the cities. Three areas were selected for protection, two of them on a sharp bend of the Columbia, and a third about eleven miles to the south. At first, all weapons -- 64 guns -- had to be placed on the south side of the river, for no bridges or ferries were available to transport guns and men to the wastelands north of the river. This left the northern segment of the optimum gun ring un-manned. Later, ferries and access roads allowed seven batteries -- 28 guns -- to be placed in this northern area. Two further problems were presented by the terrain around Hanford. Saddle Mountain, to the north, restricted radar coverage, forcing ARAACOM to place three gun positions on the

crest, outside of the optimum gun ring. To the south, guns had to be placed within the optimum gun ring because movement beyond a line of hills in that area would have negated the doctrine of mutually supporting batteries.

The locks at Sault Ste. Marie and the seven SAC bases to be defended presented an additional type of tactical problem. These targets were very small, and attacking aircraft would have to insure a relatively high degree of accuracy. They would probably approach at low altitudes and high speeds. Consequently, automatic-weapons units were selected for the defense of these locations. All such units were eventually to convert to the 75mm Skysweeper gun, which possessed on-carriage radar and high lethality.

IV

These defenses would not in themselves produce complete destruction of attacking formations. Indeed, such a claim was never advanced by AA people. At the conference held at Fort Bliss in May of 1950, the Artillery School stated that the best kill-expectancy that could be attributed to an AA defense ranged from twenty to sixty percent, depending upon the number of guns.[21] Furthermore, the 66-battalion plan was not based upon an ideal figure, but merely upon the number of units which would be available for air defense.[22]

Expected attrition rates were in some cases quite low. They averaged around twelve percent, but ranged from a high of thirty-one percent at New York, where 160 guns would be emplaced, to five percent at Los Alamos. In the winter of 1951, a change in the character of Sandia-Kirtland and Los Alamos, together with the low attrition rates

[redacted]

generated by their AA defenses, combined to bring about a cancellation of these two defenses.[23] As often reiterated by AA officers, the Second World War had demonstrated the futility of scattering AA resources to the point where no target was adequately defended.

The allocation of units to the Philadelphia defenses was increased by one battalion in February of 1952,[24] raising its expected attrition rate to the average of eleven to thirteen percent expected of all other AA defenses except those for Chicago, Washington, and New York-Brooklyn. The Chicago defenses were to achieve sixteen percent attrition, the Washington defenses eighteen percent, and, as commented above, the New York defenses were expected to knock down thirty-one percent of an attacking force.[25]

V

On the 10th of April 1951, command of all trained AA units allocated to air defense passed to the Army Antiaircraft Command. This force consisted of twenty-three battalions -- six automatic-weapons, nine 90mm, and eight 120mm -- together with four brigade headquarters, seven group headquarters, eight AA operations detachments, and fifteen signal radar maintenance units. Fourteen of these battalions were in EADF's region, and the remainder were in the west. Overnight, the Army Antiaircraft Command was transformed from an organization consisting solely of three headquarters to one having under its command over fifty organizations and over 20,000 men.[26]

In the next eight months, the number of AA battalions assigned to ARAACOM almost doubled. Much of this increase came during June 1951, when ten gun battalions were assigned. These units came from the large

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National Guard call-up that had taken place immediately after the outbreak of the Korean War.[27] So important was the National Guard to ARAACOM in this initial period of strength-building that by the end of 1951 more than sixty percent of its units were National Guard organizations.[28] At this time -- December of 1951 -- there were a total of forty-five battalions in the command, and almost 30,000 men.[29]

After the close of 1951, ARAACOM's buildup proceeded at a slower pace. A year later, in December 1952, fifty-five AA battalions were assigned to ARAACOM, representing an increase in strength of less than twenty-five percent over the year.[30] After another year had passed, ARAACOM commanded sixty-one AA battalions, for an increase of ten percent.[31] During the first three months of 1954, one battalion was added, bringing ARAACOM's strength at the end of March 1954 to sixty-two battalions. At this time, its total strength was 31,143 officers and men.[32]

VI

In addition to working out the deployment of its Regular Army strength, ARAACOM also made plans for augmenting its forces with National Guard units in the event of war. Sixty-one NG battalions had been called up at different times after the beginning of the Korean War, but all had returned to inactive status by the end of calendar year 1953. Altogether, a total force of ninety-one AA NG battalions would be available in the event of war.[33]

In the fall of 1951, ARAACOM deliberations upon the use of this force were concluded. A plan drawn up on the basis of these deliberations was submitted to the Department of the Army, which granted its

approval. ARAACOM, in this plan, envisaged equipping fifty NG battalions by June of 1953, with an additional thirty-one units to be outfitted by September of 1954 as regular units converted to NIKE and made their older weapons available for reassignment. Fifteen of the first fifty units would be given preferential treatment and brought to operational status as rapidly as possible in order to test procedures.[34]

This force would perform the following functions in the event of attack: supplement existing defenses; replace active AA units converted to surface-to-air missiles (SAM); replace active AA units sent overseas;[35] and provide AA defenses for the following additional areas:

St. Louis
Cleveland
Indianapolis
Buffalo
Duluth
Hartford
Oak Ridge
Savannah Ridge
Barksdale AFB

By the spring of 1954, the National Guard situation had been strongly affected by the progress made in plans for the use of NIKE. As will be related in the last chapter of this study, the number of units scheduled to convert to NIKE was greatly increased, making it possible for large numbers of prepared gun sites, with their equipment, to be made available to the National Guard as regular units moved out to NIKE emplacements. In June of 1954, ARAACOM plans envisioned placing thirty-five prepared battalion sites at the disposal of the National Guard, after conversion to NIKE of the regular units formerly occupying these locations. According to current scheduling, four and a half NG battalions would take over abandoned sites and their guns by the end of June 1954; twenty-four would be in NG possession by July of 1955; and all thirty-five would be so situated by November of

1956. In addition to these thirty-five battalions, fifteen other NG units were to be available in fiscal 1956 for emergency deployment to selected sites on D-Day. The other forty-one battalions in the National Guard were to replace regular units on-site after D-Day.[36*]

As plans stood in the spring of 1954, the National Guard would provide protection only for three targets not scheduled for protection by regular units in NIKE or other emplacements. These were Walker AFB in New Mexico, St. Louis, and the Oak Ridge atomic installation. Further, four locations scheduled for NG protection in the 1951 plan were deleted: Indianapolis, Duluth, Savannah Ridge, and Barksdale.[37]

In early February 1952, ARAACOM took steps to arrange for civilian participation in AA defenses during wartime. A plan was submitted to the department of the Army providing for the recruitment by state Civil Defense agencies of an Antiaircraft Civilian Auxiliary. Volunteering civilians who were within correct age brackets and were not members of an Armed Force reserve or an essential civilian activity -- such as fire or police departments -- would be accepted in a non-pay status. They would be "imbued with a feeling that they are strengthening the antiaircraft defense of their own community." A distinctive garment would be provided as well as transportation and meals while on-site. Since its submission, however, the project

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*See following page for map of planned NG deployment. This map shows deployment of 54, rather than 50, battalions, inasmuch as it includes the temporary deployment of four battalions to St. Louis. These units were scheduled to replace regular units on-site after the initial danger of attack had passed.

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has been dormant, and staff members in ARAACOM Headquarters were of the opinion that such a project would not become an actuality until a serious emergency arose.[38]

VII

When ARAACOM assumed command of troops in April of 1951, it found itself in possession of a force so poorly deployed that it could not provide protection to the nation against an initial air attack. Except for three battalions on-site* at the Hanford atomic works -- they had taken up their positions in March of 1950 -- and one battery of 40mm automatic weapons at the Sault Sainte Marie Locks, ARAACOM's units were stationed far from their defensive positions.[39] Moreover, these positions were bare of facilities. There were no access roads, leases, hardstands, barracks, or any other of the essential installations required for a battery to go into operation.

In the early part of 1951, with its deployment plan completed and the date approaching for assumption of command over troops, ARAACOM turned to a consideration of the on-site problem. Some $50 million had been authorized for tactical construction, but only $5 million had been actually appropriated by Congress. In early February 1951, General Irvine recommended that this fund be expended upon placing on-site those batteries which were farthest from their tactical locations.[40] He followed this in mid-February 1951 with a formal recommendation to the Department of the Army that all batteries be

*On-site meant that guns and fire control equipment were in position, oriented and synchronized, and tied into the air defense system so that gun batteries could open fire on hostile flights.

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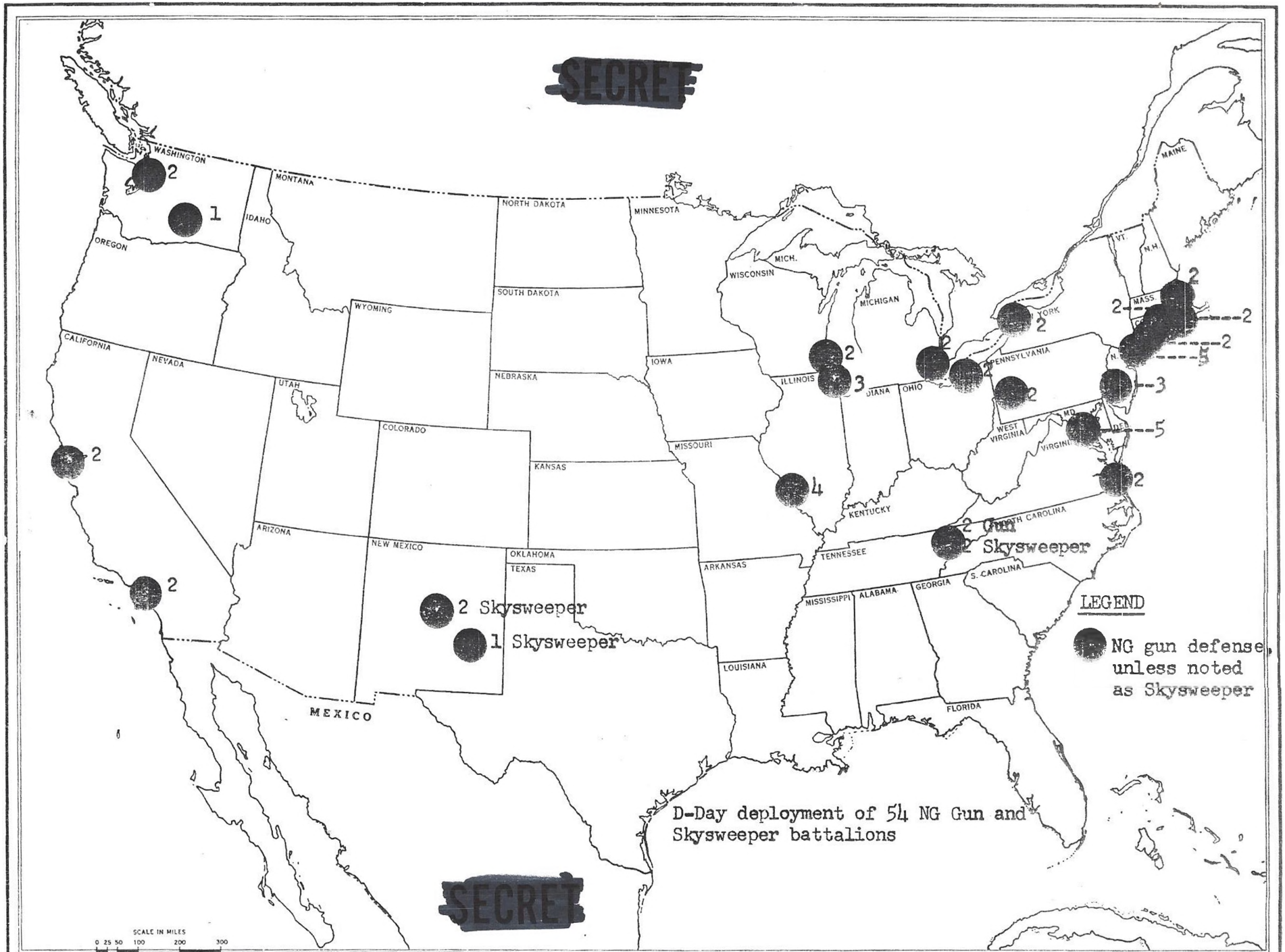

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placed permanently on-site. This was mandatory, he asserted, because the initial attack "will be the most critical and /it is probable that/... no long range warning will be received." He went on to point out that the Air Force's components for air defense were in a state of constant readiness. ADC indorsed his recommendation on to Headquarters USAF with the reminder that that Headquarters had approved such a recommendation from ADC as long ago as May of 1950.[41]

When given command over AA units in April of 1951, ARAACOM re-assessed the entire on-site problem. There would eventually be a total of 256 firing batteries assigned to air defense. Studies revealed that $75 million would be required to place each battery at its firing position.[42] As it turned out, however, only $25 million could be made available by the Department of the Army, and another tack had to be taken. After considerable discussion, ARAACOM proposed that all sites be prepared with minimum facilities -- leases, communications, access roads, hardstands, and latrines -- to allow utilization in an emergency. Also, ARAACOM proposed that all units more than six hours distant from their tactical sites be moved to interim facilities on government land within six hours travel from their positions. Minimum housing would be constructed at these interim stations.[43]

These two recommendations -- the Five-Point Program and the Six-Hour Interim Station Program -- were joined to form the Army Antiaircraft Construction Program, which was approved by the Department of the Army on 20 August 1951. By November of that year the Chief of Engineers had published basic engineering data for the projects, and work could proceed.[44]

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VIII

While these preparations were under way, ARAACOM adopted other devices to provide an immediate increase in the number of batteries on-site. One of these was the unilateral exercise, the first of which was launched in August of 1951. As many firing batteries as could be placed on-site were deployed to their tactical positions under field conditions. With their men living in tents, seventy percent of ARAACOM's batteries occupied tactical positions for seven weeks -- 28 August to 18 October 1951 -- thereby greatly increasing the nation's defensive strength during part of the critical summer months.[45] Where rights of entry had not yet been secured, units were placed as near to their tactical sites as possible. The only organizations not participating were those on firing ranges, those training civilian components, and those assigned to SAC defenses. The latter situation was brought about because as yet no agreements had been completed with SAC. Since this was the first opportunity for ARAACOM's units to work together in a tactical situation for an extended period, the exercise provided unusually valuable training for the Command.[46]

After the termination in October 1951 of the exercise, ARAACOM adopted another device to increase its on-site strength. All battalions within six hours of their sites were directed to maintain one of their four firing batteries on-site. This Twenty-Five Percent Rotation Program followed upon a precedent established the previous May in the Washington defenses, where the 35th AAA Brigade had ordered that one battery from each of its six battalions be on-site at all times.[47] Plans were also drawn up by each unit for the rapid deployment of the rest of its batteries, and authority was delegated

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to major field commanders to order on-site deployment under certain conditions of emergency.[48]

By January of 1952, the average number of batteries deployed on-site at all times was thirty-one;[49] by the following month this had risen to forty-one of the 110 batteries assigned.[50]

In April of 1952, at the outset of the period when enemy attack was deemed most likely, ARAACOM initiated another unilateral exercise. Over 150 batteries -- seventy-five percent of the Command's strength -- occupied defensive positions in sixteen target areas.[51] Within two weeks, however, a nation-wide petroleum strike forced the Command to terminate the exercise. This time the number of batteries from each battalion to remain on-site at all times was raised to fifty percent. A little over a month later, ARAACOM directed its units to disregard this figure and place the maximum possible number of batteries at their tactical locations under field conditions.[52]

This action was preceded by a major change in ARAACOM policy. It had become apparent to the Command that the rotation scheme was inadequate to the defensive task. When Lt. General John T. Lewis assumed command of ARAACOM on the 1st of May 1952, he decided to press once more for one hundred percent occupancy in all AA defended areas.[53]

In late May 1952, ARAACOM made its new proposal to the Department of the Army. To save funds, and to allow redeployment when NIKE was integrated into the system, prefabricated buildings were to be erected at all sites by troop labor. The Department of the Army, in approving this plan in early July 1952, modified the scheme to have District Engineers contract for civilian construction of site preparation, to include installation of utilities, construction of mess halls, latrines, and such support items as battalion-type gasoline

stations. The prefabricated dwelling units would be secured through the Chief of the Engineers.[54]

Since it was late in the year, and numerous delays were anticipated, Jamesway-type hutments were programmed for initial installation at all defended areas except New York, Philadelphia, Baltimore, Norfolk, Los Angeles, and Washington, D.C. In other than these locations the men would live in Jamesways until contractor work was finished, and prefabricated buildings could be erected.[55]

Very shortly, unexpected complications arose. When troops began erecting prefabricated housing in the New York area in November of 1952, the Essex County Building Trades Council, mindful of the fact that there were some 18,000 building trades union members out of work, called upon the Army to dispense with troop labor and hire civilian workers. Since the troop labor approach had been adopted in the first place because funds for hiring civilian laborers had not been available, the Army could not satisfy this request. Thus rebuffed, the Council called a strike among those laborers working for the civilian contractors who were building essential facilities.[56]

Alerted by this development, ARAACOM succeeded in forestalling difficulties by negotiating firm local agreements with unions in the other affected metropolitan regions. The New York unions, however, remained adamant. Furthermore, no contractor construction had been completed by year's end, so that the men had to live in Jamesway hutments throughout the winter of 1952-1953 in every defended area.[57]

Despite such difficulties, on-site deployment improved steadily. In January of 1952, a little more than a quarter of the

Command's batteries were on-site; six months later this figure had risen to forty percent, or 98 of 232 batteries. Meanwhile, contractor construction had been completed in the New York area, so the Army could proceed with construction of prefabricated dwellings without hindrance from labor elements. By the end of 1952, almost ninety percent of ARAACOM's assigned firing batteries, or 200 of 220, were at their tactical locations and ready to fire.[58] Most of those units not on-site by this date were Skysweeper battalions. As of the end of December 1953, an average of ninety-one percent of all units were on-site.[59] During the first quarter of 1954 this figure dropped to eighty percent, as the result of conversions to NIKE and the consequent need for construction of facilities.[60]

IX

The weapons first possessed by ARAACOM in the spring of 1951 were the .50 calibre and 40mm automatic weapons, and the 90 and 120mm guns.[61]

The first of these, designed for attack against low-flying aircraft, consisted of four machine-guns on a single mount. It's maximum effective range was one thousand yards, and it fired two thousand rounds a minute. The second, the 40mm weapon, weighed about three tons and fired a two pound projectile at the rate of 120 per minute. It had an effective range of up to two thousand yards. Both of these weapons were controlled by the use of tracers, although there was a fire control computer for the 40mm of some effectiveness.

In the gun class, the smallest weapon was the 90mm gun. Its road weight was about sixteen tons -- a big increase over the three ton 40mm weapon. This gun fired a twenty-five pound projectile at the

rate of twenty-five per minute, and had a maximum vertical range of about 36,300 feet. Its horizontal range was some 39,000 feet.

The largest gun, the 120mm, weighed some thirty tons, or almost double the weight of the 90mm. It fired a fifty pound projectile at the rate of twelve per minute -- twice the weight of missile at half the rate of fire of the 90mm. It could hurl this projectile to a maximum vertical height of about 47,400 feet and to a horizontal distance of 47,400 feet.

The actual ranges of these weapons were affected by many factors, including the capability of the fire control system and the type of fuze utilized.

The .50 calibre and 40mm automatic weapons were eventually replaced by the 75mm Skysweeper. The first of these battalions was assigned to ARAACOM in March of 1953, and the last small-bore automatic weapon was phased out in October of that year.[62] The Skysweeper was first conceived near the end of the Second World War. It was designed to eliminate the weaknesses of the 40mm: low range, low lethality, and inability to engage under night and bad weather conditions. It weighed about ten tons, and had an automatic loading system which enabled it to fire forty to fifty rounds a minute. It possessed an on-carriage radar and computer system with a maximum tracking range of about twenty thousand yards, and could fire to a vertical height of about 18,600 feet. This weapon was emplaced at SAC bases and at the Sault Sainte Marie Locks.[63] By March of 1954, six battalions were assigned and all batteries were on-site.[64]

It was in the guided missile field that revolutionary weapons changes impended. Where the guns frequently had had to remain silent

because their targets were too high or out of their limited range, the guided missiles would seek out their prey at great heights and great distances. This subject will be discussed in the last chapter of the present study.

X

Another new development in the post-war period concerned the fire control system used by the 90mm and 120mm guns. Since the middle of the Second World War, two systems numbered M-9 and M-10 had been in use. They could compute data upon targets traveling at speeds up to about six hundred miles per hour, but they could only compute such data for targets flying straight and level courses. When aircraft took evasive action -- standard procedure when approaching a target -- the computers could not predict accurate data.[65]

To accomodate this difficulty, a new computer, the M-33, was developed. It was designed to predict data for either rectilinear or curvilinear courses. A completely integrated piece of gear in one van, it eliminated the separate radar and computer system formerly used. It consisted of two radars, one for searching up to about seventy miles, and the other for gun-laying. The battery commander did not have to, as formerly, do everything by telephone, but could take his battle post in the van and have for his use a computer control panel, radar control panels, and electronically controlled display boards which could show all targets within seventy miles of the emplacement. This allowed him to decide upon future targets at the same time that his batteries were firing upon a current target.[66]

To work out operational problems and devise procedures, a battery on each coast was initially equipped with the new system.[67] Meanwhile, the other batteries in the Command proceeded to convert

to the new equipment. By the end of 1952 three out of four gun batteries were equipped, and by the end of 1953 all but one of the fifty-five battalions scheduled to convert to it had been equipped with the M-33.[68]

The integration of this new equipment into the system considerably increased overall AA capability. During the TAIL WIND exercise held in the summer of 1953, the M-33 equipment on hand in Seattle, Hanford, and San Francisco was adjudged by WADF to have "greatly increased the capability of these defenses to acquire, track and accurately fire at aircraft targets. This was shown during the exercise by the increased ability of units to acquire targets at great distances and hold these targets once acquired."[69]

Beginning in the fall of 1952, a new element was added to the resources of the AA system. Some forty-nine AN/TPS-1D radars were made available for ARAACOM's use. Possessed of a range of approximately one hundred miles, this gear greatly extended the target-acquisition ability of each AA defense, and provided also a new source of low-level air surveillance information for ADC's AC&W system.[70]

The use of this equipment was not an easily solved problem. In mid-August 1952, ADC alerted the Defense Forces to the imminent arrival of TPS-1D's in their regions, and directed them to draw up procedures for utilizing them in a secondary role in the air defense network.[71] Through the rest of 1952 and into 1953, studies were made by EADF and WADF, together with associated AA elements.[72] There was effort on the part of some ADC echelons to secure this radar for the primary use of ADC, but in May 1953 ADC discouraged such moves, stating:

> It is to be emphasized that the primary mission of AN/TPS-1D radars belonging to units of the Antiaircraft Command is the performance of the assigned Antiaircraft mission. Procedures and policies for the employment of these radars are the prerogatives of the Antiaircraft Commander, with paramount consideration being given to the accomplishment of his mission. However, by proper planning and coordination, many of these equipments may assume a secondary capability of providing coverage for the AC&W system in "fade and/or gap" areas. It is this latter potential of these radars which must be exploited and for which joint plans and procedures should be developed.

In October of 1953, following upon lower echelon studies of the problem, ARAACOM instructed its subordinate echelons to operate their TPS-1D radars on a twenty-four hour basis, and report all targets detected to the associated ADDC for identification or correlation. The procedures to be followed would have to be modified for each local situation.[74]

One TPS-1D was given to each 90mm and 120mm battalion, and four were emplaced around each Skysweeper battalion. Though sited with an eye chiefly to aiding the AA battalion, they provided valuable low altitude and gap filler support to the AC&W systems. Agreements were drawn up providing for this aid, with beneficial results. In one case, for example, the AA radars in San Francisco provided seaward radar coverage when the AN/CPS-6B on Mt. Tamalpais near San Francisco had to be shut down for modifications.[75]

Like the M-33's, the TPS-1D's greatly aided AA elements during the TAIL WIND exercise held during the summer of 1953. They "increased the ability of ... antiaircraft defenses to promptly acquire tracks passed from the ADDC."[76] This equipment therefore went far to strengthen one of the weakest links between AA and the air defense system, the inability in many cases of ADC radar equipment to carry tracks until they were within range of the older AA acquisition radars, thereby

making positive identification impossible.

An additional electronic resource of importance lay in the AN/TPS-19 IFF radars which were received by ARAACOM in late June of 1953. The successful utilization of this equipment -- the ground counterpart to the air IFF equipment utilized in ADC -- would greatly increase AA's ability to perform its mission. The first pieces of equipment received were sent to Chicago batteries to be tied to the TPS-1D's already possessed by these units and tested. 77

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CHAPTER FIVE

OPERATIONS AND RULES OF ENGAGEMENT, 1951 - 1954

I

Immediately upon being given command over antiaircraft resources and the responsibility for providing the antiaircraft defense of the United States, ARAACOM instructed its regional commands to arrange to place their units under the limited operational control of the Air Defense Command.[1] For the first time, ADC was assured of full-time operational control over associated AA units prior to an air attack.

The rules of engagement which ARAACOM's units were to observe had been drawn up in joint ADC and ARAACOM discussions very shortly after the re-creation of ADC. Published in mid-February of 1951, two months before ARAACOM was given command over troops, these rules were essentially an embodiment of the Collins-Vandenberg Agreement of July 1950.[3] Operational control, the responsibility for selecting sites, and other such aspects of the AA problem were treated in language almost identical to that used in the Agreement.

According to these rules, antiaircraft would be in a normal status of "Release Fire." In this status, AA could fire at aircraft identified by the air defense system as hostile, or visually recognized as such by the AA commander, except when "Hold Fire" was ordered by the ADC air division commander responsible. No restrictions were placed on the ordering of "Hold Fire" except to state that such an order

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would be passed only when necessary,

> and for the shortest possible time consistent with existing conditions. When possible, the order "Hold Fire" will include information regarding type, altitude, and corridor of passage of friendly aircraft over the defended area.

AA commanders, however, could fire at hostile aircraft or aircraft committing hostile acts regardless of a "Hold Fire" order.

With regard to Gun Defended Areas, the rules commented that designating them was within the prerogative of ADC Headquarters. When established -- which they never were -- they would constitute restricted areas where friendly aircraft could operate in accordance with procedures established by the local division commander and approved by ADC Headquarters. Antiaircraft could not fire at aircraft entering prohibited areas -- such as the one establishedover the Hanford works -- which were not identified as hostile until those areas were declared Gun Defended Areas.

Antiaircraft commanders would be responsible for the states of readiness maintained by their units, but the promulgation of alerts was the duty of the ADC air division commander. These alerts were to be as follows:

> Air Defense Readiness: during which AC&W and fighter systems would be placed in an advanced state of preparedness, upon the authority of Defense Force Commanders or higher, when the presence of unidentified aircraft or intelligence from other sources indicate such action to be wise.
>
> Yellow Alert: when an attack is considered likely. The notice of alert will include information as to the approximate number of aircraft, position, altitude, and direction.
>
> Red Alert: when an attack is imminent. The same information will be transmitted as for a Yellow Alert, together with probable intent.
>
> White Alert: all clear.

ADC, in these rules, instructedits division commanders to consider the use of air lanes and airborne corridors when drawing up rules of engagement for AA in their sectors in order to hold to a minimum the need for ordering "Hold Fire" for an entire AA defended area. "Antiaircraft artillery commanders," the rules stated, "should be afforded the greatest possible latitude in the performance of their unilateral functions consistent with /ADC's/... rules of engagement...."

These rules came under fire as the buildup of the AA system proceeded. They perpetuated the position taken by ConAC in January of 1950 that at no time would an aircraft be fired upon unless it was positively identified by the ADDC or visually recognized by the AA commander to be hostile. EADF had long considered this approach to the problem improper and possibly dangerous. General Webster, EADF's first commander, had disagreed with it, General Wedemeyer, commander of Sixth Army in early 1950, had hotly criticized it, and EADF's historian was moved to remark that "By 1952 experience had repeatedly demonstrated the regulation to be fatally defective."[4] To clear up one possible source of unnecessary restriction of AA fire, EADF instructed its divisions in January of 1952 that under no conditions would "Hold Fire" be given on either friendly or hostile tracks.[5]

In the early spring of 1952, lengthy discussions between ADC, ARAACOM, and the regional commands resulted in the promulgation of new rules of engagement.[6] Several important changes were made. For one, the old term "Release Fire" was replaced by two new conditions, "Guns Tight" and "Guns Free." Under the former, only aircraft identified as hostile, or committing hostile acts, could be fired upon. Under the

latter, only those aircraft identified as friendly would not be fired upon.

The rules then went on to state that all antiaircraft in a GDA would be in a "Guns Free" status as a normal condition. Those weapons outside GDA's would remain in "Guns Tight"; that is, in a condition exactly like that which obtained under the old condition of "Release Fire." If, however, an AA defense was subjected to hostile attack, "Guns Free" would automatically apply.

The status "Hold Fire" would be ordered only "when essential to the combined effectiveness of the defense," for the least possible time and degree, and would not be applied to entire defenses. It would instead apply only to "specific aircraft, sectors, altitudes, or corridors." Regardless of such an order, AA commanders could fire at aircraft committing hostile acts.

The most important change in the rules concerned the power of division commanders over the status of the AA defense. They were empowered to place all AA weapons which were not in GDA's in a "Guns Free" status when the military situation made such an action wise, and when:

> Identification capability is such as to insure identification of all friendly aircraft.
>
> Action by hostile aircraft becomes a more compelling consideration than the protection of friendly aircraft which may be unidentified.

By this action, ADC Headquarters gave authority to all division commanders to, in effect, declare GDA's when in their judgment the military situation justified such action.

The definition of a hostile aircraft was considerably changed.

Under the old rules, a hostile aircraft was one that:

> Committed a hostile act, defined as any unrecognized or unidentified aircraft which lays mines, releases parachutists, or releases bombs and/or fires guns or rockets toward any land, water, or air target.
>
> Bore Russian markings and was observed within United States boundaries without proper flight clearance.
>
> Did not meet established standards for identification, and was not declared hostile by the division commander.

Under the new rules, an aircraft would be considered hostile, and therefore liable to fire from AA in a "Guns Tight" status, when before declaration of a state of military emergency:

> It committed a hostile act, defined as any aircraft releasing bombs; firing guns, rockets, or other weapons at any friendly air, ground, or water target; or laying mines. (This would apply when previous notification of training exercises or operations of this type by friendly aircraft was not received.)
>
> It was declared hostile by a Defense Force commander on the ground that it was "manifestly hostile in intent"; i.e., a raid was indicated beyond reasonable doubt, or intelligence was available indicating an attack was en route.

After declaration of a state of military emergency by the Commander of the Air Defense Command, an aircraft would be considered hostile, and therefore liable to fire from AA in "Guns Tight" status, when it fell within either of the above two categories, or

> does not meet the established standards for identification when within Air Defense Identification Zones and is declared "hostile" by an air division commander.

Information concerning alerts was eliminated from this Regulation and included in two other Regulations published in mid-July 1952. These directives provided for emergency conditions, termed increased states of preparedness and Air Defense Readiness, and for three alerts -- Warning Red, Warning Yellow, and Warning White. Rea-

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diness conditions were to be placed in effect when intelligence dictated an advanced state of preparedness, or when the actions of approaching unidentified aircraft made it wise to adopt an alert defensive posture within ADC and ARAACOM without notifying outside agencies. Once the danger of attack passed this point, alerts would be flashed to predetermined agencies through the "Warning Yellow" and "Warning Red" progression, both of which, together with "Warning White," were similar to the alerts prescribed in the February 1951 rules of engagement.

To summarize, the changes made by ADC in the spring of 1952 relaxed the rules of engagement in several important ways. The definition of "hostile" was broadened, thereby allowing AA greater latitude to fire. Division commanders were given authority to place AA in their sectors in a "Guns Free" status when the military situation dictated. This authority was later specifically delegated to the ADDC level, giving great freedom of action to ADC directors at this level.[8] After declaration of a state of military emergency, any aircraft in an ADIZ which did not meet identification regulations would be declared hostile and fired upon by all weapons. In effect, the ADIZ's would become GDA's after declaration of a state of military emergency.

II

During 1952 there arose another problem which resulted eventually in a further change to the rules of engagement. A survey in WADF found that most controllers, contrary to ADC doctrine, were considering fighter and AA engagement of targets two entirely separate operations. They tended to either break off fighter attacks before AA-defended areas were entered, or establish "Hold Fire" orders on AA

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to allow the fighters to continue pressing their attacks.[9]

There was a possibility that such practices were necessary. The question was raised whether AA radar equipment would "break lock" and fix upon approaching fighters, or "hunt" between fighter and bomber. To test this proposition, a small exercise was run in the 28th Air Division's area between a B-29 and F-86F fighters. The latter made forty separate passes -- from the stern, the high-side, and from overhead -- singly and in close formation while the bomber made seven runs within range of AA acquisition radars. The test proved the older supposition false. While obsolescent fire control radars and their associated computers were slightly affected during close fighter passes, the newer M-33's and their associated computers, which were programmed to replace the older equipment were affected not at all.[10]

In December of 1952, WADF informed ADC of the results of this test.[11] This led to discussions between ARAACOM and ADC,[12] and the promulgation in mid-February 1953 of instructions to all commanders to employ "simultaneous engagement [of fighters and AA] as necessary to effect maximum destruction of ... attacking force."[13]

III

The spring of 1952 witnessed not only important modifications of ADC's rules of engagement, but also the first concerted effort on ADC's part to create Gun Defended Areas (GDA's). In the middle of March 1952, ADC asked its regional commands to draw up lists of those locations where the Defense Forces would like to see GDA's created.[14]

When ADC approached Headquarters USAF on the problem, however, that agency refused to allow such zones to be created, the general

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objection being that once the double perimeter of radars was completed ADC's identification ability would be sufficiently high to allow positive identification of all aircraft.[25]

So the matter stood until the following summer. Two occurrences then made it obvious that some new system for AA utilization had to be adopted, whether or not it would finally result in the creation of GDA's. The first of these was the nation-wide exercise, SIGNPOST, which was held during the period 19-28 July 1952. The other was the issuance of a staff study by the Department of Defense Weapons System Evaluation Group.

ARAACOM's batteries did very poorly during SIGNPOST; this showing, however, was due to factors not within their control. Twenty-five strikes passed over their emplacements, yet only five of these were considered to have been successfully engaged. Sixteen of the twenty strikes had passed over AA emplacements unmolested because of difficulties arising from the "Guns Tight" provision in the new ADC rules of engagement. Under these rules all batteries not in GDA's were in "Guns Tight" status, and since no GDA's had been established this meant that all of ARAACOM's battery commanders had to hold their fire until there was positive identification of the strike aircraft. The rules allowed ADDC's to place batteries in "Guns Free" status, but they proved reluctant to do so. Thus nine of the strikes could not be fired upon because the batteries either never received identification information, or received it too late to take action. Seven other strikes faded from ADC radars before coming into the range of AA acquisition radars, making positive correlation of tracks impossible.[16]

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This led ARAACOM to make a determined new bid for the creation of GDA's, wherein aircraft would be fired upon unless identified as friendly. On the 11th of August 1952, ARAACOM made its proposal to ADC. Colonel Walter F. Ellis, ARAACOM's G3, in making the proposal pointed out a serious weakness in ADC's belief that the creation of effective Air Defense Identification Zones (ADIZ's) would solve the AA problem. This concept held that since all critical areas likely to be attacked were either ringed by or included within ADIZ's, after the radar screen had been fully developed it would be impossible for an attacking aircraft to approach a critical target without its hostile character being discovered and transmitted to the antiaircraft people.[17]

Colonel Ellis drew attention to the fact that many targets were not within ADIZ's, and therefore could be bombed with impunity by an aircraft which had passed through an ADIZ a great distance away, become lost to radar surveillance in the interior, and had then approached its objective unheralded and, more important, unidentified. Other targets, while deep within ADIZ's, could also be bombed by single members of a large formation which had earlier entered the ADIZ and then dispersed to several targets. In both of these situations, antiaircraft would have to remain silent.[18]

He went on to propose that GDA's with a radius of forty-six miles be established around all AA defended areas. The conformation of each GDA would have to be locally determined to bring about well-defined boundaries and avoid such points as air fields. After NIKE entered the system, however, it was mandatory that battery commanders

have the power to fire at targets once they reached the forty-six mile circle. If a target were to approach at a rate of 450 knots and at 40,000 feet, the decision to fire NIKE would have to be made before it reached the GDA line in order to launch three missiles and obtain effective engagement before the bomb release line would be reached.[19]

Meanwhile, Headquarters USAF had opened a discussion with ADC upon the identification-rules of engagement problem. This exchange of views was triggered by a study issued by the Weapons Systems Evaluation Group which charged that AA's impotence was attributable to the rules of engagement set down by ADC.[20] To this, Major General Frederic H. Smith, Jr., ADC's Vice Commander, replied that the difficulty lay not in rules of engagement, but in identification, "and we are doing everything we can to come up with an adequate identification system in a reasonable period of time."[21] He went on to briefly describe ADC's ADIZ concept. Recognizing, however, that "radar breakdown, communications failure, or other reasons" might result in aircraft being lost after having been identified as hostile, he went on to comment that ADC was at that time considering a solution to the problem.[22]

This approach envisaged the establishment of "inner ADIZ's" around critical targets. Not precisely Gun Defended Areas, since all weapons and not just guns would be utilized for their defense, these zones would become effective after the air defense system had been alerted, and "Condition Red" was ordered. "[Any] aircraft penetrating these areas," General Smith concluded, "and not specifically identified as friendly will be fired upon with all weapons available."[23] Within a few days after General Smith's comments to USAF, a large staff effort had been set in motion in ADC Headquarters to exhaustively study

the requirements which establishment of such zones would generate.

In early September 1952, USAF's General Thatcher again raised objections to ADC's approach to the problem. He asserted that there was no need for such inner zones since all aircraft penetrating an ADIZ after Security Control of Air Traffic had gone into effect should be considered hostile and engaged by all weapons. To this General Smith replied by raising the points which in the interim had been brought up by ARAACOM in its GDA recommendation. Many critical targets were not within the boundaries of ADIZ's, and could be attacked by aircraft either not detected while penetrating the Coastal or International Boundary ADIZ, or lost to surveillance after such penetration.[25]

General Smith went on to comment that inner zones -- which ADC was beginning to term "inner defense areas" in preference to the not adequately descriptive term "inner ADIZ" -- might even be established in areas where there were no AA defenses at all, solely for the purpose of restricting friendly aerial traffic. Where the GDA concept long held by AA people had concerned itself only with the principle that all aircraft in a GDA would be fired upon unless identified as friendly, ADC's thinking went along the line of absolutely denying access to such inner defense areas to all friendly aircraft except those specifically cleared by the responsible division commander. This approach, therefore, had more ramifications to it than did the GDA concept.[26]

The fall of 1952 and the early months of 1953 were spent in securing the recommendations of the Defense Forces on the subject.[27] By March 1953, their comments had been received,[28] enabling ADC to dispatch its formal proposal to Headquarters USAF in late

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April.[29]

Reviewing the various points brought out in the exchanges with General Thatcher and ARAACOM, ADC recommended that IDA's be established around those targets in the United States which by July of 1953 would have effective AA defenses. During normal conditions, or during "Warning White," all weapons within IDA's would be in a "Guns Tight" status and would fire only upon those aircraft identified as hostile. With the issuance of "Warning Red," AA batteries would be placed in a "Guns Free" status, provided a "Warning Yellow" of sufficient length had preceded this status to allow the area to be cleared of friendly traffic. If not, "Guns Tight" would apply until the area had been so cleared, but in no case for longer than fifteen minutes.[30]

Together with this proposal ADC sent along a listing of the duties required of each agency -- ADCC, ADDC, AAAOC, and Air Route Traffic Control Center (CAA) -- and maps of proposed IDA's. These Areas were drawn up initially on the maximum effective firing ranges of 90mm and 120mm guns; ADC gave notice that before long it would send in similar maps to provide for the range of NIKE. As this guided missile was phased into the system, or additional objectives were defended by AA weapons, new requests for IDA designations would be presented.[31]

During the latter part of the following month, May 1953, ARAACOM informed the Department of the Army of this proposal, and requested that it lend its support to securing the approval of interested civil and military agencies.[31] In early July, two and a half months after ADC had submitted its proposal, USAF called a conference with ADC

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representatives on the problem.[32] On the 21st of August 1953, USAF dispatched a letter to ADC, commenting:[33]

> The establishment of Inner Defense Areas (IDA), as proposed in your letter of 28 April 1953, is approved in principle as an interim measure until the advent of improved electronics ground environment increases your identification capability to the extent that such areas are no longer necessary. It is anticipated that the electronic environments associated with the BOMARC and TALOS interceptors will provide this increased identification capability.

USAF then went on to observe that it was beginning to coordinate the project with Army and Navy, after which it would go to concerned civil agencies.

While pleased at USAF's action, ADC found itself unable to agree with USAF's observation concerning a future lack of need for IDA's. "We are unaware," ADC replied on the 10th of September, "of any electronics ground environment which will make Inner Defense Areas unnecessary in the forseeable future."[34]

The IDA proposal, by this time, was moving its slow way through the various governmental offices that would have to act upon it. By mid-December 1953, USAF had secured Army and Navy comments -- all relatively minor -- and CAA was reported to be re-writing its emergency plans to include the definition and procedures involved in implementing IDA's.[35] As of June of 1954, however, nothing further had been heard from USAF on the proposal.

IV

The defenses provided for specified SAC bases constituted special cases within the antiaircraft system. They were equipped with different types of weapons -- .50 calibre and 40mm at the outset, 75mm Skysweeper later on -- and were not so closely associated

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with the ADC network as these defenses around industrial and population centers. Furthermore, special arrangements had to be made regarding procedures and utilization.

Seven SAC bases were initially included within the basic AA defense plan drawn up in late 1950. These were: Limestone in Maine; Carswell in Texas; Rapid City (later re-named Ellsworth) in South Dakota; Fairchild in eastern Washington; and Travis, March, and Castle in California. Subsequent unit losses to overseas, however, reduced the number of battalions assigned to ARAACOM for SAC defense to four. These units were assigned to March, Travis, Castle, and Fairchild.[36] By the end of March 1954, a fifth battalion had been assigned to the Command; it was allocated to Ellsworth.[37]

The on-site problem proved unusually difficult for these units.[38] It took some time to finalize agreements with SAC, and also to secure needed construction. As late as the end of 1952, construction was still not completed.[39] In the meantime, these units were held at interim stations near their tactical sites -- Camp Haan for March, Camp Roberts for Castle, Fort Cronkhite for Travis, and Geiger AFB for Fairchild -- and were required to conduct a one-week on-site exercise at tactical positions at least once each quarter.[40]

In any event, these units during 1951 and 1952 would have had difficulty providing effective defense for these bases. They were not only poorly deployed -- while the March and Fairchild battalions were quite close to their sites, the Travis unit was almost sixty miles from its firing position, and the Castle battalion would have had to travel about two hundred miles to reach its destination -- they were

also inadequately armed. The .50 calibre and 40mm weapons, as earlier described, were seriously deficient against the types of attack which might be anticipated.

In March of 1953, the unit assigned to Castle converted to the status of a light gun battalion and was equipped with the 75mm Skysweeper.[41] In August of that year, Fairchild and Travis were so equipped,[42] and in October, the last of the original four battalions, that assigned to March, received its Skysweeper equipment.[43] In February of 1954, a new Skysweeper battalion was assigned to ARAACOM, and emplaced around Ellsworth.[44] Thus by early in 1954, the defenses provided SAC bases were well equipped to meet high-speed, night or bad-weather attacks up to altitudes of approximately 19,000 feet with a weapon whose rate of fire and projectile promised a high degree of lethality.

As of March of 1954, all of the Skysweeper batteries were on-site; two of the battalion headquarters, however, were not so situated. The operational readiness of these units, which had been steadily climbing, passed ninety percent in January 1954, and by March was at ninety-three percent.[45]

These units from the outset were placed under the limited operational control of the appropriate ADC echelon, with the qualification that SAC base commanders could restrict AA fire as necessary to safeguard aircraft operating from their bases.[46] Later, in May 1952, air division commanders were instructed to formalize such arrangements by preparing the necessary procedures jointly with such air base commanders.[47]

It later developed that arrangements of this type were either not made, or they had proceeded no further than a simple statement recognizing the base commander's authority. This produced potentially dangerous situations, for confusion in the heat of battle as to how the ADDC and the SAC base commander were to carry out their possibly conflicting authorities to restrict AA fire might result in a misdirection of fire. In early March 1954, ADC instructed the Defense Forces to make certain that detailed procedures were developed and tested by local exercises, with care being taken to insure that in every conceivable tactical situation the AA commander would have orders coming only from one location.[48] This might be arrived at by having the base commander feed his instructions through the ADDC, where the latter was located nearby, or by setting up zones around the bases wherein only the base commander could restrict fire.[49] Inasmuch as each situation would present a different problem, ADC went no further than to state that "Announcement of control status of antiaircraft weapons should be from a single source so that no misunderstanding will occur."[50]

As of this writing, the sole plan received from lower echelons was an adequately detailed description of actions to be taken at Ellsworth AFB, where the local commander agreed to pass his "Hold Fire" instructions through the nearby ADDC.[51] ADC staff members anticipated that future months would see this problem solved.

V

The meshing of two weapon systems, different in characteristics, with one of them -- AA -- in a subordinate position, operationally, has presented many serious problems. The chief of these have revolved around the central point that ARAACOM units must rely upon ADC units

to provide identification of approaching aircraft. Other problems have arisen over speed of operations, equipment inadequacies, and inexperience.

Joint exercises of one sort or another have been the chief device for testing procedures and training personnel. The first of these took place in EADF in February of 1951. Forecasting the problems which were to plague ADC and ARAACOM from then on, this exercise pointed up equipment inadequacies, faulty procedures, and lack of experience as the principle difficulties. ADC's controllers, all but ignorant of AA's capabilities, tended to maintain "Hold Fire" most of the time in order to allow their fighters to press attacks, or simply spent all their time and thoughts vectoring fighters and forgot AA entirely. The tracks that were passed to the AAAOC arrived late, or oftentimes lacked height readings -- chiefly because of lack of height-finders -- and the GCI's tended to stop passing tracks to the AA units once they had identified them as aggressor aircraft. This left the AAAOC in a difficult position, for the track had not yet appeared on the short-range acquisition radars of its batteries, and without up-to-the-minute information on the aggressor from the ADDC, it was impossible for battery commanders to tell which of the many tracks appearing on their acquisition radars was the aggressor.[52] This correlation problem proved to be an especially knotty problem, one which was not to be alleviated for many months.

On of the first problems tackled was that of slow track passage from the Air Force radars to the ARAACOM batteries. As the situation existed in the early spring of 1951, tracks went from the

ADC scope operator to the plotter in the ADDC, who then placed the track on the vertical plotting board. An AA teller, sitting in the ADDC, transmitted this information, after it had been plotted, to the plotter in the AAAOC. After the information was once more manually plotted, tellers in the AAAOC read it off to battery plotters, who passed it to the gun acquisition radar operator.[53] The time lag of from three to six minutes under normal operating conditions made it difficult to correlate tracks, especially in areas of high traffic density. Also, the fact that track information had to pass through seven individuals inevitably resulted in erroneous information.[54] Correlation, in such circumstances, was a chancy business.

Discussions of the problem came up with two proposed solutions. One of them would involve a straight-line telling circuit from the AA teller in the ADDC to the battery plotter, thus eliminating the AAAOC telling position. The AAAOC plotter, listening in on the line, would continue to plot the information for the guidance of the AA commander. The other solution was to give a scope in the ADDC to a trained AA scope-reader, who would take information directly from the scope and pass it to the battery plotter, together with supplementary information on the ADDC vertical plotting board drawn from satellite radar stations.[55]

Later tests of these proposals revealed that the second one was the more feasible, although it too suffered from a serious inadequacy in that it took from the AA commander, in the AAAOC, the power to control his batteries.[56] In time, the system developed was to have an AA controller stationed permanently in the ADDC with a scope of

of his own. This officer passed information to the AAAOC plotter, allowing the AA commander to assign targets directly.[57]

This approach was not of itself a panacea for operational coordination. Experience with the system was required to iron out the wrinkles. During a joint exercise held in June 1951, for example, the the experiences of one AA liaison officer and his teller in an ADDC operations room were instructive. He was given a seat too far from the ADC controller, so that coordination was difficult. There was no board to indicate conditions of alert, or AA action status. Furthermore, vital intelligence was not passed directly to the AA officer. A simulated Yellow Alert, placed in effect at about 1500 hours, was not given to the AA officer until two and a half hours had passed. Of twelve intelligence bulletins issued by the air division, only two were relayed during the first ten hours of the exercise to the AA officer. One of the bulletins not passed changed the condition of alert, and others contained information regarding the possible bombing of the targets defended by the associated AA emplacements. Again forecasting the inevitable adjustments to be made in coordinating activities, this ADDC before the exercise was through arranged for the message center to relay all bulletins to the AAAOC by teletype. Similar difficulties, however, continued to plague AA controllers well into 1953.[58]

To meet the difficulties attendant upon ADC's lack of familiarity with AA, EADF decided upon the creation of a joint ADC-ARAACOM school. At North Truro, Massachusetts, an AAAOC and a gun battery were set up next to an ADDC so that the physical presence

of the installation would remind trainee controllers of the other weapons at their disposal. Selected ADC and AA officers were then assigned to undergo short courses at the school during the summer of 1951. Over 160 officers, by the end of summer, had gone through this training and they returned to their organizations having viewed actual artillery firings and worked intimately with the AA system. After the school closed, in late September 1951, EADF and EASTARAACOM followed up on the enthusiasm produced in the divisions and battalions by issuing a set of instructions which encouraged the interchange of people between the ADDC's and the associated AA units for familiarization purposes.[59]

A program similar in aims was also developed in WADF. Air Force officers visited AA installations frequently to observe their observations; those headquarters people working directly with AA made such visits on a weekly basis. AC&W crews were taken on tours of AA batteries and AAAOC's. Directors in one division not only visited their associated AAAOC's but also[60]

> observe at the weekly AAA ADX on Thursday nights. There have been between one (1) and six (6) Directors at the AAOC [sic] each Thursday night for the past six weeks. The ADCC Controller, who was on duty during the exercise [SIGNPOST], attends the critique on Friday morning following these exercises. In future critiques, the ADDC Director and AAA Liaison Officer who were on duty in the ADIC will be required to attend.

Criticisms were in time made of ADC's contribution to AA operational training. Periodic joint exercises were not deemed sufficient to bring about that state of proficiency which was desired. In early 1952, therefore, several actions designed to alleviate this

weakness were taken. ADC arranged to have strike aircraft during joint exercises over-fly AA emplacements as often as possible, thus meeting a serious complaint from ARAACOM units. Special arrangements resulted in ADC fighters flying low-altitude routes, giving AA units tracking practice; this was in addition to similar missions flown by TAC aircraft. Also, SAC, upon ADC's request, agreed to over-fly AA emplacements while on routing training missions, with the stipulation that they would be given information as to the effectiveness of their electronic counter-measures against AA radars.[61]

The integration of AN/TPS-1D radars into the AA system went far to meet the track-correlation problem. ADC radars were unable, in many cases, to carry tracks within range of the M-33 acquisition radar, due to ground clutter and other problems. The 100-mile range TPS-1D provided just the link which was required.[62] As earlier commented, AA operations in TAIL WIND were greatly aided by this new piece of equipment.

Action taken after SIGNPOST, where AA had performed very poorly, brought about considerable improvement in performance. ADC and ARAACOM, aroused over AA's showing, sent off instructions to subordinate echelons to take every possible action to improve their operational coordination. Especial attention was to be given to track correlation, to teamwork between the AA commander and the ADDC director, to the establishment of "Guns Free" when warranted, and to the exchanging of intelligence information.[63] WADF, in a remark giving evidence of mounting irritation, commented acidly to its divisions that since antiaircraft units had been in the field for two years under WADF

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operational control, "adequate procedures should have been developed."[64]

After a year had passed, considerable improvement in AA operations showed itself. In the TAIL WIND exercise three-fourths of the strikes in range of AA were successfully engaged, as contrasted with only one-fifth in SIGNPOST. "In many respects," the official ADC report on the exercise commented, "the performance of AA units represents a significant improvement over previous exercises."[65]

The picture remained, however, not wholly unblemished. Two and a half years after the first joint exercise in EADF's region, it was still apparent that some controllers and directors were not sufficiently familiar with AA's capabilities and limitations. Without doubt, this situation arose in large part from the extremely high turnover of such officers with ADC. This same factor also brought about confusion over or lack of understanding of the rules of engagement, which remained a serious problem. During TAIL WIND ADDC's neglected to order "Guns Free" to the extent desired. "AA action status 'guns tight'," the report commented, "was maintained in most defenses during the entire exercise." Thus AA units had to spend most of their time correlating tracks of unknowns and friendlies upon which little track information was available. The delays thus produced brought on incomplete or missed engagements as the amount of air traffic increased to the point of saturation. Plots were usually given sufficiently early, but they frequently faded from ADC radars or were scrubbed prior to reaching AA's radar range. There was inadequate cross-telling from AA's TPS-1D's to the ADDC's. "With the exception of one AA defense," it was observed, "there is no evidence that joint procedures had been

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established for telling back AA radar plots when tracks faded from AC&W scopes."[66]

The saturation problem was a serious hurdle. Plots, during such conditions, lagged from five to twelve minutes, making correlation difficult. Identification was also rendered faulty; some targets during TAIL WIND were not engaged because identification was given after the targets had passed out of AA range. Improper correlation resulted in missed engagements and wrong targets engaged. Also, ADDC's found themselves forced, due to a shortage of radar scopes, to take the scopes formerly allocated to AA controllers. These officers were then left only with the information placed on the vertical plotting board, slowing further the passage of track information to the AAAOC's.[67]

In its critique upon TAIL WIND, however, WADF, giving evidence that the years of effort had not been wasted, was able to comment that[68]

> The coordination between the Air Force and Antiaircraft elements in the Western Air Defense Force Area during Operation "Tail Wind" showed great improvement over previous exercises. The improved teamwork was displayed by earlier track designation, more rapid identification and the inclusion of the current status of antiaircraft action in the report of track information to ADC.

Future exercises would demonstrate whether this favorable trend would continue.

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CHAPTER SIX

NIKE AND THE FUTURE ANTIAIRCRAFT SYSTEM

I

Previous chapters of this study have been concerned in the main with describing the building of an antiaircraft system based upon the weapons of the Second World War. During late 1953 and 1954, ARAACOM and ADC began to reap the harvest of years of planning in events which portended the building of a wholly new antiaircraft system based upon guided missiles.

The guided missile upon which the new system was to be based was NIKE, a weapon so-named after the winged Greek goddess of victory. For a while, another missile designated TERRIER was programmed for use by ARAACOM until NIKE became available. A beam-rider type of weapon, its weaknesses from the outset rendered its planned use an interim device.[1] Eventually, it was dropped from consideration for tactical reasons.[2]

NIKE provided vastly increased capability to the antiaircraft system. About twenty feet in length and a foot in diameter, the missile carried a warhead of over three hundred pounds. Driven by a liquid propulsion system, it could shoot up to intercept aircraft flying at 70,000 feet at a range of twenty-five miles. Its great speed -- ranging between Mach 2.3 and 2.8 -- gave it the ability to attack all known manned bomber threats.[3]

In almost every respect, the use of this weapon required procedures and tactics different from those developed for the use of

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conventional antiaircraft weapons. The operating procedures envisaged in current ARAACOM plans were dictated by the weapon's peculiar characteristics. Each NIKE battery would consist of a launching area and a control area, separated from one another by a distance of 1,000 to 6,000 yards but in every case so situated as to be within sight of each other. At the control site, the battery commander's base of operations, there would be three radars: an acquisition set to first locate the target and position the second set -- a target-tracking radar -- on target; the remaining set would track the missile, and must be able to "see" the missile when erected on its launcher. At the launching site there would be three underground magazine-launcher emplacements and six to nine above-ground unrevetted launchers. Each underground emplacement would contain stored NIKE missiles -- maintained there for protection against weather and consequent deterioration -- an elevator, a personnel shelter, and a control room. Upon the elevator would be situated one launcher.[4]

Upon notification that hostiles were approaching the defended area, word would be flashed to the launching area by the battery commander to prepare for action. Enough missiles would be raised out of the magazines to place one on each of the unrevetted surface launchers. The launcher on the elevator would be raised to the surface, the launcher and its NIKE rising to a vertical position as they were being lifted to the surface. This would be the primary reliance of the battery; the surface, unrevetted launchers were for use only if the elevator and its launcher were unable to keep up with the speed of operations.[5]

Upon acquisition of the target on his radar, the battery commander would order a NIKE fired. The missile would rise at tremendous

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speed, and, being tracked by the missile tracking radar from the instant of launch to detonation, would be directed to the intercept point over a trajectory shaped to maintain a speed and maneuverability advantage over the target throughout the time of flight. Guidance commands, produced by the computer and resulting from data fed to it by the two tracking radars, are transmitted to the missile by the missile tracking radar. Five seconds after launch, while the missile is traveling vertically and is about 7,600 feet above the launcher, booster separation occurs, the missile sustainer motor is activated, and the missile is turned from vertical to an on-course trajectory. A fraction of a second before intercept, the burst order is automatically transmitted so as to produce a spherical burst pattern of warhead fragments at the point of intercept.[6]

There were certain limitations to the usefulness of the missile as it was constituted in the spring of 1954. For one, the speed of the ascent made it impossible to immediately turn the rocket downward -- the missile could only stand a 7G stress -- so that there was an inherent parabolic "dead" area extending from 25,000 feet above the site to about seven miles out from it. Thus low-altitude attacking aircraft could not be successfully met within the dead area.[7]

The second weakness of the weapon had to do with its rate of fire. Since each battery could only guide one missile to a target at a time, the rate of fire was about one per minute per battery. Current plans, however, envisaged doubling this rate of fire in the future by the construction of two control sites per battery.[8]

II

The emplacement of this weapon required the construction of

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speed, driven by a booster rocket which would fall free when expended, to an altitude of about 25,000 feet. During this phase the missile would be in free flight and would achieve flight stability. At 25,000 feet it would be "captured" by the missile-tracking radar, which would begin transmitting guidance instructions to it. These instructions would be produced by a computer which would compare data fed to it by the two tracking radars and issue guidance instructions through the missile-tracking radar. When the missile would be within a very short distance from its target, guidance instructions would cease, and a burst order would be transmitted automatically so as to produce a spherical burst-pattern of warhead fragments at the point of intercept.[6]

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The emplacement of this weapon required the construction of

new sites around all targets scheduled to receive NIKE protection. The great range of the missile rendered uneconomical the use of gun sites emplaced with an eye to securing mutual support of 90mm and 120mm guns. Since the weapon was to be deployed as rapidly as it became available, ARAACOM had to develop its tactical doctrine concerning emplacement without the benefit of extended unit testing in the field. Information drawn from many launchings at White Sands, scientific examinations of the weapon's kill-probability, and the adding to this data of factors designed to allow for radar effectiveness, personnel errors, and other such considerations allowed ARAACOM to devise its doctrine upon firm ground and compensate for the lack of such testing.[9]

This work was done during early 1953. The tactical doctrine was roughly that the desired radius of emplacement of batteries around an area to be defended was to be equal to the number of battalions times ten thousand yards up to a total of four battalions, or, in other words, a maximum radius of 40,000 yards. For defenses employing more than four battalions, a double-ring concept was employed. It was desired that the batteries be equally spaced around this perimeter; problems arising from securing land in densely-populated regions and other such considerations made this an ideal difficult of realization.[10]

The securing of sufficient real estate -- forty acres were needed for each launching area and eight for each control site -- was a difficult hurdle. Altogether, the original NIKE program, which called for the conversion of thirty-two battalions to this weapon, required the acquisition of 128 sites. As of the middle of 1954,

Division and District Engineers had acquired most of the real estate, and construction was in progress. They had encountered some opposition in communities fearful of the consequences of this action, but when such situations arose most fears and objections could be dissipated by meetings of civilian officials and the appropriate defense commanders. In some cases, ARAACOM found it wise to relocate sites to prevent undue hardship for inhabitants. One fruitful outcome of this activity was the securing of valuable experience, which will be helpful in carrying out similar projects when implementing the expansion of the NIKE program to the approved sixty-one battalion level.[11]

III

In the fall of 1953, events took place which resulted in a major re-orientation of the NIKE program. The summer of that year had seen highest-level deliberations upon the wisdom of the nation's military policy. As an outgrowth of these discussions by the new Joint Chiefs of Staff, the President decided to greatly increase the size of the air defense establishment. As part of this increase, the antiaircraft element was to grow from sixty-six battalions -- the figure decided upon in late 1950 -- to one hundred such units.[12]

In the late summer of 1953, ARAACOM was informed of this change in program and was instructed to draw up plans as to how best to deploy this force.[13] In April 1954, the Department of the Army approved the deployment recommended by ARAACOM. Sixty-one battalions were to be equipped with NIKE, twenty-six would possess guns, and thirteen would be equipped with Skysweeper.[14*]

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*See following page for map of deployment of these units.

[redacted]

The antiaircraft program thus decided upon was one which would ultimately provide the nation with a defense immeasurably more effective than the sixty-six gun battalion program originally decided upon in 1950. Many important locations formerly guarded by conventional weapons would have their antiaircraft units converted to NIKE. Also, the number of locations which would be ringed with AA emplacements was increased. Milwaukee, Cleveland, Bridgeport, Hartford, and Providence were added to the list of vital cities requiring AA defense, Mountain Home and Davis-Monthan were added to the group of SAC bases to be afforded protection, and the Savannah River atomic installation joined the Hanford works as AEC projects deemed sufficiently vital to require allocation of AA defense.[15]

The increased participation of NIKE in the antiaircraft system was important. Along the west coast the cities of Seattle and San Francisco would each be protected by three NIKE units in addition to one gun battalion for low-altitude coverage, and Los Angeles was to be ringed by four NIKE and one gun battalions. Thus, for example, an attacker approaching the latter city would be confronted by a defense capable of launching sixteen NIKE missiles per minute, or thirty-two per minute after control facilities had been doubled in capability. Likewise, an attacking force approaching New York would not only be faced by eighty heavy-calibre guns, it would encounter a hail of twenty-four missiles per minute while still about fifty miles from the target, or forty-eight after the increase in control facilities. With a kill-probability of almost 50%, such a defense was indeed a formidable one.[16]

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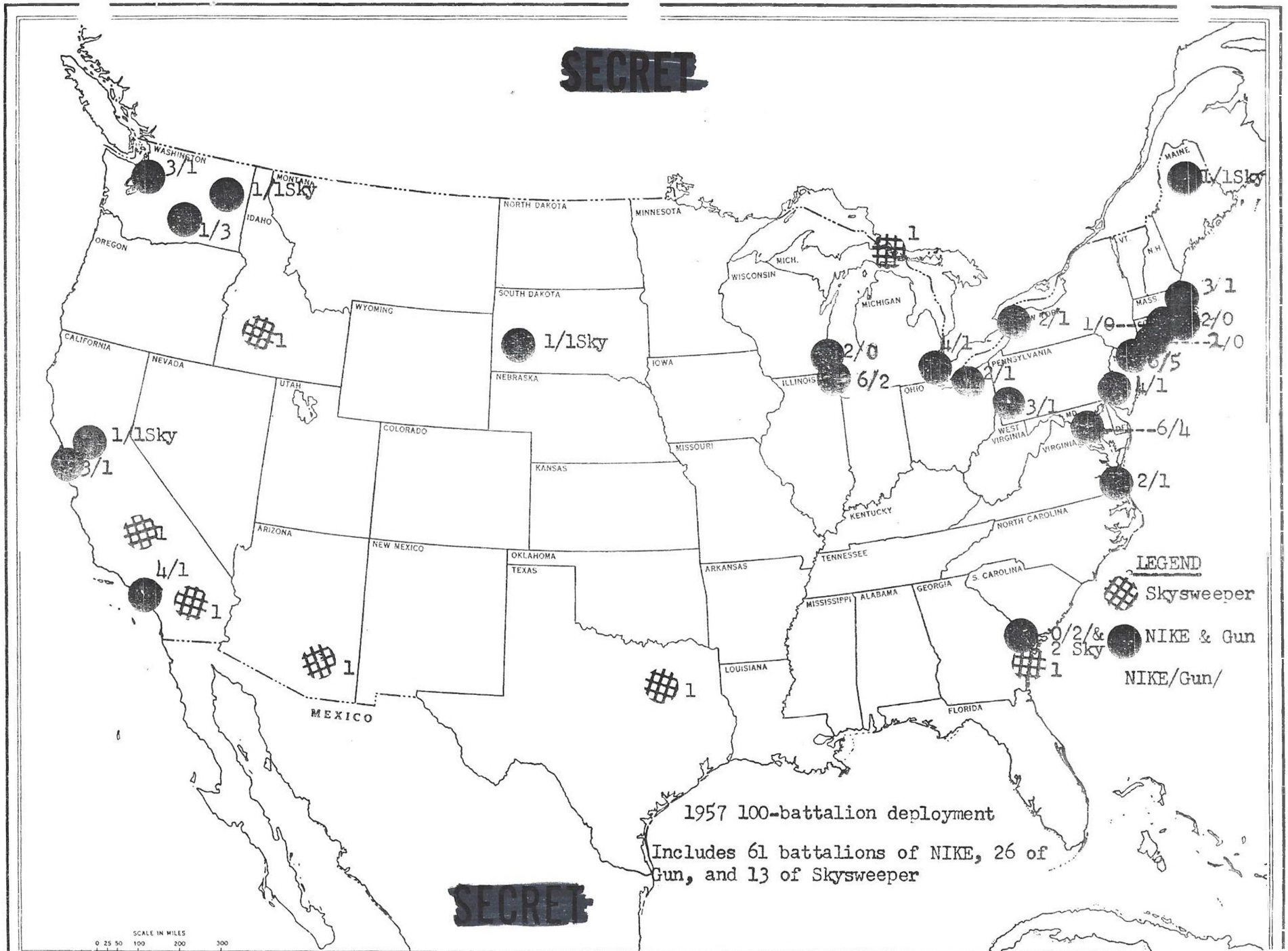

1957 100-battalion deployment

Includes 61 battalions of NIKE, 26 of Gun, and 13 of Skysweeper

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IV

In December 1953, the Joint ADC-ARAACOM Planning and Coordination Committee met to consider and approve a proposed long-range plan for the utilization of NIKE. Drawn up by the Joint (ADC-ARAACOM) Air Defense Planning Committee, this plan envisaged the deployment of one hundred NIKE battalions in addition to the thirty-nine gun and Skysweeper units relied upon for low altitude coverage.[17]

This plan proposed a listing of targets arranged in four priority groups. The first of these groups encompassed the sixty-one NIKE units included in the approved Department of the Army plan described in the preceding section, the second and third groups would require thirty-nine additional battalions, and the fourth was provided simply for planning purposes in the event that more than a hundred battalions would be authorized. There was no indication of priority between targets within particular groups.[18]

In effect, this plan proposed the creation of a partial perimeter defense around the Northeast, with island defenses for other important locations. This resulted in lowering the priority of certain industrial and population centers which had previously been afforded relatively high priorities on various extant target lists. Thus it was "considered more important to close the gap between the New York and Boston defenses by establishing defenses at Bridgeport, Hartford and Providence than ... to establish individual defenses at isolated places such as St. Louis or Houston...."[19] Such a policy had the effect of providing perimeter protection against attacks from the east or north to all cities behind a line extending from Norfolk northward to Boston,

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and westward to Milwaukee. In actuality, the initial NIKE to be utilized, termed NIKE I, did not possess sufficient range to make this perimeter defense a continuous one, but an improved missile was anticipated which would close such gaps as might exist.[20*]

The first two priority groups were considerably larger than the third, for the reason that the bulk of the material produced after creation of defenses at the locations in the first two groups would be used to create dual control capability at each battery site, thereby doubling their fire-power in the manner described above.[21]

As of June 1954, this plan was still under consideration by ARAACOM. Subordinate commanders had been requested to submit tactical plans, and ARAACOM officers envisaged submission of formal requirements to the Department of the Army in the future.[22]

V

NIKE's appearance in the antiaircraft system held surprisingly close to schedule. In 1951 the original plans drawn up had envisaged the first NIKE unit joining the antiaircraft force in April 1953.[23] As it turned out, the first such unit was assigned in January of 1954.[24] This unit, the 36th AAA Gun Battalion, had left its emplacements around Washington early in the previous November, and had moved to Fort George G. Meade, situated not far distant from Washington in the Maryland countryside. Here this unit took up temporary sites and began its training for conversion to the new weapon.[25] Like all other such units in the spring of 1954, the 36th Battalion was not yet able to move to permanent facilities. Lengthy land acquisition and construction activities had yet to be gone through, and it appeared to be some months

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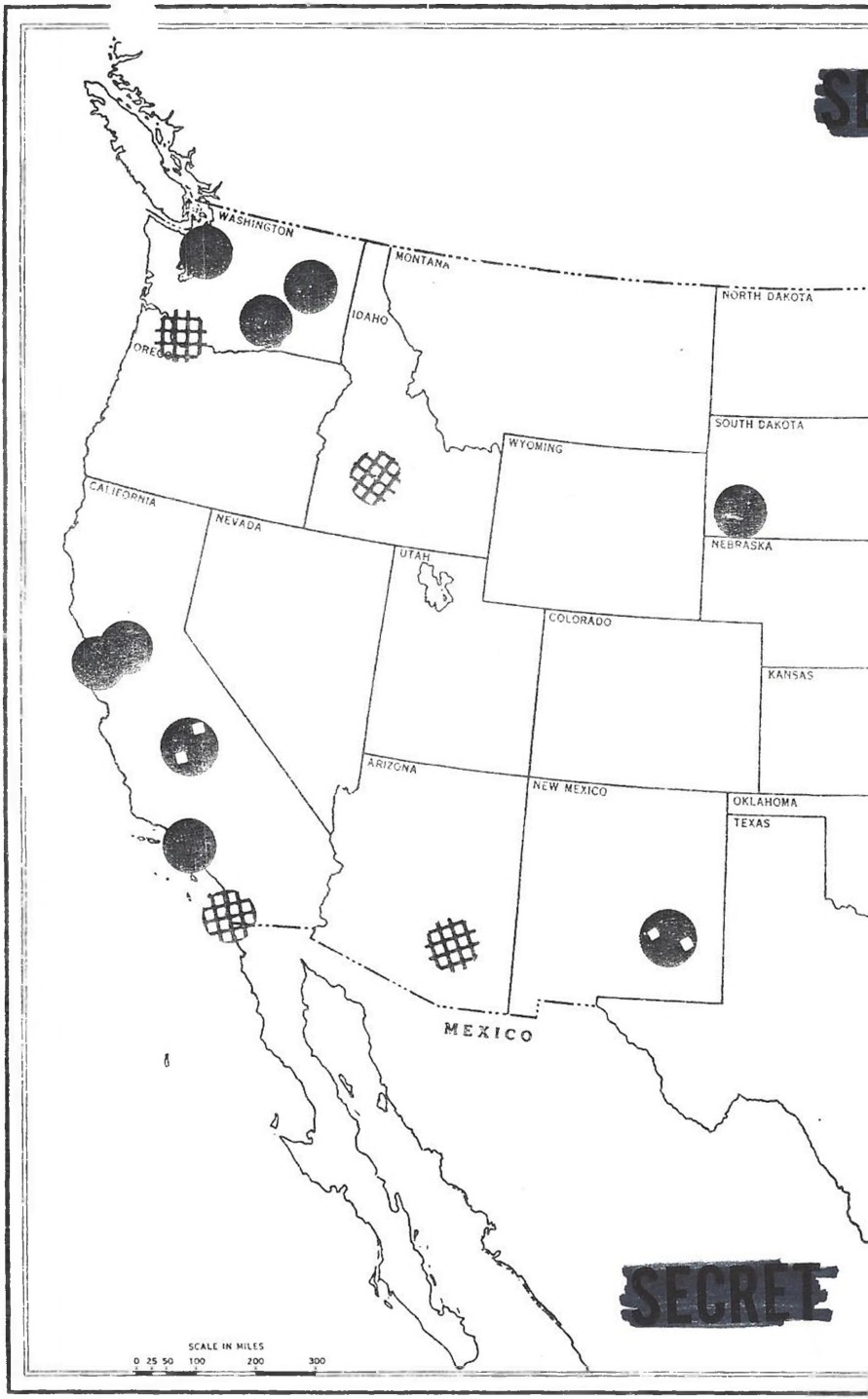
*See following page for map of proposed deployment.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OREGON
IDAHO
MONTANA
NORTH DAKOTA
SOUTH DAKOTA
WYOMING
NEBRASKA
CALIFORNIA
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KANSAS
ARIZONA
NEW MEXICO
OKLAHOMA
TEXAS
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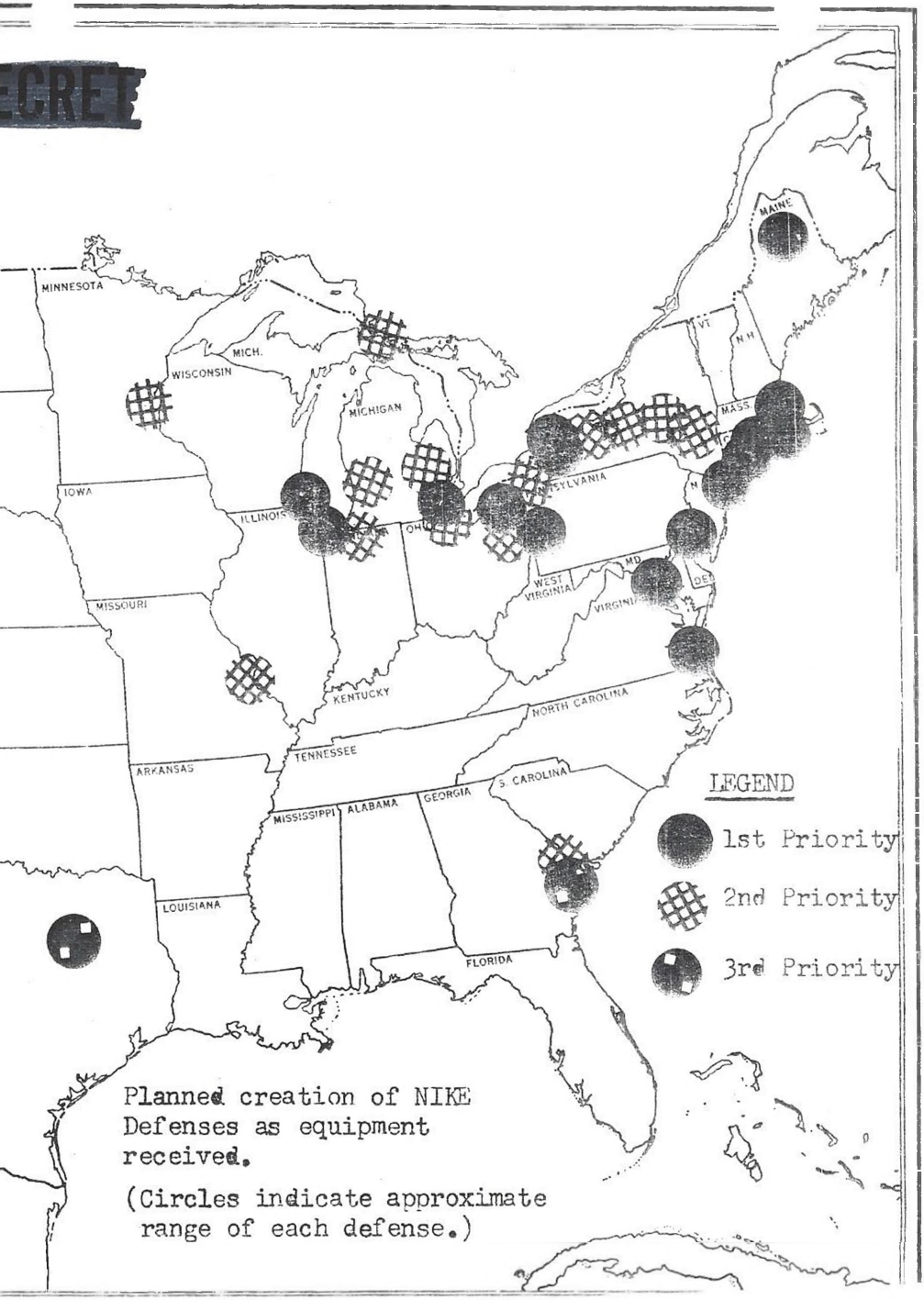

Planned creation of NIKE Defenses as equipment received.

(Circles indicate approximate range of each defense.)

before the first NIKE unit would take up positions in its permanent quarters.[26]

By the middle of the year, eight battalions were equipped with NIKE and were occupying temporary on-site positions. A training program at Fort Bliss and White Sands Proving Ground -- designed to train cadres for each converting unit -- was capable of turning out trained men in step with the production of equipment, and ARAACOM expected that after another year had passed a total of thirty-two battalions would be converted to NIKE and on-site. The full sixty-one battalion NIKE strength was expected to be on-site in tactical positions by February 1957. Long before this, converting or activating battalions would be able to move directly to permanent emplacements. ARAACOM anticipated that the construction of permanent facilities would have progressed to this point by October of 1954.[27]

V

In commenting upon the doctrinal implications contained in NIKE and its capabilities, ARAACOM Headquarters in June 1954 observed that though the rules of engagement currently in force were adequate,[28]

> a complete understanding of the doctrine byboth Army and Air Force personnel concerned becomes increasingly more important because of the greater role which will now be played by antiaircraft. It must be recognized that this new weapon gives the Antiaircraft Command a much greater defense potential; and the misuse of this capability through improper application of rules of engagement would result in a much greater loss to the over-all defense system. Failure to release the fire of this weapon or to withhold it inside the weapons range capability, could well prove disastrous.

NIKE's peculiar characteristics lent emphasis to these words. Though its range, capability at extreme altitudes, and high kill-probabilit

per projectile made the weapon far superior in performance to conventional devices, its slow rate of fire made it critically dependent upon early and accurate identification of approaching aircraft. Each NIKE battery could fire only one missile per minute, or two per minute when control facilities were doubled. This contrasted sharply with the rate of fire possessed by batteries equipped with conventional weapons. The 90mm battery, equipped with four guns, could fire one hundred projectiles per minute. The 120mm battery, likewise equipped with four guns, could fire forty-eight projectiles per minute. This great curtain of fire could be thrown up even if identification were not achieved until attackers were within a relatively few miles.

On the other hand, it was imperative that NIKE batteries know whether an approaching aircraft was hostile or friendly while it was still great distances away. As Colonel Ellis, ARAACOM G3, had pointed out in August 1952 while proposing that GDA's be established, each battery must be able to start firing when its target was at least forty-six miles away in order to get off three missiles before the attacking plane reached the bomb release line.[29] If NIKE were to reach out to strike its objective effectively, identification had to be achieved by the associated ADDC while the approaching enemy was considerably more than fifty miles away, for notification of his character had to be passed from ADDC to AAAOC to battery, where it would be necessary to engage in further correlation of tracks on acquisition radars. Only after this would it be possible to train the target-tracking radar on the hostile aircraft.

At least one ARAACOM officer who had long experience in AA

operations was convinced that current identification procedures were inadequate to meet this challenge. Colonel George R. Carey of WESTARAACOM commented to ADC representatives that[30]

> The need for rapid and positive identification created by Nike cannot be met by any identification system now in use or planned for use in 1954. The only system known to us which could provide the required rapid and positive identification is the establishment of prohibited air spaces over vital target areas into which no aircraft could enter without being automatically considered hostile. If all air traffic were to be prohibited from entering an air space over vital United States target areas and if the limits of the prohibited areas were to extend 50 nautical miles from the sites of the Nike batteries defending the area, intruding aircraft could readily be distinguished. If, in addition, any aircraft entering the prohibited air space were automatically subject to destruction, the short notice required by the nature of the Nike battery would be sufficient for realization of the maximum Nike capabilities.

As of June of 1954, however, both ADC and ARAACOM could only rely, as ARAACOM put it, upon "careful training, close coordination and decisive command action."[31]

REFERENCE NOTES

Documents cited in this study are available in the Headquarters ADC Historical Directorate, the Headquarters USAF Historical Division, or in the files of ADC lower-echelon units. The document location is shown by the following abbreviations:

DOC._____ indicates that the document is a supporting document to this study only and is located at the Headquarters ADC Historical Directorate and the Headquarters, USAF Historical Division.

ADCHR/#____, Doc. ____. (#1 covers period to June 1951, #2 to December 1951, etc.) indicates that the document has been used as a supporting document to a previous Headquarters ADC Historical Report, as shown, and is located at the Headquarters ADC Historical Directorate and the Headquarters USAF Historical Division.

ADC unit, semi-annual period, Doc._____, e.g., WADF, 1951A, Doc. 235 ("A" refers to the period 1 January to 30 June, "B" to 1 July to 31 December). indicates that the document has been used as a supporting document in an ADC lower-echelon unit and is located in the particular unit's files, at the Headquarters ADC Historical Directorate, and at the Headquarters USAF Historical Division.

HRF indicates that the document has not been used in a previous history and is located only in the Headquarters ADC Historical Directorate's Historical Reference Files.

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8. As in n 6, Devers to Spaatz, Memo, "Responsibilities for Air Defense," 14 June 1946, with inclosed Army Ground Forces Study, "Security from Enemy Air Actions," (ca. June 1946), which is Tab A to ADC Staff Study Number 17, as in n 6.

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16. As in n 12, 1st ind., ADC to AAF, 27 March 1946, and 2nd ind., AAF to ADC, 22 April 1946.

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3. See Memorandum for the Record, Colonel John B. Cary (AC/AS Plans, Hq ADC), 20 October 1947 (DOC. 16), and ADCHR#1, pp. 55-56.

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60. As in n 15, "Operational Readiness."

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63. As in n 61.

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44. As in n 37, and "Authorization and Status of Battalions."

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2. Command Report: 1952, Army Antiaircraft Command, p. 36 (ADCHR#4, Doc. 17).

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18. As in n 17.

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HEADQUARTERS
AIR DEFENSE COMMAND
ENT AIR FORCE BASE
COLORADO SPRINGS, COLORADO

ADHAH

SUBJECT: Transmittal of Amendment to Historical Study

TO: Director, Research Studies Institute
The Air University
ATTN: USAF Historical Division, Archives Branch
Maxwell Air Force Base
Alabama

1. The attached amendment to ADC Historical Study No. 4, "Army Antiaircraft in Air Defense, 1946-1954," was prepared at the request of the Commanding General, Army Antiaircraft Command. Request that the amendment be either stapled or scotch-taped to the appropriate page of the copies of the study sent your organization by previous correspondence.

2. Upon removal of inclosure this correspondence may be downgraded to unclassified.

FOR THE COMMANDER:

1 Incl:
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Hist Study (3 cys)

Inserted 3 Apr 1957

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