CHAPTER 7

THE AIR FORCE WRITES ITS DOCTRINE 1947–55

"Where in the Air Force," asked Maj Gen Lauris Norstad, the assistant chief of air staff for plans in 1946,

> will there be assembled more of what it takes to study, discuss, devise, develop, test and formulate than at the Air University? Here, in an atmosphere dedicated to instruction, thinking, study and discussion, there will of necessity be a constant evaluation of any current combat and an immediate application of its lessons to existing tactical doctrines "Shall we change; is our doctrine sound?" will be daily questions in the minds of hundreds of instructors, spurred on by the sharp analysis and questions of thousands of highly-experienced students Why not give these men the job of evaluating combat and formulating tactical doctrine for the entire Air Force? . . . They can probably do a better job, resolve a greater amount of sound thinking into useable doctrine than any group of men anywhere And they will do it whether or not they are charged with it.[1]

Early Efforts to Identify Air Force Doctrine

As a result of Norstad's recommendations and the favorable reputation enjoyed by the old Air Corps Tactical School, the Air Force issued a June 1946 mission summary that read that the Air University:

> reviews, revises, and prepares publication of AAF basic doctrine. . . Develops basic doctrines and concepts for the employment of air power. . . . Maintains continuing research into the strategic, tactical, and defensive concepts of air power, both manned and unmanned aircraft and guided missiles . . Maintains close liaison with the Headquarters of the Strategic Air Command, the Tactical Air Command and the Air Defense Command with regard to matters of policy and doctrine[2]

During 1946 the Air University established the Air War College at Maxwell Field, Montgomery, Alabama; the Air Command and Staff School at Craig Field, Selma, Alabama; and the Air Tactical School at Tyndall Field, Panama City, Florida. Believing that the Air University ought to furnish officers with facts, skills, and technical information and also to guide the future thinking of the Air Force, the Air University's Faculty Board stated that the new educational institution would not be bound to accept official policies without question but would only present them for study. Regardless of existing policies, students could be told of the Air University's beliefs. The Faculty Board stated that all curricula would incorporate a basic school doctrine: "the ultimate objective of air power is to force

the capitulation of an enemy nation by air action applied directly against the vital points of its national structure. This may not at any given time be primary in importance, but it is the ultimate objective."[3]

The Air University's broad responsibility for developing concepts and doctrines and for testing tactics rested upon an initial assumption that the institution would be assigned typical combat air units that could be employed for test purposes. As has been seen, Gen Carl A. Spaatz found it impossible to assign such units to the Air University and ordered that the Air University would depend on other commands to conduct tactical tests and developmental work. Spaatz also stated that the "doctrines taught at the Air University will be those current in the various commands, approved as necessary" by Air Force headquarters.[4] Seeking to bridge the conflict in orders, Maj Gen David M. Schlatter, the Air University's deputy commander, announced that in accomplishing its research, evaluation, and doctrinal functions the Air University would "act in the capacity of a monitoring agency or steering committee utilizing the expert knowledge available in all of the commands of the Air Force."[5] Recognizing that its mission was one of evaluation rather than research, the Air University redesignated its Research Division as the Evaluation Division on 29 August 1947.[6]

Except for announcing the basic doctrine that would govern its instructors, the Air University made little progress in preparing statements of basic Air Force doctrine. In Washington on 13 May 1946, Brig Gen Francis H. Griswold, deputy chief of air staff for operations, urged that the Air Force ought to begin to formulate its doctrine. "There is a requirement for a field manual," Griswold wrote,

> which will establish the place of air power in the armed forces and define our policies, doctrines, strategy and tactics . . . The theory or strategy of air power, particularly strategic bombing, has never been adequately put on paper. . . . A strong and logical framework must be developed from which can be provided appropriate manuals for the provisional education of officers of all ranks in all of the armed forces, and policies to guide our public relations and dealings with Congress

Although War Department Field Manual (FM) 100-20, *Command and Employment of Air Power*, had been "a declaration of independence of air power," Griswold noted that it was already "obsolete and entirely inadequate." As written in 1943, this manual had emphasized the coequality of air and ground power. "Land power and air power," Griswold thought, "are not always interdependent forces. There are times when air power at least may be an independent force." At the time of Griswold's recommendation, however, Maj Gen Muir S. Fairchild, the Air University commander, was reluctant to commit his personnel to a doctrinal problem until the new institution was firmly established. Maj Gen Charles C. Chauncey, deputy chief of the Air Staff, additionally feared that any revision of FM 100-20 might stir up a political controversy that could hinder the cause of armed service unification.[7] Unlike the Air Force, the Navy moved boldly to provide a basic doctrine to its forces. In the closing months of World War II, it assembled a full-time panel of officers whose duties had involved combat command or

important staff work and directed them to prepare a series of US fleet (USF) publications. The key manual in this series—USF-1, *Principles and Instructions of Naval Warfare*—went through many drafts within the panel, was circulated for comments from naval commanders, and was published on 1 May 1947 with the notation that it represented "the best service opinion and best knowledge that obtains in 1946."[8]

With armed services unification assured by the National Security Act of 1947, Brig Gen Thomas S. Power, now deputy assistant chief of air staff for operations, directed the Air University to undertake its doctrinal responsibility without further delay. "There is a requirement for an Air Force publication of field manual scope," he wrote, "that will establish the doctrine and command of air power in the Armed Forces and define our policies and strategies. . . . It is visualized that this manual will be the top level Air Force document from which will be derived all other Air Force publications relative to air power and joint operations." Power directed the Air University to revise FM 100-20 and to provide recommendations for the type of Air Force publication that would be employed to disseminate doctrine.[9] Without awaiting action on this problem, the Air Force in August 1947 summoned representatives of the Air University, the Air Defense Command, the Tactical Air Command, and the Strategic Air Command to form two panels to provide guidance for an Air Force position in regard to air defense procedures, doctrine, and organization. Headed by Col Richard H. Carmichael, chief of the Air Power Employment Section of the Air University's Evaluation Division, the Air Defense Policy Panel held meetings during the winter of 1947-48 and made its final written report to the Air Force chief of staff on 2 February 1948. The report concluded: "The security of the nation from air attack rests primarily upon our strategic air offensive capabilities, but air defense is necessary and can achieve a degree of effectiveness which may mean the difference between victory and defeat." It recommended that a unified continental theater of operations comprised of Army, Navy, and Air Force forces operating under a single commander would provide the most effective and economical organization to ensure the security of the United States against air attack.[10]

When the Air University was directed to revise FM 100-20 and to recommend a system of doctrinal publications, General Schlatter took account of the fact that the Air University's Evaluation Division had only 18 officers and that not all of them could be assigned to a manuals project He, therefore, directed that the Evaluation Division monitor and evaluate such projects, which would be carried out in the Air University's schools and colleges. He specifically directed the Air War College to revise the field manual and to recommend a system of doctrinal publications.[11] During his tenure as founding commandant of the Air War College, Maj Gen Orvil Anderson frequently had student seminars study and report on major air problems, and he used this procedure to handle the doctrinal projects.

On 16 September 1947 two Air War College seminars began working on the assigned problems. In its report on 19 December, a seminar headed by Col W. M. Garland recommended that the Air Force develop a single integrated publications

system under the Office of the Vice Chief of Staff. The seminar suggested that the old Army system of disseminating doctrine in field manuals and technical manuals had been too rigid and had never provided a comprehensive coverage. The Navy's US fleet series appeared more acceptable as a model for the Air Force. The seminar, therefore, proposed that the Air Force ought to use a series of "air employment instructions" that would promulgate the concepts of the roles and objectives of air power in national security, the principles and doctrines of command and employment of the Air Force in peace and war, and the strategy, tactics, and techniques of Air Force operations. Published under the authority of the chief of staff, these air employment instructions would "constitute essential guides" and would "reflect the most logical current thought in the employment of air power," but they would not seek "to suppress initiative or to establish a set formula for air warfare." The air employment instructions should be divided into three general categories. Category 1 would comprise a basic book on air power. Category 2 would outline in general terms the application of fundamental principles and basic doctrines of employment to specific operational fields of Air Force endeavor—for example, strategic air operations. Category 3 would deal with the operations, tactics, and techniques of type units of the Air Force, such as the tactics and techniques of fighter escort. Immediate responsibility for stating requirements for air employment instructions and for ensuring that they were properly revised would rest with the Air Force deputy chief of staff for operations. The seminar recommended that the air employment instructions be issued in loose-leaf binders so that they might be revised easily.[12]

The Air University accepted the requirement for such series of doctrinal publications, but it was not willing to limit the series to purely operational matters since it believed that the Air Force would need to express doctrine in administrative, logistics, communications, intelligence, and related special staff fields. Accordingly, on 5 February 1948 the Air University recommended that the air employment instructions should include three somewhat different categories from those proposed by the Air War College. Category 1 would continue to be the basic volume entitled "Air Power." Category 2 would be called "The Commander's Guide," and its single volume of seven books would include statements of Air Force operations in general and in strategic applications, joint endeavors, air defense, air transport, air reconnaissance, and special activities. Category 3 would be "The Group and Squadron Commander's Handbook," and its single volume of six books would deal with the tactical group and squadron and the tactics and techniques of bombardment, fighters, reconnaissance, air transport, and special air units. The Air University noted that "the interested agency on the highest level should be responsible for the doctrine promulgated in a given field."[13]

Both the Air War College and Air University emphasized that the number and type of publications within the Air Force ought to be greatly reduced. The Air Staff also endorsed this objective on 5 March when it directed the Air University to proceed with the preparation of the recommended air employment and administrative instructions, which quite likely would be issued as a series of Air

Force manuals rather than as a separate publications series.[14] Although the Air Staff appeared to have approved the Air University's planning, an Air Force Publications Board, which assembled in Washington early in 1948, refused to accept the plan of action. The Air Force regulation issued on the subject of publications on 26 April described 10 types of publications, including manuals. Manuals would include the types of material that had been called field and technical manuals, training standards, guides, handbooks, pamphlets, textbooks, and workbooks. Any Air Force command would be authorized to issue local command manuals on subjects peculiar to the command. Air Force manuals would normally be prepared by responsible functional Air Staff agencies, but, in certain instances, Headquarters USAF would delegate the preparation of the texts of manuals to a subordinate command. In those cases, the Air Staff would review and approve the draft manual. The air adjutant general was charged to edit and authenticate all Air Force manuals.[15]

While Colonel Garland's seminar was surveying the Air Force publications system, another Air War College seminar headed by Col C. P. Lessig was assigned the task of revising FM 100-20. Because of Garland's recommendations, Lessig's seminar undertook to draft the "Air Power" volume of the air employment instructions series and completed this project in February 1948.[16] Meanwhile, another seminar—headed by Col R. A. Grussendorf and composed of Cols Noel F. Parrish, Arno Leuhman, E. L. Sykes, and G. P. Disosway—was tasked with the problem of determining how the Air University ought to proceed with producing "The Commander's Guide." In a study completed on 16 March, this seminar suggested that the Air Force had been "organized and operated as a result of ideas existing in the minds of a very few men" that had "never been well stated" and had "never been brought together and organized into a complete and logical form" nor "explained in suitable terms bearing the sanction of official approval." It recommended that a permanent group of qualified Air Force officers and civilian writers, working under direct authority of the vice chief of staff, should be assigned the task of writing and continuously revising the text of the air employment instructions. Grussendorf's seminar also recommended that the collection of source material for this permanent group should be as comprehensive as possible, that the sources should encompass the best thoughts of all available experts on air power employment, and that personal interviews should be used to the maximum. Since few air leaders had written clearly on the fundamentals of air warfare, the seminar suggested that any complete and official statement of the meaning of air power could "be derived from only one source, the minds of leading military airmen." While they were brief and incomplete, the statements of Air Force leaders during the investigations of the Air Policy Commission and the Joint Congressional Aviation Policy Board headed by Sen Owen R. Brewster were judged to represent Air Force principles and purposes better than anything to be found in official publications. The seminar concluded with a flourish: "The principles of Air Warfare stem from Mitchell, Arnold, and Knerr more notably than from Frederick

or Napoleon, and Air Force thinking needs no Old Testament text for justification"; air power doctrine would come largely from living men.[17]

Having received authorization to proceed with the preparation of the air employment and administrative instructions, Air University officers assumed that the Air Force Publications Board would accept the planning that had been done in the Air War College originally. On 5 April 1948, the Air University accordingly established a board of officers from the Evaluation Division and the Air Command and Staff School to draft "The Commander's Guide"; and on 16 April the command directed the Air Tactical School to prepare "The Group and Squadron Commander's Handbook."[18] Expressing a desire that the publications should have a high quality of styling, illustrations, content, and format, the Air University asked the Air Force to make available to it personnel "with literary or artistic experience and talent."[19] While on a visit to Fort Monroe and Washington to survey Army and Navy publications activities early in May, Colonel Carmichael, who would shortly become chief of the Air University Evaluation Division, was startled to learn that the Air Force regulation on publications had "rejected the Air War College plan completely." He pointed out that the new Air Force regulation placed responsibility for doctrinal manuals with Air Staff agencies and thus conflicted with the assignment of doctrinal responsibilities to the Air University. Under the new regulation no single Air Force agency was empowered to pass judgment on the content of manuals or review the whole field to ensure that manuals provided a comprehensive coverage. At no point in the new system was there a stated requirement for professional editors, writers, or illustrators. "The quality of USAF publications, particularly manuals which will become the media for the enunciation of USAF employment and training doctrine," Carmichael noted, "is not assured of being superior or even excellent."[20]

Although the Air Force regulation of 26 April made Air Staff agencies responsible for manuals on doctrine, the Air Force, nevertheless, stated on 25 June 1948 that the Air University planning represented "an advance in simplification and condensation of Air Force manuals." Therefore, the Air Staff directed the Air University to continue preparation of the category 1, 2, and 3 instructions and suggested subjects for several specialized administrative manuals that the Air Force would require.[21] At this juncture Colonel Carmichael again asserted the need for a single Air Force agency, under the vice chief of staff or able to speak with the authority of the vice chief, to provide a central direction for the planning, preparation, and revision of Air Force manuals. "It is completely unrealistic," he thought, "to believe that Headquarters staff agencies will 'normally prepare' all manuals." He thought that the three principal deficiencies in the Air Force publications system—divided responsibility at the top, lack of a master plan, and insufficient professional assistance—sprang from a "lack of appreciation for the prodigious amount of thought and labor required to produce a good manual." "A manual," he said,

> must first express sound doctrine This requires careful research and evaluation of everything that has been written or spoken about the subject Once the ideas have been assembled they must be arranged in a logical and orderly manner. Then the writing phase of the process begins, the most laborious part of the task. When ideas are expressed in such a way that the reader can readily grasp their meaning, the manual is readable as well as intelligible. There is more to readability than merely making the meaning clear to the reader, it is measured also by the use of illustrative materials within the text... A well written and illustrated manual is the result of the ideas and work of many people This fact must first be recognized before any effective manual system can be established

Carmichael also noted that "manual writing cannot be effectively and efficiently accomplished as a part time, 'in addition to other duties' measure" and urged that the Air University ought to establish a production unit that "will take the writing load off of the instructors in the schools and place it upon qualified civilians under the direction of competent officer personnel."[22]

Anticipating that it would become "the 'Bible' of the Air Force and the keystone from which all other Air Force doctrinal publications will stem," the Air University expedited the preparation of the category 1 volume now titled "Air Power and the US Air Force." The initial draft prepared by the Air War College seminar in February 1948 was reviewed and revised by the Evaluation Division in March and April and was circulated through the Air University's schools and staff during May. Believing that the principal purpose of a manual was to teach, the Air University sought to ensure that the air power manual was "written in sufficient detail and with such clarity so as to be intelligible and attractive to the average junior officer." Although it did not consider its draft to be a final product, the Air University submitted "Air Power and the US Air Force" to the Air Force director of training and requirements on 2 July 1948, with a request that the Air Staff review its "scope, tenor, and general form."[23]

When the Air Staff had completed its review of "Air Power and the US Air Force," Maj Gen Frank F. Everest, assistant deputy chief of staff for operations, informed the Air University on 21 September 1948 that the manual did not fulfill the purposes for which it was intended. The Air Staff found the draft manual to be discursive and defensive rather than positive, to be written in a narrative form rather than concisely worded for reference purposes, to be lengthy and cumbersome, to contain much inessential in detail such as references to World War II experiences, to include controversial statements that did not contribute to an enunciation of doctrine, and to have other bits and pieces of information that were much too obvious for a high-level publication. Still the Air Staff disagreed with the reasoning of the manual only in a few particulars. It criticized as unnecessarily controversial the manual's statement: "Because air forces can be used in so many ways in the attack and because of the difficulties of protecting against such air attacks, the requirements for air defense measures are so great as to approach the unacceptable." The Air Staff believed that the description of an air mobilization phase at a war's beginning weakened the Air Force's emphasis on

an air force in being. The strong assertion in the manual that "strategic bombing operations are normally conducted independently of ground and naval forces" was said to be contrary to the more moderate Air Force position that Army and Navy forces were essential for the defense of overseas air bases required for a strategic air campaign. "In the preparation of this high level doctrinal publication," the Air Staff advised,

> it is necessary that it be as timeless and far thinking as possible . This publication on air employment is of such importance, covering high level doctrine and the principles of aerial warfare, that it should not be burdened with detailed instructional and procedural methods which are constantly changing. On the other hand, this type publication should cover general over-plans for doctrine and strategy which would stimulate flexibility of thought and action at all levels of command.[24]

In the spring of 1948 the Air University assigned responsibility for preparing the category 2 "Commander's Guide" to the Air Command and Staff School at Craig Field and for drafting the category 3 "Commander's Handbook" to the Air Tactical School at Tyndall Field. Each of these institutions, in turn, assigned the responsibilities for drafting the various books in the volumes to specific instructors. These instructors were unable to begin any serious attempts to write before the summer vacation period, and even then they could do little more than to prepare some highly tentative drafts on their assigned contributions. On 22 December the Air Force director of training and requirements asked that the drafts of the category 2 and 3 manuals be delivered to him in order that he might use them to provide guidance to the Air Staff in negotiations that were getting under way with the Navy. Although the Air University was reluctant to allow imperfect work to go to Washington, it complied with the Air Force request with misgivings but with some expectation that it might also begin to get some comments on the work.[25] After surveying the manuscripts, however, the Training and Requirements Division returned them with the notation that it had not considered them ready to be submitted to the Air Staff.[26]

During the spring and summer of 1949, the Air University Evaluation Division worked on revising the category 2 and 3 volumes, giving priority to the category 2 "Commander's Guide," which it intended to publish first. In the autumn of 1949 the Air University forwarded printed copies of the five books of the "Commander's Guide" to the Air Staff and to the major Air Force commands, with a request that they be reviewed for content, style, format, and suitability for Air Force usage. As had been the case with the "Air Power" volume, Air Staff comments on the guide were highly critical. One reviewer stated: "I don't believe a Commander would read it more than once—he might even stop after the first page." Other comments indicated that the volume contained information that was out of date, was too elementary to meet the purpose for which it was intended, was incomplete in scope, and generally did not measure up to standards required of an Air Force publication. The Air Staff directed on 25 July 1950 that the volume should be rewritten, and it further suggested that the Air University seek assistance from the

Air Force's operating commands. "Only then," stated Col Dorr E. Newton of the Directorate of Requirements, "will we get the latest tactical doctrine, tactics, and techniques incorporated."[27]

"I guess I personally am responsible for having sent out some poor tentative manuals," admitted Maj Gen John DeForest Barker, who had become the Air University's deputy commander in August 1949. "I decided to let them go out 'as is' for comment, and then rewrite them in manual form, rather than to write them in manual form, send them out for comment, and then again rewrite them according to the comments. I think we saved time by this method, but we certainly didn't improve our standing in the community."[28] Barker was free to admit that the Air University's manuals had been couched in "Adjutant General's language" which was "stilted, expressionless, and to a considerable extent meaningless." "They are the kind of a book which a man reads because he has to," he said, "not because he wants to. I would like very much to have them written in such a style that people enjoy reading them and hence will get more out of them."[29] Highly motivated to complete the doctrinal manuals project, Barker proved able to exercise some economies within the Air University and to secure spaces for four military and three civilian editors for assignment to the Air University Publications Office. In June 1950 the Publications Office took over the responsibility for completing the "Air Power," "Commander's Guide," and "Commander's Handbook" manuals. The work of revising these books appeared to be going well, perhaps because of the fact that the Air University had secured many indications of the sort of material that was not believed to be appropriate in a doctrinal publication. On 26 September 1950, however, Barker received word that a project was under way in Washington to prepare and publish joint armed forces doctrinal publications. Since the joint-force doctrines might well supersede the air employment instructions, Barker reasoned that the Air University must suspend its doctrinal work pending the maturity of the higher level discussions on doctrine.[30]

Air Force Activities in the Field of Joint Doctrine

At the end of World War II senior Air Force officers expected that the Army and Navy Staff College—which would become the National War College in mid-1946—would be able to provide joint-force doctrine in much the same manner in which it was expected that the new Air University would prepare air doctrine.[31] Under a directive from the Joint Chiefs, a Joint Operations Review Board of approximately 50 Army and Navy officers convened at the Army and Navy Staff College early in 1946 to study the joint operations of World War II and to revise joint doctrine as necessary.[32] Meanwhile, under the guidance of the National War College, the Joint Operations Review Board submitted a draft manual entitled "Joint Overseas Operations" to the Joint Chiefs on 15 August 1946, which the Joint Chiefs promptly transmitted to the Army and Navy for comment.[33] Although General Spaatz acknowledged the need for a new publication to replace prewar Army-Navy agreements, he was unwilling to accept the draft "Joint Overseas

Operations" manual. The proposed text envisaged some unity of command with an integrated, triservice joint staff, but it failed to develop this doctrine in any precise detail. The text did not consider the possibility that a hostile nation might be defeated by air attack, and it was chiefly concerned with amphibious landings of ground troops at an overseas objective.[34]

Thinking that the armed services must have an agreement on future overseas operations but being unwilling to accept the jointly prepared manual, Maj Gen Otto P. Weyland, assistant chief of air staff for plans, proposed on 29 August 1946 that the Army Air Forces extend the same type of cooperative arrangements accepted in War Department Field Manual 31-35, *Air-Ground Operations*, to the field of amphibious operations. Following this line of reasoning, the assistant chief of air staff for operations, Maj Gen Earle E. Partridge, prepared a paper entitled "Joint Procedures for Tactical Control of Aircraft in Joint Amphibious Operations," which the Army Air Forces promptly submitted to the Joint Chiefs as its concept of the command and control of air power in joint operations. This paper stated, "The Joint Task Force is normally divided into air, ground, and naval components, each under its own commander. All components of the team are under the Joint Task Force commander who is responsible for the joint effort." In brief, the Air Force paper sought to secure a unity of air action by expanding the joint operations center already being used as the instrument of Army-Air Force cooperation to include a Navy operations section as well as the Army air-ground section and the Air Force combat operations section.[35]

The Army informally concurred with the Air Force position, but the Navy preferred to look upon amphibious operations as a two-phase endeavor in which a fleet commander would command forces afloat and would pass command to the landing force commander when troops were set ashore. The Navy had already published its views in USF-6, *Amphibious Warfare Instructions*, and it looked upon the Air Force paper as containing "information which is contrary in many points to standard Navy doctrine and to experience gained in World War II."[36] The Navy opposition made it evident that the paper could not be approved by the Joint Chiefs, but General Partridge, director of training and requirements of the Air Force, believed, nevertheless, that it could be issued as a revision of Field Manual 31-5, *Landing Operations on Hostile Shores*. Seeking comments and recommendations, Partridge submitted the Air Force position to the Air University and the Tactical Air Command. The Tactical Air Command responded with a vigorous demand that the Air Force not "compromise or appease" and suggested that the wording on command structure should be stated even more strongly.

> The Air Force should advocate and persist as a basic principle that there should be a unified command for an amphibious operation; that there will be appointed an overall commander who commands the operation from the time of inception until completion, that the overall commander will not concurrently command one of the major subordinate forces involved; that the overall commander will have a joint staff consisting of Air, Ground and Naval personnel, that the amphibious force will be composed of a

> Naval Force responsible for the conduct of all ground action, and an Air Force responsible for the conduct of all air action.

The Air University concurred in the Tactical Air Command's recommendations. It assumed that the proposed statement on command would "certainly be violently opposed by the Navy," but it thought that the manual might be issued as Army-Air Force doctrine. On 28 October 1948, however, the Army agreed that "a Manual of this type would be desirable as an interim statement of doctrine," but it believed that such a manual ought to be processed through the Joint Chiefs and was unwilling to consider its issuance as an Army-Air Force publication.[37]

Still seeking to secure a means for developing joint doctrines and procedures that would replace unilateral service publications, the Joint Chiefs of Staff established an Ad Hoc Committee for Joint Policies and Procedures in the autumn of 1948 and assigned it the task of revising the 1935 edition of *Joint Action of the Army and Navy*. The deputies for operations of the Navy and Air Force and the deputy for administration of the Army served as the members of the ad hoc committee.[38] Since one of the sections in the proposed publication was to concern tactical air support, the committee requested the Tactical Air Command and the Army Field Forces to prepare a joint statement on the matter. To the surprise of the Tactical Air Command, which saw no reason why the organizational lessons tested during World War II and incorporated in Field Manual 31-35 should be so soon out of date, the Army Field Forces indicated that the manual was already obsolete and should be revised. With this and other matters in dispute, the Army member of the committee proposed that the Joint Chiefs of Staff should establish at least four joint centers (airborne, tactical air support, air defense, and amphibious), which would be charged with the development of joint doctrines, tactics and techniques, joint training, and joint testing of equipment Some Marine Corps officers interpreted this proposal as an Army attempt to deprive the Marine Corps of its responsibilities in the amphibious field. The Air Force did not like the proposal since it believed that it would be as inappropriate for ground officers to evaluate air tactics, techniques, and equipment as for air officers to attempt to do the same for similar ground activities. In the end, the Navy and Air Force members voted against the joint center proposal because it involved the transfer of legally established primary service responsibilities to new agencies.[39]

General Norstad, the Air Force deputy chief of staff for operations, agreed with the proposal of Maj Gen Robert M. Lee, commander of the Tactical Air Command, that a board of the Air Force's most experienced tactical air commanders ought to review current doctrine, tactics, procedures, and equipment; draw conclusions as to their suitability in the light of new developments; and make appropriate recommendations. Gen Muir S. Fairchild established the USAF Board of Review for Tactical Air Operations on 10 June 1949, the membership included Lt Gen Elwood S. Quesada, Maj Gen Richard E. Nugent, General Schlatter, General Weyland, and Brig Gen David W. Hutchison. Appearing before the review board on 14 July, Gen J. Lawton Collins, US Army chief of staff, urged

that Field Manuals 100-20 and 31-35 be rewritten. Field Manual 100-20, for example, stated that missions against hostile forces at the front lines were "most difficult to control, are most expensive, and are in general least effective." Collins did not believe that this statement was necessarily true. He argued that Field Manual 31-35 should be revised to define tactical air support of ground forces as being "the application of tactical air power in the furtherance of a ground campaign as required by the ground force commander to achieve his mission." He also proposed that a joint tactical air support center be established in the Fort Bragg-Pope AFB area. After holding six formal sessions, each of several days' duration, the board reported in October 1949. Its major finding was the Air Force concept of tactical air power needed positive reaffirmation and ought to embrace three major concepts: (1) tactical air operations in concert with a major surface campaign designed to exploit the strategic air offensive by engaging the military forces of an enemy nation in combat; (2) tactical air operations in concert with a limited surface campaign to defend or to expand certain important base areas; and (3) tactical air operations in concert with the strategic air offensive within the capabilities of tactical air power to attrite the enemy air force, to destroy the mobile transportation facilities of the enemy nation, and to isolate deployed enemy forces from their source of sustenance. The Board of Review agreed that Field Manuals 100-20 and 31-35 required revision, but it asserted that the Air Force must be its own judge of tactics, techniques, and equipment.[40]

As early as 1 July 1948 General Spaatz informally indicated that the broad mission of the Tactical Air Command required it to develop and test tactical doctrines and techniques.[41] In a headquarters reorganization in January 1949, the Tactical Air Command accordingly established a deputate for plans, headed first by Col William W. Momyer and later by Col Henry Viccellio, and included within it a directorate of doctrine that was charged to represent the Tactical Air Command on joint agencies, boards, and committees that might examine and evaluate doctrine, tactics, techniques, and procedures related to tactical air operations.[42] Beginning in February 1949 the Tactical Air Command's deputy for plans worked closely with representatives of the Army Field Forces in preparing a joint paper for the Ad Hoc Committee for Joint Policies and in defining procedures that delineated the areas of agreement and disagreement on the tactical air support of ground forces.[43] The planned reorganization of the Tactical Air Command also authorized the establishment of a Headquarters Tactical Air Force (Provisional). Effective on 16 July 1949 the Tactical Air Force (Provisional) was established at Pope AFB where it would work closely with Headquarters V Corps at nearby Fort Bragg in planning and conducting joint maneuvers and exercises.[44]

In the spring of 1949 the Tactical Air Command and the Army Field Forces had been unable to agree on a joint paper for submission to the ad hoc committee sitting in Washington, but another project looking toward the preparation of a joint training directive for the Tactical Air Force and V Corps went more smoothly when it was begun in early August 1949. Working from an agreed outline of proposed

chapters, Tactical Air Command representatives prepared drafts that went to the Office of the Chief of Army Field Forces. With concurrence from the Army Field Forces, the draft chapters were sent to the Tactical Air Force-V Corps for field tests.[45] Army officers were enthusiastic about the Tactical Air Force-V Corps agreement. General Collins, speaking with a degree of hyperbole, described it as an organization that was able "to work full time not only in training but also in the development of tactical doctrine of airborne and close support operations, as well as in the development and testing of proper equipment."[46]

Before the end of March 1950, drafts of most of the chapters of a joint training directive had been forwarded to the Tactical Air Force-V Corps for consideration and testing. According to the plan, the organization and equipment specified in the draft training directive were to be tested in the course of regular joint maneuvers and field exercises; based on these field tests, the Tactical Air Command expected to prepare a publication that could replace Field Manual 31-35.[47] The beginning of the Korean War, however, forced the cancellation of most planned field exercises and maneuvers and also increased the need for revisions in joint air-ground doctrine. Because of the urgency of the matter, Brig Gen Homer L. Sanders, vice commander of the Tactical Air Command, and Brig Gen William S. Lawton, chief of staff of the Army Field Forces, went ahead with the publication of the *Joint Trainng Directive for Air-Ground Operations* on 1 September 1950. In a preface they described the directive's purpose as being to establish "the urgently needed amplifications and revision of the principles, means, and procedures" set forth in Field Manual 31-35. They noted that much of the organization and technique specified in the directive had not been adequately field-tested, but they conceived that the directive's provisions would be incorporated in a joint departmental level publication after adequate field testing.[48] In Washington, Lt Gen Idwal H. Edwards, Air Force deputy chief of staff for operations, expressed pleasure that the Tactical Air Command and Army Field Forces had prepared "an excellent working doctrine for units of the field armies and tactical air force." "In my opinion," Edwards wrote on 2 November 1950, "this is the best available document on air-ground operations and it is one which will provide proper guidance and training in a vital phase of joint operations."[49]

The expansion of the Tactical Air Command in the late summer of 1950, together with the establishment of the Ninth Air Force (Tactical) at Pope AFB on 1 August 1950, represented an Air Force effort to provide a proper parallel organization with the Army at a working level. According to Maj Gen Willard R. Wolfinbarger, who assumed command of the Ninth Air Force, this "lack of parallel organization for both the Air Force and Army at a common working level has been a serious handicap in the promulgation of Joint Doctrine and in the supervision of Joint Operations to insure adherence to Joint Doctrine." But Wolfinbarger did not think that the new organizational pattern established the Tactical Air Command in a coordinate status with the Army Field Forces. As the primary Army agency for the supervision of operations and training within the zone of interior, the Army Field Forces were able to present the *Joint Training Directive* to Army service

schools and numbered armies as approved joint doctrine that would be taught and practiced. On the other hand, the Tactical Air Command could only present the *Joint Training Directive* as joint doctrine approved by the command with an expression of "hope that other activities will accept it as such until it can be properly coordinated and made official."[50]

According to all reports the association between the Tactical Air Force (Provisional) and the V Corps as field agencies of the Tactical Air Command and Army Field Forces was generally harmonious, and General Collins apparently hoped that the establishments in the Pope Air Force Base-Fort Bragg area might grow into a joint center. Obviously moving toward this end in the autumn of 1950, the Army established the Army Airborne Center and the Army Air Support Center at Fort Bragg. These centers were parts of the Office of the Chief of Army Field Forces; each was headed by an Army major general. Going along with the plan a part of the way, General Wolfinbarger, who was now temporarily commanding the Tactical Air Command, established a Tactical Air Command Airborne Liaison Office at the Army Airborne Center on 14 November. But when the Army Field Forces requested on 13 December that three other Tactical Air Command liaison officers be assigned to the Army Air Support Center, Wolfinbarger declined to comply. He recalled that the Headquarters Tactical Air Command had been located at Langley AFB so that its personnel would enjoy close daily liaison with the people in the Headquarters Army Field Forces at nearby Fort Monroe. He pointed out that the location of the Army centers at Fort Bragg had already lessened the desirable daily contact between staff officers. "I feel," he concluded, "that the assignment of liaison officers to the Army Air Support Center would decentralize and undermine to an unacceptable degree Tactical Air Command's responsibility for establishing and revising the doctrine, tactics, and techniques of tactical aviation which, obviously, must be accomplished at Army Field Forces-Tactical Air Command level."[51]

Given the differences in service viewpoints that had to be reconciled, the Ad Hoc Committee for Joint Policies and Procedures of the Joint Chiefs of Staff made slow progress in its efforts to define principles and procedures for the joint action of the armed forces. One of the main points of contention continued to be the Army's position that major areas on interservice responsibility ought to be made the province of joint centers constituted under the principle of unified command and operated under the immediate jurisdiction of the Joint Chiefs of Staff. Named by the Joint Chiefs, the commander of a joint center would have a joint staff and one of the chiefs of staff would be designated as the executive agent for each joint center. The Navy and the Air Force did not agree that such joint centers should be established.[52] By the spring of 1951 the ad hoc committee reached some successful compromises, on 26 April the Joint Chiefs of Staff approved the first two chapters of *Joint Action Armed Forces*. Entitled "Principles Governing the Functions of the Armed Forces" and "Functions of the Individual Services," these chapters discussed the principles, responsibilities, and functions of the armed services that had been set forth in the Key West agreement, which had been issued in 1948 as

"Functions of the Armed Forces and the Joint Chiefs of Staff." During the summer of 1951, the Joint Chiefs also reached agreement on the last two chapters, "Principles Governing Joint Operations of the Armed Forces" and "Principles and Doctrines Governing Joint Aspects of Special Operations of the Armed Forces." In September 1951 the *Joint Action Armed Forces* (JAAF) paper was published as Army Field Manual 110-5, Navy JAAF, and Air Force Manual 1-1.[53]

An Air Force critique of *Joint Action Armed Forces* pointed out that the three separate service identifications of the same document appeared to violate the principle of "maximum practicable integration of policies and procedures" that was the announced goal of the publication. The same critique found the JAAF to be filled with "semantic compromises" that left "gray areas" of meaning, the interpretations of which in times of crisis "could prove costly in delay and indecisiveness in military action."[54] Among its other provisions, the JAAF authorized the establishment of six joint service boards, each to be under the direction of the service that had a primary interest in the particular field of endeavor. These joint boards were to develop joint doctrine and procedures; evaluate joint tactics and techniques, the adequacy of equipment, and the adequacy of joint training; and review publications covering the conduct of joint training. When the boards were established early in August 1951, the Air Force chief of staff was made responsible for the Joint Air Defense Board at Ent AFB, Colorado, and for the Joint Tactical Air Support Board and the Joint Air Transportation Board, both at Pope AFB. The chief of staff of the Army was responsible for the Joint Airborne Troop Board at Fort Bragg; the commandant of the Marine Corps for the Joint Landing Force Board at Quantico, Virginia; and the chief of naval operations for the Joint Amphibious Board at Little Creek, Virginia. Each of the boards responsible to the Air Force would be headed by an Air Force major general who would be directly responsible to the Air Force chief of staff but would forward all reports on air defense, air support, or air transport matters through the commanders of the Air Defense Command or the Tactical Air Command as the case might be.[55] The responsible service was charged to provide logistical support to each of its boards, and the directors or chairmen of the boards were instructed to draft basic charters and to prepare their requirements for representatives from the three armed services.[56] The joint boards were empowered to draft joint doctrine within their spheres of authority that after approval by the Joint Chiefs of Staff would supersede service doctrines. As they began work, however, each of the service representatives on the joint boards found that he required formal statements of the individual positions and doctrines of his services.

The Air University as a Doctrinal Center

"Since I have been here," wrote General Barker in August 1949, "we've been in a constant struggle to get out to our people a valid and clear-cut statement of operational doctrine. It's needed badly; not only in our schools but in the various joint boards on which the Air Force is represented, and throughout the entire Air

Force." Barker was convinced that the Air University was the best-qualified agency in the Air Force to prepare and publish doctrinal manuals. "To begin with," he argued,

> we have more qualified senior officers than any one place in the Air Force except the Pentagon. Their everyday work involves the preparation of matter appropriate to operational manuals Of greatest importance is that they can and do devote many long hours to this preparation, to the complete exclusion of all other matters. This cannot be done in the Pentagon Secondly, our people are unbiased as far as loyalty to strategic, tactical, air defense, etc., are concerned They are able to view operational doctrine from the viewpoint of the whole Air Force—no compartmentation. This, to my mind, is of the utmost importance if we are going to develop proper air power employment[57]

While attending an Air Force Educational Conference chaired by General Fairchild in February 1950, General Barker proposed that the commander of the Air University be authorized to approve and publish operational Air Force manuals under an authority from the chief of staff. He explained that the Air University would coordinate the subject matter of all proposed manuals with appropriate Air Force commands and would refer points of difference to the Air Staff for decision. He demonstrated that the Air Materiel Command already possessed a similar authority to approve and publish technical orders and manuals. General Fairchild felt that Barker's proposal had some merit; nevertheless, he ruled that the doctrinal manuals would have to be approved by the Air Staff, with the deputy chief of staff for operations acting as the approving officer for all operational manuals.[58]

In the summer of 1950 the immediate impact of the Korean War and the subsequent expansion of the Air Force had important effects upon the Air University's organization for the production of doctrinal manuals. The Air Force at once suspended all of the Air University's schools but indicated that many of the instructors would continue to be available to the Air University. Some of the instructors might be used to complete the "Commander's Guide."[59] Within a few weeks the Air Force decided that the Air War College ought to conduct accelerated classes and that the Air Command and Staff College would be moved from Craig AFB to Maxwell AFB, where it would also conduct short school sessions. The Air Tactical School at Tyndall, however, would be inactivated. On 24 July, Barker proposed that the surplus instructors from this school ought to be brought to Maxwell and assigned to the Air University Evaluation Division. Under former planning, the Air University had intended that manuals should be drafted in its several schools. Now, however, Barker wished to concentrate the function in the Evaluation Division, which would become a separate entity in the Air War College. This proposal did not please the Air War College inasmuch as it considered the evaluation function to be germane to the college's educational function. However, an Air University study committee pointed out that the war college mission already required it "to promote sound concepts of the broad aspects of air power in order to assure the most effective development and

employment of the air arm." Effective on 9 October 1950, the Evaluation Division was transferred from the Academic Staff to the Air War College where it was redesignated as the Evaluation Staff.[60] But, as has been noted, the Air Force directed on 26 September that the production of doctrinal manuals should be held up pending the completion of the JAAF publication.[61]

Even though the Air University had not completed a basic doctrinal manual on air power before it was directed to suspend work on the project, it had generated several ideas as to what the doctrine ought to be. In the summer of 1950, Gen Hoyt S. Vandenberg had stated: "Tactical and strategic air power is part of the same ball of wax." Finletter had said: "Tactical air and strategic air are merely handles which have been developed to identify different functions, each of which is indispensable and each of which fits into the overall integrated structure of air power." While attending the weapons orientation course at Sandia, New Mexico, Barker was distressed to hear an Air Force instructor present a concept that the Tactical Air Command had functions distinct from those of the rest of the Air Force. Barker observed that the Air Force had revolted at the idea of assigning aviation in small packages to corps and armies, but he wondered if the Air Force might not be violating this same principle "by tying up, within the Air Force, pieces of aviation, each designed for a particular job." In the autumn of 1950 Barker collaborated with Col Dale O. Smith in the publication of an article entitled "Air Power Indivisible." On 21 December, Barker asked General Edwards, Air Force deputy chief of staff for operations, to approve a memorandum on Air Force doctrine that emphasized the fact that all elements of the Air Force had to be prepared to perform any operational function of the Air Force. The paper asserted: "A clear-cut differentiation between strategic missions and tactical missions is neither desirable nor possible." By demonstrating that air power was indivisible, Barker hoped to "break down the feeling on the part of the Army that unless we have huge forces set up under the label 'Tactical Air Force' they are not getting tactical support."[62]

Much to the surprise of Barker and Gen George C. Kenney, the Air University commander, General Edwards was unwilling to approve the proposed Air University statement of air doctrine. Edwards concurred "wholeheartedly" with the principle of the flexibility of air power and with the conclusion that there was a lack of clear differentiation between strategic and tactical air missions, but he insisted that the Strategic Air Command ought not to be diverted from its primary missions to perform tasks of lesser importance. "In view of the capability of the long-range bomber," Edwards wrote, "I feel that from an organizational point of view the authority for the higher direction of the war should retain direct control over some units which they can employ in a sustained drive against the war-making capacity of an enemy nation or which they can divert, *if necessary*, to the more direct support of any theater in overwhelming need." To safeguard the integrity of the Strategic Air Command, the Air Staff drafted an insertion to be placed in the Air University statement of air doctrine, the key portion reading:

> Although the labels "Strategic" and "Tactical" have been applied to two of our major commands, those titles were arbitrarily chosen and are not intended to connote strict compartmentation of functions The Strategic Air Command as it exists today merely represents the one segment of air power reserved to the specific control of the authority for the higher direction of the war; it is an organization which can be used either independently or in conjunction with one or more theater commands to achieve the result desired. It not only represents a potent offensive weapon capable of obtaining a decisive result through the progressive destruction of an enemy's warmaking capacity, but represents as well a mobile reserve of air power that can be turned by the authority for the higher direction of the war to the immediate support of any theater overwhelmingly in need of help In this light its organizational integrity, of course, must be preserved; however, whether allocated to the Strategic Air Command as we know it or to some other Air Force unit, heavy and medium bombardment aircraft like all other combat aircraft are flexible. Their flexibility is a vital part of air power.

Accepting the Air Staff changes, General Kenney on 3 February 1951 forwarded copies of the "Air University Doctrine on the Employment of Air Force Combat Units" to the commandants of the Air University's schools and to Air Force instructors at non-Air Force schools, with the added notation that the doctrine had been approved by Air Force headquarters.[63]

When he received the "Air University Doctrine" at Norfolk, where he was deputy commandant of the Armed Forces Staff College, Brig Gen Robert C. Candee said that it was "like a shot of fresh air and sunshine after all the hearsay and 'hooey' that has hung like a pall over the subject."[64] In Washington in December 1950 a staff study on air-ground operations prepared within the Air Force Office of Deputy Chief of Staff for Development had already noted that the *Joint Training Directive for Air-Ground Operations* continued to relate tactical air operations to the maneuver of ground forces and thereby limit tactical air power to a narrow supporting role.[65] In the autumn of 1950 the chief of Army Field Forces directed the commandants of all Army schools to use the *Joint Training Directive* as the basis for all instruction on the subject, but on 19 January 1951 General Barker took advantage of the fact that all Air Force instructors in Army schools were assigned to the Air University's 3894th School Squadron (non-Air Force schools) and directed them to continue to base their lectures on the Air Force doctrine contained in Field Manual 31-35. "The manual, *Joint Training Directive for Air-Ground Operations*," Barker directed, "cannot be accepted at this time by the Air Force inasmuch as there are areas in which basic concepts and terminology depart from those expressed in FM 31-35."[66] This directive placed the Air University in opposition to the Tactical Air Command; on 2 February, Maj Gen Glenn O. Barcus, deputy commander of the Tactical Air Command, requested that the Air Force approve the *Joint Training Directive* as working doctrine and asked the Air University to offer constructive criticisms looking toward the revision of the joint directive.[67] Resolution of the controversy apparently gave the Air Staff some difficulty since it had previously approved the "Air University Doctrine." However, on 9 March 1951 the Air Force directed that the *Joint Training Directive*

would be used in order to provide uniformity in all air-ground training and instruction throughout the Air Force. The Air University was instructed to provide constructive comments and recommendations that would be useful in the revision of this still tentative doctrinal directive.[68]

The work just completed on the "Air University Doctrine" had convinced Kenney and Barker that the Air Force ought to place emphasis on the "tactical employment of air force" rather than on "the employment of tactical air force."[69] The controversy over the *Joint Training Directive* required the Air University to intensify its thinking on the subject. The Air University's concept for the command and employment of air power was that air forces be grouped logically by objectives in various echelons of command. Some air forces were to be under the immediate direction of the Joint Chiefs of Staff in order that they might carry out objectives lying beyond the immediate interest of any one theater commander or supporting more than one theater. Some air forces would be assigned to a theater commander to conduct air operations required by the theater mission. Other air forces would be assigned to the air defense of the continental United States. All wars would consist of campaigns—some defensive in purpose and some offensive—each satisfying the national war objectives in whole or in part. Theater commanders would conduct local campaigns necessary to achieve objectives assigned by the Joint Chiefs of Staff. Air forces committed to a theater should be prepared (1) to conduct air campaigns to satisfy theater requirements for security against the enemy air force or deployment of enemy ground forces; (2) to participate in such sea and ground campaigns as were conducted by the theater; and (3) to participate according to opportunity in air or sea campaigns charged to forces from outside the theater. Army and Navy forces also were to be committed to theater ground and sea campaigns and to participate in the air campaigns. Any doctrine for command and control of the Air Force—especially the theater air force—had to recognize that the lower the echelon of assignment the more limited would be the objective, hence the more limited the flexibility and usefulness of the air unit to accomplish multiple obligations. Decentralization in the command and control of air power could cause hazards within a theater. "Objection to this decentralization," Barker urged, "should not be considered just a fetish of the Air Force."[70]

After stating the Air University's concept of the relationship of theater air forces to the whole Air Force—the Air University preferred theater air forces to tactical air forces because the latter term had incurred adverse connotations—Barker made specific objections to the *Joint Training Directive*. "Basically, our objection to the doctrinal implications of the joint training directive," he explained, "is that it over-simplifies the problem of theater air forces. It leaves the impression that support of ground campaigns is the only reason for being of theater air forces. It implies that the gaining of air superiority is general support to the ground campaign without revealing the thought that the enemy air force is a matter of theater concern regardless of surface campaigns being conducted or contemplated." Making specific reference to several allusions in the *Joint Training Directive* to the supporting attributes of the tactical air force, Barker observed: "We feel that the

narrowness of the doctrinal implications of the subject directive make it unacceptable for use as uniform air-ground doctrine." He requested that the Air University be authorized to present its concepts of air power in resident and nonresident instruction and to use the *Joint Training Directive* for presenting the operational methods of conducting close tactical air support.[71]

The Tactical Air Command, which apparently feared that the Air University emphasis on the lack of difference between strategic and tactical missions might lead to a decision that the only tactical air mission was the close support of ground troops, was initially quite skeptical about accepting the Air University's proposal to use the terms *theater aviation* or *theater air forces* to indicate those air forces that were assigned either permanently or temporarily to a theater commander to assist him in carrying out his mission. The Air Force also had some doubts about the new term.[72] At the Air University on 1 June 1951, Barker explained the theater air force concept to Secretary Finletter. Three weeks later, after making a trip to Korea, Finletter wrote Barker that what he had seen in the combat theater convinced him that the Air University's concept ought to be properly defined and understood within the Air Force.[73]

While the doctrinal differences between the Air University and the Tactical Air Command were under discussion, the Tactical Air Command and the Army Field Forces had begun to take steps to ensure that the tentative doctrine in the *Joint Training Directive* would be field-tested and revised as appropriate. Meeting initially on 29 March, a steering committee of representatives from the Tactical Air Command and the Army Field Forces undertook studies looking toward revising the directive. Before very long, however, the representatives of the Army Field Forces began to advance the proposition that a theater commander must be authorized to allocate some portion of tactical air power to the support of ground troops and that this air power should not be withdrawn from such support except with the approval of the ground commander. The two sides of the steering committee now began to write unilateral positions for submission to the Joint Tactical Air Support Board. Seeking to perfect a manual that would meet Air Force requirements, representatives of the Tactical Air Command and the Air University met together early in September 1951 and prepared a paper entitled "Tactical Air Operations." This paper was approved by Lt Gen John K. Cannon and forwarded to the Air Staff on 10 September. On 19 October another conference at Air Force headquarters recommended that the Tactical Air Command should continue to adhere to the details of the *Joint Training Directive for Air-Ground Operations* in its relationships with the Army Field Forces but that the Air University should prepare an Air Force manual on theater air operations that would fully develop the Air Force view of tactical air doctrine.[74]

Successful Preparation of Air Doctrine Manuals

Contrary to some expectations the concentration of the Air University's schools and colleges at Maxwell AFB during the spring of 1951 resulted in the development

of closer coordination of effort and thinking; for several years hence the Air University served as the Air Force's doctrinal center. As the Air University commander, General Kenney had given strong support to doctrinal studies; both General Edwards, who became Air University commander on 1 August 1951, and Lt Gen Laurence S. Kuter, who took the position on 1 March 1953, continued this tradition. General Barker continued as Air University deputy commander until his retirement in August 1953. In October 1951 Maj Gen Roscoe C. Wilson became commandant of the Air War College, and Brig Gen Lloyd P. Hopwood brought a pervasive interest in doctrine into the Air Command and Staff College when he became its commandant on 18 June 1953. Marking the beginning of the augmentation of the Air War College Evaluation Staff, Colonel Momyer was named as its director on 16 June 1951.[75] Something of the new esprit of the Air University was manifest in a statement by Col James W. Chapman, the assistant chief of staff for plans and operations of the Air University on 22 June 1951. "I believe," Chapman recommended, "that the Air University should strive to become the brains of Headquarters USAF. It is the one place in the Air Force system in which unbiased, reflective thinking can be accomplished. The atmosphere which prevails in Headquarters USAF is not conducive to productivity which is based on realistic, honest evaluations and appraisals."[76]

Even though the long-awaited JAAF publication had not been issued, General Barker's appraisal of Air Force doctrinal requirements in the late spring of 1951 led him to believe that the Air University could not delay any longer in beginning to exercise its doctrinal mission. New thinking in the Air War College Evaluation Staff gave a fresh approach to the problem: the evaluation staff began preparing a basic doctrine brief and a series of other briefs on such subjects as tactical air operations and proposed that these documents be issued as Air University doctrine. On 14 July, Barker forwarded a proposed Air Force manual on basic doctrine to Washington and asked the Air Force Council to approve and distribute it at the earliest possible date.[77] In personal negotiations during July, Colonel Momyer worked out a procedure for the preparation of doctrinal manuals that seemed likely to speed the work. In meetings with Tactical Air Command (TAC) representatives, Momyer prepared an itemization of basic factors affecting theater air operations and got TAC's concurrence with them. In Washington, where he was serving as deputy chief of staff for operations, General Edwards promised that he would get a prompt decision on any specific points of difference that might arise between the Air University and a major air command. Based on indications of Air Force approval, the Air University on 31 August canceled its plans to produce Air University doctrine and established an Air Force manuals project that called for the preparation of a basic Air Force manual and a series of manuals on such subjects as theater air operations, strategic air operations, and counterair operations.[78]

Early in September 1951 the Air Force Council gave formal consideration to the Air University's plan for producing basic doctrine manuals and "expressed concern that we have no organization or group in the Air Force making a

continuing effort toward development of concept or doctrine." "While individuals or staff agencies develop pieces of the problem," the Air Force Council noted, "no single agency has the overall job as its primary duty." The council believed that older Air Force officers had an understanding of Air Force doctrine and concepts; but the council felt that the great majority of the Air Force officer corps did not possess the "'base line' of doctrine and concept upon which to build judgment commensurate with the importance of the jobs to which they must be assigned." Since an additional 25,000 rated Air Force officers had come to active duty in the year preceding September 1951, the Air Force Council believed that it was particularly important that doctrine and concept should be clearly enunciated and widely distributed without delay.[79]

When he informed General Edwards, now the Air University's new commander, of the decisions of the Air Force Council, Gen Nathan F. Twining observed that the Air University was already charged with "developing doctrine in the fields of strategy and employment of air power," but that he believed that the Air Force Council felt a need for something "of a more comprehensive, fundamental nature, and basic to such treatment of strategy and employment." Twining remembered that the Air War College had previously proposed that it ought to be allowed to continue a small, highly selective group of students through two additional years of resident postgraduate study and that the principal objective of this group would be "the formulation, establishment, review, compilation, and distribution of dynamic doctrine and concept."[80]

Although General Twining did not elaborate on the matter, the Air Force Council apparently saw some difference between the old realm of doctrine and something newer—dynamic doctrine or concept. Since its establishment, the Air War College had been responsible for "promoting sound concepts on the broad aspects of air power in order to assure the most effective development and employment of the air arm." Air War College students, however, had often been confused by an almost synonymous usage of the words *concept, doctrine, strategy,* and *policy*. Because of this confusion an Air War College seminar group in January 1948 had established its own definitions: Military concept was defined as "a mental image of the application of military science to future wars"; strategy was considered to be "the science and art of employing the strength of a nation to secure its objectives, or the science and art of military command, exercised to meet the enemy in combat under advantageous conditions," and policy was believed to be "a settled course adopted and followed by a government, institution, body, or individual."[81] Air War College students subsequently accepted the definition of doctrine appearing in the *Dictionary of United States Military Terms for Joint Usage*, published by the Joint Chiefs in June 1948. This dictionary defined doctrine as

> a compilation of principles and policies, applicable to a subject, which have been developed through experience or by theory, that represent the best available thought, and indicate and guide but do not bind in practice. Its purpose is to provide that understanding within a force which generates mutual confidence between the

> commander and his subordinates in order that timely and effective action will be taken by all concerned in the absence of instruction.[82]

Considering these same semantic problems in September and October 1951, however, another Air War College seminar observed:

> There appears to be a fine line of demarcation between concepts and doctrines on the one hand, and doctrines and principles on the other hand It is difficult to differentiate between concepts which existed in the minds of some far-sighted individuals in the Air Force and the doctrine which was accepted as official by the War Department . . In the field of ideas there is evidently a degree of general acceptance ranging from the first nebulous ideas of an individual, up successively through concepts, doctrines, and principles The point at which an idea becomes a concept, a concept a doctrine, and a doctrine a principle, is not always clear Thus at any one time our Air Force doctrine may be said to be partly concept, partly doctrine, and partly principle [83]

Something of all of these thoughts went into the Air War College recommendations of the actions necessary to secure the results desired by the Air Force Council. General Edwards approved the study and sent it to Washington on 26 September 1951. Edwards recommended that a postgraduate study group be established in the Air War College "to provide a single Air Force agency whose principal objective is to formulate, establish, review, compile and distribute concept and doctrine and to develop officers highly qualified in the study of National Defense needs." The study of concept would "include future USAF positions in and responsibilities for national security and the determination of future USAF objectives." Edwards stated: "Operational doctrine . . . must derive from one common Air Force concept. . . . The work of producing and maintaining current Air Force operational doctrine must be kept in harmony with the concept developed and appropriately both tasks should be assigned to the same agency." He noted that the Air University's failure to produce and distribute operational doctrine in the form of manuals was "due to a failure to assign the responsibility of producing and distributing manuals to this one agency of the Air Force." "We do not look upon this as a task," he continued, "which is to be performed solely here at the Air University. Rather, our idea is that the Air War College, charged with the study of concept, will be designated by the chief of staff, US Air Force, as the Air Force agency responsible for production of doctrinal manuals; that the work will be carried out in close partnership with appropriate commands; and that controversial issues will be submitted to Headquarters USAF for decisions." Edwards requested that up to 25 officers of broad experience should be assigned to the Air War College postgraduate study group. Its success would hinge on two factors: "First, officers of the highest caliber must be detailed to this work with assurance that they will remain for the entire tour. Second this group must not be used as a 'catch-all' to which are sent the day to day problems which should be solved by regularly established staffs."[84]

Acting on earlier recommendations, the Air Force on 3 August 1951 issued a new regulation that charged the Air University to "function as an Air Force

doctrinal, educational, and research center." Recognizing that the new Air Research and Development Command was becoming effective, the Air Force relieved the Air University on 4 September of its old responsibility for initiating and reviewing studies, for testing tactics, and for the tactical testing of organization and equipment. Marking a partial acceptance of the plan for the postgraduate study group, the Air Force on 18 October charged the Air University to:

A. conduct two-year postgraduate study to develop Air Force officers exceptionally well qualified to treat with and solve the military aspects of national security problem.

B. foster and encourage the development of doctrine and concept within the Air Force.

C. formulate, review, compile and recommend military air doctrine, to include: (1) USAF responsibilities for national security; (2) future USAF objectives, including weapon systems; (3) special studies bearing on the above as directed by Headquarters USAF.

While the Air Force broadened the scope of the Air University's authority to study and recommend, it was unwilling to charge the Air University with any sole responsibility to produce and promulgate Air Force concepts and doctrines. As a result of discussions of the Air University's recommendations within the Air Force Council, Twining informed Edwards "that the council noted that the development of doctrine and concept is a dynamic process involving all Air Force commands and activities."[85] When he became commandant of the Air War College in October 1951, General Wilson attempted to sell "the idea of a graduate study program to generate new thinking in the fields of concept and doctrine." In response to a letter asking for clarification of the exact intent of the Air Force Council in regard to the postgraduate study group, Twining informed Edwards on 18 December 1951: "The primary emphasis for the study group is one of training, i.e., development of a high degree of skill in sound problem solution. A portion of the vehicle for achieving the desired level of training shall be the development and maintenance of a sound philosophy—or concept—or air power and military air force. Solutions to specific problems confronting the Air Staff will be assigned to this group only in rare circumstances."[86]

Even though the Air Force Council expressed its desire that Air Force doctrine should be produced and disseminated promptly, the Air Staff—which alleged that "these manuals are of extreme importance and must receive every consideration"—moved very slowly. On 2 October 1951, the Air Staff approved the projected titles in a family of operational manuals proposed by the Air University, but on 25 October the Air Staff returned the Air University's draft of the basic Air Force manual without approval.[87] "Some of the statements in the draft," explained Maj Gen Robert W. Burns, acting deputy chief of staff for operations, "although self-evident truths in substance, are stated in a form which makes them generalizations and in a sequence which is lacking in continuity." To get on with

the job, Burns directed that a committee of two officers from the Air Staff and three from the Air University would assemble at Maxwell AFB early in 1952 and redraft the text.[88] In the months that the draft manual had been under consideration in the Air Staff, the Air University had meanwhile prepared and printed in October a somewhat rearranged version of it as Air University Manual-1, *USAF Basic Doctrine*. In order to get comments for the consideration of the review committee, Barker now circulated this manual to major Air Force commands and to key Air Force officers.[89] "I believe," wrote Maj Gen James A. Samford, Air Force director of intelligence, to Barker, "your 'theater air force' instead of 'tactical air force' is one of the biggest strides yet made."[90] On the one hand, Lt Gen Howard A. Craig, the Air Force inspector general, thought that the pamphlet had "much merit and enunciates quite clearly basic doctrine for the use of US Air Force personnel and is needed." On the other, he questioned the Air University's statement of the national objectives, especially one which stated that the United States would "prevent any unacceptably dangerous increase in strength by a probable enemy." Craig pointed out that this objective, if it were true, would justify preventive war.[91] The Tactical Air Command's USAF Air-Ground Operations School found the manual to be "a Doctrinaire statement rather than Doctrine." The faculty of this new school suggested:

> Each of the three major combat commands presently operate under specific command doctrines, which guide all activities leading to Operational Readiness to fulfill their respective missions These respective doctrines, which have evolved principally from battle experience, are comparable to basic religious tenets in each command. It is not believed any command would surrender its basic doctrine willingly, or shift from a major to a subordinate role, unless it is consulted beforehand and is prepared to accept as an emergency measure such overriding doctrine [92]

When it assembled on 8 February 1952, the Air Staff-Air University committee included Cols William B. Keese and Robert Orr from the Air Force Directorate of Plans and Colonels Momyer, Smith, and Douglas Williams from the Air University. This committee took cognizance of all the recommendations made by the Air Staff and by the major commands and completed a draft manual on 7 March that Edwards described as "the best of all previous efforts over the past five years." Edwards, nevertheless, believed that the draft did not meet manual requirements: it was too long, included too much discussion rather than concise statements, and included current decisions on organization and roles of the military services, which Edwards did not consider to be basic doctrine. Accordingly, Edwards, Barker, and Wilson rewrote the draft manual; on 25 June 1952, Edwards submitted it to the Air Force. "I feel that nothing will be gained," he recommended, "by giving this current proposal any general distribution to obtain further remarks and recommendations. Any further refinement should be limited to the Air Staff and the final review of the Air Council."[93]

While the preparation of the basic air doctrinal manual was proceeding at higher levels, the Air War College Evaluation Staff had begun work on the plan to

produce four manuals deriving from the basic manual (theater air operations, air defense operations, air transport operations, and strategic air operations) and five manuals expanding the theater air operations manual (counterair operations, close-air-support operations, air interdiction operations, theater airlift operations, and theater air reconnaissance operations). At the request of the senior Air Force representative on the Joint Amphibious Board, who found himself unable to obtain guidance concerning Air Force positions with respect to joint amphibious operations, the Air University agreed early in 1952 to prepare an additional manual on the subject of air operations in conjunction with amphibious operations.[94] This series of manuals was a much less ambitious undertaking than the old air employment instructions had been, but the Air University now planned that the Evaluation Staff would produce these operational manuals by working in coordination with the responsible Air Force commands.

After nearly a year's work on the operational manuals, Colonel Momyer reported some of the difficulties that the Evaluation Staff had encountered:

> We have found from this past year of research that the writing of manuals is perhaps one of the most difficult tasks in the field of military writing. It is creative and yet it must be exact These requirements dictate thorough research and imagination on the part of the author in translating the research into a manuscript that is easily understood and yet is complete in context. Unfortunately, there are very few individuals who possess this particular talent . . . For the most part our greatest difficulty has been a lack of precedent in this field of writing . . The manuals we are attempting to produce have little similarity to the stereotyped and somewhat stultified type manual produced by the Army. In this attempt to strike out on our own, we have encountered many obstacles that were certainly anticipated, and others that could not be foreseen. Of course, we have encountered the additional prejudice in respect to what constitutes doctrine, tactics, techniques, and procedures. Thus, we have been seeking for a level of writing that has no definition and is not always apparent when one thinks it has been obtained. . . . Our experience to date reveals general acceptance of the fundamentals presented but non-concurrence in the manner in which those fundamentals have been expressed; not only non-concurrence in the expression but in some measure the degree of detail subscribed to those expressions and fundamentals. The only method by which we can strike a balance as to detail and scope is by trial and error I recognize this to be a long and laborious task but all short cuts to date have failed. . . . We find ourselves constantly in a dilemma as to whether too much detail has been presented or whether we have become so terse that the meaning is clouded and darkness descends upon the reader.[95]

In addition to the problem of delimiting the characteristics of the operational manuals, the Evaluation Staff had difficulties getting assistance from the Air Force operating commands and in procuring the assignment of officers needed to maintain its strength. As a working procedure, the Evaluation Staff undertook to prepare a draft of a manual, submit it to the operational command for review, and then form a committee including representatives from the operating command to revise the draft. The Strategic Air Command participated enthusiastically in the review of the manual on strategic air operations and sent officers to the Air University to work with a review committee. The Air Defense Command was

willing to work in this same fashion. The Military Air Transport Service (MATS) found so little wrong with the draft on the global air transport manual that it did not want a review committee. In fact, MATS so readily concurred with the proposed draft that Momyer was not satisfied that it had been given "the detailed review necessary for expressing sound doctrinal matter." In view of the number of manuals projected in the theater air warfare field, Momyer regretted that the Tactical Air Command "has not been able to participate to the extent that I believe is necessary."[96] In his annual Air War College report filed on 1 July 1952, General Wilson pointed out that the Evaluation Staff had suffered not only from a lack of technically qualified personnel but from a shortage in its authorized strength. Authorized 20 officers—18 of whom were to be qualified in doctrinal areas—the Evaluation Staff had only 12 officers assigned in the doctrinal area in November 1952. As a result of this demonstration of deficiency, the Air Force brought the Evaluation Staff up to its assigned strength and desired experience capabilities early in 1953.[97] However, the Tactical Air Command still found it difficult to participate with the Air University in doctrinal endeavors. "As you probably know," General Cannon wrote Edwards on 29 December 1952, "my personal attitude toward the Air University is that it should confine its efforts to teaching, and leave such matters as the development of tactics and doctrine, and the preparation of Air Force manuals to appropriate field commands and Headquarters USAF."[98]

Both because of the unusual amount of interest in the field of tactical air warfare and because of lingering controversies with the Tactical Air Command, the Air University encountered exceptional difficulty in preparing and teaching a doctrine of theater air operations. The Air University's contention that the term *theater air forces* should replace *tactical air forces* continued to draw opposition. Barker insisted that the use of the term *tactical air operations* focused student attention erroneously on the command relationship at the tactical air force-field army level. In an extension of the meaning of the term *theater air forces*, Colonel Momyer asserted that theater air forces could include Air Force tactical air units as well as Marine and Navy air units that might be assigned to a theater. He saw theater air forces as a more inclusive term, and he believed that the commander of the theater air forces ought to have a centralized command authority over all air units assigned to a theater. The Air University emphasized that a numbered tactical air force associated with a field army not only provided close combat air support to that particular field army but also participated in the counter air force and large-scale air interdiction operations under orders from the theater air force commander.[99] Early in June 1952 Barker's explanation of the matter resulted in the withdrawal of an Air Force recommendation that the Air University return to the use of "tactical air force" instead of "theater air force."[100] In a conversation with Barker in February 1953, however, General Kuter, then Air Force deputy chief of staff for personnel, once again brought up the subject of theater air operations, which the Air University conceived would be conducted under the central command of an area or a theater commander. Kuter was concerned lest the term *area commander* might be construed to mean an infantry division, corps, or army commander; he

argued in favor of continuing the use of strategic, tactical, and air defense. Barker was willing to delete references to the area commander, but he insisted that "the use of the words 'strategic' and 'tactical' hereinafter referred to as 'them words' has tended to compartment our operations." He continued, "The basic difficulty is the impossibility of finely defining 'them words.' We try to stress the need for unity of effort, singleness of purpose of all air forces, and find it difficult to do so if we divide operations into classes which are designated by undefinable words."[101]

The Tactical Air Command did not like the term *theater air forces* and was skeptical of the Air University's emphasis on the unity of air power; nevertheless, Cannon and Barker were able to achieve a meeting of minds on some other basic concepts. As written in July 1948, the Air University's draft of the air employment instructions manual entitled "Air Power and the US Air Force" had defined air superiority as "that degree of capability of one force over another which permits the conduct of air operations by the former at a given time and place without prohibitive interference by the opposing air force. Air superiority is local and possibly temporary."[102] Early in 1952, however, Cannon and Barker drafted a paper that pointed out that local air superiority could no longer be accepted as a concept in an era in which the high speeds and long ranges of modern aircraft permitted an enemy to shift air forces quickly and over considerable distances to any target without necessarily changing bases. In view of modern capabilities, Cannon and Barker agreed: "Offensive operations designed to defeat the enemy air force and insure an adequate degree of security from hostile attack should not be limited to restricted areas, nor can they be planned or carried out profitably in an uncoordinated fashion by commanders having limited jurisdiction such as those at numbered air force-field army level."[103]

Although the *Dictionary of United States Military Terms for Joint Usage* specified that the joint operations center manned by the numbered tactical air force and field army was a joint establishment, General Barker vigorously resisted a Department of Army position taken in December 1952 that the joint operations center "would retain over-all control of aircraft for air superiority, deep interdiction, and air defense." He already had made the case that the tactical air force received a part of its mission from the theater air force commander, and he now questioned whether the joint operations center was a joint establishment. Brig Gen Reuben C. Hood, who was commandant of the Air Command and Staff School at the time, pointed out, for example, that the joint operations center had no responsibility for planning ground operations and was actually an Air Force operations center with Army personnel present in what amounted to a liaison capacity. "The view," said Hood, "that close support missions are jointly planned and ordered is not believed consistent with practice. Army participation in planning consists of designating targets and times plus providing information. The decision to order a strike is an Air Force rather than a joint decision, and the planning of the strike to include strength, armament, route, and method of attack is by the Air Force combat operations section."[104]

By the end of 1952 the Evaluation Staff had substantially completed the four principal operational manuals that were designed to elaborate the basic air doctrine manual. However, after nearly six months in coordination, the Air Staff was still reviewing the draft of the basic manual that General Edwards had sent to Washington on 25 June. Seeking to pry the manual loose, Edwards on 1 January 1953 reported that the lack of a basic doctrine manual was a major deficiency hampering the Air University's accomplishment of its mission. This report of deficiency apparently got results since the Air Force director of plans was directed to turn out the manual as a matter of priority; an ad hoc committee within the Plans Directorate composed of Cols Harvey T. Alness, William B. Keese, and S. L. Fisher was named to revise the manual for final consideration by the Air Force Council. When stationed at the Air University a few years earlier, Alness had worked on drafts of this same document; now he described his committee's work as being one of assembling parts of previous draft efforts into a new format. The committee, nevertheless, included a new section discussing air forces and the principles of war—subject matter that had been included in the Air University's earliest draft of the category 1 "Air Power" manual but which had been subsequently omitted in later drafts because of a feeling that these principles were not a part of basic air doctrine. On 9 March, Alness presented the new draft to the Air Force Council, which, except for a few minor changes, accepted the manual practically as it was written. Acting in General Vandenberg's absence, Twining approved the draft on 13 March. However, he directed that comments would be collected on the manual for six months to a year and that it would be revised if the comments so warranted. Upon returning to Washington, Vandenberg also approved the manual. As published on 1 April 1953, Air Force Manual (AFM) 1-2, *United States Air Force Basic Doctrine*, carried Vandenberg's comment: "Basic air doctrine evolves from experience gained in war and from analysis of the continuing impact of new weapon systems on warfare. The dynamic and constant changes in new weapons makes periodic substantive review of this doctrine necessary."[105]

"I am disappointed with it," General Barker stated on 23 March after he had received and studied an advance copy of AFM 1-2. Barker considered that the Air University draft manual submitted on 25 June 1951 had presented "more clearly and more distinctly the why and wherefores of our doctrine" than did the approved manual, and he thought in terms of whether the Air University ought not to publish its own version of basic doctrine for the guidance of its personnel. Barker's main complaint, however, was the amount of time that had been required to publish the basic doctrine manual. "It has taken the Air Force five tedious years," he pointed out to Lt Gen Thomas D. White, Air Force deputy chief of staff for operations, on 27 March, "to get an approved manual on basic air force doctrine." The many rewritings of the manual had resulted "in no change of importance in the doctrine. The changes were in what to include or exclude, how to express an idea, arrangement of subject matter." At such a rate of progress, Barker estimated that 15–20 years would be required to publish the remaining doctrinal manuals. He

again recommended that the Air University commander be authorized to approve and publish Air Force manuals on operational doctrine.[106]

After giving serious thought to Barker's proposals and informally discussing them with members of the Air Force Council, General White replied on 22 April that there "can be no question about the compelling need within the Air Force for clear-cut and succinct statements of operational doctrine or the fact that the Air University is the best-qualified Air Force agency to prepare such manuals." White, nevertheless, insisted that Air Force headquarters was the only agency in the Air Force that was always conversant with Department of Defense policies and interservice negotiations. For this reason, headquarters would have to review all operational doctrine manuals. General White agreed that "far too much time was spent in seeking a document that would be palatable to all," and he promised that future Air Staff review of operational doctrine manuals would be limited to "substance only." Matters of arrangement, expression, and illustration would be left to the Air University.[107] On 22 May, General Twining directed that the Air University be charged with receiving comments from the major air commanders regarding AFM 1-2 and with revising the manual in light of these comments and in light of developing air weapon technology.[103]

On 12 March 1953, the same day that Barker had received word that the Air Force Council had approved AFM 1-2, the Air University sent forward four basic operations manuals that were designed to expand the basic doctrine manual in the direction of strategic air, air defense, theater air, and air transport operations. During this same period, the Air War College Evaluation Staff sponsored a conference of representatives from the Air Staff, the Joint Amphibious Board, and the Tactical Air Command. On 4 June this group completed the draft of an Air Force manual concerned with air operations in conjunction with amphibious operations. It appeared that Tactical Air Command proposals for language changes would delay Air Staff review of the theater air operations manual. But General Kuter, after assuming command of the Air University, negotiated the compromise that the manual should be printed as written and that it and other manuals would be kept under constant study and revised at one-year intervals.[109] On 1 September 1953, the Air Force released printed copies of AFM 1-3, *Theater Air Operations*; AFM 1-4, *Air Defense Operations*; and AFM 1-5, *Air Operations in Conjunction with Amphibious Operations*. Dispute over corollary tasks to be specified for the strategic air forces—which were ultimately specified as being aerial mining, antisubmarine warfare, and interdiction of enemy surface forces—delayed publication of AFM 1-8, *Strategic Air Operations*, until 1 May 1954.[110] The manual on air transport operations was never published.

In view of the dissension that had accompanied the preparation of the *Theater Air Operations* manual and the Air University's plan to expand the subject with additional manuals, the Air Force assembled a wide-ranging conference on theater air forces during September 1953. This meeting included Evaluation Staff project officers and representatives of the Tactical Air Command, the Far East Air Forces, US Air Forces in Europe, and the Air Staff. The Evaluation Staff had prepared

draft manuals on counterair, interdiction, and close air support, but the conferees decided that a single manual would suffice. The group also reviewed the manuscripts and agreed on desired language changes. With all commands represented in one room, one of the participants in the conference later recalled that coordination of the subject matter for the manual was surprisingly easy to accomplish. Completed in draft on 28 February, this single manual was printed on 1 March 1954 as AFM 1-7, *Theater Air Forces in Counterair, Interdiction, and Close Air Support Operations*. The Air Force subsequently printed AFM 1-9, *Theater Airlift Operations*, on 1 July 1954, and AFM 1-11, *Theater Air Reconnaissance*, on 1 December 1954.[111]

Viewed as a series, AFMs 1-3 through 1-11 represented the greatly refined results of more than 30 years of intermittent research, study, analysis, and codification. Although it had served as a project agency for their preparation, the Evaluation Staff described the manuals as "products of the entire Air Force." They had not been written in an "ivory-tower" atmosphere but in close collaboration with representatives of the Air Staff and of the major commands. The manuals expressed basic operational doctrine in broad terms. It was expected that the major commands would prepare command manuals describing how things were to be done.[112] However, the Air Force Directorate of Operations was not entirely satisfied with the operational manuals. Various officers pointed out that the manuals contained "background material . . . superfluous for doctrinal purposes," as well as material pertaining to "procedures and tactics rather than strictly doctrine." The doctrine on the command and control authority incumbent upon a theater air commander was more rigid than the Directorate of Operations believed to be justified. Air Force Manual 1-5, for example, specified that all theater air forces (Air Force, Navy, Marine Corps, and Allied) would be under the operational control of the theater air commander. The Directorate of Operations believed that the theater air commander should have operational control of Navy, Marine Corps, Allied, and Army air forces only when they were conducting operations in furtherance of the theater air mission. Both Air Force Manuals 1-3 and 1-5 adamantly opposed the allocation of the control of aircraft to a surface commander. In the Far East in July 1952, however, Brig Gen Jacob E. Smart had proposed that the Fifth Air Force could allocate mission control over specific air units for a specific length of time to a surface commander (in this case an Army corps commander) who could exercise this control through an air operations officer. After returning from the Far East to become commander of the Tactical Air Command, General Weyland described this concept in a lecture during the summer of 1954. Weyland urged that this concept of last phase of control could give a surface commander the prerogative of designating tasks for specific air units for a specific time in furtherance of his surface campaign. The control of air power was not allocated piecemeal since the theater air commander would have allocated air units for such a purpose only after he had viewed all theater air requirements The Air Force Directorate of Operations was willing to accept the concept of last-phase control. But even though the Directorate of Operations was not entirely

satisfied with the operational doctrine manuals, it was reluctant to push for any immediate revision of these documents since they generally met Air Force requirements and had been so excruciatingly difficult to prepare and coordinate. The best solution appeared to be a long-term project that would result in the incorporation of all basic doctrinal material into a single AFM 1-2.[113]

Continuing Air Doctrinal Activity

"In jet-atomic warfare," wrote General Kuter, after taking command of the Air University, "there will be no room for gross errors of judgment. There will be no time, should hostilities start, to correct mistakes in the types of forces that we have provided, the manner in which they have been organized and trained, or the way we fight." In order that the United States would be prepared for a future war, Kuter submitted that it would have to have proper doctrine and the doctrine would have to be accepted. In this same article, Kuter also suggested that the Air Force's doctrine had always stressed war and had failed to stress "the capabilities of our air forces to influence the behavior of other nations by actions short of war in support of national policy."[114] In a statement of command policy, Kuter observed: "The Air University's mission of education has coupled with it the responsibility to function and to produce as the doctrinal and related research center of the Air Force." Since as many as 2,000 man-hours of Air Force service could be contained in one class of Air War College students, he expected to reap great dividends from the accumulated talents available "in our obligation to keep our Air Force doctrine current and valid and to provide as a by-product of our learning activities, policies, concepts and plans of importance to our Air Force today and in the future."[115]

Kuter began holding regular meetings with Generals Barker, Wilson, Hopwood, and Smith, the last being the Air University director of education, to review the activities of the Air War College Graduate Study Group. These meetings became more and more worthwhile and were soon "guiding, monitoring, and coordinating the Air Force talent available at Maxwell in the faculties and great student bodies of the schools." Kuter hoped that the Air University would be able to do "really productive long-range thinking and planning with regard to subjects such as the size, general nature and organization of the USAF in an era of pilotless airplanes and ballistic missiles." He suggested that with the passing of time the Air University general officers might justify their designation "as a General Board of the Air Force and recognition as a supplement or adjunct of the Air Council."[116]

Because of his interest in moving Air Force doctrine forward Kuter gave close attention to the Air War College Graduate Study Group. Although he considered that the individual research efforts of the members of the group "have been excellent—in some cases brilliant," he suggested that the group had not met expectations, chiefly because it was not large enough to form an effective discussion unit or to attract important lecturers or consultants.[117] The final Air Staff directive that had established the Post-Graduate Study Group on 26 June 1952 had authorized the Air University to retain a few graduates from each Air War College

class for an additional two years of advanced military study. Instituted on 21 July 1952 under the direction of Dr Eugene M. Emme, the Graduate Study Group included only three officers, who, after introductory seminars on research techniques, launched into major research topics of their own selection. After a year's residency, Col E. B. Miller, Jr., —whose research report, "Guided Missiles and Pilotless Aircraft in Theater Air Operations," attracted attention in the Air Staff—became the group's first graduate in June 1953. At this time, additional officers were assigned from the graduating Air War College class.[118]

As an instructor in the Air War College, Col Raymond S. Sleeper had become convinced that "the objective of air power is not to destroy the enemy people, not to destroy the enemy cities if it can be avoided, not to produce panic, not to destroy morale, but 'to change the temper' of the enemy, or, specifically, to produce behavior in the opposing government that is acceptable to us." In an article published in the winter of 1951–52 Sleeper suggested that a further study of the British experience in the use of the persuasive effect and pressure of air power to quell revolts in Iraq and Aden during the 1920s might have applicability to the cold war.[119] General Wilson nominally assigned Sleeper to the Graduate Study Group in August 1953 in order that he might test his thesis. Borrowing Air University professional civilians and securing selected students from the Air Command and Staff College, Sleeper organized and directed Project Control, which sought to determine whether the Royal Air Force techniques might have been used to advantage by the United States so as to have affected the course of historical events from the 1930s through 1945. Even though it produced 21 volumes, Project Control had not demonstrated fully that Sleeper's thesis was completely applicable to contemporary national problems. Nevertheless, Project Control contributed to an understanding of the effect of air power on international relations both in times of peace and of war.[120]

General Kuter believed that the Air War College Evaluation Staff ought to be made the center of doctrine and concept development. On 27 March 1954, he asked permission of the Air Force to disband the Graduate Study Group and to use its 10 colonel spaces to establish a long-range planning staff parallel to the Evaluation Staff within the Air War College. At first the Air Staff was unwilling to agree that a field agency should have any responsibility for the preparation of Air Force plans, but Kuter explained that the Air University did not intend to impinge on the Air Staff's business but rather to prepare "very long range studies in the field of strategy and doctrine." Evidently reassured, the Graduate Study Group was dissolved and its personnel allotments, which had never been filled, were transferred to the Air War College Evaluation Staff where a Long Range Planning Division was established.[121] Among the officers of the Graduate Study Group so reassigned was Col Richard P. Klocko. In a research study entitled, "Air Power in Limited Military Actions," published in August 1954, Klocko outlined a requirement for a combat-ready air task force that eventually would be developed as the Tactical Air Command's Composite Air Strike Force At the same time these changes were in the offing, the Air War College took another step originally

proposed by General Wilson in July 1952. "An organization such as the Air War College," Wilson had reasoned, "should develop over a period of years a library of its own military writings." Activated in May 1954, the Air War College Studies Group became responsible for editing and preparing for publication at the newly established Air University Press the best of the student theses, lecturers' manuscripts, and writings of the Air War College staff.[122]

As soon as the Air Force issued Air Force Manual 1-2, *United States Air Force Basic Doctrine,* on 1 April 1953, General Twining sent out a personal letter to each major air commander requesting that they send their comments and suggested changes to the Air University, which would make periodic substantive reviews of the doctrine. The major air commanders generally welcomed the manual and had few changes in mind. Only General Weyland, then commanding the Far East Air Forces, recommended substantial changes and he merely desired an elaboration of the principles of war as they pertained to the employment of air forces. After the comments were received, neither the Air Staff nor the Air University believed that any substantial revision was in order, and the new edition of Air Force Manual 1-2 published on 1 April 1954 contained only a few minor editorial changes.[123]

Within a few months, however, the new doctrinal thinking at the Air University indicated that AFM 1-2 ought to be broadened in scope. The work would be undertaken by a new group of Air Force thinkers. A rotation of personnel and the internal reorganization of the Air War College Evaluation Staff in July 1954 was marked by the assignment of Col Ephraim M. Hampton as Air War College deputy for evaluation and Col Jerry D. Page as chief of the Doctrine Division. Assisted by Col Royal H. Roussel as project officer, Page promptly undertook the work of revising AFM 1-2 without delay. "Our own experiences in the doctrinal field," Page and Roussel subsequently reported, "lead us to believe that the total war capabilities of air forces—their capability to destroy in total war—are the most clearly understood of all their capabilities. Their great potential in times other than war is less clearly understood."[124] General Kuter agreed that Air Force doctrine had not stressed sufficiently the capabilities of air power throughout the entire spectrum of international conflict. Page and Roussel sought to expand the basic doctrinal manual so that it would take greater cognizance of the capabilities of air power in periods other than general war. Incorporating ideas received from Kuter, Hopwood, and Sleeper, Page and Roussel prepared a draft of a revised manual in August 1954, which they coordinated with key individuals at the Air University, in the Pentagon, and in Europe. After this coordination, Page and Roussel redrafted the manual in Joint Chiefs of Staff style and had it printed at the Air University preparatory to final review in Washington. On 4 January 1955, Kuter forwarded copies of the proposed manual to General White, now Air Force vice chief of staff, together with a chart that explained how the manual had been changed and the reason for the changes.[125]

Following Air Staff and Air Force Council review of the new edition of AFM 1-2, General White notified Kuter on 1 February 1955 that the Air Force liked the new statement of basic doctrine; the vice chief noted that although the draft had

retained the basic doctrine of the original manual, it had managed a "clear discussion of the area between the two extremes of conflict (general war and full peace) so as to permit emphasis on the broad potentialities of air forces as a persuasive instrument in combating the international tension brought about by 'cold war' conditions."[126] At White's request, the Air University readily agreed to change the draft to emphasize that the US Air Force was a term inclusive of both the active military forces and the reserve air forces. However, Air University was less able to cope with another Air Staff comment that the manual was difficult to understand and ought to be rewritten in "readable writing." After making a "fog count," which followed an Air Force procedure of assigning arithmetical values to such things as long and strange words and involved sentences, Brig Gen S. F. Giffin, Air War College vice commander, figured that the draft of AFM 1-2 fell into the range of comprehension of a college sophomore. Thus, Giffin concluded that many of the persons who said they did not understand the writing in the draft manual were actually saying that they did not understand the doctrine. Page and Roussel also took note of the fact that the 4,100 words in the manual would be read in 20 minutes, but they suggested that informed readers would have to spend much more time in thinking about the manual than in merely reading it.[127] Based on such analyses, the Air University declined to make changes in the style in which the manual was written.

When it was officially published on 1 April 1955, AFM 1-2, *United States Air Force Basic Doctrine*, represented a codification of experience bearing on the subject of air power and air warfare. It accepted the old definition of air power: "The term 'air power' embraces the entire aviation capacity of the United States." It asserted that air power had radically changed the conduct of war. "With air forces and modern weapons available, it is no longer necessary to defeat opposing armed forces as a prerequisite to conducting major operations directly against an opponent either in his sovereign territory or in any locality." The key to the new doctrine was the statement: "United States air forces are employed to gain and exploit a dominant position in the air both in peace and in war. The desired dominant position is control of the air." Older Air Force doctrinal statements had defined control of the air in terms of the attainment of air superiority in a time of war. The new manual stated: "Control is achieved when air forces can effect planned degrees of destruction while denying this opportunity to the enemy." It also pointed out that

> control of the air is achieved when air forces, in peace or war, can effect the desired degrees of influence over other specific nations Control of the air is gained and held by the appropriate employment of the nation's air potential Sometimes a dominant position can be obtained through the mere presence and passive use of air forces. At other times control of the air may require the active use of air forces to attain the desired dominant position There will be occasions when a combination of passive-type dominance and active-type dominance may serve best in support of the national objectives.[128]

"Our doctrine states, in effect," Page and Roussel wrote in an independent explanation of AFM 1-2, "that control of the air can be exploited continuously, day and night, seven days a week, 365 days a year, under any conditions. This can be so because control of the air does not denote a continuous physical action against something." In an illustration, Page and Roussel drew from the lessons of Korea:

> Our air forces in Korea were dropping bombs, fighting MiGs, attacking troops and gun positions, and a great number of other things *actively*. But these were not "separate" air forces fighting a "separate" war They were part of our global air entity, and standing with them—although not used *actively* in Korea—was the tremendous additional power of this global entity. We must assume that much of the impact of our air power in Korea—much of its influence—came from air forces that never dropped a bomb or fired a bullet in Korea.

In addition to these wartime applications of air power, the Berlin Airlift, the use of air transport planes to give relief from floods in Pakistan in 1954, and the "kinderlift" flights of underprivileged children out of encircled West Berlin for summer vacations in West Germany were illustrations of peaceful applications of air power. "A nation's influence in international negotiations," the new doctrine states, "is strengthened or weakened by the state of its air forces. The capabilities of powerful air forces for achieving decision in major war are thus translated into a capacity for the maintenance of world peace."[129]

As soon as AFM 1-2 was released, *Air Force Magazine* published the entire text and called it "one of the most important books in the world."[130] As Air Force vice chief of staff, General White endorsed the new doctrinal statement because of its clear discussion of the role of air power throughout the entire spectrum of international conflict, because the doctrine established the worth of air forces without denigrating other forces, and because the emphasis of the inclusive nature of air power rebutted the charge that providing air forces put all of the nation's "eggs in one basket."[131] The new doctrine appeared to have a growth potential that could encompass new technological developments. Admitting that the Air Force seemed to be having difficulty in shifting its thoughts from control of the air based on actual combat operations, Col Jack N. Donohew, Air Force deputy assistant for programming, pointed out in December 1956 that what he called "deterrent control of the air" would have applicability in an era when unmanned weapon systems would have to be maintained in constant readiness for instantaneous launchings. Although these weapons would not be physically present in the air, they would serve to preserve control of the air.[132] Speaking as Air Force chief of staff in December 1957, General White again endorsed AFM 1-2. "Our doctrine," he said, "is published for all to read in a 10-page, unclassified Air Force document. I believe this doctrine is wholly responsive to the primary aim of serving the national policy and is in step with the changing times."[133]

Failing Efforts to Produce Interservice Doctrine

Looking backward at the work of the Joint Air Transportation, Airborne Troop, Air Defense, Tactical Air Support, Landing Force, and Amphibious Boards that were formed in the autumn of 1951 in response to the *Joint Action Armed Forces* (JAAF) manual, General Barker did not think it remarkable that these joint boards failed to accomplish their purposes. Referring to "the patent inability of a lower echelon of authority to resolve an interservice problem that could not be solved at the highest level of authority," Barker observed that "the same divergence of views at the highest level of authority which mitigated against a resolution of the problem are manifestly evident at the lower echelons because of disseminated service positions on such controversial matters."[134]

In accordance with the JAAF agreement, the Army, Navy, and Air Force had moved promptly to establish the joint boards, which were to develop joint doctrines and procedures; evaluate joint tactics and techniques, adequacy of equipment, and adequacy of joint training; and review publications covering the conduct of joint training. In August and September 1951, General Vandenberg named some of his best senior officers to head the joint boards for which the Air Force served as executive agent: Maj Gen Grandison Gardner to the Joint Tactical Air Support Board at Pope AFB and Maj Gen Earl S. Hoag to the Joint Troop Carrier Board, which was soon redesignated as the Joint Air Transportation Board, also at Pope AFB. The Army established the Joint Airborne Troop Board at Fort Bragg as a successor to the former Army Airborne Center; Maj Gen William M. Miley, who had commanded the center, now headed the board. The Marine Corps established the Joint Landing Board with the Marine Corps Schools in Quantico, Virginia, and this board was headed by the school's commandant—first by Lt Gen Franklin A Hart and soon thereafter by Lt Gen Clifton B. Cates—as a collateral duty. The Navy established the Joint Amphibious Board at Little Creek, Virginia, under the chairmanship of Rear Adm Lyman A. Thackerey.[135] Army, Navy, Marine, and Air Force officers were assigned to full-time duty on the several joint boards, except for the Joint Air Transportation Board and the Joint Airborne Troop Board, whose membership served cross-duties on both boards.[136]

Even though the charters of these joint boards vested them with major responsibilities of evaluation, the administrative guidance issued to the boards by the military services ensured that decisionmaking authority would remain in Washington. Senior Army members on the boards were directed to coordinate their actions with the chief of the Army Field Forces. They were authorized to concur or not concur in projects at the board level; however, they could not approve or disapprove projects except in accordance with review of the projects by the Department of the Army.[137] The commandant of the Marine Corps instructed the senior Marine Corps officers who sat on the boards to act for the Marine Corps on board-level projects, but he provided that final approval of all projects would have to be referred to the chief of naval operations.[138] Initial Air Force letters of instructions to the senior Air Force board members stated that they would "be

acting as the direct representative of the Chief of Staff, USAF," and would be responsible for indicating "concurrence or non-concurrence on all completed Board reports." Quite shortly, however, these letters were elaborated to provide:

> As the Senior Air Force Representative you will represent the US Air Force at Board level and you are empowered to state your views as "Air Force" views on all completed Board reports However, as is customary in all joint functioning, your stated "Air Force views" do not constitute a commitment of the Chief of Staff, USAF, to support these views at higher levels Final approval or disapproval of "Service Views" taken at any level or echelon of command is reserved to the head of the Service [139]

The work of the Joint Air Defense Board was somewhat overshadowed by Project Lincoln, the Summer Study Group, and the Citizens Advisory Committee. This joint board maintained harmonious relations with the Air Defense Command and Army Antiaircraft Command and accomplished a wide variety of projects ranging from the design of protective aircraft revetments to a statement of recommended air defense doctrine. When completed on 14 April 1954, the recommended air defense doctrine visualized an air defense system that could accomplish a "continuous surveillance of the enemy from the time he departs his own territory until he is destroyed." It also stated that active defense ought to include "a devastating attack against enemy aircraft on their home bases; continued attack during the enemy's departure from home bases, and while in foreign theaters; attack continuously throughout the enemy's journey to the United States and Canada; and a final assault against aircraft, which may survive until arrival within their objective areas before their final approach to their targets."[140] General Gardner forwarded the proposed doctrine to General Twining with a personal letter. "I believe," Gardner wrote, "that we can maintain a defense through which penetration would be improbable if not impossible. I think that the cost of such a defense is not beyond what we can endure and I believe that such a defense should be our objective."[141] Gardner recommended that the Strategic Air Command (SAC) should build bombproof facilities at bases near the outer boundaries of the United States and ought to make a maximum dispersal of its intercontinental bombers. Other than these measures SAC should depend for its protection on an expanded warning time that would allow it to put its aircraft in the air and evacuate its ground personnel in case of a hostile attack.[142] The accomplishments of the Joint Air Defense Board were not inconsiderable. The establishment of the Continental Air Defense Command (CONAD) on 1 September 1954 as a unified command directly responsible to the Joint Chiefs of Staff created a more powerful air defense network. The new command was responsible for establishing methods and procedures for the use of the forces available for the air defense of the continental United States. Officially, the Joint Air Defense Board continued to exist. Following the retirement of General Gardner in August 1954, Maj Gen Frederic Smith, the CONAD vice commander, assumed the additional duty of chairman of the Joint Air Defense Board.[143]

The Joint Tactical Air Support, Joint Air Transportation, and Joint Airborne Troop Boards proved to be controversial. An Army spokesman in Washington stated that they were "likely to become the focal point of procurement planning not only for troop and cargo carriers, but in many cases will also be the agency responsible for formulating requirements for virtually all tactical support aircraft." This statement indicated that the Army still hoped that the boards might become unified centers that would manage joint applications of forces.[144] During the JAAF negotiations and when the charters of the joint boards were being written, the Tactical Air Command persistently opposed the assignment of doctrinal responsibilities to the Joint Tactical Air Support and Joint Air Transportation Boards and argued that this would amount to an usurpation or duplication of the Tactical Air Command's responsibilities.[145] Moreover, the Air Force's failure to fill some vacancies in the boards or to appoint one individual to serve on more than one board revealed a flagging interest in them General Wolfinbarger served as director of the Joint Tactical Air Support Board. When General Hoag retired in February 1953, Wolfinbarger was appointed to serve additionally as director of the Joint Air Transportation Board. After Wolfinbarger retired in July 1953, Maj Gen Robert L. Copsey was named director of the Joint Air Transportation Board; but the other position remained vacant for several months before Maj Gen Edward H. Underhill was named director of the Joint Tactical Air Support Board. Although Copsey continued to direct the Joint Air Transportation Board, Underhill was transferred to other duties in August 1954. At that time the Tactical Air Command strongly objected to assigning another general officer to the Joint Tactical Air Support Board and the director's position remained vacant. In May and June 1953 both the Army and the Air Force reduced their personnel authorizations for these three joint boards, stating that they would thereafter collectively employ the retained officers to accomplish their most urgent projects.[146]

When its charter was approved in May 1952, the Joint Air Transportation Board was made as the principal agent of the armed forces responsible for developing doctrine and procedures and for evaluating tactics, techniques, equipment, and training for all air transportation matters. Almost immediately Generals Collins and Twining had agreed that the board would not consider any matters concerning the Military Air Transport Service. The Air Force had ruled that responsibilities for aeromedical transport, war plans, and mobilization matters were outside the purview of the board. Other attempts of the board to pursue projects were stymied by competition from other commands and by conflicting service positions.

The Tactical Air Command, for example, consistently outpaced the board in stating operational requirements for new equipment. A budding project looking toward the development of a doctrine for employing rotary-wing aircraft in joint operations was terminated when the Army ruled that it would use its own helicopters and had no requirements against which the Air Force should program units. Likewise, after long study, the board proved unable to agree on the subject of a command structure for a joint airborne operation.[147] The Joint Chiefs of Staff, at the suggestion of the chief of naval operations, had directed the board "to

establish joint doctrine and procedures of governing command, employment and control of tactical air forces in support of ground forces." The Tactical Air Command opposed this directive because it believed that the wording of the directive implied that there was no extant doctrine on air-ground operations and because it believed that it could have secured an early agreement with the Army Field Forces for a revision of the *Joint Training Directive* if the problem had not been referred to the board. As it too was directed to do, the Joint Tactical Air Support Board prepared a draft manual, which included basic agreement between the Army, Navy, and Marine Corps and a dissenting Air Force position. The point in contention was the Air Force demand that the existing system of "unified command at theater level only and coequal status of component commanders at all echelons" should be retained, as opposed to the Army, Navy, and Marine Corps position that advocated that the command of air support aviation be delegated to the supported unit.[148]

The Joint Landing Board, established initially at Quantico and moved to Camp Lejeune, North Carolina, on 1 July 1952, handled highly specialized matters that were not of transcendent concern to the Air Force.[149] On the other hand, the Joint Amphibious Board was directed to resolve more complex matters regarding the doctrine and procedures of joint amphibious operations. When he was assigned to this board as an Air Force representative on 15 October 1951, Col Robert A. Erdin discovered that the Navy had a firmly fixed position, that the Army had definite opinions, and that the Air Force had not given much thought to amphibious warfare. Since the board proposed to give priority to defining doctrines and procedures to govern joint amphibious operations, Erdin devoted much of his time during 1952–53 to perfecting an Air Force position, which, as has been seen, was engrossed in AFM 1-5. On 15 January 1954 the Joint Amphibious Board forwarded a three-way split in opinion to the Joint Chiefs of Staff. The Navy-Marine Corps position was that all joint amphibious operations should be conducted by a joint amphibious task force, commanded by an admiral who would personally command both the joint task force and the supporting naval forces. Working through a staff officer designated as a tactical air commander, the joint amphibious task force commander would exercise operational control over all air operations in the amphibious objective area. When control of the air was passed ashore, operational control of air forces would be passed to the landing force commander. The Air Force position that a theater command structure normally would be flexible enough to accommodate all types of operations, including amphibious operations, was incorporated as doctrine in AFM 1-5. Operational control of all theater air forces even during amphibious operations should be retained by the theater air commander. Where the theater command structure might be unable to conduct an amphibious operation, the Air Force urged the establishment of a joint staff and component commanders for air, naval, and ground forces. The Army held that an amphibious operation would be a preliminary portion of an extended surface campaign. It advocated establishing a supreme joint task force commander who would be superior to the amphibious task force commander. The joint task force

commander would control an "Air Force long-range striking force" whereas other air forces would be controlled by the amphibious force commander while command was afloat and by the amphibious landing force commander when command went ashore. The Joint Chiefs circulated the Joint Amphibious Board's recommendations to the Air Force and the Army for comment; when no basic agreement could be reached, the recommendations were apparently laid aside within the Joint Chiefs of Staff.[150]

Facing personnel shortages incident to the expansion of the Air Force, General Vandenberg directed that the Air Staff initiate action to eliminate the joint boards in the spring of 1953. At this time, General Kuter suggested that the Air Force members on the several boards should be assigned to the Air War College Evaluation Staff in order that it might assume greater responsibilities in the field of joint doctrine.[151] In a memorandum to the chairman of the Committee for Joint Policies and Procedures of the Joint Chiefs of Staff, General Partridge, Air Force deputy chief of staff for operations, formally recommended on 1 February 1954 that the joint boards be discontinued. "Continuation of the joint Boards," Partridge urged, "represents Services' support of organizations which are expensive in manpower and dollars, unable to fulfill their purpose effectively, duplicate the capabilities of other existing agencies, and whose work, essentially, must be re-done by subsequent reviewing echelons."[152] Asked to comment on the proposal, Colonel Erdin estimated that the Joint Amphibious Board had cost more than $500,000 and had completed only one formal project and this with split views.[153] General Copsey believed that there was a great need for interservice doctrine, but he admitted that the Joint Air Transportation Board had failed to "accomplish the timely purposes of its charter."[154] The Tactical Air Command observed that the joint boards had accentuated interservice disagreements and recommended that they should be discontinued immediately.[155]

For more than a year the Air Force got no support for its demands that the joint boards be discontinued, but after a time the Marine Corps and the Navy came to this same opinion. The Army acceded last of all, and on 3 December 1954 the Joint Chiefs of Staff directed that the joint boards would be dissolved. In accordance with the Joint Chiefs directive, the Continental Air Defense Command assumed the responsibilities of the Joint Air Defense Board after it was dissolved on 1 February 1955. Following dissolution of the Joint Tactical Air Support Board on 15 February and the Joint Air Transportation Board on 1 March, the Tactical Air Command became responsible for developing joint doctrine, procedures, tactics, techniques, training, publications, and equipment related to close combat support of ground forces and joint airborne operations. The Air Force invited the Army, Navy, and Marine Corps to establish liaison with the Tactical Air Command to aid in the development of joint doctrinal matters. The Tactical Air Command was similarly charged to provide liaison officers to the Army Field Forces, the amphibious forces Atlantic Fleet, and the Marine Corps Development Center to aid in their development of joint doctrinal recommendations concerning joint airborne troop and amphibious operations, effective with the dissolution of the

Joint Airborne Troop, Joint Landing, and Joint Amphibious Boards.[156] In order to accomplish joint doctrinal concerns specified in the JAAF manual, the Joint Chiefs specified that the responsible commands would prepare working draft recommendations and circulate them to interested commands in other services before submitting them to the responsible service. The responsible service would submit completed projects to the other services for concurrence before submitting them to the Joint Chiefs of Staff for consideration. Once the Joint Chiefs gave their approval, projects concerning basic doctrines, procedures, and command relations would be promulgated by the responsible service.[157]

Interservice Disagreements on Doctrine

In the early 1950s, thinkers in the Air Force and the other services held an optimistic belief that a better understanding and publication of sound air power doctrines would have a wholesome effect on the national military effort. "Of all the people who desire a statement of Air Force doctrine," an Air War College seminar concluded in 1951, "none is more anxious to receive it than the Army and the Navy. Likewise statements of military doctrine by the other services would be helpful to the Air Force. For it is out of this welter of confusion that basic misunderstandings are created."[158] Writing in the *US Naval Institute Proceedings* in April 1952, Col George C. Reinhardt, US Army, charged that "among the most radical enthusiasts of air power themselves, there exists today more divergent opinion on the composition of that power and of its optimum use in war than ever arose, between general and admiral, over the relative importance of land and sea combat." Reinhardt suggested that "Mahan, in his day, clarified not only the unification of the various functions of sea power into a cohesive force but also combined the strategy of sea and land combat into a practical, working entity." Reinhardt, therefore, concluded that "air power, American air power in particular, needs its Mahan."[159]

With the publication of AFM 1-2, *United States Air Force Basic Doctrine*, the Air Force possessed a codification of its fundamental ideas. "Of the various types of military forces," the April 1955 edition of the manual stated, "those which conduct air operations are most capable of decisive results.... With air forces and modern weapon systems available, it no longer is necessary to defeat opposing armed forces as a prerequisite to conducting major operations directly against an opponent either in his sovereign territory or in any other locality." Recognizing that "the medium in which air forces operate—space—is an indivisible field of activity," the basic doctrine manual held that "all command arrangements must be in accord with the precept that neither air forces nor their field of activity can be segmented and partitioned among different interests. Because air forces possess the inherent ability to concentrate effort at decisive times and places, they can be employed in a variety of tasks for the purpose of accomplishing a variety of effects."[160]

The statement of basic Air Force doctrine differed markedly from that of the older surface forces. Department of the Army Field Manual 100-5 diametrically

opposed the Air Force doctrine. "Army forces as land forces," stated this manual, "are the decisive component of the military structure. . . . During the course of military operations Army forces, because of their decisive capabilities, are supported from time to time by other military components. . . . In any case, the efforts of all components are directed toward insuring the success of the land operations." US Naval Warfare Publication 10 presented a position closer to Air Force doctrine; the manual discussed military pressure against an enemy:

> The mobility of attacking units and distances from which they can strike enemy targets are strong factors in increasing the effectiveness of pressure Actual occupation or control of enemy territory is the optimum of pressure in that it has an overwhelming effect on the enemy's capacity to wage war . Air strategy, designed to seek a decision primarily by air action . . is in the process of historic development and . will become more clearly definable with the passage of time.[161]

"Everything depends upon air supremacy: everything else must take second place. With control of the air, control of the sea and land follows," reasoned Col Richard C. Weller of the Air War College in the spring of 1954. "Oddly enough," he continued, "military men agree that air power or the air element is dominant over the surface elements. But this has only stimulated them to seize for their own element all of the air support which eloquence permits."[162] In negotiations within the Joint Amphibious and Joint Tactical Air Support Boards, Army and Navy representatives argued in favor of what they described as a "unity of command at the scene of battle." Prior to the emergence of air power as a major component of war, Air Force officers were willing to admit that there had been a certain logic to a self-sufficient force concept, but with the increased flexibility of aircraft they were agreed that it was mandatory that control of available air power should be retained at the highest levels practicable. "All of the various proposals advanced in furtherance of the outdated 'unity of command at the scene of battle' concept . . .," stated the Tactical Air Command, "result in the segmentation and subordination of air power to the relatively localized surface battle despite the costly evolution of the proven centralized control concept."[163]

That the Army and Navy felt strongly in support of their desire to decentralize air power was also a matter of record. In June 1953 a Navy lecturer criticized the rigidity of Air Force doctrine. "Since local air superiority is temporary or harder to make effective because of greater destructive weapons," he said, "there is a tendency to ignore it. . . . Time and space factors are not yet instantaneous quantities, and by proper selection of opportunity and location, a force—air or sea—can argue or gain superiority for limited periods." Believing that the Air Force's constant emphasis on centralization of control might arise from a lack of confidence that the other services might not employ air to its fullest advantages, this Navy lecturer expressed the hope that "as the Navy and Army demonstrate their awareness of air power and its best employment, operational control of air units can perhaps be centralized or decentralized as appropriate to the situation."[164] Speaking to the USAF Scientific Advisory Board on 22 March 1954,

Lt Gen John E. Dahlquist summed up his view of the local command and control concept favored by the Army. "It is my conviction," he said,

> that the commander whom we hold responsible for the land battle must be provided with the means to accomplish his mission and the authority to control those means. In the area forward of the Army rear boundary, the ground force commander must have authority to direct the employment of ground and supporting air and naval weapons simultaneously against his targets... Control must include the authority to assign and suspend air and naval support missions . . The tremendous increase in the potential mobility of combat forces . makes the requirement for command responsibility and decisive action more important today than ever before.[165]

As the joint boards were breaking up, Army Chief of Staff Gen Matthew B. Ridgway announced on 31 January 1955 that the *Joint Training Directive for Air-Ground Operations* contained views on "command relationships and the responsibilities of supporting and supported forces" that the Army could not accept and that the directive accordingly "does not represent the views of the Department of the Army on doctrine for air-ground operations."[166] Instead of resulting in the production of harmonious interservice doctrine, the joint board negotiations appeared to have widened the doctrinal divergencies of the Army, Navy, and Air Force.

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CHAPTER 8

STRATEGIC IMPLICATIONS OF THE NEW LOOK 1953–57

In the winter of 1950–51 the civil and military leadership in Washington seriously feared that the war in Korea was a Soviet ruse, designed to commit American forces to what Gen Omar N. Bradley called "the wrong war in the wrong place" while the Russians prepared to attack in Europe. The Joint Chiefs of Staff (JCS) believed that general war with Russia and Europe might be imminent. The Communist invasion of the Republic of Korea showed that the Soviets were willing to employ war as an instrument of aggression; and the Joint Chiefs of Staff looked on mid-1954 as a time of maximum danger. By this time the Soviets would possess a stockpile of atomic weapons sufficient to mount a devastating attack on United States military installations, industry, and population centers. The Soviets had produced enormous quantities of military equipment in 1946–47, and, if it were to be used, this equipment would logically be used in 1954–55 before it became obsolete. The rebuilding of Russian industry and the relocation of much of it beyond the Urals would be largely complete by 1954–55. After 1954, moreover, the military strength of the United States and its allies would get closer and closer to that of the Soviets.[1]

Statements of Defense Policy: The New Look and Massive Retaliation

At the highest levels, the image of war was general war. The nation's military leaders agreed that the Korean conflict—which had to be fought as a limited war—was abnormal. General Bradley declared in October 1950: "We will refuse absolutely to allow local wars to divert us from our central task. They must not be allowed to consume so much of our manpower as to destroy our strength and imperil our victory in world war." Speaking of Korea early in 1951, Gen J. Lawton Collins warned: "To prevent an invasion of western Europe, the area most coveted by the Communists, we would have to fight an altogether different war than we have been fighting."[2] Accepting the likelihood of an impending general war in December 1950, the National Security Council (NSC) recommended an expanded military production program that was designed to create a production base capable of rapid expansion to full war mobilization. Looking toward 1 July 1954 as a time of maximum danger, the Joint Chiefs of Staff recommended in October 1951 that Army forces should be stabilized at 20 divisions and Navy forces at 409 major combat ships, including 12 modern aircraft carriers, plus three Marine Corps

divisions with their supporting air wings while the Air Force should be expanded to 143 wings (126 combat and 17 troop carrier). President Truman approved these force goals in December 1951, but his instruction that military budgets should be held below $60 billion a year stretched the earliest date of readiness for the 143-wing Air Force out to 30 June 1955. At a conference in Lisbon in February 1952, the North Atlantic Treaty Organization nations established a goal of 96 divisions by 1954, 40 of these divisions to be in a permanent state of readiness and 56 to be capable of becoming operational within 30 days.

The American strategy was not completely agreeable to Great Britain. Prime Minister Winston Churchill had returned to power in 1951 at a time of national economic crisis. To ease the financial strain on his government he had instructed his chiefs of staff to reappraise Britain's defense policy. After intense study, the British chiefs of staff prepared a paper demonstrating that the advent of nuclear weapons justified a primary reliance on atomic air power and substantial reductions in surface forces. During a visit to Washington in July 1952, Air Chief Marshal Sir John Slessor argued for the adoption of the British strategy. He urged that the Lisbon force goals placed too great a strain on fragile European economies and recommended a strategy of nuclear deterrence that would be based upon American and British nuclear air capabilities.[3]

During his successful 1952 campaign for the American presidency, Gen Dwight D. Eisenhower promised economy in government, an honorable end to the Korean war, and, if necessary, a personal trip to the war zone in order to learn how best to serve the interests of the American people. When he visited Korea early in December 1952 in the company of Adm Arthur W. Radford, then commander in chief, Pacific, Eisenhower was said to have been dissatisfied with "the dissipation of American resources in a remote, indecisive struggle." While returning homeward aboard the cruiser *Helena,* Eisenhower held talks with several of the men who would serve in his cabinet, including John Foster Dulles and Charles E. Wilson, who would become the secretaries of state and defense respectively.[4]

In his book *War or Peace,* published in 1950, and in later speeches and articles, Dulles had expressed his conviction that strong military forces could prevent war and that the wars of the past had begun because aggressors had miscalculated their opposition. "Many believe," Dulles had written, "that if the Kaiser had known in advance that his attack on France by way of Belgium would have brought England, and then the United States, into the fray he would never have made that attack. . . . Many also believe that if Hitler had known that his war would involve the United States he would not have started it."[5] Dulles also believed that "the original Korean attack would not have occurred if it had not been assumed either that we would not react at all, or if we did react only at the place and by the means that the aggressors chose."[6] Aboard the *Helena* and in additional conferences in Honolulu, Dulles held the position that the United States could not mount an adequate static defense everywhere around the Communist perimeter. Rather than spread its defenses thin, the United States should clearly manifest its intent to resist aggression and should concentrate its attention on deterring attack by

maintaining a strong retaliatory power capable of striking swiftly at sources of aggression. Admiral Radford agreed that American military power was spread-eagled. "The sooner we could gather some of these forces back into the palm of our hand, and turn them into truly ready forces for deployment anywhere," Radford later observed, "the better our strategic position would be."[7] While Radford and Wilson felt that Asia would continue to be a pivotal area in the cold war, Eisenhower suggested that when Western Europe was strong enough to defend itself the Asian problem would become manageable.[8]

"It is difficult to be sure just what has prevented aggression against the free world," Secretary Wilson stated shortly after he took office. "I think there is a deep realization in Moscow that any major aggression against the free world will start a conflict in which all forces of the free world will be marshaled in a fight to crush such aggression, and that the forces of the free world include not merely our long-range bombers, or even all airplanes capable of carrying atomic bombs, but rather all of the military strength of the United States, which includes its industrial productive capacity and also the military strength and industrial capacity of all of our allies."[9] As submitted to Congress in January 1953, the Truman administration military budget for fiscal year 1954 recommended an appropriation of $41.3 billion, the amount of money that would permit the Army and Navy to hold at their established force levels and the Air Force to build toward the 143-wing objective. If this appropriation were voted, however, the Bureau of the Budget envisioned a national deficit of $9.9 billion in fiscal year 1954, and, if the military force levels recommended by the Joint Chiefs were to be attained, there would be another $15 billion deficit in fiscal year 1955 and continuing deficits until fiscal year 1958. Since the Eisenhower administration had promised economy and a balanced federal budget, Wilson worked closely with the National Security Council in an effort to reduce military expenditures. As a preliminary measure in February 1953, he ordered a temporary halt to all new military construction and to that which had just gotten started pending verification of need for each project. Further study showed that the Army and Navy had about reached their programmed strength levels, but the Air Force's need for new money reflected amounts necessary to move upward to the 143-wing level. Even without this new authority, the Air Force was expected to carry $28.5 billion in unexpended funds over into fiscal year 1954. Wilson regarded some carry-over funds as being inevitable in any build-up program, but production should have begun to catch up with authorizations. He was additionally critical of the emphasis given to expansion of the mobilization base of the defense industry and pointed out that much of this industrial base would have to be liquidated after the Air Force reached its programmed strength, provided no war had occurred. "If I had been doing it the last 3 years," Wilson observed, "I would have built more production and less mobilization base to begin with." One immediate way in which the government could reduce new money requirements would be to abandon preparations for a maximum year of danger. In April 1953 Eisenhower approved a new policy that the United States should not attempt to meet a major aggression by any particular date but should "get . . . ready

and stay ready." Eisenhower described the new policy as being that of "a floating D-day."[10]

Although the incumbent Joint Chiefs of Staff, headed by General Bradley, were not asked for advice on proposed force changes, Gen Hoyt S. Vandenberg formally protested Air Force reductions to the new Secretary of the Air Force Harold E. Talbott. On 7 and 8 May the Joint Chiefs warned Wilson that "any government decision to reduce force goals below those in approved programs . . . would increase the calculated risk, and that the years 1954–55 represented the beginning of a potentially dangerous period during which the USSR would have a substantial stockpile of atomic weapons, and the improved ability to deliver such weapons."[11] Despite this admonition, the Department of Defense submitted a revised budget for fiscal year 1954 that was reduced by about $7.5 billion, of which $5.3 billion represented a cut in Air Force funds. Pending a new look at the entire defense picture, which Wilson promised would be made in the autumn of 1953, the goal of an interim force level for the Air Force was set at 120 wings, with 110 to 114 of these wings to be activated and substantially well equipped by 30 June 1954. Most of the units to be deferred were day-fighter and fighter-bomber wings; the new aircraft on order for them would be used to modernize Air Reserve and Air National Guard forces.[12] In spirited hearings before House and Senate appropriations subcommittees, Generals Bradley and Vandenberg strongly defended the programmed requirement for 143 wings, to be achieved as soon as possible, desirably by 1954. "No sound military reason," Vandenberg stated, "has been advanced to explain why the Air Force build-up to the agreed force level is again to be delayed. Once again the growth of American air power is threatened with start-and-stop planning, and at a time when we face an enemy who has more modern jet fighters than we have and enough long-range bombers to attack this country in a sudden all-out atomic effort. Rather than reduce our efforts to attain air superiority over the Communists, we should now increase those efforts."[13]

The Wilson budget prevailed in Congress in spite of the eloquent pleas of General Vandenberg. At a conference with legislative leaders on 12 and 19 May, President Eisenhower lent his support to the Wilson program, arguing that the Air Force had been operating on excessive lead time, had too many "paper" wings, and needed to build up its strength without reference to target dates. As finally enacted in August 1953, the appropriation act for fiscal year 1954 totaled $34.6 billion, representing a final cut of $6.7 billion from the amount originally requested by the Truman administration. Of this total, $12.9 billion was allocated to the Army, $9.4 billion to the Navy, and $11.4 billion to the Air Force. Counting both new and carry-over funds, Wilson pointed out that $31.5 billion of Navy and Air Force funds were committed to the procurement of aircraft and related equipment. Such funding, he thought, would be sufficient to continue the buildup of America's defenses pending the determination of future force levels by the National Security Council and a new Joint Chiefs of Staff.[14] Former Secretary Thomas K. Finletter, nevertheless, observed that the Air Force had taken virtually all of the Department of Defense cuts and that the "arbitrary" cutback in dollars had been such as "to

restore the roughly equal division of the Defense dollar among the three Services." He wrote, "This way of deciding on the forces to defend our country, in this most dangerous time of our history cannot possibly be justified or excused."[15]

Department of Defense Reorganization

As early as 1950, John Foster Dulles had suggested that the National Security Council ought to be made a top policymaking body that would unify foreign, military, and domestic policy. In his State of the Union message to Congress on 2 February 1953, President Eisenhower pledged to provide the National Security Council with "the vitality to perform effectively its statutory role."[16] In his presidential campaign, Eisenhower had spoken of a need for restudying the operations and functions of the Department of Defense. Before leaving office, Secretary of Defense Robert A. Lovett prepared a memorandum that outlined several defects in defense organization that had become apparent during the Korean emergency. To maintain civilian control with the department, Lovett recommended that the secretary of defense should be recognized as the president's deputy commander in chief of the armed services and that the unified commanders should be made responsible to designated secretaries of the military departments rather than to individual chiefs of staff. He pointed out that the "two hat" status of the Joint Chiefs made it difficult for them to maintain broad nonservice points of view. He further showed that the statutory Munitions Board and the Research and Development Board had built-in rigidity, since representatives of the military departments sat on these boards as judges and claimants of their own requests.[17]

Seeking a thorough view of the administrative problem of the Department of Defense, Secretary Wilson appointed a Committee on Department of Defense Organization headed by Nelson A. Rockefeller on 19 February 1953. The committee heard witnesses and reported on 11 April. Eisenhower accepted most of the committee's recommendations and transmitted them to Congress on 30 April as Reorganization Plan No. 6. This plan reaffirmed the power of direction, authority, and control of the secretary of defense; channeled responsibility and authority over unified commands through secretaries of the military departments; abolished the Munitions Board, the Research and Development Board, and several other unwieldy staff agencies and replaced them with six new assistant secretaries of defense; and charged the chairman of the Joint Chiefs of Staff with authority to direct the Joint Staff. Air Force leaders had generally favored closer unification of the armed services, but former Secretary Finletter appeared in opposition to Reorganization Plan No. 6 when the House Committee on Government Operations held hearings on it. Finletter feared that the reorganization would create a single monolithic establishment that would dominate rather than coordinate the military services. At a time when the world was in the midst of a great air and atomic technological revolution, he was afraid that the monolithic department would emphasize balanced forces and equal

divisions of the defense dollar by services instead of centering on atomic air power and making the other forces ancillary to it.[18]

Eisenhower also extended the authority of the National Security Council and provided it with new machinery. He included the secretary of the treasury and the director of the Bureau of the Budget as members of the National Security Council. On 23 March he established the NSC Planning Board to assemble, analyze, and organize data on problems presented to the council. He established the Operations Coordinating Board of the NSC on 2 September in order to make a single agency responsible for translating approved policies into operational programs and ensure that they were carried out.[19] Since Congress did not disapprove or amend Reorganization Plan No. 6, it became law on 30 June; Secretary Wilson wasted little time putting it into effect. The additional assistant secretaries replaced the boards and agencies that had been specified for oblivion. On 2 July, Wilson further directed the Joint Chiefs of Staff to designate officers to work with his representatives to revise the Key West agreement in accordance with the new reorganization. Completed in October 1953 but not announced until January 1954, this revision made the secretary of a military department, rather than a member of the Joint Chiefs of Staff, the executive agent for a unified command. The line of authority, thus, ran from the secretary of defense to a unified commander through a secretary of a military department, but the military chief of a service was authorized to act for his department in matters regarding strategic direction and conduct of combat operations in emergency and wartime situations.[20]

New Look Military Force Objectives

In July 1953 Eisenhower ordered the officers he had selected as new members of the Joint Chiefs of Staff—Admiral Radford, who would become chairman; Gen Matthew B. Ridgway, who would be Army chief of staff; and Adm Robert B. Carney, who would become chief of naval operations—to come to Washington where they would join Gen Nathan F. Twining, who had become Air Force chief of staff on 30 June. President Eisenhower charged them to "make a completely new, fresh survey of our military capabilities, in the light of our global commitments." On 24 July Wilson assembled these officers and other top civilian and military officials at Quantico, Virginia, for a three-day "outing." Here Wilson expressed confidence in the new atomic weapons, stated that the United States already had attained a strength that would make any attack on this nation "foolhardy in the extreme," and firmly announced that the military planners must get more military strength for dollars expended. In another presentation, Director of the Budget Joseph Dodge warned that the fiscal year 1955 national budget would have to show further substantial reductions above and beyond the revised budget for fiscal 1954.[21] Signed on 27 July as the Quantico conference was breaking up, the military armistice in Korea promised to reduce the operating costs of the armed services. However, 20 August 1953 the Soviet Union announced that it had successfully tested a hydrogen bomb.

As the first step in the New Look that the Joint Chiefs of Staff were directed to take at defense requirements, Admiral Radford asked the National Security Council on 13 October to provide guidance as to the nature of the war that the armed services would be expected to fight. Radford emphasized that preparations to fight every kind of war would be unnecessarily costly and that no mobilization planning would be realistic or useful unless it was founded on a proper strategic outlook. In response to Radford's question, the National Security Council issued fundamental guidance in the form of a paper designated as NSC-162. The council estimated that the danger from the growth of Soviet atomic weapons capability and air power had become absolute and stated that this threat had to be countered by American "atomic air power." It recommended that an air striking force capable of delivering atomic weapons should provide the nation's first line of defense and that the Joint Chiefs should be authorized to plan to use the new weapons when and where feasible. The NSC recommended increased spending of about $1 billion a year on air defense, and, in view of the added costs of air defense and of prevalent manpower shortages, it believed that the number of men in the military services should be reduced. President Eisenhower approved NSC-162 in its final version and summarized the new defense policy in his State of the Union message to Congress on 7 January 1954. At this time Eisenhower explained that the United States was "taking full account of our great and growing number of nuclear weapons and of the most effective means of using them against any aggressor." He went on to say that the United States would emphasize air power, mobile forces that could be held in strategic reserve and readily deployed to meet sudden aggression, continental air defense, a defense industrial base that could be swiftly converted from partial to all-out mobilization, and a professional corps of trained officers and enlisted personnel. Eisenhower envisioned a defense establishment that could meet "a twofold requirement—preparedness for the essential initial tasks in case a general war should be forced upon us, and maintenance of the capability to cope with lesser hostile actions—and aimed to satisfy this requirement with less drain on our manpower and financial resources."[22]

Given the guidance that the nation would emphasize an air strategy and given the information that the military budget and manpower ceilings would be reduced from those of fiscal year 1954, the Joint Chiefs of Staff established an ad hoc committee headed by Lt Gen Frank F. Everest, who was serving as director of the Joint Staff. This committee, which included representatives from all of the services, was to make recommendations on the force levels to be developed in the next two years.[23] Air Force planning was already well developed. General Twining had told a Senate committee in July that the Air Force was going to seek to attain its "ultimate goal of 143 wings," and he had directed the Air Staff to make a root and branch examination of Air Force requirements in the light of new weapons and new machines.[24] The Air Staff study showed that more powerful thermonuclear weapons would permit some reductions in the strategic air forces, though not substantial cuts since the number of thermonuclear weapons in the stockpile was still small. Substantial cuts could be made in medium troop carrier wings designed

for service in theaters of operations, since many Army units were to be returned to a strategic reserve in the United States. Air defense wings would have to be increased. The Air Staff study recommended a program objective of 127 wings in fiscal year 1956, which would be expanded to 137 wings by the end of fiscal year 1957. The 137-wing goal would include 7 heavy bombardment, 28 medium bombardment, 4 heavy reconnaissance, 5 medium reconnaissance, 2 fighter reconnaissance, and 8 strategic fighter wings in the strategic air forces; 34 fighter-interceptor wings in the air defense forces; and 2 tactical bombardment, 4 light bombardment, 21 fighter-bomber, 6 day-fighter, 5 tactical reconnaissance, 4 heavy troop carrier, and 7 medium troop carrier wings in the tactical air forces. In comparison with the 143-wing objective, the 137-wing program represented a reduction of 2 medium bombardment and 1 medium reconnaissance wing in the strategic forces; 1 light bombardment, 1 fighter-bomber, and 6 medium troop carrier wings in the tactical air forces; and an increase of 5 fighter-interceptor wings in the air defense forces.[25]

Early in December 1953 the Everest committee made its report to the Joint Chiefs of Staff. The report contained four separate views as to the force requirements for the following two fiscal years. In view of the split recommendations, as well as their recognition that the probable availability of personnel and money would be the controlling factors in fixing force levels, the individual chiefs were now required not only to analyze their own service needs but to recommend what they thought the other services ought to have. They laid great stress on improving continental defenses, and they laid out in considerable detail a defense program to be accomplished over a period of years. They also made efforts to define a "level-off position in defense forces which could be attained and maintained for an indefinite period of time." The Joint Chiefs accepted the concept that "the United States will emphasize the development of those capabilities for which we are best suited, while our allies will assume greater responsibilities for developing other capabilities for which they are best suited." They recognized that military strategy would need to place greater reliance on a maximum exploitation of atomic weapons, and they accepted the proposition that there would be no time for buildup in a future war.[26]

Although the Joint Chiefs apparently had little difficulty outlining the strategic concepts springing from the NSC New Look directive, they had more difficulty recommending service force levels. At first the Joint Chiefs wished to cut off the Air Force program at 127 wings, to be attained at the end of fiscal year 1956. The Air Force, however, protested that the 127-wing program would have to be differently configured from a program that was conceived as a measured step to a balanced 137-wing program. In the end the Joint Chiefs recommended that the Air Force be authorized to attain 137 wings by the end of fiscal year 1957. They also accepted a revised Navy program whereby the Navy would meet personnel and financial reductions by reducing its auxiliary and amphibious warfare vessels. It would keep 14 attack aircraft carriers and 16 carrier air groups on active service, and in the fiscal year 1955 budget it would receive funds to begin the construction

of a third *Forrestal*-class aircraft carrier and a third atomic-powered submarine. According to General Ridgway, the Joint Chiefs gave "scant consideration" to his recommendations for Army force levels; he later described the fiscal year 1955 budget as a "directed verdict" and said that the same would be true of the 1956 and 1957 budgets. The Army was reduced to a strength of 17 divisions, 18 regimental combat teams, and 122 antiaircraft battalions. These force levels, Ridgway said, "were not based on the freely reached conclusions of the Joint Chiefs of Staff" but instead "were squeezed between the framework of arbitrary manpower and fiscal limits"; for some reason, General Ridgway did not file a divergent view. Later on, Secretary Wilson, Admiral Radford, General Twining, and President Eisenhower each announced that the Joint Chiefs had unanimously agreed to the armed service force levels that were accepted by the Department of Defense and budgeted for fiscal year 1955.[27]

"The President of the United States, the Secretary of Defense, and the Joint Chiefs of Staff," Admiral Radford stated on 14 December 1953, "are of one mind: this nation will maintain a national air power superior to that of any other nation in the world." In this speech before the National Press Club and in another presentation to the congressional appropriations subcommittees in March 1954, Admiral Radford defined air power to include "the Air Force, naval aviation, Marine Corps aviation, Army aviation, and the tremendous aircraft industry and civil air transport systems of the United States."[28] Secretary Wilson described the New Look as "a natural evolution from the crash program that was adopted following the beginning of hostilities in Korea." Even though Wilson described the New Look as a logical application of economy in force to be attained by the exploitation of new nuclear weapons, he denied that the United States would place sole or exclusive reliance on the new weapons. General Twining described the New Look as a strategy that satisfied the twofold requirement of "preparedness for general war, should one occur; and maintenance of the capability to cope with lesser situations—with . . . less of a drain on our manpower, material, and financial resources."[29]

To carry out the recommended national defense program for fiscal year 1955, Congress made available to the Department of Defense a new obligational authority, subdivided as follows—$7.6 billion for the Army, $9.7 billion for the Navy, and $11.6 billion for the Air Force.[30] Though the New Look professed to depend heavily upon an air power posture, former Secretary of the Air Force Finletter was quick to point out that the budget figures showed Air Force and Navy appropriations substantially the same as they had been the previous year, whereas the Army's funding had been substantially reduced. Finletter urged that fiscal considerations still had too much weight in determining the size of the military establishment, and he found that "the composition of the Armed Forces is still dominated by the Division-by-Services method, thus producing a compromised Defense Force in which the top priority functions are not provided for."[31] In commenting on this same matter, retired Lt Gen Ira C. Eaker agreed with the Eisenhower position that there was a very real limit to the amount of national

resources that could be committed to weapons production; nevertheless, Eaker found that the national defense budget represented a serious imbalance of 75 percent defensive forces and 25 percent offensive. "No nation," he remarked, "has won or can win from a defensive posture."[32] Although welcoming the public announcements that the nation increasingly would emphasize air power, air-minded leaders were not entirely sure of the meaning of the New Look.

Massive Retaliation as a Strategy

In a speech before the Council of Foreign Relations in New York City on 12 January 1954, Secretary of State Dulles attempted to present an overall view of the national security policies of the Eisenhower administration. This remarkable address provided a rationale for the New Look and added a concept of "instant, massive retaliation" to the doctrine of deterrence. Dulles emphasized that often in the past the United States had reacted to Communist instigated emergencies. "Local defense," he said, "will always be important. But there is no local defense which alone will contain the mighty land power of the Communist world. Local defenses must be reinforced by the further deterrent of massive retaliatory power. A potential aggressor must know that he cannot always prescribe battle conditions that suit him." Dulles asserted: "The way to deter aggression is for the free community to be willing and able to respond vigorously at places and with means of its own choosing." He explained that the basic decision of President Eisenhower and the National Security Council was "to depend primarily upon a great capacity to retaliate, instantly, by means and at places of our own choosing." He pointed out that the Korean conflict had "been stopped on honorable terms . . . because the aggressor, already thrown back to and behind his place of beginning was faced with the possibility that the fighting might, to his own great peril, soon spread beyond the limits and methods which he had selected."[33]

The timing of Dulles's massive retaliation address coincided with a critical juncture in the foreign affairs of the United States. Dulles was scheduled to meet with Soviet and Western foreign ministers at Berlin on 22 January. Even though he reportedly felt that the chances of reaching any significant agreements with the Russians were slim, nothing could be lost from a candid emphasis upon America's military power. The Eisenhower administration also wished to prevent Indochina from falling into the hands of the Communists. But despite large amounts of American military equipment and technical assistance to French forces, the Communist Vietminh forces, with an active assistance from the Soviet Union and Communist China, appeared likely to defeat the French in Vietnam, where guerrilla war had been in progress since 1945 and had been intensified after the Korean armistice. The massive retaliation address served to meet in part the policy vacuum that existed in Southeast Asia.[34] Contrary to the wishes of Dulles, who feared that the Communists might be inspired to attempt a feat of force in Vietnam to support their diplomacy, the Berlin conference placed the problem of restoring peace in Indochina on the agenda for discussion at another conference to be held

in Geneva in April.[35] The massive retaliation address also touched off another great debate on American policy in the United States. "All told," wrote Chester Bowles on 28 February, "the administration seems to be saying that in dealing with future armed Soviet or Chinese aggression into non-Communist territory anywhere in the world, it proposes to rely chiefly upon atomic attack by the Strategic Air Forces against the major cities in Communist countries."[36] "All this means, if it means anything," said the defeated Democrat candidate for president Adlai Stevenson in a speech on 6 March, "is that if the Communists try another Korea we will retaliate by dropping atom bombs on Moscow or Peiping or wherever we choose—or else we will concede the loss of another Korea—and presumably other countries after that—as 'normal' in the course of events."[37]

Obviously attempting to clarify national policy in an interview published on 5 March and in an address on 9 March, Admiral Radford explained: "It is evident from the forces we intend to maintain that we are not relying solely upon air power."[38] At a press conference on 16 March, Dulles called attention to the fact that his address had advocated "a 'capacity' to retaliate instantly. In no place did I say we would retaliate instantly, although we might indeed retaliate instantly under conditions that call for that. The essential thing is to have the capacity to retaliate instantly. It is lack of that capacity which in my opinion accounted for such disasters as Pearl Harbor."[39] In an appearance before the Senate Foreign Relations Committee on 20 March, Dulles emphasized that collective defense would be the companion of the capability for massive retaliation. "No single nation," he said, "can develop alone adequate power to deter Soviet block aggression against vital interests. By providing joint facilities and by combining their resources, the free nations can achieve a total strength and a flexibility which can surpass that of any potential enemy and can do so at bearable cost."[40] While flying home from the Berlin conference, Dulles wrote an article which he considered to be a "more polished . . . restatement" of his earlier address in New York. Published in *Foreign Affairs*, this article denied that "the United States intended to rely wholly on large-scale strategic bombing as the sole means to deter and counter aggression." He continued: "A potential of massive attack will always be kept in a state of instant readiness and our programme will retain a wide variety and the means and scope for responding to aggression. . . . The essential thing is that a potential aggressor should know in advance that he can and will be made to suffer for his aggression more than he can possibly gain by it. This calls for a system in which local defensive strength is reinforced by more mobile deterrent power. The method of doing so will vary according to the character of the various areas. Some areas are so vital that special guards should and could be put around them—Western Europe is such an area."[41]

If Dulles had hoped that the massive retaliation address would help shore up the policy vacuum in Southeast Asia, such was not to be the case. Spurred into an all-out field campaign when the Berlin conference provided them with a timetable, the Vietminh laid siege to a substantial French garrison at Dien Bien Phu, in northwest Vietnam. While Dulles had anticipated that the Vietminh might attempt

a feat of military force prior to Geneva, the first responsible intimation that the French were in extreme difficulty came to Washington from Gen Paul Ely, the French chief of staff, who stopped at the Pentagon on 20 March long enough to discuss the possibility of US air strikes against the Communist forces surrounding Dien Bien Phu. A little later, the French government forwarded a request for assistance to Washington through diplomatic channels.[42] As deliberations progressed in Washington, Admiral Radford expressed the view that the loss of Dien Bien Phu would constitute a serious loss of prestige to the entire free world. In the Far East, Brig Gen Joseph D. Caldera took selected members of his Far East Air Forces (FEAF) Bomber Command staff to Saigon, where they made plans for 98 B-29s to fly a maximum-effort carpet-bombing air strike with conventional bombs against the Communist forces around Dien Bien Phu. Back in Washington, Admiral Carney joined Admiral Radford in recommending strong action, but General Ridgway was opposed. "I felt sure," Ridgway wrote later, "that if we committed air and naval power to that area, we would have to follow them immediately with ground forces in support." On the basis of an analysis made by a survey team he had sent to Vietnam, Ridgway predicted that the requirement for US Army forces would be extremely large.[43]

While the crisis continued, conferences between Dulles and congressional leaders on 3 April and a discussion between Eisenhower, Dulles, and Radford on the evening of 4 April developed the consensus that the United States should intervene in Indochina only as a part of a collective effort, that the French should take further steps to give complete independence to Vietnam, Laos, and Cambodia, and that any ground forces employed in the war ought to be indigenous forces. When queried about collective action, the British were unwilling to make any undertakings in advance of the Geneva conference. In Paris on 23 April, French foreign minister George Bidault pled that an American air strike could still save Dien Bien Phu, but neither Dulles nor Radford could now agree with him, since Radford felt that the military situation had deteriorated too far. When Dien Bien Phu surrendered on 7 May, the way appeared open for the Communists to take over virtually all of Vietnam; but, possibly because they feared to go too far and provoke an American response, the Communists settled for less than they might have claimed. In the final Geneva protocol on 21 July, the French agreed to a supposedly temporary division of Vietnam at the seventeenth parallel pending a national plebiscite and the Reds agreed to withdraw their forces from South Vietnam, Cambodia, and Laos.[44] Some critics of massive retaliation would later state that the policy met an almost immediate defeat in Indochina.[45] However, the often critical Thomas K. Finletter, writing shortly after the Geneva settlement, pointed out that the United States had been unable to take effective action in Southeast Asia because of the lack of a multilateral political base with Britain, France, and the indigenous countries of the area.[46] Meeting at Manila from 6–8 September 1954, representatives of Pakistan, Thailand, the Philippines, Australia, New Zealand, France, the United Kingdom, and the United States drew up and signed the Southeast Asia Collective Defense Treaty, mutually pledging

themselves to consult on measures for common defense whenever one of the signatories felt the territory or political independence of any state in the area was threatened by armed attack or subversion.

Following closely after Geneva, the new American emphasis upon nuclear weapons and the reduction of manpower requirements permitted a reevaluation of the strategy of the North Atlantic Treaty Organization (NATO) along lines earlier suggested by Great Britain. Under the strategy visualized at Lisbon in 1952, the Strategic Air Command's nuclear strikes would have been expected to delay a Soviet advance long enough to permit mobilization of the 96 divisions that would be required to stop the aggressor at the Rhine. To most European nations this objective had been too costly in manpower and too limited in scope to be acceptable, they had made little real progress toward fulfilling the program envisioned at Lisbon. In a new assessment of defense requirements in December 1954, the NATO Council resolved that member nations would plan on the use of nuclear weapons from the outset of a war. This decision to stockpile nuclear warheads, which would be readily available for the defense of the alliance in time of need, permitted a reduction in the size of the ground forces thought necessary. Under the new NATO strategy the local defense forces would provide a "shield" at the forward defense line in Europe while air atomic strikes flown by the Strategic Air Command (SAC), the United Kingdom Bomber Command, and American naval forces would provide the "sword." Best described by Gen Lauris Norstad, who became supreme allied commander in Europe in 1956, the NATO strategy included three objectives. "Our first task," Norstad explained

> must be to create conditions—and this means by the availability of force—so if an incident should arise we could compel a pause. We could force a break in the continuity of the action that is started, whether it is by design, a probing operation, or whether by mistake Our second objective is in this break to compel the aggressor to make a conscious decision that he is either going to war or he is not going to war. The third objective is when he is making that decision he must think of the total consequences of the act, if he decides to go to war.... He must think of the fact that not only will he involve himself in a contact with these so-called shield forces in the forward area, but he will also involve himself in the operations of the retaliatory forces, so you make him face up to the total cost of aggression You never permit him the luxury of thinking in terms of just a little piece of the price that he might have to pay[47]

When the United States defense policy had matured in 1953-54, Admiral Radford described it as being based upon a studied assumption of Communist action. "Communism when seeking a means to a political end," Radford said, "is reluctant to use *organized* armed forces in an overt aggression except as a last resort." Radford saw two corollaries deriving from this basic assessment: "Communism will use all measures short of actual warfare to attain a given objective before resorting to armed force.... Communism will not resort to armed force unless there is a reasonable chance of quick victory *without*—in the opinion of its leaders—appreciable world reaction." This assessment of Communist policy

provided the ground rules for American defense policy. "Actually," Radford explained,

> there is no local defense which alone can contain the massive land power of the Communist world. Consequently, local defenses must be reinforced by the deterrent power of strong counteroffensive forces possessing the capacity for devastating counter blows deep into enemy territory. In other words, an Allied strategic concept of operations must be based on the combination of local defenses, deterrent power, and an ability to strike swiftly and powerfully. Our current defense program is geared to that concept. . . . In developing the collective physical shield a growing reliance can be placed upon Allied forces now being strengthened in many areas of the free world. . . . But the essence of our concept is the capacity to strike in devastating strength at any element of the enemy's power There can be no alternative. A workable deterrent will cause a would-be aggressor to hesitate, particularly if he knows in advance that he thereby not only exposes those particular forces he uses for aggression, but he also deprives his other assets of "sanctuary" status

Radford emphasized that "if the Armed Forces of the Soviet Union committed aggression *in force* against this or that nation to whom we were tied in a collective security arrangement . . . this would be the beginning of World War III."[48]

Air Force Views on Massive Retaliation

According to one observer the majority of Air Force officers appeared to be strongly in favor of the military strategy of massive retaliation.[49] "History may show," stated *Air Force Magazine*, "that the 'massive retaliation policy' of the Eisenhower Administration marked the turning point in the Free World's successive retreats and indecisive stalemates in dealing with the onrushing tide of aggressive Communism."[50] Writing as vice chief of staff of the Air Force, Gen Thomas D. White described the new national security policy as being a policy of realism. "We have recognized," he thought, "that our atomic weapon developments form the only effective counter to the overwhelming mobilized manpower of the Soviet. Our Air Force with its ability to deliver nuclear weapons has been recognized as an instrument of national policy." White noted that the air power concept was not new—he recalled that farsighted men such as Douhet, Mitchell, Arnold, Lindbergh, Slessor, de Seversky, and Orvil Anderson had voiced the concept—but he remarked that "recent acceptance of these truths has been the result of startling advances in the power of modern weapons."[51]

Brig Gen Dale O. Smith believed that Secretary Dulles's statement of the massive retaliatory policy was a "bolder and more confident step" that echoed the words of the late General Vandenberg, who had said: "Air power alone does not guarantee America's security, but I believe it best exploits the nation's greatest assets—our technical skill."[52] When published in May 1956, Smith's pioneer book, *US Military Doctrine, A Study and Appraisal,* pointed out that the massive retaliation policy did not visualize air power as an exclusive or self-sufficient means of victory. President Eisenhower had emphasized that there would still be a need

for effective land, amphibious, antisubmarine, and other forces. "The decision," Smith wrote, "is not an all air-power decision by any means but merely a decision to emphasize air in this age as the fulcrum for our military policy." Nevertheless, he hoped and expected that the national policy of exploiting air power—arrived at "through long and sometimes halting evolution of doctrine, and through exhaustive study and debate among experts in every field of the military art"—would result in the elimination of the old tendency "to build three self-sufficient services, each planning to win a war with different doctrines."[53]

While Air Force officers were said to have regarded the New Look and massive retaliation as being "a major, strategic reorientation toward war," the implementation of the policy into strategy seemed none too certain. Taking a clue from Smith's belief that armed service doctrines evolved upward and with general acceptance became "national policy," Col Paul C. Droz remarked that the executive policy of the New Look appeared to have "preceded rather than stemmed from plans and doctrine."[54] Col Wendell E. Carter made this same observation. "While some observers conclude that the dominant nature of air power has now been recognized in national policy," he wrote, "it is relatively certain that the wisdom of this decision (if it has in fact been made) has not fully percolated down to all the subordinates who contribute to planning activities. It is significant, too, that the national policy was set by the president on his own initiative and was not the result of the unanimous advice of his military advisers. This may have put the lid on the pot, but it is doubtful that the fire has been turned off under the bouillabaisse—or that it will be until the services have a more nearly common viewpoint."[55]

Air Force Thinking on Counterforce and Air Power

In his commentary on the meaning of the New Look to the Air Force, General White asserted that the startling advances in the destructive power of air weapons had accentuated old truths: air forces must be combat ready; they must have central direction in order to complement each other (even the best air force, if divided or compartmented, would be vulnerable to piecemeal destruction); they must have a capability to inflict instant, effective retaliatory punishment upon an aggressor; and they must remain uncompromised in their ability to exercise a wide variety of persuasive actions. White asserted that hostile air forces would always be the primary concern and priority target of the total US air forces.[56] Gen Curtis E. LeMay also believed that the Soviet capabilities demanded that the Air Force should return to its old doctrines. Before 1950, when the Soviets had no atomic stockpile, LeMay had been willing to "violate the principles of war and forget about the rulebook and go about leisurely destroying their war potential or taking on any other task that seemed desirable at the time." By 1953, however, the Soviets had an atomic stockpile plus a growing delivery capability. LeMay accordingly concluded: "We have to go back to the rulebook and the principles of war and fight the air battle first, which means that we must as quickly as possible destroy their capability of doing damage to us."[57] In a landmark speech, which drew very little attention

when it was delivered in February 1954, General Twining stated: "We can now aim directly to disarm an enemy rather than to destroy him as was so often necessary in wars of the past."[58]

Even though the Air Force leaders believed that Soviet atomic capabilities had served merely to return Air Force thinking into its old doctrines, the new Soviet capabilities demanded changes in air strategy and especially in the mission of the Strategic Air Command. At a session of the USAF Board of Review for Tactical Operations in September 1949, Maj Gen David M. Schlatter had observed: "Our Strategic Air Command isn't any more a strategic air command than my aunt's foot. It is our striking force." He argued further that the Strategic Air Command would have "to help the soldier dig in in Europe and hold on to territory against the forward Russian divisions."[59] Speaking in June 1953, General Vandenberg told a Senate subcommittee: "The proper role of air forces is to destroy the enemy's industrial potential." On further questioning, however, he stated that the Strategic Air Command would have to cover all the installations from which the Soviets could launch an atomic air attack against the United States. SAC would then have two priority missions: to destroy the enemy's industrial potential and "to save the friendly ground forces that are already in contact with the enemy."[60] As outlined by General LeMay, the mission assigned by the Joint Chiefs of Staff required that the Strategic Air Command prevent an enemy nation from launching an atomic attack against the United States, retard the massing and launching of Soviet ground forces, and systematically destroy hostile war-sustaining resources.[61]

At the time that the Joint Chiefs directed that the Strategic Air Command would assist theater forces by retarding Soviet advances, the Strategic Air Command found it difficult to target specific objectives. Some of the Soviet forces would be moving, and aircraft would have to search for them before making attacks. Planning for the retardation mission became even more complex early in 1952 when the Joint Chiefs of Staff began to allocate nuclear weapons to the unified theater commanders for employment by naval air forces and theater air forces. The Joint Chiefs recognized this problem and directed the Air Force to establish a jointly staffed war room in the Pentagon and joint coordination centers in appropriate theaters of operations. The purpose of these centers was to forward information on targets scheduled for nuclear attack to the war room where duplications might be noted and theoretically eliminated. Joint coordination centers were established in the Far East and in Europe during 1952. Staffed by Strategic Air Command personnel, SAC Zebra in Europe and SAC Xray in the Far East served both as coordination centers and as advance command posts to control an emergency war plan employment of Strategic Air Command forces in support of theater commanders. Under then existing ground rules, as many as four commanders were scheduling atomic attacks against the same target. It was thought, however, that in case of a war the joint coordination centers would be able to spread the word when a target was attacked, thus halting duplicative attacks.[62] As long as all prospective nuclear targets were within the Soviet Union, the simple coordination procedure appeared workable. However, the situation rapidly began to get out of hand when

the New Look greatly loosened planning for the employment of the ever growing atomic stockpile in limited as well as general wars.[63]

Speaking in November 1953, former Secretary of the Air Force Thomas K. Finletter voiced the opinion that the Air Force needed to revise its "consideration constantly away from the old anti-industry concept of the SAC operations and . . . make it an anti-force operation."[64] When he published *Power and Policy* in the summer of 1954, Finletter again argued that the

> old counter-industry concept for the Strategic Air Command should be given up There should be substituted for it what may be called the front-to-rear concept. Under this concept all targets from the enemy's front lines, through his communication and supply lines, his airfields and storage, back to and including the sources of production and governmental direction would be the objective of Atomic-Air's attack In the time of atomic plenty there will be enough bombs to do all this. . . The first emphasis would be on the enemy's atomic air, on the fields, installations, planes and missiles from which his atomic attack on us would come Once these are destroyed the emphasis would shift to the obliteration of the enemy's military forces, his industry, and his ability to function as an organized state [65]

In a review of Finletter's book, T. F. Walkowicz, a member of the USAF Scientific Advisory Board, agreed that mounting Soviet atomic capabilities were making the Soviet air forces rather than the Soviet economy the priority enemy target in the event of a war.[66] In a major article published in February 1955 under the title of "Counter-Force Strategy," Walkowicz presented what he considered to be a comprehensive thesis on nuclear warfare. He reasoned that the possession of nuclear weapons by both prospective combatants had rendered obsolete any idea of using a mobilization base in war: either the United States or the USSR would win or lose a war with forces already on hand at the outset of hostilities. Since the United States and the Soviet Union each possessed combat ready forces able to destroy each other, a strategy of bombing cities or factories was impracticable. The United States, however, held a substantial advantage in its possession of a larger stockpile and a wide variety of atomic weapon systems. Walkowicz, therefore, urged that the United States should give priority emphasis to the development of both the Strategic Air Command and theater air forces and that nuclear weapons and delivery systems should be directed primarily against Soviet air forces and other enemy forces in being. "As our counter-force capability becomes really formidable," Walkowicz wrote, "the US will have both the option of choosing and the initiative of announcing a policy to employ nuclear weapons primarily against military targets."[67] Finletter called Walkowicz's article "a fine contribution to thinking on this all-important subject."[68]

Both Finletter and Walkowicz emphasized the military reasons for counterforce strategy, but Richard S. Leghorn, an Air Force reserve officer who had returned to civilian status after a tour in the Air Force Office of Development Planning, advanced the humanitarian aspects of a counterforce strategy. In an article, "No Need to Bomb Cities to Win War, A New Counterforce Strategy for Air Warfare," published in January 1955, Leghorn proposed that the United States might

unilaterally renounce H-bomb and A-bomb attacks against cities, unless in retaliation for mass-effect weapons employed by the Soviets against free world cities. If the United States or its allies were attacked with conventional armies, the United States would punish the aggressor by directing tactical nuclear weapons against hostile attacking units in the battle zone and enemy military installations in immediate rear areas, including air bases supporting the aggression. If the United States or its allies were attacked with nuclear weapons, the United States would employ nuclear weapons to destroy the enemy's nuclear stockpiles and delivery capabilities.[69] Leghorn described his proposals as a counterforce strategy, but his plan to limit nuclear weapons to battlefield targets fell rather neatly into the definition of what retired Rear Adm Sir Anthony W. Buzzard, British Royal Navy, would conceive to be graduated deterrence. Buzzard proposed to return nuclear war to the tactical battlefield and to avoid strategic nuclear attacks against towns and cities unless such proved to be absolutely essential.[70]

Air Force leaders found much that was acceptable in the proposed counterforce strategy. Writing in the winter of 1954–55, Col Robert C. Richardson III, air member to the NATO Standing Group in Washington, suggested that at the outset of hostilities, adversaries armed with nuclear weapons would direct their blows against target systems that offered quick payoffs, such as combat formations of all arms and services.[71] General LeMay emphasized that the Strategic Air Command's primary war mission would be the enemy's atomic capability. "I think," LeMay said, "it is generally conceded by all military personnel in this day and age, [that] you must win the air power battle, gain air superiority, before you can conduct any other type of military operation."[72] Maj Gen John Samford, Air Force director of intelligence, was frankly skeptical about any proposal to make direct attacks against the psychological strength of the enemy. He knew no way in which target planners could estimate the effect of direct attacks against an enemy's will to wage war. Thus, he favored attacks against hostile military and industrial targets where effects of destruction could be better predicted and the results of incremental reductions could be more accurately measured.[73] There was general agreement in the Air Force that a future war would allow little or no time for mobilization. The Air Materiel Command accepted the policy that the decisive phase of a future general war would be the first 90 days and that hostilities could begin at any hour. "It is one of the tenets of modern warfare," LeMay wrote, "that the decision in tomorrow's conflict will be reached using only the forces in being at the outset.... Today, shooting wars are won or lost before they start. If they are fought at all, they will be fought principally to confirm which side has won at the outset."[74]

As a second priority to the counterair strikes, the Strategic Air Command planned to support theater commanders in retarding the advance of Soviet ground forces. For this task, LeMay planned to deliver weapons against targets the theater commander wanted destroyed.[75] Even though much of the counterforce strategy was acceptable, the Air Force was as yet unable to accept such an undertaking in all its details. Mindful that a major reason for the assignment of theater-support missions to the Strategic Air Command in 1950 had been that the large and scarce

atomic weapons of that time could be transported only by strategic bombers, Gen Otto P. Weyland believed that as tactical aircraft gained atomic capabilities the primary responsibility of the Strategic Air Command should shift from theater support strikes to attacks on basic sustaining resources, industries and facilities essential for the prosecution of war and that the Tactical Air Command and the theater air forces ought to become "responsible for attacks on enemy military forces and materials in being, en route to or in battle."[76]

Although the Strategic Air Command would remain responsible for an important segment of the retardation missions, the targets SAC was scheduled to attack under the retardation objective were somewhat less than the counterforce concept seemed to contemplate. As a third priority, the Strategic Air Command also planned to systematically destroy the enemy's war-sustaining resources. Said a SAC spokesman, "their steel plants, their heavy industry, and the goods of war will be destroyed so that they cannot fight." This third-priority task, moreover, would be accomplished almost simultaneously with the higher priority tasks since the Strategic Air Command—unlike the naval and theater air forces, which would retain some reserve of nuclear weapons—was committed to an immediate salvo of its nuclear stockpile as soon as possible after H-hour. Operational concerns had another important effect on the Strategic Air Command's target planning: many targets fell within several of the common target categories and numerous separate targets commonly were found in the immediate vicinity of population centers. By increasing the size of the weapon delivered, the Strategic Air Command would be able to destroy several separate targets with one successful sortie, thus attaining a "bonus effect" from a single larger weapon.[77] At least two other reasons were given for the Air Force's early hesitation about accepting counterforce as a strategy. The counterforce concept posed a requirement for a very large number of nuclear weapons and delivery vehicles—many more than the Air Force had programmed or could reasonably expect to obtain.[78] The counterforce concept also demanded an accurate identification and location of Soviet forces prior to H-hour. As of mid-1956 the Air Force did not yet have intelligence or reconnaissance capabilities that could provide such exact information.[79] The Air Force considered the counterforce strategy to be basically sound and worth planning for, but it could not accept it in all of its details

Efforts to Define Air Power

The strategic requirements of the New Look—especially instant reaction to aggression and the corollary concept of instant readiness—touched off an active discussion on the need for the proper understanding of the characteristics of air power. As has been seen, Brig Gen William Mitchell in the early days of American aviation had defined air power as "the ability to do something in or through the air." Following this same dynamic definition, the Air Corps Tactical School had taught: "The air power of a nation is its capacity to conduct air operations; specifically, the power which a nation is capable of exerting by means of its air

forces. . . . Air power is measured by the immediate ability of a nation to engage effectively in air warfare."[80] While early air thinkers generally identified air power with the air striking force, the emphasis in the early 1940s on a mobilization base in the aviation industry led to a broadened definition of air power. Alexander P. de Seversky provided this expanded concept in his book, *Victory through Air Power*. Being, as he later said, "a Navy man by education," de Seversky adapted Admiral Mahan's classic definition of sea power for his own purposes. "I automatically said," de Seversky recollected, "that air power means everything. The airplanes, the industries, the men, the materials, everything that produces the power in the air or power to navigate in the air constitutes air power."[81] At the end of World War II Gen Henry H. Arnold accepted this broad definition of air power; in 1955 Air Force Manual 1-2, *United States Air Force Basic Doctrine,* stated: "The term 'air power' embraces the entire aviation capacity of the United States."[82]

This broad definition of air power was accepted within the Department of Defense. When he justified reductions in the Air Force in June 1953, Secretary Wilson said that the Air Force's wing strength was only "a segment of our air power" and asserted that if Navy and Marine air strengths were taken into consideration the "over-all air power" of the nation totaled 152 wings.[83] Disputing Wilson's reasoning, General Vandenberg argued that naval air units were committed to a mission of controlling the seas and would not be available to assist with air missions until primary naval functions were accomplished. "In other words," Vandenberg said, "when the bell rings you would not, in my opinion, count upon the Navy to carry out its primary mission if, at the same time, it is required to help the Air Force carry out its own primary mission."[84] In December 1953, however, Admiral Radford defined national air power as including the Air Force, Navy, Marine Corps, and Army aviation and "the tremendous aircraft industry and civil air transportation systems of the United States."[85]

Believing that the New Look concept of air power as manifest in the fiscal year 1955 defense budget was only "an optical illusion—the same old numbers racket," de Seversky began to change his mind about his definition of air power. In an April 1954 article he pointed out that from its share of the defense appropriations the Air Force "not only has to build an Air Force to fulfill its primary mission to destroy the enemy and to protect the continental United States, but it also has to build an enormous tactical air force, and transport and cargo planes in support of and for use by our Army." De Seversky now maintained that aviation designed to support the Army should be budgeted to the Army. "Just aviation—an amorphous mass of aircraft, no matter how large, no matter how useful it may be to the Army, Navy, and Marine Corps—if it is not designed to win and maintain command of the air," he wrote, "does not constitute air power."[86] In an article prepared in July 1954 for the *American Peoples Encyclopedia*, de Seversky wrote: "Air power is the ability of a nation to assert its will via the air medium. . . . Only when an aircraft is designed to assist and increase the efficiency of the air force in its task of establishing command of the air is it an instrument of air power."[87] In an amplification of this article for *Air Force Magazine*, de Seversky asserted that a lack of basic

understanding of what constituted military air power was the root of the confusion reigning in the national defense effort. "The scope of the Air Force's mission," he maintained, "must be fully understood if our country is to shake off the curse of the present antiquated philosophy of balanced forces strategy."[88]

Believing that the real meaning of air power was getting lost in a maze of diverse definitions, Air Force thinkers attempted to provide a definition that would be nationally acceptable. Cols Jerry D. Page and Royal H Roussel of the Air War College Evaluation Staff prepared an article in which they accepted the doctrine that air power was an entity. In this frame reference they thought of air power as "those military forces . . . which are employed and directed as a single instrument by the military agency charged primarily with the responsibility for conducting operations through the air." They concluded: "Unlike air power, military auxiliary aviation is invariably confined in its use to support of operations which have definite land and sea boundaries." They defined "military auxiliary aviation" as being "composed of those products of the national air capacity which are diverted or withdrawn from the air power total for the primary purpose of conducting land or sea operations under the military agencies charged with those responsibilities."[89] Taking a semantic shortcut, Prof Barton K. Leach abruptly defined "United States air power . . as the United States Air Force."[90] When he appeared before Senator Stuart S. Symington's committee, which was investigating air power in April 1956, General LeMay did not define air power. However, he stated that intelligence indicated that the Soviets would possess more long-range jet bombers than the United States by 1958–60. He stated, "We are drifting into coordinating our tactics and weight of effort, timing of things, and that sort, and we are drifting towards what we airmen have maintained all along, to fight an air power battle requires a single commander." LeMay urged that a single air commander would be required to achieve the "primary single goal of destroying Soviet air power."[91]

The new definitions of air power were not acceptable to other national leaders. Admiral Carney stated: "Air power is not a compartmented thing peculiar to any one agency; it is needed by the Army, Navy, Air Force, and Marine Corps for the accomplishment of their assigned roles and missions; it is needed to expedite the business of other governmental agencies, or industry, and of the population at large."[92] Speaking pointedly in response to LeMay's testimony, President Eisenhower on 4 May discounted the charge that the United States was lagging behind the Soviet Union. "We have," he told reporters, "the most powerful Navy in the world . . . and it features one thing, airpower. . . . Now we have got a tremendous airpower, a mobile air power, in the sea forces."[93] Preferring to speak about deterrent power rather than air power, Secretary Wilson stated that "primary deterrent power" rested in the Strategic Air Command, but he emphasized that this force was supplemented by "atomic capable aircraft with carrier task forces constantly deployed overseas; the atomic bombing capability of aircraft of our tactical air forces deployed overseas and ever on the alert; and the atomic capability of our surface-to-surface guided missile and artillery units also deployed overseas."[94] When questioned on these matters by the Symington committee in

July, General Twining conceded that naval aircraft could make a valuable contribution to the air power battle, provided carrier air attacks were possible against Soviet airfield targets immediately after a war's beginning and were coordinated with Air Force attacks. He pointed out, however, that the Navy had important primary control-of-the-sea missions, that no one could be sure where naval carriers would be physically located or what targets their planes would be prepared to strike immediately after H-hour. For those reasons, Twining asserted that "the strategic air force has to be just as big, just as strong, and just as ready regardless of this Navy contribution on these targets I am talking about."[95]

After considering this course of efforts to define air power, the Air War College Evaluation Staff offered a more cohesive definition early in 1957. "Air power," it said, "is the hard core of any modern defense organization. It comprises those military resources, together with their effective command, control and employment, which enable a nation to use the air for its own purpose and to deny its effective use to the enemy." Given effective command and control that recognized the unitary nature of global air warfare, the Evaluation Staff's definition was broad enough to include Army antiaircraft defense as well as Navy air defense and aviation resources.[96] Emphasizing a dynamic and inclusive concept of air power, Maj Gen James Ferguson, Air Force director of requirements, wrote in April 1958: "Air power is the total of elements needed to apply force in the appropriate degree. It is offensive, defense, reconnaissance, transport. It is general thermonuclear offensive, limited nuclear and conventional war, police action, or perhaps a show of force. It is deterrence and, if deterrence should fail, it is destruction of the aggressor."[97] Speaking to the National Press Club on 29 November 1957, however, General White declared that the US Air Force was "synonymous with airpower." "Just as our Army and its soldiers are synonymous with land warfare and the Navy and its sailors with sea battles," he said, "so are the USAF and its airmen synonymous with air warfare."[98] In April 1958 Maj Gen Jacob E. Smart, the Air Force assistant vice chief of staff, reiterated this same position that the National Defense Act 1947 had established the US Air Force as the service representing "the primary airpower strength of the nation."[99] At the Air War College, Maj Gen Robert F. Tate, nevertheless, preferred the larger definition of air power. "I think we must," he said, "whether we like it or not, acknowledge that air power if properly used does lie in the Navy as well as in the Air Force, and perhaps eventually in the Army."[100]

Although the discussions of air power appeared academic, the emphasis placed on the unitary nature of national air power stimulated thought about the internal organization of the Air Force. Even though Air Force doctrine had accepted the fact that air units might be placed under diverse air commanders to simplify span of control, it emphasized that air power must not be compartmented but must be wielded as a unitary force for the prosecution of the global air battle.[101] In view of the increasing threat of a Soviet atomic attack by air and the requirement for unitary command and control of air power, there was a question as to whether the Strategic Air Command and the Tactical Air Command (TAC) ought to continue

to be separate establishments. As early as March 1953, Brig Gen James Ferguson suggested that the Air Force was not entirely without blame for prevalent compartmentations of air power. "We have permitted," he pointed out, "internal segregation of partition of air power at a time when technological developments least warrant such action. By such partition we invite the wedge which will split apart such aircraft assigned to TAC for special use as long range artillery at a time when this tactical portion of our air force may very well play an important role in the strategic mission."[102] As has been seen, Finletter proposed in *Power and Policy* the need for a merger of all air units with atomic weapons under a single command that might be called the strategic-tactical air command or simply STAC.[103]

In the postwar years, when no hostile nation had possessed air capabilities sufficient to destroy the United States, General LeMay had been willing to believe that the United States "could afford the luxury of devoting a substantial portion of our Air Force effort to support of ground forces." He thought, "The maintenance of part of our force as close support posed no grave risk, because the enemy didn't have the capability to destroy us. He couldn't initiate an effective air offensive blow against us because he couldn't mount one." By 1956, however, LeMay considered that the Soviets possessed aircraft and weapons capable of inflicting nuclear devastation on the United States. Under these conditions, he said: "Offensive air power must now be aimed at preventing the launching of weapons of mass destruction against the United States or its Allies. This transcends all other considerations because the price of failure may be paid with national survival."[104] Based on this strategic estimate, LeMay apparently was not adverse to the Army's attempts to increase its own organic supporting firepower. In June 1956, Gen Maxwell D. Taylor, the new Army chief of staff, stated that "the trend will be toward the substitution of the missile, the Army-controlled missile, for what we call close support of ground forces."[105] In a directive on roles and missions issued on 26 November 1956, Secretary Wilson authorized the Army to develop surface-to-surface missiles with ranges up to 200 miles. At an Air Force Commanders' Conference in January 1957, LeMay considered that Wilson's directive was an emancipation of the Tactical Air Command inasmuch as it visualized, as LeMay saw it, that "the firepower necessary for close support in the confines of the combat zone can and should be provided by relatively short range weapon systems organic to the Army." He accordingly recommended that the time had come to reorganize all of the offensive elements of the Air Force into an "Air Offensive Command" under a single air commander. "With control of our air forces piecemealed throughout the world," he warned, "we need lose only in one area to insure the destruction of our own country. . . . Whether we choose to recognize it or not, SAC and TAC are bedfellows. . . . As a matter of top priority, for reasons of national survival, they must deter together through their ability to defeat Communist air power together." Given a combination of the Strategic and Tactical Air Commands, LeMay thought that the Air Force could more logically "take a united stand in pursuit of its ultimate objective of achieving unified control of all air offensive forces, regardless of service, under a single air commander."[106]

"I have stressed the indivisibility of air power and the necessity of centralized control of air resources," said General Weyland after assuming command of the Tactical Air Command in 1954, "as much as any man alive." From his headquarters at Langley AFB, Weyland set out to develop the Tactical Air Command into a jack-of-all-trades element of offensive air power as well as a supporting force for surface operations. The strategic tactical air forces appeared to him to be an offensive capability that would be applied against a spectrum of targets comprising "an unbroken chain from field, mine, and forest to the battle area." Speaking of the target spectrum, Weyland explained: "There is no sharp line of demarcation, there is a desirable area of overlap, and, by close coordination, strategic and tactical air forces can and do complement and assist each other without duplication of effort."[107] In spite of these beliefs, he took a firm stand against LeMay's concept of a single offensive force. Weyland favored a single service that would integrate the offensive capabilities of all the armed forces, thus permitting a single-uniform military force to exploit the national air capabilities; but he did not expect to see such a single service mature in his time. Under the existing command organization, theater commanders had legitimate area responsibilities in which theater air forces assumed major importance for general war and for contingencies short of general war. Unless the Air Force was prepared to risk the danger that forces of the Strategic Air Command might be placed under theater control, Weyland argued that the Air Force must proceed very cautiously toward amalgamating tactical and strategic air forces. "We must face, too," he continued, "the inalterable fact that the forces of the Strategic Air Command are dedicated to a single and inflexible purpose—the prosecution of an all-out war. Their people and their equipment simply are not capable of or familiar with the many contingencies which may arise short of that general conflict." Weyland favored the establishment of a single commander with authority to control or coordinate worldwide tactical air resources. He thought that many of the advantages supposedly inherent in a single commander of an air offensive force could be attained through a centralized authority to direct targeting and to coordinate the timing of all air strikes in case of a general war.[108]

In offering his proposal for an air offensive command, General LeMay assumed that the Army would be quick to develop surface-to-surface missiles and to undertake its own close-support and interdiction efforts. Despite General Taylor's remarks, however, the Army followed a very cautious approach designed to ensure that Air Force support capabilities would be reduced only gradually as Army missile capabilities increased.[109] The growth of Army missile power was cited as a justification for reducing the strength of the Tactical Air Command, but the Army could not arrive at an organic missile strength that would permit it to dispense with tactical air support. LeMay also had assumed that the missions of the Strategic Air Command and the Tactical Air Command were becoming increasingly congruous. But forces were already at work that would demand that the Strategic Air Command be almost entirely committed to the deterrence of general war while the Tactical Air Command would be developed as a general purpose force. Instead of

moving together, the missions of the Tactical Air Command and the Strategic Air Command became more widely separated. Although unable to agree to the integration of its own forces to the degree contemplated by General LeMay, the Air Force continued to work for a higher degree of unification of the Army services.

Air Force Positions on Nuclear Stalemate and Limited War

"Air power," General Vandenberg stated in June 1947, "is a power for peace in the uncertain world of today—if air supremacy rests in the right hands."[110] In the late 1940s and early 1950s, Air Force leaders were said to agree that American air weapons were clearly superior to an enemy's weapons and that the best assurance against the outbreak of war was the ability to win such a war.[111] Looking toward the long-term future in 1953, President Eisenhower attached great importance to the role of military power in maintaining the peace of the world. "This power," Eisenhower emphasized, "is for our own defense and to deter aggression We shall not be aggressors, but we and our Allies have and will maintain a massive capability to strike back."[112]

On a visit to the United States the summer before his retirement as chief of the Air Staff of the Royal Air Force in December 1952, Air Marshal Slessor recalled the hundred years of Pax Brittanica that had rested on the power of British naval forces and visualized the establishment of a Pax Atlantica based on air power. "I believe the stability of the world," he said, "can be preserved just as surely as it was between Waterloo and Sarajevo. And this time it will rest on airpower—largely, but not exclusively, American Airpower." Slessor repeated these ideas in a series of talks on the British Broadcasting Corporation early in 1954. In an article entitled "Has the H-Bomb Abolished Total War?" published in *Air Force Magazine* in May 1945, Slessor asserted that total war waged with thermonuclear weapons "would amount virtually to mutual suicide." Reasoning from the premise that to win a war meant to create "world conditions more favorable for oneself than would have been possible if there had not been a war," Slessor concluded: "The world may take courage and hope from the fact that there is today not the slightest chance of anyone winning a war on that definition. . . . What has now happened is that total war has been abolished in the only possible way—*it has abolished itself,* now that new ultimate weapons of atomic and thermonuclear power are in the hands of both potential antagonists." Slessor reasoned that the United States and Great Britain could not afford "to neglect the defensive altogether," that they would have to "give the necessary priority to a striking force, not vastly superior in strength to anything that anyone else has, but strong enough to do the job and efficient enough to put the weapon down where we want to, if we have to." He also argued that the two allies would require "the ability to deal in a limited way with limited emergencies wherever and whenever they may arise." "We can take it as a foregone conclusion," he predicted in a look at the future,

> that our opponents, having deduced that it would be too costly to overwhelm us by direct assault, will take every opportunity to turn or undermine our defenses by other means. We must look forward to a difficult era of what may be described as termite warfare—subversion, infiltration, and the exploitation of rebellion; fishing in the troubled waters of immature nationalism, of misgovernment and social inequalities in new states still in a rudimentary stage of political development, of religious hatreds and economic disequilibrium, and, almost certainly, other minor aggressions on the Korean model . The function of atomic airpower will be the big stick in the background, to keep these affairs from spreading—to prevent the minor tactical episode from developing into the mortal threat.[113]

The concept of nuclear stalemate caught on rapidly in Great Britain and spread to the United States. The British military commentator J. F. C. Fuller agreed that the hydrogen bomb had "bereft organized international war of its political significance." "With the advent of the hydrogen bomb," stated Air Chief Marshal Sir Phillip Joubert, "it would appear that the human race must abandon war as an instrument of policy or accept the possibility of total destruction." Speaking to Parliament on 1 March 1955, Prime Minister Churchill predicted: "In three to four years' time . . . the Soviets will probably stand possessed of hydrogen bombs and the means of delivering them not only on the United Kingdom but also on North American targets. . . . It does not follow, however, that the risk of war will then be greater. Indeed, it is arguable that it will be less, for both sides will then realize that global war would result in mutual annihilation."[114] In the United States, scientist Robert A. Oppenheimer coined the simile that war between thermonuclear powers would be equivalent to a battle to the death between two scorpions in a bottle. "No great war can ever again be won," said Dr Vannevar Bush, "it can only end with the partial or complete annihilation of both contestants."[115] In October 1955 Secretary of the Air Force Donald A. Quarles referred to the creation of "a stalemate through deterrent strength" as being, "paradoxically, our best hope for peace." Secretary Wilson observed in January 1956: "I assure you that in my opinion everybody is going to lose in the next war. . . . The hope of the world [is] that by having a stalemate long enough sensible men of good will throughout the world could try to get some formula for establishing peace in the world."[116]

At first the concept of nuclear stalemate was thought to be a condition that would have some possible benefit to the United States, but with the passing of time some defense analysts began to promote the idea that a condition of finely balanced mutual deterrence would be very advantageous to the whole world. In 1959 Prof Oskar Morgenstern advanced the idea that it would be beneficial to maintain a nuclear stalemate, even by the expedient of strengthening Soviet forces by weakening US power. "In order to preserve a nuclear stalemate," Morgenstern wrote, "it is necessary for both sides to possess invulnerable retaliatory forces. . . . In view of modern technology of speedy weapons delivery from any point on earth to any other, it is in the interest of the United States for Russia to have an invulnerable retaliatory force and vice versa."[117] A study prepared by James E. King, Jr., Paul H. Nitze, and Arnold Wolfers of the Washington Center of Foreign

Policy Research recommended: "On the assumption that steps will be taken to create a workable alternative to US strategic deterrence of the less provocative forms of Sino-Soviet aggression, the United States should pursue a policy aimed at increasing the ability of the strategic equation by unilateral action, by the encouragement of reciprocal action, and by an arms control policy directed at strategic stability."[118] Herman Kahn, another civilian analyst, suggested: "We must not look too dangerous to the enemy. . . . We do not want to make him so unhappy and distraught that he will be tempted to end his anxieties by the use of drastic alternatives."[119]

Air Thinking on Nuclear Stalemate

With the apparent exception of Secretary Quarles, Air Force thinkers were quite skeptical of the existence of a condition of nuclear stalemate. Seeking to determine Air Force requirements under the New Look, an Air War College Evaluation Staff analysis completed in April 1954 held that the objective of deterring all-out war demanded a continuing ability to deliver nuclear weapons to the heart of the Soviet Union. The effectiveness of a deterrent would be proportionate to an enemy country's conviction that US air capability would inflict unacceptable damage upon it and that it could not deny that capability by effecting an air-tight defense system, making a technological breakthrough in offensive weapons (such as an intercontinental missile), blackmailing America's allies, sabotaging or subverting American bases, or making an effective surprise attack against US offensive air forces.[120] In another study issued in April 1955, the Air War College Evaluation Staff acknowledged that deterrence was a composite of moral, economic, political, and military capabilities and that all military strengths—whether land, sea, or air—had some deterrent effect. The 1955 study asserted, however, that deterrence of an enemy was primarily "the ability to retaliate against the heart and core of his nation—a capability held securely in the hands of invulnerable force—that will cause him to fear the consequences of any aggression he might initiate."[121]

Appearing before Senator Symington's subcommittee on the study of air power in April 1956, General LeMay presented the Strategic Air Command's definition of deterrence. "A deterrent force," he said, "is one that is large enough and efficient enough that no matter what the enemy does, either offensively or defensively, he will still receive a quantity of bombs or explosive force that is more than he is willing to accept. . . A deterrent force is an effective nuclear offensive force which is secure from destruction by the enemy regardless of what offensive and defensive action he takes against it. The striking force is considered effective if it can still inflict unacceptable damage on the enemy."[122] From testimony such as this, the Symington committee concluded: "To be safe, we must have strategic airpower of sufficient strength to absorb any surprise attack and, even after suffering the heavy damage incident to such an attack, be able to retaliate " General Twining agreed with this conclusion.[123] Tersely summing up a belief that deterrence was a "delicate

balance of terror," Rand analyst Albert J. Wohlstetter concluded: "To deter an attack means being able to strike back in spite of it. It means, in other words, a capability to strike second."[124]

Based upon their examinations of the nature and requirements of a deterrent posture, Air Force leaders seriously questioned whether a nuclear stalemate could exist and whether, if it could exist, it would serve to eliminate general war. In April 1956 Brig Gen Sidney F. Giffin, vice commandant of the Air War College, remarked that stalemate described an end situation in the game of chess in which neither of two opponents could win or lose. He considered the term inappropriate to a situation that should be described as a "precarious balance of power" that might at any time be "tipped through the indifference or carelessness shown by one side or through the moral or technological advances achieved by the other."[125] Expanding upon this same theme, Col Robert C. Richardson postulated that to maintain a stalemate "both sides must have stocks of atomic weapons and the means for their delivery while at the same time lacking defenses capable of protecting their vital areas from destruction by the enemy." If either side developed "pay-off" defenses against air attack, the stalemate would never occur. In view of the normal processes of evolution of weapon systems, moreover, Richardson thought it unlikely that an exact parity in weapons, delivery forces, or defenses would occur for any length of time or endure for any length of time. "I suggest," he concluded, "that the so-called atomic 'stalemate' or 'stand-off' is more of a psychological than a real deterrent. At best it is a cliche born of the natural tendency to rationalize away the prospects of total atomic war."[126]

That any effective nuclear stalemate would depend upon the psychological judgments of Soviet leaders and to a lesser extent of the Soviet people was a cause for concern to Air Force leaders. Gen Carl A. Spaatz agreed that no right-thinking person would initiate a nuclear war, but he added: "I do not agree that dictators are in their right mind. I am certain Hitler was not, so I do not think we can assume that the Russians are going to have . . . completely sensible people running them all the time."[127] This same concern for Soviet motivations and capabilities caused General Twining to describe the proposition that prospects of mutual suicide had abolished total war as "a dangerous fallacy." "We must recognize," he said, "the fact that total war is no less a potential threat today, when both sides possess atomic weapons, than it was several years ago when we alone had them."[128] In the spring of 1960, after becoming Air Force chief of staff, General White described deterrence as "what we hope to achieve through specific impact on the collective mind of the Soviet leadership."[129] White took "particular exception" to the notion of "mutual deterrence." "I cannot agree," he said, "that the Soviet Union is trying to deter us. Deterrence, as I see it, is a one-sided problem—it is ours."[130] Reasoning that no one could state what amount of destruction the Soviets or Chinese Communists would be willing to accept, that the Soviets had a tremendous advantage in their ability to make a first strike, and that technological change made for very rapid fluctuations in offensive and defensive capabilities, Gen Thomas S. Power, the new commander of the Strategic Air Command, added: "a tremendous

disservice . . . is rendered the American people when people say there is a nuclear stalemate. . . . It is a very fluid situation. We have the deterrent posture today. We can lose it tomorrow."[131]

Limited Wars Are a Problem

In the autumn of 1953, the US State Department's Policy Planning Staff reportedly believed that the Army could have strengthened a case against the dominant trend toward nuclear weapons by giving up the idea of tailoring its forces for a large conventional war and instead basing its argumentation on the more solid ground of preparing to meet small war.[132] In his address of 12 January 1954, in which he broached the concept of massive retaliation, Secretary Dulles did not neglect the matter of local defense: "Local defenses," he said, "must be reinforced by the further deterrent of massive retaliatory power." In April 1954 he expanded the theme, writing: "To deter aggression, it is important to have flexibility and the facilities which make various responses available. In many cases, any open assault by Communist forces could only result in starting a general war. But the free world must have the means for responding effectively on a selective basis when it chooses."[133] Despite these statements, Dulles apparently did not believe that the State Department could advocate properly or competently particular military means or methods for implementing the national strategy—this was the task of professional military planners.

In the initial planning for force allocations under the New Look, General Ridgway rejected the image of limited war. "The day when wars had limited effects," he observed in the autumn of 1953, "is past. . . War, if it comes again, will be total in character."[134] General Ridgway considered "around 26 divisions" or approximately 1.3 million men to be a realistic strength for the Army, but New Look planning visualized a reduction of the Army from its post-Korean War strength of 1,540,000 persons and 19 divisions to a strength of approximately 1,000,000 persons and such number of divisions as could be effectively manned with this strength by the end of fiscal year 1957. Ridgway viewed the reduction of the Army by one-third in some 30 months as "too fast and too drastic."[135] Alarmed by events in Asia and Europe in April 1954, Secretary Wilson indicated that a "soul-searching review" of specific policies, including the impending reduction of the Army from 19 to 17 divisions, was being undertaken. Actually the fiscal year 1955 budget originally estimated that the Army would be cut to 1,102,000 persons by 30 June 1955, but the conflict in Indochina caused the retention of a personnel cushion. The Formosa Straits crisis of early 1955 delayed the planned reduction a little longer. Late in 1954 the Eisenhower administration sought to attain a balanced national budget in fiscal year 1956 by accomplishing military force reductions previously planned for fiscal year 1957. Secretary Wilson took the matter to President Eisenhower, with the Joint Chiefs present to argue their cases. According to Wilson, Ridgway wanted the Army to have "a much bigger force " The president authorized 35,000 more persons for the services, the Joint Chiefs

divided the increment, giving the Army 25,000, the Navy 7,000, and the Marines 3,000.[136]

Unlike the Army, the Navy had no difficulty implementing the New Look. As early as November 1953, Rear Adm Arleigh A. Burke, who would become the chief of naval operations in June 1955, pointed out that the armed services needed a new strategic concept to meet the divergent requirements of "preparation for vast retaliatory and counteroffensive blows of global war and of preparation for the more likely lesser military actions short of global war." Burke visualized naval and air forces capable of coping with special situations and the maintenance of "strategic reserve ground forces—not large—but in a high degree of combat readiness—so trained—constituted and equipped—that they can move immediately into any area to support Allied forces in those military actions which cannot be handled solely by local forces supported by our Naval and Air Force."[137] The Navy was alerted early in 1954 during the Indochina crisis; its aircraft carriers provided a backdrop of strength early in 1955 when the Chinese Communists brought pressure to bear against Quemoy and Matsu.[138] In their force requirements for fiscal year 1956, the Joint Chiefs of Staff raised the Navy's requirement for attack aircraft carriers from 14 to 15 without, as General Twining noted, specifying what kind of carriers they would be or how large. Early in 1956 Admirals Radford and Burke both pointed out that aircraft carriers could project air power into areas of the world where the United States had no airfields.[139] While Navy officers seldom failed to stress the versatility of sea power in any type of war, the Navy's concern was manifestly most intense on the problem of a general war. In June 1956 Admiral Burke told the Symington committee that he did not believe that the Soviet leaders would initiate general war, but he hastened to add: "At the same time, you can never count for sure on that. There may be an insane man who can persuade his people to follow him."[140] Admiral Burke also found it difficult to determine just what amount of offensive air capability might be necessary to deter Russia from general war.[141]

In assessing Air Force requirements under the New Look, General Twining disagreed with those persons "who profess to believe that the defense of the free world can be deployed against atomic attack and at the same time concentrated to meet a World War II type of offensive. . . . In the past it has been difficult enough to impose a new strategy on top of an old strategy. To impose now the old strategy on top of the new is out of the question."[142] At the May 1954 Air Force Commanders' Conference, however, General Weyland expressed the belief that the Communists would never start a brushfire war in an area where the United States was prepared to conduct effective combat operations, particularly tactical air operations. Pointing out that the US Air Forces in Europe and the Far East Air Forces were both committed to existing areas of responsibility, Weyland suggested that the Tactical Air Command be authorized to organize and maintain a highly mobile tactical air force in the United States that could be deployed to meet contingencies anywhere in the world.[143] Both Twining and White agreed that Weyland's proposal had considerable merit. However, when Weyland formally

requested authority on 25 June to activate an additional tactical air force headquarters, the Air Staff proved reluctant to approve it. To attain 137 combat wings by 30 June 1957, the Air Force was committed to reduce personnel assigned to overhead purposes.[144]

While General Weyland had originated the idea of a mobile tactical air force as a deterrent to local wars, Tactical Air Command officers believed that an Air War College Graduate Study Group thesis by Col Richard P. Klocko entitled "Air Power in Limited Military Actions" may well have influenced the Air Staff's ultimate acceptance of the new concept. Completed in August 1954, Klocko's thesis was said to have served "as a sort of a tactical air 'bible' at Headquarters USAF."[145] In his study Klocko assumed that in a period of atomic equilibrium the deterrent effect of atomic power would apply to both opposing coalitions and that the world would be faced with a series of limited military actions. He defined these actions as "any employment of military forces which fall short of launching the nuclear atomic air retaliation against the USSR." He believed that the New Look had failed in Indochina as a result of political default rather than flaws in military capabilities or concepts. In Indochina the United States had announced in advance that the conflict might be extended, and this "ultimatum" had caused world opinion to fear worldwide nuclear war. A better course of action would have been to have presented the Reds with a *fait accompli*. "The United States," he urged on the basis of this thinking, "should consistently and ardently advocate that the massive retaliatory power policy in general terms and the intent to use it if necessary should be internationally understood as a deterrent to limited aggressions and to general use. In any specific situation, however, the time, the place, and the means of applying this power should never be suggested or announced until the actual operation reveals them."[146]

Given the maintenance of massive retaliatory power and the condition of atomic equilibrium, Klocko urged that the United States seek to develop political and military stability in free world countries around the Communist perimeter. Since the Soviet Union was the only air adversary who could seriously threaten free world aerial operations and since any extended involvement with Soviet air power would inevitably expand the local conflict, Klocko thought that friendly air superiority could be assumed in limited actions, which would mean that both land-based tactical air units and aircraft carriers could be freely employed in limited air actions. Sea-based air power promised to circumvent awkward international questions regarding foreign base rights. The effectiveness of air power in limited military actions would vary directly with the degree of organization and centralization of the hostile forces. Klocko pointed out that limited air operations could take many forms such as transportation, destruction, neutralization, blockade, or interdiction. All forms of military forces ultimately might be useful in limited operations; the essential factor was air power's uniquely rapid ability to deploy to an area of crisis However, a lack of prior funding had hindered postwar deployments of air power to crisis areas; to minimize such a cause of delay, Klocko proposed that the Air Force should establish and fund a "Ready Air Fleet" within

the Tactical Air Command. Based in the United States this ready air fleet would be an integrated self-supporting organization that could immediately deploy to a crisis area and operate until such time as normal operational forces could be moved into the area to augment or replace it.[147]

After extended correspondence, the Air Force permitted the Tactical Air Command to activate the Nineteenth Air Force as an operational headquarters at Foster AFB, Texas, on 8 July 1955.[148] In announcing the establishment of what would be called the Composite Air Strike Force, General White pointed out that the Tactical Air Command's nuclear strike and aerial-refueling capabilities had brought a "new look" to tactical air forces. "To meet the threat of lesser wars," he said, "our tactical air forces can provide an increasingly effective deterrent."[149] During 1955 and 1956 General Weyland frequently stated his belief that the free world faced an era of periphery or brushfire wars that would have to be deterred or won with tactical air forces.[150] In May 1956 he told the Symington committee that the United States "must have adequate tactical air forces in being that are capable of serving as a deterrent to the brushfire type of war just as SAC is the main deterrent to a global war."[151] Presenting his "Concept for Employment of Tactical Air Worldwide" to the Air Staff at about this same time, Weyland argued:

> It is becoming increasingly clear that any armed conflict which may occur in the foreseeable future will most probably be of the limited or local variety. The United States must develop an effective deterrent to such local wars and must be able to support the indigenous forces of friendly countries if such a war does occur. SAC and ADC are dedicated as major war deterrents and their postures and concepts are limited to major war situations SAC forces are not suited for and cannot cope with the essentially tactical air aspects of local wars Nor should they become seriously involved in a local war, since they would jeopardize their effect as a deterrent to major war Consequently, tactical air power must be the primary deterrent to local or limited war Additionally, it must be the full-fledged but more economical element of our offensive air power as a general war deterrent [152]

In September 1956 Brig Gen Henry P. Viccellio, commander of the Nineteenth Air Force, deployed Mobile Baker—a token composite air strike force consisting of one squadron of F-100C day-fighters, one squadron of F-84F fighter-bombers, a flight of B-66 tactical bombers, and a flight of RF-84F reconnaissance aircraft—from bases in the United States to Europe. Employing in-flight refueling, the F-100s made the Atlantic crossing in 4 hours and 55 minutes. After arriving in Europe, the atomic-capable strike aircraft participated in an operational exercise. "As SAC is a deterrent to major war," wrote General Viccellio, "so will the Composite Air Strike Force be a deterrent to limited war."[153]

Other Air Force leaders held somewhat different views on the likelihood of limited war. In response to a journalist's question posed to him in December 1955 as to whether air power could prevent small wars, General LeMay observed: "We believe that, by working hard and maintaining our efficiency at the highest possible standards, that is the best thing we can do to assure [that] wars large or small will not happen. . . . I think that most wars are started when one nation thinks it could

beat the other one. If they didn't think they were going to win, they certainly would never start it."[154] LeMay developed his thought more fully in an article published in September 1956 in which he defined the decision phase of a future war as the preparation of combat ready air atomic forces in a time of nominal peace. "Only a foolhardy nation," he continued,

> would ever base its power strategy upon the doubtful assumption that what it started as localized conflict would remain localized The only condition under which this assumption could apply would be for one nation to be absolutely and positively guaranteed that the other lacked either resolution or intelligence. For if a nation is determined to survive and preserve its way of life, it must avoid risk of extinction, regardless of how that extinction might be brought about and if a nation is intelligent, it must realize that objectives can be won just as surely in piecemeal advances as by one all-out blow. Therefore, combine both intelligence and resolution in a nation, and you have a nation against whom you dare not instigate limited actions unless you are ready to accept the possible consequences of all-out war. . . . This leads us back to where we started. An enemy cannot start a shooting war unless he has already won the decision phase, and he dare not, in the face of strength, resolution, and intelligence on our part, start a so-called "limited action" unless he is in the same position [155]

As late as mid-1956 General Twining appeared to be basing his thoughts on limited war on the assumption that the United States would continue to possess strategic forces superior to those of the Soviets. "It is conceivable," he said in June 1956, "that if the aggressor rationalizes that our retaliatory force would make it impossible or too costly for him to win a general war he might then choose the alternate of peripheral or small wars." Under these circumstances tactical air forces coupled with Army and Navy forces would provide "a powerful deterrent against peripheral war."[156] Intelligence information arriving in the United States during 1956, however, indicated that the Soviet Union was giving little attention to the preparation of forces for limited wars but was instead bending every effort to develop long-range air and rocket forces, which in a few years might well exceed the strength of the strategic forces of the United States. At the height of the Suez Canal crisis, in early November 1956, the Soviets threatened to use nuclear-armed intermediate range ballistic missiles against France and Britain. Earlier Air Force thinking about limited war had assumed that Soviet forces would not be directly employed in peripheral undertakings. By November 1956, however, Air Force planners could visualize a local war in which "the opposing side will have the full backing of the USSR, with, actually or potentially, very large forces equipped with the most modern weapons, and with the capability of using atomic weapons."[157] "The threat of limited war has increased," Twining stated in February 1957, "because the Soviets have acquired a greater capability to wage general war, and can, therefore, undertake limited aggression with less fear of total retaliation."[158]

In several speeches delivered during October 1956, Air Force Secretary Donald Quarles professed to find it hard to understand how the United States could successfully deter general war without also being able to deter or win little wars. "It seems logical," he said, "if we have the strength required for global war we could

handle any threat of lesser magnitude. . . . From now on, potential aggressors must reckon with the air-atomic power which can be brought to bear immediately in whatever strength, and against whatever targets, may be necessary to make such an attack completely unprofitable to the aggressor."[159] In February 1957 General Twining pointed out that all of the armed forces of the United States could be called upon to provide forces to resist local aggression and to end it quickly before it could spread. "If we wanted to," he added, "we could even use part of the strategic force for jobs like that. It would of course depend upon the area, and the job to be done."[160] Accepting the position that the Air Force as a whole rather than any special part of it would deter or win small wars, Maj Gen John D. Cary, Air Force director of plans, stated in March 1957 that "the Air Force believes that local war is best prevented by the same means as general war."[161] The Air Force, thus, recognized that tactical air forces deployed in overseas theaters might well be the first military force that could be brought to bear on an aggressor and that tactical air forces were cheaper than strategic air forces on a wing-for-wing basis. In any allocation of scarce resources between strategic and tactical air forces, however, the Air Force had to admit that tactical air forces had three disadvantages: tactical air units would be vulnerable because of their proximity to the enemy; the limited range of tactical aircraft would curtail the number of targets they could be programmed against and would hamper their global mobility; and tactical air forces (except for the tactical Matador missile) would lack appreciable all-weather strike capabilities.[162]

Emergence of Flexible Response as a Strategy

When Army leaders began to convert their frame of reference from general to limited war during 1954, they found some comfort in the writings of "unofficial critics of national defense." Gen Maxwell D. Taylor stated that George F. Kennan's book *The Realities of American Foreign Policy* and Bernard Brodie's article "Unlimited Weapons and Limited War" constituted the "first public questioning of the validity of the New Look policy of Massive Retaliation."[163] A new version of Army Field Manual 100-5 published in September 1954 gave predominant attention to the Army's role in a general war, but also pointed to the probability that political considerations would prevent the use of maximum air power in limited aggressions. "The continuing possibility of such limited wars," the manual stated, "requires the maintenance in being of Army forces capable of immediate commitment and fully organized, trained, and equipped for combat, and at the same time possessing a capability of strategic mobility."[164]

The Army's claim for a greater strength appeared to be supported in January 1955 when the National Security Council completed its first comprehensive review of the New Look strategy. The NSC policy paper was described as giving recognition "for the first time to the possibility of a condition of mutual deterrence and the importance in such a period for the United States to have versatile, ready forces to cope with limited aggression."[165] President Eisenhower, however, wished

to rely on free world defense forces. "To provide for meeting lesser hostile action—such as local aggression not broadened by the intervention of a major aggressor's forces—growing reliance," Eisenhower wrote on 5 January 1955, "can be placed upon the forces now being built and strengthened in many areas of the free world. But because this reliance cannot be complete, and because our own vital interests, collective security and pledged faith might well be involved, there remain certain contingencies for which the United States should be ready with mobile forces to help indigenous troops deter local aggression, direct or indirect."[166]

Under the Department of Defense budget program for fiscal year 1956 submitted to Congress in January 1955, the Army would be expected to reduce its active duty strength to approximately 1,027,000 persons and could thus support 15 combat and 3 training divisions and 136 antiaircraft battalions.[167] However, the Department of Defense and the Joint Chiefs of Staff had encouraged each service to maintain the maximum combat force possible within approved manpower ceilings, and General Ridgway had preferred to increase Army combat units even though there had been a loss in personnel. On 30 June 1955 the Army would thus possess 20 divisions, 122 antiaircraft battalions, and 6 regimental combat teams. One of the divisions was slated for early inactivation; Ridgway reported that five divisions were training organizations and that two divisions located in Alaska and Panama were "static divisions." According to Ridgway, the Army thus had something in the neighborhood of 13 combat-ready divisions, and of this total only four or five divisions that were located in the United States and Hawaii were combat ready and could be counted as strategic reserve divisions. Ridgway was critical of the Army's "paper" strength and he pointed out that the four or five strategic reserve divisions had very little mobility in the form of airlift or sealift.[168] In justifying the Army program early in 1955, Ridgway continued to emphasize the role of Army forces in general war. "I think," he told congressmen, "the part of prudence and wisdom dictates that the United States be prepared to win a long war if we get involved in it. That means substantial use of the decisive element in any war of the past, which has been the man on the ground, who has a capability for progressively applying force, who has the capability that no other armed service has, that of seizing, occupying, and retaining ground taken."[169] Although Ridgway thus continued to visualize the Army's primary role as a force in general war, his valedictory criticism of the national defense strategy submitted to Secretary Wilson in a formal memorandum on 27 June 1955 emphasized the Army's role in limited war. Sometime between 1958 and 1962, Ridgway urged, the Soviets would possess a nuclear capability sufficient in size to inflict critical damage on the United States, and they would also have effected greatly improved air defense measures against American nuclear bombers. In this period US nuclear air superiority would have lost its significance. Soviet strategy would be directed toward employments that would preclude the use of nuclear weapons on a worldwide basis Free world military forces, except in Western Europe, were isolated detachments around the Soviet periphery. While US military policy statements referred to a mobile-ready

force, Ridgway bluntly charged that "no adequate mobile-ready force now is in being and the actual creation of such a force must compete with increasingly emphasized nuclear-air requirements." Ridgway concluded, "*It is my view that the commitments which the United States has pledged create a positive requirement for an immediately available joint military force of hard hitting character in which the versatility of the whole is emphasized and the preponderance of any one part is de-emphasized.*"[170] (Emphasis in original.)

Even before he had been selected to succeed Ridgway as Army chief of staff, Gen Maxwell D. Taylor felt that the Army had been lagging behind in the national defense effort. Struck by what he believed to be a "departure from the dogma of Massive Retaliation" in the National Security Council guidance paper of January 1955, Taylor, shortly after becoming Army chief of staff on 1 July 1955, presented to his staff a new program that he referred to as a "new strategy of Flexible Response." Taylor reasoned that in the approaching era of atomic plenty the Communists will probably be inclined to expand their tactics of subversion and limited aggression." He thought that the military requirements of the United States would be to maintain military technological superiority; a deterrent atomic delivery system capable of retaliation; an effective continental defense system; adequate Army, Navy, and Air Force units capable of intervening in local aggressions; and other ready Army, Navy, and Air Force elements that could reinforce forces deployed abroad in general war or that would intervene in local aggressions. Taylor also called for the development of indigenous defense forces, reserve forces in the United States, stockpiles of material to meet war requirements until wartime production became adequate, and a war production, mobilization, and training base to support an atomic general war. "The acceptance of such priorities of effort," he subsequently observed, "would have resulted in added attention to so-called limited-war forces and would have placed them in virtually equal priority with the atomic deterrent forces "[171]

The suggested strategy of flexible response was not acceptable to Secretary Wilson, who considered that the free world had to rely on its collective strength "not only to beat back any local aggression but to deter the aggressor from broadening the conflict into global war." Wilson also believed that the "problem of deterring small wars cannot be considered separately from the problem of deterring war generally" and that the "capability to deter large wars also serves to deter small wars."[172] Since there had been no apparent change in the international situation and since the original New Look program could achieve stabilized combat forces by fiscal year 1957, Wilson announced in October 1955 that there would be no major change in the level of military spending or the size of the military force in the fiscal year 1957 budget. For fiscal year 1957 the Army was thus budgeted for a force of 19 divisions, 10 regimental combat teams, and 144 antiaircraft battalions.[173]

Appearing before the House Appropriations Subcommittee in February 1956, General Taylor accepted the budgeted force level for the Army for fiscal year 1957 but suggested that a "unrestricted nuclear war will be a total disaster for all

participants." He accordingly urged that the United States must develop "tridimensional" strength—on the ground, in the air, and on the sea. "I feel," he said, "that we have made a great deal of progress in developing an atomic air deterrent. I think now that our program needs to be bent a little—perhaps more than a little—in order to focus attention on the danger of the small war which seems to me to be coming to the forefront all the time as the greatest danger we are facing." Taylor discounted the assumption that a general war would begin with all-out nuclear attacks. "It seems more likely," he continued, "that a combat situation might be created anyplace around the globe, smoulder for a while with local combat only occurring, and then widening by other factors to the point that the decision is taken—to go for keeps." "Our Army mission," he said, "is to destroy an enemy on the ground anyplace, anywhere." "There is no reason to say," he urged, "that we are hopelessly out-numbered and that our defense on the ground must be obtained indirectly from atomic superiority in the air. I am convinced that our Army, equipped with the weapons which we are now developing and supported by well-trained allies, can maintain deterrent strength on the ground sufficient to hold the Communist armies in check." In 44 countries around the world the United States was assisting its allies in developing more than 200 divisions. In addition to this force, Taylor estimated that an optimum US Army strength based on purely military considerations would be "around 1.5 million men with an active combat force of about 28 divisions."[174]

The Army's new concept of limited war was presented to the public at an inopportune time. Believing that no useful purpose would be attained by questioning national strategy, the State Department looked with disfavor on a draft article that General Taylor proposed to publish in *Foreign Affairs* spotlighting nuclear stalemate and the likelihood of limited Soviet aggressions. The Soviets were clearly building atomic forces rather than ground strength for limited aggressions; they announced a major reduction of 640,000 men in their military force in August 1955 and another cut of 1,200,000 men in May 1956.[175] Charged by Secretary Wilson to examine future military requirements for the three years following fiscal year 1957, the Joint Chiefs of Staff met in seclusion at Ramey AFB, Puerto Rico, from 3–9 March 1956. General Taylor introduced his paper calling for the development of flexible response; he later recorded that his colleagues "read this Army study politely and then quietly put it aside." Again, according to Taylor, the Joint Chiefs finally recommended that military programs should continue at approximately current levels for the three years after mid-1957. To maintain such force levels and still afford the costs of new equipment, the national defense budget would have to be raised from some $34 billion to as much as $38 to $40 billion in the years up to 1960. After reviewing the Joint Chiefs' recommendations, Secretary Wilson estimated that costs of national defense would probably exceed the $40 billion mark.[176] In a new assessment of the role of NATO published in May 1956, Air Marshal Slessor suggested that the function of ground troops in Europe would be to serve as a token of national determination,

like a trip-wire or a plate-glass window which if disturbed would unleash thermonuclear retaliation.[177]

Even though Senator Symington's committee had been established to examine the charge that the development of American air power was lagging, Army spokesmen used this forum to develop the case for flexible response. Appearing before the Symington committee in May 1956, a team of officers headed by Lt Gen James M. Gavin, the Army's chief of research and development, discussed the Army's requirements for missiles and aircraft. "The Department of the Army's mission," Gavin explained, "is, by its evident readiness at all times, to be ready to win in a general war. At the same time it must, by virtue of its high state of readiness in terms of both modernization and mobility, deter small wars or deter any aggressor who would attempt to achieve a limited objective through limited military action. If a small war does occur, we must win such a war for failure to win would in itself bring on a general war." Gavin believed that the Russians, in the event that they decided to venture the risk of a general war to achieve an objective, "would start on the basis of a limited objective to put themselves in a better position, and perhaps ultimately cause enough deterioration of our position to where they could win without risking any attack upon the USSR." He repeated the Army position "that we are far more likely to be involved in a peripheral war than in a general war."[178]

The new concept that limited war was a major threat, together with the impending development of Army antiaircraft missiles, led General Gavin to advance the idea that "in the missile era the control of the land will be decisive." By controlling the land, military forces would possess the launching platforms necessary to control the air. Gavin argued that air superiority was "one of the most misunderstood terms" in the military vocabulary. "When first it came into use," he said,

> it was presumed that it was a condition of affairs in a battle area that would enable one side to gain complete moral and physical superiority over the other We learned in World War II that it was a fleeting stage of affairs indeed and while one side could enjoy complete air superiority such as we presume the allies did in the winter of 1944–1945, from time to time the enemy could strike suddenly and achieve in a local area a surprising degree of air superiority with a great posture of resources on his side. . With the performance of aircraft as we now see them coming along, that is where they fly at higher speeds and much greater turning radius, air superiority to us is going to be something quite different we believe than anything we have seen in the past.. It does not seem possible to control the land areas by merely flying over them with the type aircraft and type defenses that will be related to each other in the future.... So we do not think that the term "air superiority" as it was applied in 1945 could well be applied to the future.

Gavin also stated that surface-to-air fire in World War II and in the Korean conflict had been a principal destroyer of aircraft, and he noted that the Army's new family of "very effective" surface-to-air Nike missiles promised to increase aircraft kills at the same time that the increasing speeds of aircraft reduced the effectiveness of

air-to-air combat. "We see emerging a pattern," Gavin said, "that suggests clearly that control of land areas will be decisive."[179]

Other Army officers—including Maj Gen Earle G. Wheeler, the Army's director of plans, and Maj Gen Hamilton H. Howze, director of Army aviation—discussed concepts of future land warfare, which would be characterized by wide dispersal of units and installations, ground and air mobility, firepower of increased range and lethality, and efficient and reliable communications. The Army intended to develop its own organic capability for air movements of Army combat units within the combat zone; but its interest also extended to four elements of air power that were beyond its organic resources: control of the air in the battle area, long-range deployment, intratheater airlift, and aircraft firepower. To attain "a reasonable degree of freedom from attack by enemy aircraft," the Army intended to depend upon air and naval forces, together with its own organic antiaircraft weapons. To place fire on targets beyond the range of organic weapons, the Army "presently has a direct interest in firepower delivered from aircraft." "As we integrate rockets and missiles into the Army fire support system," the Army briefer added, "we are increasingly able to provide much of this needed fire support with our organic weapons." Although the Army of the future would have decreased requirements for air superiority and air support, it would have a greatly increased need for tactical and strategic air transport aviation. Admitting that what he was suggesting exceeded the Army's stated requirements to the Air Force, Gavin specified that the Army needed a capability simultaneously to airlift one division in each combat theater, one division in the United States, and one division from the United States to a combat theater. General Wheeler testified that Air Force tactical airlift capability was sufficient to lift about one division and that studies had shown that the combined military and civil reserve air fleets would not be able to meet the requirements of all services during the first 30 days of a general war.[180] Summing up the position that the Army would be the decisive military force of the future, Gavin stated: "First we must aggressively continue our development of our surface to air missile family and in continuation of this development program acquire an antimissile capability. Second, the role of the man who fights on land with modern equipment and supported by missiles will be of decisive importance in future combat. Our nation . . . must have both strategic and tactical mobility to enable it to fly its power when and where needed in support of our national policy and to the degree needed, and finally, we believe that in the missile era the control of the land will be decisive."[181]

When General Taylor appeared before the Symington committee in June 1956, he viewed reports that the Soviets were reducing their ground forces and increasing their strategic striking arms with cool skepticism. At this time Taylor repeated his plea that a "new atmosphere" was being created by "a condition of mutual deterrence, resulting in the decreased likelihood of deliberate general war, but the increased likelihood of the small war, the erosion of the free world." Stressing the Army's role as "an indispensable member of the service team," he recalled that "the primary function of the Army is the destruction of the enemy army, the primary

function of the Air Force is to destroy enemy air power, and for the Navy to destroy enemy naval power."[182]

A "New" New Look Strategy

Although the Joint Chiefs of Staff recommended in March 1956 that the military force levels for the three years following fiscal year 1957 should continue approximately at the existing New Look levels, they estimated that the costs of modernizing these forces would raise the sum of the national defense budget to higher levels than the approximately $34 billion a year committed to defense during the first three years of the New Look. When the initial service requests for fiscal year 1958 were totaled, the estimated requirements to meet authorized defense programs came to $48.6 billion—an amount which President Eisenhower described as "unrealistic."[183] Recognizing that it would be impossible to secure such an expanded peacetime military budget, Admiral Radford and the Joint Chiefs of Staff began to plan a new strategy that would be popularly described as the "new" New Look. Believing that ground forces provided a visible rather than an actual deterrent to Soviet aggression, Admiral Radford favored a reduction in military manpower requirements. When he appeared before the Symington committee in June 1956, Radford speculated that a show of force, coupled with a threat of nuclear retaliation, would have deterred the Communists' aggression in Korea. "I am quite certain," he said, "if we had had one battalion or even a company, on the 38th parallel in Korea flying the American flag . . . I don't think the Communists would have attacked because they would have known that if they overran this one United States combat unit, certainly the United States would come in." Radford hastily added: "This visible deterrent may be obtained with very small forces."[184] In July 1956, Radford proposed to the Joint Chiefs of Staff that military manpower be cut, chiefly by reducing Army deployments in Europe and Asia to small atomic task forces and by greatly reducing Army strength in the United States. General Taylor strongly opposed these proposals at a Joint Chiefs of Staff meeting on 9 July. Within a week, Radford's position was published in substance in the *New York Times*. Adverse international reactions led to the withdrawal of Radford's plan; Secretary Wilson soon declared that no responsible person had ever advocated the reduction and withdrawal of forces contained in the so-called Radford plan.[185]

When General Twining appeared before the Symington committee in June 1956, he strongly urged that the United States commit itself to a new strategy that would place prime reliance on nuclear weapons for limited as well as general warfare. "We cannot afford," he said, "to keep in our Armed Force conventional forces for the old type of warfare plus those for atomic warfare. We have got to make up our minds that we have to go one way or the other." By accepting a new strategy built around the use of atomic weapons, the United States would be able to reduce its forces considerably. Such a new strategy, Twining stated, would represent "the only way we can provide the forces for the country within a

reasonable standard of financing."[186] Twining's remarks brought into the public domain a fact that had troubled Air Force leaders for several years. While the original New Look guidance had emphasized nuclear weapons, it had been broad enough to require the maintenance of conventional air capabilities. The thesis that the armed forces must prepare for nuclear general war and nonnuclear local wars presented a serious dilemma. "By trying to be strong in both conventional and atomic capabilities . . .," Col Robert C. Richardson argued, "we may become weak in both. At best, money and time will be wasted on obsolete weapon systems because of specious reasoning that atomic weapons will never be used."[187] Making strong allusions to "warped thinking," Brig Gen Dale Smith had written: "Air Forces provide the ideal weapons for limited war, but to be most effective, the political restrictions applied to a limited war must favor the air weapon rather than favor enemy manpower."[188] Writing in May 1956, General Weyland pointed out that tactical nuclear weapon capabilities were essential to the mobile tactical strike forces. "With nuclear weapons," Weyland thought, "these forces can be compact and yet be so effective as to provide the decisive balance of power." He emphasized that tactical nuclear weapons were not "weapons of mass destruction" and that they could be selectively employed against primary military targets. "We should never again, in my opinion," he concluded, "restrict our selection of weapons or target area as we did in Korea. The best weapon to do the job with the least loss of life should be selected for each target under consideration."[189]

In the summer of 1956 the Joint Chiefs of Staff rejected Radford's proposals for marked reductions in Army manpower.[190] Still the trend in military policy was toward reliance on nuclear weapon systems as the primary line of defense. On 31 August 1956 the Air Force deputy chief of staff for development directed the Air Research and Development Command to limit the future development of high explosive weapons to those required for employment from already operational aircraft.[191] "There is very little money in the budget we are proposing to you now," Secretary Wilson told congressmen in January 1957, "for the procurement of so-called conventional weapons . . . we are depending on atomic weapons for the defense of the Nation." In further explanation of the new strategy, Wilson said: "Our basic defense policy is based on the use of such atomic weapons as would be militarily feasible and usable in a smaller war, if such a war is forced upon us." Radford reiterated the same thoughts: "Our whole military program," he stated in January, "is based on the use of atomic weapons in global war and in the use of atomic weapons in accordance with military necessity in situations short of global war." "We have said publicly that we are designing our forces to use atomic weapons," Radford repeated in March 1957. "That comes pretty close to saying we are going to use whatever weapons are necessary to defend our vital interests."[192]

In the hearings on the fiscal year 1958 defense budget, General Taylor and other Army spokesmen again presented the Army's strategy of flexible response. However, Congress appeared to be more strongly concerned with a need to hold spending in check to avoid raising statutory national debt limits and displayed more interest in the Symington committee's finding that the US strategic striking force

was "declining relatively as against the steadily growing striking capacity of the Soviets" than in its other recommendation that the United States should be prepared for both limited and unlimited war.[193] Secretary Wilson already had stated his opinion that the Air Force structure appeared to provide "adequate airborne lift in the light of currently approved strategic concepts."[194] In February 1957, moreover, General Taylor informed Symington that the combination of active and reserve tactical airlift was "considered to be adequate for the Army's needs at this time."[195] In an added rebuff to the Army's requirements for strategic mobility, Admiral Radford sponsored a special airlift briefing for the House Committee on Appropriations that demonstrated that 1,800 C-124s would be required to move an Army division with its impedimenta and 30-days' supplies in a 24-hour period. Even if aircraft were available, such a movement could not be accomplished because of a lack of enough airfields. "I think," Radford summarized, "there are people in the Army who honestly feel that it should be possible to move Army units by air . . . to any place in the world. I say that people who then express the feeling that we do not have [sufficient airlift] capability do not understand the magnitude of the problem of moving by air."[196]

According to Secretary Wilson, President Eisenhower had reduced the service requests for fiscal year 1958 appropriations because he sensed that budget-cutting was in the wind. The military budget got severe handling in Congress. As Wilson remarked, "Obviously the people in the country are in no mood to spend more dollars."[197] Instead of the $38.4 billion budget requested by Eisenhower, Congress was going to vote only $35.4 billion in new appropriations for fiscal year 1958.[198] Even though it was obvious that Congress would not vote the amount of money requested for fiscal 1958, President Eisenhower ruled in the summer of 1957 that the defense budget for fiscal year 1959 would again be held to a $38-billion ceiling.[199] Faced with the decision that Eisenhower wished a stability of expenditures and that the National Security Council endorsed increased dependence upon atomic weapons, Secretary Wilson, apparently with the assistance of Deputy Secretary Donald Quarles and Admiral Radford, attempted to cut the Gordian knot by proposing reductions of military manpower to compensate for the rising cost of military equipment. Presented at a meeting of the National Security Council on 25 July 1957, the Wilson-Radford plan called for holding defense expenditures at approximately $38 billion in the period 1959–61 by reducing overall military manpower. All of the services would reduce their forces, but the Army would expect to drop from 15 to 11 divisions in the period. Forewarned of the Wilson-Radford plan, Army Secretary Wilber Brucker and General Taylor spoke out strongly in the meeting against what they described as a preparation for general atomic war and the neglect of lesser wars in which big weapons could not be used. Wilson was said to have remarked in reply that the national policy was to "maximize air power and minimize the foot soldier," and, as Taylor recalled, there "seemed to be a tacit agreement that this was a correct if colloquial statement of the military strategy being pursued by the United States."[200] Although the plan was never specifically approved or disapproved, it became the

point of departure for the Department of Defense budget for fiscal year 1959. The Army was instructed to plan for an end strength of 900,000 men and 15 divisions in fiscal year 1958 and 850,000 men and 14 divisions in fiscal year 1959.[201]

Nuclear Weapons and Limited Wars

As it happened the strategy of what was called the new New Look was put together in the United States during 1956–57, a period of growing Soviet strategic challenge and relatively fixed United States defense budgets. As has been seen, the Air Force already was perfecting its position that the total military capability that deterred general war also would serve to deter or to win limited wars. However, Lt Gen Thomas S. Power, commander of the Air Research and Development Command, was troubled about the Air Force's capabilities to participate in cold war and limited war crises. On 10 December, Power wrote Twining suggesting that an Air Force cold war symposium should be held in order to study new requirements for doctrine, equipment, techniques, and systems necessary for limited military operations. Power was especially concerned about the effectiveness of Air Force weapons and tactics in a small war in which the use of nuclear weapons might be forbidden.[202]

On a call from General Twining, Air Force commanders assembled at the Pentagon on 9 April 1957 for a Cold War Conference. At this session the commanders resolved that the problem of local war would require an additional conference later in the summer. General White, nevertheless, considered that the discussions were marked by an agreement that the Air Force should seek to explain to the public that there was a vast difference between megaton thermonuclear weapons and small tactical atomic weapons and that it should seek to make a "continued and increased effort to eliminate the high explosive requirement from the national policy." According to White the conference agreed that the Air Force should measure and retain the high-explosive capability of thermonuclear weapons, but should not increase that capability, and should eliminate those weapons when the national policy permitted.[203] Speaking for the Air Research and Development Command, Lt Gen Samuel E. Anderson thought that it would be inconsistent to continue to plan to use conventional weapons in view of the types and numbers of aircraft that were operational and projected; the speeds, bombing accuracies, and guidance systems that these planes would possess; and the hardening of enemy targets. Anderson recognized that nuclear weapons were frowned on in a time of peace, but he predicted that they would be needed and relied on once a war broke out.[204]

Already on the public record with a statement that "we must continue to maintain a capability for the use of conventional weapons, thus rounding out our ability to deal with any contingency which might arise,"[205] General Weyland dissented from the findings of the Air Force Cold War Conference. Weyland wrote General White that if he were willing to think solely as an Air Force officer he could join in a policy of replacing conventional weapons with nuclear weapons because

it would make the Air Force job so much easier, but as an individual charged with upholding national policy Weyland could not accept a course of action that could eventually undermine national policy. "I can visualize local war situations arising," he wrote,

> where the threat of only atomic retaliation would severely prescribe the US bargaining position at the conference table and turn the mass of human opinion against us, whereas possessing a conventional retaliation, could place world opinion on our side . . . I do not foster a large and expensive program, but rather a modest program designed to meet the limited requirements of a local war and the aircraft we visualize now and in the future. I, therefore, believe our policy must be to continue retention and modernization of a conventional capability until such time as small atomic weapons, pinpoint delivery systems and world education reach the point of reliability and acceptance so as to permit elimination of conventional weapons, yet retain the proper environment in which our national policy can thrive and be effective.

Weyland also took issue with the Strategic Air Command's position that it could fight a local war without detriment to its general war posture. "I don't think any unbiased Air Force officer," he wrote, "visualizes B-52s finding and dropping weapons on a small guerrilla troop concentration in the jungles of Indo-China—or some other area of concern in the local war problem. I not only think it illogical, but feel that it would be a pure malemployment of such an expensive force when we can do the job better and more economically with tactical air forces."[206]

At the same time that the major Air Force commanders were failing to reach complete agreement about a sole reliance on nuclear weapons, Secretary Dulles was emphasizing the importance of free world defense forces in an address before the annual luncheon of the Associated Press on 22 April. Placing emphasis on collective defense, Dulles noted: "It is agreed that the primary task is to deter war. . . . It is also agreed that the principal deterrent to aggressive war is mobile retaliatory power. . . . It is also agreed that it would be imprudent to risk everything on one single aspect of military power. There must be land, sea, and air forces for local action and for a defense which will give mobile striking power the chance to do its work."[207] At a news conference on 16 July, Dulles spoke of a need for making the NATO allies less dependent upon the United States and revealed that the United States was studying ways whereby "through perhaps a NATO stockpile of weapons and various arrangements of that sort, there can be assurances to our allies that, if they are attacked, if war comes, they will not then be in the position of suppliants, as far as we are concerned, for the use of atomic weapons."[208] On the basis of the 22 April address, General Taylor hoped that Dulles might support the Army in the discussions on 25 July before the National Security Council. Taylor reported, however, that Dulles remained silent and that the State Department representatives had an "attitude of curious detachment." "It was," he recalled, "as if they felt that conflicts in the Pentagon were what the Japanese call 'a fire on the other side of the river.'"[209]

A few weeks after becoming Air Force chief of staff, General White assembled the Air Force commanders in Washington on 27 August to discuss and mature an

Air Force position on local wars, which White subsequently approved. This position stated that the Air Force requirements in any local war situation could be met with forces and resources provided for general war purposes; that local war operations could be supported from available stocks and facilities, provided some minimum calculated risks were assumed; that a local war could spread into a general war and that failure to make such an assumption could bring about such an expansion; and that the almost infinite variety of possible local war contingencies required the tailoring of effort in the light of specific situations and resultant national objectives. The position paper noted that the Air Force possessed varied forces with adequate backup able to meet many likely local war situations. These forces included the Tactical Air Command, which was prepared to redeploy rapidly by air to participate in local wars with little advance notice, and the Strategic Air Command, which was prepared to participate in local war situations from general war positions to an extent not appreciably affecting its general war posture. These forces were under the control of the Air Force chief of staff and should so remain when used in a local war situation. The composition of air forces initially involved in a local war would generally be dictated by the situation but would consist of the best forces that could be made available at the earliest time.[210]

In an address to the USAF Scientific Advisory Board on 4 December, General White elaborated on the Air Force position and philosophy on local wars. He noted that the national policy toward local wars was to deter such conflicts, but failing that to cope with them successfully. The military contribution to deterrence hinged on three generally agreed essentials: adequate armed force, manifest determination to use the force, and a potential aggressor's belief that the force and determination existed. "It is the Air Force view," White said, "that just as nuclear delivery capability constitutes a deterrent to general war, so can this total firepower deter local war. The right measure of this total firepower can, in turn, resolve local conflict if we fail to deter the aggression. . . . We *deter* with our total capability, including all lessor facets thereof; we will elect *to use* that portion required and best suited to the resolution of the particular conflict." The policy of any nation, especially in the nuclear age, demanded that if conflict must be waged it would be done in a manner as to involve the least risk of aggravating the conflict into general war. This approach required the rapid and resolute application of force, neither too little nor too much. "Those principles," White thought, "call for a military capability, *within* (and not separate from as in addition to) total US forces, which is instantly ready, flexible, and selective including nuclear firepower." He emphasized that the application of force would vary. The Strategic Air Command certainly would not be unleashed to handle minor disputes, but it could dispatch aircraft to warn, repulse, or destroy aggressor forces in significant local conflicts. "If the conflict is so small as to obviate the need for the balancing power of nuclear weapons," he continued, "then the United States certainly has the capability to handle the conflict." General White urged that it would be impossible to preconceive and tailor a force that would be appropriate to the many types of

limited conflict that could occur: it would be much wiser to select and adapt portions of the joint and allied general war capabilities and use them as political requirements might dictate at the time.[211] Appearing before the Senate Preparedness Investigating Subcommittee on 17 December, General White acknowledged that local war might be said to be the primary job of the Tactical Air Command, but he considered that the Strategic Air Command could "because of its long range and its flexibility, without moving from its general war positions, bring to bear its very great forces in a local war situation."[212]

Even though he had earlier questioned some of the Air Force policies regarding local war, General Weyland supported the new Air Force position in major addresses delivered before the American Ordnance Association in November and the USAF Scientific Advisory Board in December. Weyland reminded his audiences that it would be very difficult to forecast where a local war might occur or who the enemy might be. Although its role was primarily to deter general war, the Strategic Air Command could quickly assist in a local war situation; the theater air forces and the Tactical Air Command were specifically designed and trained for the wide variety of tasks to be expected in local wars. "Generally speaking," Weyland suggested, "a friendly country which is a possible target for local aggressions has a capability for effective ground fighting, but few have an appreciable tactical air capability. If they know they will be supported quickly, they may be depended upon to fight in defense of their own country. US Tactical Air can provide the decisive balance of power in time to be effective."[213] Explaining the concept that the Strategic Air Command could deter local war, General LeMay, who had become Air Force vice chief of staff, said to the Senate Preparedness Investigating Subcommittee: "I do not believe we can afford to maintain separate weapon systems for various types of arguments that we might get into with our neighbors in the world. I think we are going to have to build for the worst cases, and then use them for all others. . . . We have been into some minor skirmishes because we did not make it clear that we would use our full power as necessary."[214] Even more of the meaning of the Air Force position on nuclear weapons and limited wars was revealed by Maj Gen James H. Walsh, director of Air Force intelligence. "The military objectives in a limited action," Walsh said,

> would be, first, to gain air control and then to cripple the enemy military force. This objective really does not depend on nuclear weapons for its basic validity, but we have come to respect the decisiveness and effectiveness inherent in nuclear firepower, principally because of its great economy in sorties . In this fast-moving age we no longer can build non-nuclear forces at the expense of our atomic strike and defense units, and at the same time move boldly into the parameters of space at the tempo required for survival . . It is time that we recognize that we have crossed the nuclear Rubicon, and to consider the political and military advantages accruing therefrom We cannot allow our national courage to collapse by resorting to very cautious and reticent objectives, which would penalize our ability to use nuclear weapons intelligently to deter and, if hostilities occur, to bring limited wars to a quick end. The agonizing memory of the drawn-out Korean conflict is too fresh to be forgotten.[215]

Increased Acceptance of Flexible Response

Although the United States remained committed to a policy of maximum reliance upon air power and nuclear weapons for both general and limited war contingencies, the Army's concept of flexible military response gained acceptance in influential circles. Writing on 23 September 1956, Prof Walt Whitman Rostow desired the United States to outstrip the Soviet Union in the nuclear arms race, but he also urged: "We must develop American capabilities in the general area of limited war We must round out the spectrum of deterrence down to the level of guerrilla operations."[216] Many of the analysts at the Rand Corporation endorsed the strategy of limited war. Civilian scholars began producing a body of literature on the subject. William W. Kaufmann edited a volume of essays entitled *Military Policy and National Security,* published in 1956, that focused attention on limited war. Appearing in 1957, Prof Robert E. Osgood's *Limited War: The Challenge to American Strategy* argued that limited war had become the most likely form of armed conflict and that the United States should develop its military policy on this assumption.[217] Also published in 1957 was Prof Henry A. Kissinger's *Nuclear Weapons and Foreign Policy,* which became extremely influential at national policy levels. Although the volume reflected Kissinger's opinions, it had grown out of panel discussions initiated in 1954 by the Council of Foreign Relations. Under the chairmanship of Gordon Dean, the members of this panel included such active duty military officers as General Gavin and many of the civilians who had earlier participated in Project Vista. Believing that complete defense unification was out of the question, Kissinger called for the reorganization of the armed services into a strategic force and a tactical force, each to be combat ready for the accomplishment of separate missions in general or limited war. He believed that Western Europe could be successfully defended with tactical nuclear weapons; but he argued in great detail that the effective use of these weapons required new formations, force structures, and tactics.[218]

The new body of literature on the subject of limited war reinforced the Army position on strategy and may well have affected the thinking of Navy leaders. Although the Navy strongly supported strategic deterrence during the early years of the New Look, Navy leaders, following the retirement of Admiral Radford as chairman of the Joint Chiefs of Staff on 15 August 1957 and the appearance of the Soviet Sputnik on 4 October 1957, became strong advocates of preparedness for limited war. "Given a shield of mutual deterrence," Secretary of the Navy Thomas S. Gates announced in December, "power to prevent limited aggression and to win limited war becomes decisive." Admiral Burke, upon becoming the new chief of naval operations, argued that the United States by its emphasis on general nuclear war was in imminent danger of losing sight "of the necessity to maintain adequate strength to combat limited war in areas remote from this country—limited wars requiring United States control of the seas." He continued, "There is also a growing tendency to consider a nuclear war as being adequate to cope with limited war.

This is a fallacy. For a war to remain limited, there must be restraint in the selection of targets and in the use of nuclear weapons."[219]

Already having begun to believe that the tactical nuclear defenses of the North Atlantic Treaty Organization needed to be strengthened, Secretary Dulles appeared for a brief moment to be flirting with the concept that Europe might be the scene of a limited nuclear war. In an article prepared for publication in *Foreign Affairs,* which was released on 18 September 1957, Dulles expressed a belief that the development of small and clean nuclear weapons would benefit free world defenses. "In the future," he wrote,

> it may thus be feasible to place less reliance upon deterrence of vast retaliatory power. It may be possible to defend countries by nuclear weapons so mobile, or so placed, as to make military invasion with conventional forces a hazardous attempt. . Thus, in contrast to the 1950 decade, it may be that by the 1960 decade the nations which are around the Sino-Soviet perimeter can possess an effective defense against full-scale conventional attack and thus confront any aggressor with the choice between failing or himself initiating nuclear war against the defending country Thus the tables may be turned, in the sense that, instead of those who are nonaggressive having to rely upon all-out nuclear retaliatory power for their protection, would-be aggressors will be unable to count on a successful conventional aggression but must themselves weigh the consequences of invoking nuclear war.[220]

In Europe where he had become supreme allied commander in November 1956, Gen Lauris Norstad wished to increase the effectiveness of the NATO shield forces by increasing their tactical nuclear capabilities, but he thought it very unlikely that any serious incident along the sensitive frontiers of NATO could remain limited.[221] As far as General White was concerned, local conflict in the NATO area would be "tantamount to general war."[222] At the NATO Heads of Government Conference on 16 December 1957, Secretary Dulles stated that the "major deterrent to Soviet aggression against NATO is the maintenance of a retaliatory power of such capacity as to convince the Soviets that such aggression would result in their own destruction." The United States, nevertheless, desired that the strength of the NATO ground, sea, and air shield forces should be increased. To this end the United States was prepared to make available intermediate range ballistic missiles to the NATO countries and to participate in a NATO atomic stockpile program, whereby nuclear warheads would be deployed under United States custody at agreed upon bases where they would be released to the NATO commanders for employment by nuclear capable forces at the outset of hostilities. NATO units would be equipped and trained to use the nuclear warheads when they were released to them at the appropriate time. The NATO Heads of Government Conference accepted the American proposals on 19 December 1957.[223] To effect the decisions, the NATO standing group in Washington worked out a plan known as MC 70 that required the creation of a minimum ground force of 30 divisions; these units were to be regarded as essentially nuclear forces. Some 22 of the NATO divisions were to be available by 1960–61, about halfway through the five years covered by the plan.[224] Even though this acceptance of the force goals of MC 70

as a planning objective promised to increase the effectiveness with which the shield forces could perform their mission, there would be no relaxation on the requirement for the strategic nuclear deterrent. After its regular meeting in Paris in December 1958, the North Atlantic Council reaffirmed "that NATO defensive strategy continues to be based on the existence of effective shield forces and on the manifest will to use nuclear retaliatory forces to repel aggression."[225]

After reading the Dulles article in *Foreign Affairs,* General Taylor had great hope that the State Department would support an expansion of the Army and agree "that limited-war forces had the active role to play in future military operations, the atomic retaliatory forces a passive role." When he presented the strategy of flexible response to the National Security Council at a January 1958 meeting, however, General Taylor observed that there was animated conversation, but "Secretary Dulles and his advisers did not provide the strong support for a new strategy which I hoped."[226] Taylor evidently had misread Dulles's writings and it was soon evident that Dulles continued to think of defense as a combination of collective local defense and strategic retaliation. In an executive session of the Senate Foreign Relations Committee on 9 January 1958, Dulles made it evident that he was not prepared to endorse a limited-war program that called for large-scale spending and committed the United States to local defense in peripheral areas. Dulles warned that any attempt to finance the extra military effort by cutting economic aid—as some members of Congress had suggested—would be "reckless folly."[227]

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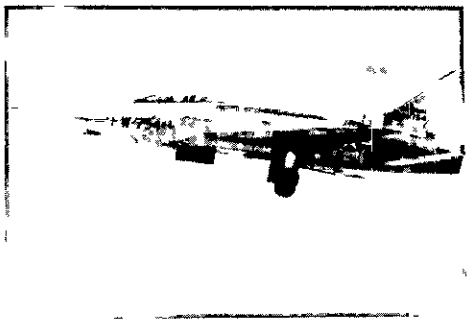

F-100, Super Sabre

Donald A Quarles, secretary of the Department of the Air Force, 1955–57

Lt Gen James Ferguson, director, Requirements, 1956–61

CHAPTER 9

MISSILE TECHNOLOGY AND THE AIR FORCE 1945–60

"On October 4, last year," said Gen Nathan F. Twining, chairman of the Joint Chiefs of Staff, in January 1958, "a shot was fired which was both seen and heard around the world."[1] The shot was the successful Soviet launching of Sputnik I, the first man-made satellite in history. Following up this feat on 3 November 1957, the Soviets successfully launched into orbit Sputnik II, a 1,120-pound vehicle that carried the world's first space passenger, a dog named Laika. The impact of the Soviet triumph in space and missile technology created dismay everywhere outside the Iron Curtain. In Washington, the House Committee on Government Operations warned: "We face the terrifying prospect that nuclear attack upon the United States can be directed from Soviet bases."[2]

Guided Missiles: The Research and Development Phase

Concerned about the delay in the development of new weapons, Congressman Daniel J. Flood of Pennsylvania criticized "the whole mentality in the Pentagon and the Armed Forces of the United States, especially with the military, and this goes for all of them – the Army, the Navy, and the Air Force, and everybody else." Flood warned, "And until that mentality is changed by the rule of reason, until men with ideas, until men with imagination, until somebody is willing to leave his feet and take out that play as it comes around his end, until that hidebound military mind gets more elastic, and until brilliant and capable officers are permitted to try – and if they miss not get their heads cut off – you are going to be in a bad shape for a long time."[3] Other authorities believed that interservice bickerings had contributed to the lag in United States missile and space technology. In his State of the Union message on 9 January 1958, President Dwight D. Eisenhower observed: "I am not attempting today to pass judgment on the charge of harmful service rivalries. But one thing is sure. Whatever they are, America wants them stopped."[4]

Starts and Stops in Early Missile Programs

Viewed in retrospect the influence of technology upon modern warfare had begun to manifest itself in the final stages of World War II. This influence was apparent in German missile employments and in the Anglo-American developments in electronic warfare and nuclear explosives. The translation of the

potential technological developments into a new and unexplored plateau of the capabilities of military forces required imagination, time, and tremendous quantities of money. At the end of World War II, Gen Henry H. "Hap" Arnold showed some of this imagination. Dr Theodore von Karman's Scientific Advisory Board warned General Arnold that German aeronautical laboratories had made great progress in missilery even beyond the Wasserfall ground-to-air antiaircraft missile and the V-1 and V-2 offensive projectiles. Arnold believed that the United States had "shown a dangerous willingness to be caught in a position of having to start a war with equipment and doctrines used at the end of a preceding war." In his final war report, Arnold visualized the employment of projectiles that might have velocities of 3,000 miles per hour. Such weapons could be launched from "true space ships, capable of operating outside the earth's atmosphere."[5]

Genuinely interested in intercontinental air warfare and wishing to initiate new research projects before plentiful wartime funds dried up, Arnold withheld three $10-million items from the Army Air Forces' fiscal year 1946 procurement budget and committed the money to long-range developmental projects such as AAF Project MX-791, which committed $10 million to the Douglas Aircraft Corporation for a three-year study of future warfare. This contract marked the genesis of the nonprofit Research and Development (Rand) Corporation, which split away from Douglas in 1948. Completed in forced draft on 2 May 1946, a Rand study entitled "Preliminary Design of an Experimental World-Circling Spaceship" demonstrated that American engineers and engineering skills were capable of orbiting a 500-pound satellite by 1951.[6] Other portions of the fiscal year 1946 funds that Arnold diverted to development were committed to some 26 projects dealing with four categories of missiles: air-to-air for the protection of bomber forces and for use by fighter interceptors; surface-to-air for use against invading aircraft and missiles; air-to-surface as standoff weapons for employment by bombers; and surface-to-surface for use in both short-range tactical and long-range strategic employments.[7]

The Army Air Forces planned a wide range of exploratory projects and intended that only those projects that showed definite promise after preliminary study would be continued.[8] The inspiration for a part of the projects came from industrial sources. Simon Ramo, for example, visualized that future combat against an adversary equipped with an A-bomb would require air-launched missiles "so that our fighter planes could stand off at a distance safely and launch the missiles and go home while the missiles went about doing the job." Believing that the "military field was going to be a very fascinating and important one for that class of scientist who was interested in applied technology," Ramo went to work as director of research in the radio division of the Hughes Aircraft Company.[9] Other projects followed lines of research indicated by German progress, thus visualizing parallel development of both subsonic pilotless aircraft and supersonic guided missiles. Specific projects undertaken in early 1946 included the Falcon air-to-air missile; the Rascal standoff missile; the ground-to-ground Matador, Snark, and Navaho winged pilotless aircraft missiles; and the MX-774 Hiroc intercontinental

ballistic missile. Looking toward ground-to-air defense, the Army Air Forces gave Boeing Company a contract for ground-to-air pilotless aircraft (GAPA) for use against high-performance aircraft and contracted with the General Electric Company and the University of Michigan to undertake a basic design for ballistic trajectory rockets capable of intercepting and destroying hostile missiles. Conducted at the Willow Run Research Center, the University of Michigan study was designated Project Wizard.[10]

In the course of exploiting captured German technological data, the Air Materiel Command's Project Paperclip brought several prominent German scientists to Wright-Patterson AFB, Ohio. Included in the group was former Maj Gen Walter R. Dornberger, who had headed the German military rocket development program. These German scientists assisted in drafting the missile research and development program, and the Air Force gave considered thought as to whether the group ought not to be retained as an in-house research and development capability within the Air Materiel Command. In the early 1920s the Air Corps had attempted to design and build aircraft at Wright Field, but this arsenal system had proved inferior to the development of aircraft by private enterprise. The Army Air Forces, therefore, decided not to retain the group of German missile experts; within a few years most of them were employed by private industry.[11]

"The aerial missile, by whatever means it may be delivered," warned Maj Gen Hugh J. Knerr, secretary-general of the AAF Air Board, on 26 February 1946, "is the weapon of the Air Corps. Unless we recognize it as such and aggressively establish ourselves as most competent in this field, the responsibility therefore will become established by the Army or the Navy."[12] Since only a limited quantity of "brains and materials" was available for research and development in the United States, Knerr feared that scarce resources might be overtaxed by competing Army, Navy, and Army Air Forces projects.[13] Under the terms of a War Department directive issued on 2 October 1944, the Army Air Forces was responsible for the development within the Army "of all guided or homing missiles launched from the ground which depend for sustenance primarily on the lift of aerodynamic forces."[14] The first organization dealing exclusively with guided missiles was established early in 1945 by the Joint Chiefs of Staff for the purpose of reviewing projects concerned with the development of rockets comparable to the German V-1s and V-2s. The Committee on Guided Missiles existed to review programs and recommend action.[15] Long familiar with the arsenal system of development, the Army Ordnance Department began research on artillery-type missiles at Fort Bliss, Texas, and White Sands, New Mexico, before the end of World War II. A Wac-Corporal research rocket was fired at White Sands in September 1945, and in the autumn of that year Dr Wernher von Braun and about 120 other German scientists were brought to Fort Bliss to assist with experimental firings of captured V-2 missiles. The main objective was a high-altitude research program, but the Fort Bliss group was given an additional task of developing a small research vehicle called the Hermes II. Looking back at his work at Fort Bliss, von Braun would

describe the general attitudes as being: "The war is over; let us utilize these interesting new toys that we imported from Europe, and let us put them to use for high-altitude research."[16] Early in 1946, the Navy Bureau of Aeronautics awarded four research contracts for feasibility design studies of space vehicles, and in August 1946 the Naval Research Laboratory contracted with the Martin Company for an improved research version of the German V-2 called the Viking.[17]

Looking toward the coordination of research and development activities the secretary of war and the secretary of the Navy established the Joint Research and Development Board on 6 June 1946 under the chairmanship of Dr Vannevar Bush, who had headed the wartime Office of Scientific Research and Development. The Joint Research and Development Board promptly established a Committee on Guided Missiles.[18] In view of a further need to clarify arguments as to what the jurisdiction of the Army and the Army Air Forces would be for missile development, the War Department on 7 October 1946 made the Army Air Forces responsible "for the research and development activities pertaining to guided missiles." Three days later the War Department provided that this assignment of responsibility was only research and development and should not be necessarily applicable to the assignment of operational responsibility for such guided missiles as were developed and procured.[19] The enactment of the National Security Act of 1947 vested overall review authority for national military research and development in the National Military Establishment's Research and Development Board. Doctor Bush remained its chairman until 5 October 1948; the Committee on Guided Missiles continued to function as a board activity. In the separation of the Air Force from the Army, the Air Force was relieved effective on 19 July 1948 of its responsibility for the guided missiles research and development program required to accomplish roles and missions of the Army.[20]

By committing a total of more than $34 million of its fiscal year 1946 funds to research in missiles, the Army Air Forces appeared to have solidly grounded its future on new technology. The decision to award the missile development contracts rather freely also reflected an appreciation of the fact that the United States lacked basic technical knowledge on the subject and that World War II had knocked out Western Europe's capacity to provide basic technological knowledge for some years to come.[21] Almost at once, however, the most imaginative item of the Air Force research program—the 5,000-mile MX-774 Hiroc intercontinental ballistic missile (ICBM), whose study contract had been allocated to the Consolidated-Vultee Aircraft Corporation—began to experience problems. As previously noted, Doctor Bush, while testifying before the Senate Committee on Atomic Energy in December 1945, completely discounted the technical feasibility of a high-angle intercontinental rocket.[22] The technical problem was indeed a large one. The early model atomic bomb weighed a little over five tons and had a half-mile kill radius. The Hiroc would thus have to be a very large missile with an extremely powerful thrust, but even this would not solve the problem of accuracy. The average accuracy possible with a Norden bombsight was 15 mils. Thus, a Hiroc fired from a distance of 5,000 miles could theoretically miss its target by about 75

miles. In view of the half-mile kill radius of an atomic warhead, this degree of "accuracy" was not very attractive.[23]

The missile also presented technical difficulties. The specific impulse of the oxygen and alcohol fuels was too low to give the missile a 5,000-mile range. The warhead would encounter very high temperatures when it reentered the earth's atmosphere. Some scientists suggested that the Air Force was proposing to develop a meteor that would burn upon reentering the atmosphere.[24] Based on the technology of 1945 (which many scientists later would declare made Bush's negative evaluation of the technical feasibility of an intercontinental ballistic missile entirely sound at the time), Bush continued to suspect both pilotless aircraft and guided missiles. In his book, *Modern Arms and Free Men*, published in 1949, Bush pointed out that the German V-1 pilotless aircraft fired against London had been easily countered. "When the defense dispositions reached their climax," he wrote, "they brought down some ninety-five percent of the buzz-bombs that came within range, and they repeated or bettered this performance later at Antwerp." Flying slowly at constant altitude and in a straight line, the V-1 buzz bombs had made almost ideal targets Based on these analyses, Bush urged that the manned bomber was far cheaper and superior to either a pilotless aircraft or a ballistic missile. He dismissed the ballistic missile quite summarily: "It would never stand the test of cost analysis. If we employed it in quantity, we would be economically exhausted long before the enemy." For the near future, Bush suggested that only small and short-range missiles would have practical application to air warfare.[25]

Even though he gave strong support to the development of missiles during his tenure as deputy chief of staff for research and development of the Air Force, Gen Curtis E. LeMay was quite unwilling to admit that the heavy bomber lacked growth potential. "We in the Air Force," LeMay wrote in May 1946,

> are assuming that guided missiles will be fired at bombing vehicles whatever their form may take and are already taking measures to develop and destroy enemy vehicles whether they are fighter planes or guided missiles. Granted as the science progresses, tactics will change, new weapons will be employed, but destruction of enemy industry and means to wage war calls for large quantities of destructive power. It may well be that in the future this power may be more efficiently delivered by rockets or guided missiles than by heavy bombers; however, it is not here yet and the science of strategic bombing and the development of bombing equipment will keep pace with the defensive missiles used to stop it The heavy bomber will only go out of existence when a new weapon is invented which will do the job more cheaply and effectively. . . . Even when the efficient guided missile of large weight, carrying capacity and extreme range is developed, military flexibility may still demand the existence of manned vehicles capable of delivering tremendous blows on spots inaccessible to rocket fire . . , or to conduct operations against targets of opportunity No one weapon will meet all the requirements of modern warfare, and it can be safely assumed that warfare in the future will become even more complex [26]

When he appeared before the House Subcommittee on Appropriations on 6 March 1947, Lt Gen Ira C. Eaker, deputy commanding general of the Army Air Forces, emphasized the tremendous expense of preparing for an early

"push-button warfare" capability. Eaker suggested that the day may come when the long-range guided missile would replace the conventional very heavy bomber. With unlimited funds and resources in a development effort equivalent to that which had produced the atomic bomb, Eaker estimated that a 5,000-mile-range guided missile could be developed in five years. "Ten to fifteen years from now, by working hard and with at least a quarter of a billion dollars annually for experimentation in that field alone," Eaker estimated, "we can produce a rocket of 5,000-mile range. The prototype . . . will probably cost 200 million each, and individual rockets of that size and type thereafter may cost as much as 7 million." "We cannot, therefore," Eaker concluded, "abandon the development of the very long-range very-heavy bomber as a primary weapon of our long-range striking force but we should, as a wise precaution, spend the necessary experimental funds to insure that we are the first in the field with a long-range guided missile which may be the primary weapon at some future date, but probably not within 15 years."[27]

Although the Army Air Forces (AAF) had assumed that some of the missile projects established in 1945-46 would prove infeasible and would be dropped after a year or two, it was not prepared for the reductions in research and development funding that would occur in fiscal year 1947. As has been seen, the Bureau of the Budget impounded and transferred Air Force research and development funds. In the guided missiles field, the reduction in funds from $29 million to $13 million that took place in December 1946 forced the Army Air Forces to terminate some 11 of 28 guided missile projects, even though it had not received the technical data it needed to make well-advised decisions. The reduction was especially ill-timed because some missile contractors were progressing from a study phase to one of testing small-scale missile mock-ups.[28] In an effort to establish guidelines for a drastically reduced missile program, Maj Gen Benjamin W. Chidlaw, the Air Materiel Command's deputy commander for engineering, recommended on 6 May 1947 that the Army Air Forces "should concentrate on those missiles which show greatest promise of early tactical availability." Chidlaw envisioned that missile projects should be established for phased development in a relatively few companies, thus reducing a rather high cost arising when a number of companies attempted to expand their engineering and scientific staffs to handle individual projects. Since the 5,000-mile MX-774 intercontinental missile did not promise "any tangible results in the next eight to ten years," Chidlaw recommended that it be deleted from the Army Air Forces program.[29] In Washington a staff study signed by Brig Gen Thomas S. Power, AAF deputy assistant chief of staff for operations, on 16 June 1947, based its recommendations regarding missiles on the basic assumption that "for the next ten years, long range air bombardment will be effected by means of subsonic bombers only." Given this assumption, the pressing requirement would be for operational bomber defense and standoff bombing missiles and conversely for surface-to-air and air-to-air interceptor missiles. The study posed an urgent requirement for an early development of a means to detect and destroy enemy supersonic guided missiles, and an early requirement for highly accurate surface-to-surface, 1,000-mile-range guided missiles. This study also

stated an eventual requirement, probably by 1957, for a supersonic surface-to-surface missile with a range of up to 10,000 miles. The study recommended as its first priority, bomber-launched air-to-surface and air-to-air missiles; as its second priority, a 150-mile-range tactical surface-to-surface missile; as its third priority, bomber and missile interceptor missiles with associated detection and control means; and as its fourth priority, long-range surface-to-surface missiles. Gen Hoyt S. Vandenberg approved this order of priority on 18 June 1947. After coordination through the War Department, this list of priorities was transmitted to the Air Materiel Command as a directive on 12 August 1947.[30]

The full effect of the Army Air Forces' decision was to subordinate the guided missile research and development program to the support of a strategic bomber offensive. The reorganization of the headquarters of the Army Air Forces that took place on 10 October 1947 with creation of the Air Force manifested a similar preoccupation with the preparation of a force in being. For the next several years, the policy on guided missiles included the twin precepts that the Air Force would program guided missile units into its forces only after determining the extent to which the guided missile units could supplement or replace manned aircraft units and that guided missiles would be handled like any other piece of Air Force hardware.[31] When appropriations were reduced in the spring of 1947, the Air Materiel Command promptly dropped the contract for the MX-774 intercontinental ballistic missile. The Consolidated-Vultee work had arrived, nevertheless, at three important innovations: the use of the missile body as the wall of the fuel tanks as a weight-saving measure, the employment of swiveling rocket engines to provide directional control in flight, and the development of a nose cone that could be separated from the main missile body. Enough money remained when the project was canceled to permit the contractor to test three single stages of the missile during 1948. The results were so favorable that Consolidated-Vultee and its successor, Convair Division of the General Dynamics Corporation, kept the key members of the MX-774 engineering team together to continue studies of ballistic missile systems.[32] Following the demise of the MX-774, the Air Force missile program was reduced progressively to the Falcon air-to-air interceptor missile, the Rascal standoff bomber missile, and four pilotless aircraft missiles – the Matador, the Snark, the Bomarc, and the Navaho.

When it became responsible for coordinating military research and development programs in 1947, the National Military Establishment's Research and Development Board recognized that guided missile programs represented a relatively new technical field in which little was known and took a fairly relaxed view toward service projects that were in some competition with one another. While the Air Force was working on the Falcon missile, for example, the Navy was developing the Sparrow air-to-air missile; the two missiles involved different approaches to the same problem.[33] In another respect, however, Doctor Bush was less liberal. While the reductions of funds for research and development in fiscal years 1947 and 1948 were a part of general reductions in postwar military appropriations, Bush arbitrarily limited the total defense research and

development budget beginning in fiscal year 1949 to approximately $500 million a year. Believing that only so much technical talent was available, Bush insisted that larger expenditures automatically would produce waste and poor results by forcing much research and development work into the hands of mediocre personnel. Dr Karl T. Compton, who succeeded Bush as chairman of the Research and Development Board in October 1948, believed that the Defense Department could spend wisely an annual research and development budget of $650 million a year, but the precedent of the $500-million budget had been set. In fiscal year 1950 the Department of Defense spent about $550 million in research and development, less than four cents out of every dollar appropriated for the defense establishment.[34]

Facing the need to conserve scarce defense research and development funds and acting under the direction of the secretary of defense, the Joint Chiefs of Staff reviewed missile research and development projects in the autumn of 1949. As a result of this examination, primary responsibilities for research and development of short-range surface-to-air missiles were allocated to the Army and Navy.[35] At this time the Boeing Company appeared to be making good progress in developing the Air Force ground-to-air pilotless aircraft missile. But the Army had begun to develop the Nike-Ajax missile in 1945 and the Navy was developing Terrier and Talos antiaircraft missiles, either of which might have met Air Force requirements for point-defense weapons. The Air Force, moreover, recognized that a tremendous number of beam-riding antiaircraft missiles with a 25-mile range would be required to defend the continental United States. In view of these factors and the decision of the Joint Chiefs of Staff, the Air Force stopped development of the GAPA missile in November 1949 and contracted with Boeing and the University of Michigan to investigate the feasibility of a 250-mile-range interceptor missile plus an associated electronic control system. The feasibility study was approved during 1950; a development contract was awarded formally in December for a Bomarc (Boeing and Michigan Aeronautical Research Center) weapon system.[36] Based on the Joint Chiefs of Staff review, the Air Force resolved not to attempt to develop missiles suited for close support of ground forces. The Air Force position was that close support missiles ought to be handled by the Army as an improvement of its battlefield artillery. Both the Air Force and the Research and Development Board kept the Matador tactical missile under scrutiny during 1949 to determine if its 350-mile range should be extended or if the missile should be dropped from development. Compared with other missiles, however, the Matador was essentially simple. It was, in effect, a subsonic, pilotless fighter aircraft that was guided to its target by a ground-based, short-range (shoran) bombing system. The Air Force eventually decided to build the Matador (TM-61) because it would give all-weather interdiction capabilities to a tactical air force. The Matador first flew in 1950. The Air Force deployed it overseas beginning in 1954 to stations in Germany, Taiwan, and Korea.[37]

Other Air Force missile systems were far more complex than Matador. Most of them were scheduled to become operational in the 1954-55 time period, but each

of them pressed beyond existing parameters of the technological arts. Basically a pilotless aircraft that would be carried under the fuselage of a B-36 or a B-47, the Rascal (SM-63) was designed as a Mach-2 missile with a 100-mile range. It was designed so that a missilier in the bomber could control the missile from the time of launch until it hit its target. The Snark (SM-62) resembled a big sleek fighter plane. A turbojet engine gave the Snark a Mach-0.9 airspeed and range that was specified to be 5,500 miles; a gyrostabilized celestial navigation system guided the Snark to its target once in flight. The Bomarc (IM-99) was a pilotless fighter that would be launched with a liquid-fuel rocket booster and whose twin ramjet engines would give it an airspeed of Mach 2.7. Missile control officers used a ground radar control system to maneuver the Bomarc into an attack position, at which time its radar would lock onto the target. The Air Force did not expect the Navaho (SM-64) to be operational at an early date. This missile was designed to carry a heavy nuclear warhead (subsequently determined to be a thermonuclear warhead) and was to have a 5,500-mile range and a supersonic speed of Mach 2.7. The navigational system was to be a nonemanating, pure inertial system, which would not have to refer to the stars or to the ground for course or guidance corrections. Getting the Navaho up to flying altitude where its ramjet engines could take over was a problem that presented some initial complexity. One proposal was to use a B-36 to carry the Navaho aloft and then launch the missile in the air. In 1950 final design specifications provided that the Navaho would be launched piggyback from the ground on liquid-fuel rocket engines. Each of these missiles involved exploitations of underdeveloped technology; how soon the missiles could be placed in operation was anyone's guess. "We have tried," Maj Gen Gordon P. Saville admitted candidly, "to make a guesstimate of operational availability which includes the fact that inventors have invented as scheduled and that the tests have gone on with the normal amount of 'snafu' that we expect."[38]

Technological Breakthrough in Ballistic Missiles

Speaking in 1953, Dr Walter G. Whitman, chairman of the Defense Research and Development Board, suggested that mistakes in military research and development had included the reductions in research and development funding after 1945 and his board's inability to decide what program should receive the greatest emphasis at any one time.[39] Looking back in 1957 at these initial phases of Air Force missile development, Lt Gen Charles S. Irvine, deputy chief of staff for materiel, observed:

> When looking at the early developments of the atomic bomb .. [given] what we knew about guidance, ... we were not ready to build a ballistic machine and do an efficient job of knocking out targets considering the number of dollars or manhours it would take per target. We went to the airbreathing route, a pilotless airplane, a subsonic Snark or Navaho supersonic machine, which would in its time period carry a big enough warhead and be more accurate This appeared to be the best solution as we saw the state of the art at that time ... Looking back at it, maybe that was a bad decision We could have

> developed a guidance for the ballistic missile while we were doing the other job But our crystal ball was not that bright.[40]

Col Edward N. Hall, who would become an Air Force missile expert, blamed the early decisions equally on ballistic advocates, who thought in terms of thousands of yards rather than thousands of miles, and the experts on aerodynamics who were convinced that there would always be an inverse relationship between speed and range and could not visualize a supersonic vehicle that would have a 10,000-mile range.[41] In effect the Air Force had assumed in its projections that there would be a period of years in which there would be a gap between piloted aircraft and ballistic missiles: this gap could be most feasibly filled by air-breathing pilotless aircraft.[42]

Both as a reaction to the Soviet's explosion of an atomic weapon and in recognition that research and development had lagged in the several years that it had been subordinated to operational concerns, General Vandenberg—with more than a little prompting from Secretary of the Air Force W. Stuart Symington—reestablished a deputy chief of staff for development at the Air Staff level and established the Air Research and Development Command (ARDC) on 23 January 1950. General Saville assumed the duty as deputy chief of staff for development without delay, but the Air Research and Development Command required an evolutionary period to take control of the major Air Force research and development centers and to work out the mission and basic concepts that would guide the new organization's research and development efforts.[43] The Ridenour committee's (see chapter 6) report had demonstrated that past thinking on research and development had been too much on a project-by-project basis and that the research-development-production cycle had been much too long. "In the past," noted Brig Gen Donald N. Yates, assistant deputy chief of staff for development, "we . . . pointed toward mainly the development of an aircraft . . . hoping that we could patch existing guns, armament, and electronics equipment into it."[44] At the request of Gen Muir S. Fairchild, General Saville prepared a staff study on the development and procurement of combat ready air vehicles. This study recommended adopting a systems approach in the development of new weapons; making of a decision to go into limited production at the time that the mock-up or breadboard model was approved; conducting an accelerated and integrated test program before the production rate was stepped up; and retaining development responsibility and authority within one agency during the life span of the equipment. The weapon system concept gained immediate acceptance. A weapon system was defined as "a completely and integrally equipped aircraft, missile or other flying device with all its airborne and ground equipment necessary to satisfy a military operational requirement."[45] During its first year of operation, the Air Research and Development Command also faced the problem as to whether it should attempt to build and staff laboratories for Air Force research. After careful study, Dr Louis N. Ridenour advised Lt Gen Earle E. Partridge, who had taken command on 24 June 1951, that "the primary mission of the ARDC in

the field of research is to connect the Air Force with pertinent research being done elsewhere, and to stimulate work that appears to be of direct interest to the Air Force." Expanding on that guidance, Partridge stated that ARDC would handle both research and development "out of shop" when contract operations were proper and feasible. "The ARDC," Partridge stated, "favors contract operations when such contract operations are to the advantage of the US Government."[46]

While the Air Force was expanding its research and development organization, the beginning of the Korean War loosened budget purse strings. The Air Force received $238 million for research and development in fiscal year 1950; annual and supplemental defense appropriations made $522.9 million available to the Air Force for such purposes in fiscal year 1951.[47] With more money available President Harry S Truman wanted to see the missile programs move along faster, with special emphasis on the development of defensive missiles. On 30 August 1950, Truman invited K. T. Keller to a conference at the White House and requested that Keller, an experienced engineer, see what he could do to advance the guided missile program. After receiving this presidential mandate, Keller began a 90-day fact-finding tour of the military's research installations and contractor facilities, including the Army's Redstone Arsenal at Huntsville, Alabama, where the Army had drawn together its missile research and development from White Sands, New Mexico; Fort Bliss, Texas; and other installations. Keller determined that about 4,000 military and 11,000 contractor personnel were working on missile programs. He concluded that the best contribution he could make to the programs would be to head a small organization that would act as a consultant and adviser to everyone involved with guided missiles. President Truman accepted this recommendation and on 24 October 1950 appointed Keller to be the director of guided missiles for the Department of Defense. Truman charged Keller to direct and coordinate the activities connected with research, development, and production of guided missiles. From his observations of the military services' missile programs, Keller came to several other conclusions. He saw no reason why one service could be charged to conduct research and development on a missile system that might be assigned to another service when it became operational. Keller also thought that engineers tended to avoid "the dirty, stinking work of getting the little problems cleaned up." He commented that quite frequently when they met problems engineers tended to veer off to a new conception rather than concentrating on the solution of the problem. Keller believed that the development process had to stabilize its objectives long enough to find out what made a piece of hardware malfunction. Keller promptly embarked on a campaign "to get hundreds of missiles out flying so that there can be some kind of a sensible evaluation of the field for general policy guidance." Keller was impatient with the military concept that logistical support concepts ought to be worked into the plan for the development of a weapon system. "We must get a workable article first," he said.[48]

Based on his mandate from President Truman and his understanding that highest priorities should be given to the development of air defense missiles, Keller picked out the Nike, Terrier, and Sparrow as programs for expedited development.

Speaking of Keller, Dr Wernher von Braun, who had moved to the Redstone Arsenal as director of development operations, recalled: "When he came in things began to move."[49] Limited to a range of 25 miles, the Army's Nike-Ajax antiaircraft missile did not significantly compete with the Air Force Bomarc. However, the Army soon began to develop the Nike-Hercules, which would have a range of 75 miles.[50] Apparently with Keller's enthusiastic support, the Army initiated development of the Redstone missile with a range of 450 miles in 1951.[51] Although the range of the Redstone was reduced to about 200 miles when it was programmed for a heavy thermonuclear warhead, the success with the program indicated that it would be equally feasible to develop another missile derived from the Redstone that would have a range of about 1,500 miles. Believing that the Army might want to deploy its tactical support missiles far to its rear, perhaps a thousand miles or more, Maj Gen James M. Gavin, who was serving as the Army's assistant chief of staff for plans and operations, recommended that the Army should seek to develop a 1,500-mile ballistic missile.[52]

To the Air Force and to the Rand Corporation the development of an intercontinental ballistic missile would serve two useful purposes. It would provide an offensive weapon system, and the boosters employed for the intercontinental missile would also be powerful enough to place military earth satellites in orbit. Even though the Air Force canceled work on the MX-774 Hiroc, General Vandenberg signed a space policy statement on 15 January 1948 that read: "The USAF, as the Service dealing primarily with air weapons—especially Strategic—has logical responsibility for the satellite."[53] Apparently as the result of continued Rand studies, General Saville late in 1950 directed that a long-range rocket study be reinstituted. In view of Convair's earlier work with MX-774, the Air Force awarded a study contract to Convair on 31 January 1951 to investigate the relative merits of glide and ballistic missiles capable of attaining a 5,500-mile range and carrying an 8,000-pound warhead. This study contract soon was limited to an intensive investigation of a ballistic missile. In view of favorable results reported by Convair and evidence of Soviet progress toward the development of high-thrust rockets, the Air Research and Development Command suggested in March 1952 that the MX-1593 research missile—now called Atlas—be reissued in the form of a general operational requirement for the development of such a ballistic missile. However, the Defense Research and Development Board did not approve the continuation of studies on the missile and development of components for it.[54]

The initial studies of the intercontinental Atlas missile visualized large and heavy atomic warheads. However, in the winter of 1952–53, the Atomic Energy Commission's advances in the development of new nuclear weapons pointed the way to the design of small high-yield warheads. In December 1952 the USAF Scientific Advisory Board pointed out that the substantially increased warhead yields meant that accuracy requirements and guidance developments could be somewhat relaxed. By the summer of 1953, Convair was able to show that many of the design characteristics of the Atlas could be met by existing technology. The

Atlas, for example, would be able to use the high-thrust, liquid-fueled rocket engines that had been designed to launch the Navaho missile. Convair estimated that the Atlas could be made operational by 1962; but, in Washington, General Yates, Air Force director of research and development, called attention to the fact that the Atlas development program would be extremely expensive. Whereas the Air Force had received $525 million in new obligational authority for research and development for fiscal year 1953, the new Eisenhower military budget for fiscal year 1954 allotted only $440 million of new money for such expenditure. "It is extremely important," Yates ordered in reference to Atlas, "that this expensive program be carried on at a relatively slow rate with increases planned only on the accomplishment of the several difficult phases of the program."[55]

At the same time that the Air Force was making a decision to go slow in developing the Atlas, other events were occurring that would make it necessary to speed it up. Early in 1953, after taking office as special assistant for research and development to Air Force Secretary Harold E. Talbott, Trevor Gardner actively supported the development of an intercontinental missile. Effective on 30 June 1953, Reorganization Plan 6 abolished the National Defense Research and Development Board and the Office of Director of Guided Missiles and vested these responsibilities in a new Office of Assistant Secretary of Defense for Research and Development. Based on a request received from Gardner, the Department of Defense Armed Forces Policy Council ordered the establishment in June 1953 of a study group of the nation's leading scientists to evaluate strategic missile programs. To perform this task, Gardner assembled a group of scientists under Prof John von Neumann, which would be known as the Air Force Strategic Missiles Evaluation Committee or less formally as the Teapot Committee. Holding the first of three meetings in November 1953, the von Neumann committee undertook to examine both the impact of the thermonuclear breakthrough upon the development of strategic missiles and the possibility that the Soviet Union might be somewhat ahead of the United States in developing ballistic missiles. Later evidence made it apparent that the Soviet Union had addressed itself as early as 1946 to the problem of transporting a 10,000-pound atomic warhead over intercontinental distances. The Soviets had captured the German rocket center at Peenemunde and had taken many German technicians to the USSR, but these technicians were not permitted to participate in the Soviets' advanced development programs. The objective of these programs evidently was to design rockets that could boost five-ton warheads over intercontinental distances. By 1953 many of the German technicians were being allowed to return home; they brought reports of the intense Soviet interest in all phases of missile technology. In the course of its investigation the von Neumann committee got four separate and different intelligence estimates, still Gardner noted that the "lump impression . . . is that the Soviets are significantly ahead of us in the strategic missile field."[56]

While the von Neumann committee was at work, the Rand Corporation provided it with technical assistance; Rand also prepared an independent report that was transmitted to the Air Force on 8 February 1954. When the von Neumann

committee report was submitted on 10 February, it was prefaced by the observation that

> unusual urgency for a strategic missile capability can arise from one of two principal causes: A rapid strengthening of the Soviet defenses against our SAC manned bombers, or rapid progress by the Soviet in his own development of strategic missiles which would provide a compelling political and psychological reason for our own effort to proceed apace. The former is to be expected during the second half of this decade As to the latter, the available intelligence data are insufficient to make possible a precise estimate of the progress being made by the Soviet in the development of intercontinental missiles, but evidence exists of an appreciation in this field on the part of the Soviets, and of activity in some important phases of guided missiles which it is natural to connect with the objective of development by the Soviet of intercontinental missiles. Thus, while the evidence may not justify a positive conclusion that the Russians are ahead of us, a grave concern in this regard is in order[57]

In its review of the Air Force missile program, the von Neumann committee noted that the employment of thermonuclear warheads would permit significant relaxations in requirements for missile thrust and orders of guidance accuracy. The committee concluded that new warheads would make it possible to redesign the Atlas and develop it for operational use in five or six years if the Air Force gave the ballistic missile program overriding priority and centralized directing authority and if the Air Force provided exceptionally competent scientific guidance. Not content merely to limit itself to generalities, the committee made an important study of Air Force research and development management procedures. In developing the B-58 bomber and Matador missile, the Air Force had employed an existing company as the single prime contractor; but the committee stated unequivocally that no single contractor in the United States had sufficient across-the-board technical competence to manage a program to develop an intercontinental ballistic missile. The Air Force similarly did not have sufficient in-house capabilities to manage such a program. The von Neumann committee, therefore, proposed to establish a special management group by drafting highly competent people from universities, industry, and government.[58]

Believing that the strategic necessity for the intercontinental ballistic missile was at least as urgent as the wartime development of the atomic bomb, Trevor Gardner worked diligently to get top-level support for such a missile. After a series of three meetings on the subject of the entire missile program, the Air Force Council recommended on 23 March 1954 that accuracy requirements be reduced for all missiles carrying thermonuclear warheads and that the Atlas program "be reoriented so as to achieve the early establishment of an optimum intercontinental ballistic missile system." General Twining approved the recommendations on the same day. On 14 May the Air Force further directed that developing the Atlas would be given its highest priority.[59] In an unusual management action the Air Research and Development Command established a Western Development Division under the command of Brig Gen Bernard A. Schriever at Inglewood, California, on 1 July. The primary mission of the Western Development Division

was to manage the development program for Air Force weapon system 107A (Project Atlas), including ground support for it, and to recommend operational, logistic, and personnel system concepts for the program. Since procurement and contracting for the Air Force was the mission of the Air Materiel Command, this command on 15 August established the Special Aircraft Project Office (later the Ballistic Missiles Office) on the field location at Inglewood.[60]

Seeking to preserve the scientific talent available in von Neumann's committee, Gardner persuaded many of the men who had served on this committee to continue to function as the Atlas Scientific Advisory Committee. At a meeting on 20–21 July the committee again considered the weapon system responsibility for Atlas and again recommended that no existing airframe manufacturer, including Convair (which wanted to assume the role of single prime contractor for the Atlas weapon system), was strong enough in scientific depth and experience to discharge prime contractor responsibilities. In August the Western Development Division determined that systems responsibility could be placed either with an airframe contractor, a university laboratory, an Air Force organization, or a specially qualified contractor who would be independent of the contractors supplying missile components. A contractor of the latter type was already in existence: in September 1953 Simon Ramo and Dean Wooldridge, who had done pioneer management work with the Hughes Aircraft Company in developing the Falcon air-to-air missile, had formed the Ramo-Wooldridge Corporation. General Schriever was impressed with the new corporation and recommended that it be granted the technical direction and systems engineering responsibility for the Atlas program. After being authorized to take the action on 3 September 1954, the Ballistic Missiles Office negotiated a contract with Ramo-Wooldridge to provide the scientists and engineers needed to analyze complex technical and scientific questions and direct systems engineering for the several associated contractors that made up the development team. With their military counterparts in the Western Development Division, the Ramo-Wooldridge technical and scientific personnel were integrated into what Schriever described as "a development-management team, with all elements working on a side-by-side, counterpart basis."[61] Given final assurance by the Atomic Energy Commission that a small high-yield warhead could be expected, this team made final the configuration of the Atlas missile in the last quarter of 1954. In the first six months of 1955, contracts were let for the Atlas airframe and nose cone, guidance and control, and propulsion systems.[62]

At its meeting in July 1945 the Atlas Scientific Advisory Committee had suggested that the United States begin developing an alternate strategic missile to the Atlas at once. The committee had several reasons for its position. Convair's plants were near the California coast and to depend on a single type of strategic missile would make the program extremely vulnerable to hostile attack. In addition, the Atlas was "a big pressurized metal sack" that might collapse under violent maneuvers and a missile with a more conventional structure would offer more prospects for growth potential. While this reasoning was valid, the Air Force was

hard put to justify developing a second strategic missile in view of rather stringent expenditure limitations.[63] Some further indecision resulted after 2 December 1954, when the Air Force issued a general operational requirement for a tactical ballistic missile with a range of 1,000–2,000 miles. Schriever feared that the development of a tactical missile would compete for the use of existing test facilities, thereby delaying the Atlas strategic missile. He also suggested that a tactical missile might become a natural fallout from one of the stages of an intercontinental missile.[64]

Early in January 1955 Ramo-Wooldridge provided Schriever with a favorable analysis of the prospects for developing a two-stage, conventional structure intercontinental ballistic missile. On 12 January, Schriever formally asked approval for the alternate strategic missile, pointing out that such a program would provide desirable second sources for subsystems that might be interchangeable between the Atlas and the new missile. By early March the Air Research and Development Command and the Air Materiel Command developed a proposal that went forward to Washington. On 28 April, Secretary Talbott approved a second source for intercontinental missiles, with the understanding that the missile would be constructed well away from either seacoast. The new missile, designated as the XSM-68 Titan, would include a configuration that could be adaptable to exploitation as a tactical ballistic missile. From proposals submitted by several aircraft companies, an Air Force source selection board recommended that the Martin Company appeared best qualified to develop the missile's airframe. A letter contract was issued on 27 October 1955 authorizing Martin to design, develop, and test the airframe for the two-stage XSM-68 and to plan a program for developing the complete weapon system. The Western Development Division and the Ramo-Wooldridge Corporation management team was made responsible for weapon system engineering for the Titan.[65]

At the same time that the Air Force directed the Western Development Division to proceed with the Titan, it directed the division to study and evaluate all possible approaches to the tactical ballistic missile. In line with this directive, Schriever directed his subordinates to look into earlier research studies concerned with solid-propellant technology. Based on this preliminary work, the Air Force contracted in April 1956 for three studies looking toward the development of solid-propellant rocket motors. During this year both the Tactical Air Command and the United States Air Forces in Europe submitted requirements for a tactical ballistic missile that could be launched quickly in response to a battlefield threat, but the Air Force could not validate the requirements because it had to devote its limited funds principally to the development of the intercontinental missiles. A working group headed by Lt Col Edward N. Hall, nevertheless, put together a concept of a three-stage, solid-propellant missile that possibly could be employed by stages for either tactical or strategic purposes. Such a missile would need to be relatively cheap, available in quantity, and capable of rapid launch from hardened ground silos. Because of this growing Air Force interest in such a second-generation ballistic missile, General Schriever designated the working

group in September 1957 as a small weapon system office for what was first called Weapon System Q, later Sentry, and, finally, Minuteman.[66]

The operational concepts for the Minuteman missile drawn up by Colonel Hall's group visualized a simple, reliable, rugged missile with a long storage life and simplified maintenance requirements. The missiles could be deployed in underground silos that were spaced far enough apart and sufficiently hardened so that an enemy warhead could destroy no more than one missile. The missiles could be maintained in constant readiness to fire, and a given complex of missiles could be controlled by an automatic monitoring and launch system. This missile would not be able to carry as heavy a warhead as the Atlas or Titan, but Ramo-Wooldridge argued that "by keeping the missile small and the weapon system cost low, we can more readily afford to size the force so that a sufficiently large portion of the force will survive, irrespective of actions taken by the enemy."[67]

Soviet Threats Speed Missile Development

As late as the spring of 1955, the Eisenhower administration apparently assumed that the Soviet Union would not have the technology to counterbalance American strategic superiority until late in the 1960s. Based on new information, however, the Technological Capabilities Panel of the President's Science Advisory Committee—called the Killian committee after its chairman, James R. Killian—reported to President Eisenhower on 14 February 1955 a deep concern about the vulnerability of North America to surprise attack. To enable the United States to meet this threat, the Killian committee recommended that the Air Force give top priority to developing intercontinental missiles and that the Air Force proceed with developing intermediate range ballistic missiles (IRBMs). The committee argued that the latter action was essential to the national security. Lending support to the new strategic estimates of the increasing threat to US security, the Soviets displayed enough type-39 heavy jet bombers at the 1955 May Day celebration in Moscow to make it evident that these equivalents of the Air Force's B-52 had been in quantity production as much as a year earlier than anticipated.[68] In October 1955 the National Security Council accepted much of the Killian committee's report, which recommended the highest national priority be extended to the development of the intercontinental ballistic missile (ICBM) and additionally recommended that land- and ship-based intermediate range ballistic missiles should be considered essential to the national security. By December, President Eisenhower had assigned highest priorities to the Atlas, Titan, Jupiter, and Thor programs.[69]

In March 1955 General Gavin already had recommended to Gen Matthew B. Ridgway that the Army proceed with the development of a ballistic missile with a 1,500-mile range; however, Ridgway turned the proposal down because he anticipated that the Army could not get the money for such a program.[70] In November 1955 the Joint Chiefs of Staff studied the matter of intermediate range ballistic missiles and, with Gen Maxwell B. Taylor dissenting, advised Secretary of

Defense Charles E. Wilson that the Navy had a valid requirement for a ship-based intermediate range ballistic missile and that the Air Force had a similar requirement for a land-based intermediate range ballistic missile but the Army had no valid requirement for such a capability.[71] Wilson was unwilling to accept this guidance. On 8 November he ordered that an Army-Navy team work together on an intermediate range ballistic missile that would be modeled largely after the Army's Redstone rocket and that the Air Force independently develop another intermediate range ballistic missile. Even though he established a Department of Defense Ballistic Missiles Committee to coordinate the separate programs, Wilson frankly expected that interservice competition would continue. Nevertheless, he felt that this interservice rivalry would hasten the development of an intermediate range missile. Wilson realized that this duplication of effort would increase the expense to the nation. At the same time that he established the Ballistic Missiles Committee, Wilson created the Air Force Ballistic Missile Committee and the Joint Army-Navy Ballistic Missile Committee.[72]

Recognizing that the Soviets would score a tremendous advantage if they placed intercontinental ballistic missiles into operation before the United States possessed a similar capability, Trevor Gardner stated "that we had to get that weapon first." The Air Force did not want anything to interfere with the development of intercontinental missiles. Gardner recorded that the immediate effect of the effort to produce an intermediate range missile would be to establish a competition for hardware, people, money, and facilities that might well jeopardize the Air Force's objective of attaining a strategic missile capability at an early date. He also described Wilson's directive as "causing committees to be born at a rather rapid rate. Those of us who had been running the program found [that] we were now working part time for committees and spending large fractions of our time . . . justifying ourselves before these various committees at the Secretary of Defense level and within the Air Force." Convinced that "current budgets in research and development would not permit us to remain technically superior to the Russians in airpower," lacking "sympathy with the kind of organization that was set up to manage the ballistic-missile activity," and "alarmed that the total Air Force budget would simply guarantee us the second best Air Force in the future," Gardner resigned as assistant secretary of the Air Force for research and development and presented his views in a series of magazine articles early in 1956.[73] Viewing the Wilson decision in retrospect, Secretary of the Army Wilber Brucker later remarked that giving the Army the authority to develop an intermediate range ballistic missile stirred "another one of the services," which was "not interested except passingly in the IRBM," into immediate action and the competition between these two services accelerated progress on the missile program, with the Army moving forward on some of its plans "a year to a year and a half" earlier than originally scheduled.[74] At Redstone Arsenal, Maj Gen John B. Medaris had already been designated to command an expanded Army missile activity in October 1955; the Army Ballistic Missile Agency was officially established there on 1 February 1956. Studies on the Army's Jupiter missile had gotten under way in

the summer of 1955 and, following the Wilson decision, plans to develop the Army IRBM went forward rapidly. The Jupiter would use the same engines that the Air Force had developed for the Navaho booster and that the Air Force would use in the Atlas. Based on the belief that nuclear warheads smaller than those planned for land-based IRBMs and ICBMs could not be made available, the Navy participated in the initial planning for the Jupiter. In September 1956, however, the Atomic Energy Commission (AEC) advised the Department of Defense that even smaller warheads could be developed. As a result of this information, the Navy sought permission to withdraw from the liquid-fueled Jupiter program to develop a smaller solid-propellant fleet ballistic missile that would be called the Polaris. Wilson gave his approval in November 1956 and the Navy completely withdrew from the Jupiter program on 10 December 1956.[75] In keeping with the Army's arsenal concept, the Army Ballistic Missile Agency served as designer and prime contractor for the Jupiter missile and contracted with the Chrysler Corporation for hand-tooled test quantities of the airframes required for assembly of the completed missile.[76]

Presenting an admittedly Air Force view on the subject, Gen Charles S. Irvine described both the Army Jupiter and the Air Force Thor as fallouts from the Atlas program. The Army disputed this claim in the case of the Jupiter.[77] The Air Force's Thor project, however, was clearly derived from ongoing missile programs and followed a plan that had been developed by the Western Development Division and Ramo-Wooldridge team even before the Air Force assigned the intermediate range ballistic missile project to the Air Research and Development Command on 18 November 1955. The Thor (SM-75) would utilize already developed engines, nose cones, and guidance systems, and the only new contractor required for it was for the construction of the airframe A letter contract was issued on 27 December 1955 to the Douglas Aircraft Corporation for the development of the SM-75 airframe and for assembly and testing of the missile. The first Thor arrived at the Air Force Missile Test Center, Patrick AFB, Florida, on 18 October 1956, less than a year after the Air Force ordered the development of the missile. The first Thors were handmade articles, but the Douglas Company had prepared to begin production in quantity from the project's beginning.[78]

When he directed, in November 1955, that both the Army and the Air Force develop intermediate range ballistic missiles, Secretary Wilson had announced that development of the missiles would not prejudice the roles and missions of the services. "I am going," he said, "to let Admiral Radford and the chiefs take enough time to worry about . . . the specific roles and missions at some later date after we know what we have."[79] Army spokesmen, nevertheless, made it very clear that they wanted the intermediate range missile Early in 1956 General Taylor boldly asserted the Army's claim to a 1,500-mile-range missile. "Our Army mission," he said, "is to destroy an enemy on the ground anyplace. . . . We are very interested in being able to use for Army purposes against Army targets any missile of any range."[80] After becoming the chief of Army research and development, General Gavin urged that "TAC air is going out" and that the Army would need missiles to

fight in an area "from the Black Sea to the Mediterranean where TAC has no requirements." Army leaders also urged that the Jupiter be mobile and suited for field deployment. In contrast, the Air Force Thor would have to be deployed in fixed positions.[81]

In the event of future hostilities, Secretary Wilson conceived that a unified commander "would use all available weapons and all kinds of people that were made available to him"; for this reason Wilson was not too concerned about whether the Army, Navy, and Air Force might develop a given weapon, or how that weapon might fit into the service roles and missions. Nevertheless, he requested that Adm Arthur W. Radford discuss the effect of new weapons on the service roles and missions with the Joint Chiefs of Staff. Although Wilson considered the advice of the Joint Chiefs of Staff, he apparently exercised his own judgment on the matter. The Air Force possessed reconnaissance, intelligence, and ancillary capabilities required to employ a 1,500-mile-range missile. As explained by a defense spokesman, a 1,500-mile missile "gets into the strategic mission—strategic as distinct from the tactical part of the battle."[82] Announcing his decisions in a major policy document issued on 26 November 1956, Secretary Wilson ruled that the Army would continue to develop surface-to-surface missiles for the close support of Army field operations but that the Army's zone of operations would be defined as extending not more than 100 miles beyond the front lines and normally about 100 miles to the rear of the front lines. The dimensions of the Army combat zone, thus, would place a range limitation of about 200 miles on the design criteria for Army missiles. Wilson ordered that operational employment of land-based intermediate range ballistic missiles would be the sole responsibility of the Air Force, that operational employment of ship-based intermediate range ballistic missiles would be the sole responsibility of the Navy, and that the Army "will not plan at this time for the operational employment of the Intermediate Range Ballistic Missile or for any other missiles with ranges beyond 200 miles."[83]

Decisions for Production and Deployment

With the exception of the Army's Nike-Ajax and Redstone, the Air Force's Matador, and the Navy's pilotless aircraft called the Regulus, Department of Defense missiles had not progressed beyond the research and development stage by the spring of 1957. Initially because of budgetary limitations and then because of the impact of the Soviet Sputnik, the Department of Defense faced many moments of truth during fiscal year 1958 when decisions had to be made on the acceptance or rejection of new weapon systems that were approaching readiness for production and operational deployment. These decisions would be agonizing at best and the decisionmaking process would be complicated by interservice rivalry—which, though it may have proved useful in hastening research and development, may have resulted in a maze of claims and counterclaims as to the advantages or disadvantages of particular systems.

In July 1958 the Air Force faced the problem of maintaining a force in being that would deter large and small wars, while simultaneously bearing the expense of developing missiles for future employment within a fiscal year 1958 expenditure ceiling of $17.9 billion.[84] Monetary considerations forced a sweeping reconsideration of the Air Force missile programs. As has been seen, Air Force developmental planners had assumed in the late 1940s that there would be a gap between the time when piloted aircraft would become obsolete and would be replaced by ballistic missiles; these planners expected that air-breathing pilotless missiles would be valuable weapons in the transitional phase. To meet this latter requirement, the Air Force had put the SM-62 Snark, the SM-63 Rascal, and the SM-64 Navaho under development. Following then current logistical concepts, the Air Force had designated an aviation company as the single prime manager for the Snark, Rascal, and Navaho. The Air Force had intended to pursue a "fly-before-buy" policy, but many factors other than management were involved and each of these programs slipped badly. None of the programs were operational by the middle 1950s. The elapsed time from program approval to the first operational unit deployment of the Snark was 13.4 years. With all-out developmental priorities, including prime weapon systems management by the Western Development Division and Ramo-Wooldridge team and a new concurrency concept of development, the cycle of development to unit deployment of the SM-75 Thor and the SM-65 Atlas was reduced to 3.3 and 4.9 years respectively. Had the Thor and Atlas been developed on a "fly-before-buy" basis, the Air Force estimated that their development-to-deployment cycle would have been nearly four years longer.[85] By early 1957 it was evident that the pilotless aircraft and the ballistic missiles would enter the operating inventory not at staggered intervals but at approximately the same time, and it was equally evident that the ballistic missiles would be the superior weapons

By the spring of 1957 the Air Force had invested $679.8 million in the research and development of the Navaho during the many years of the program. Facing the fact that the high-altitude, cruise-type Navaho had been superseded by the Atlas and Titan, the Air Force canceled the Navaho program on 8 July. Although the Navaho program never produced a weapon system, the Air Force considered it as "anything but an unqualified failure." The Navaho program had permitted a continuing development of the large liquid-fueled engines that, in the end, powered the Atlas, Thor, and Jupiter missiles. The inertial guidance system developed for the Navaho enabled the Navy's Polaris-equipped submarines to make the accurate fixes of their positions at sea that they would need for missile firings. The design for the Mach-3 B-70 bomber was heavily based on a scale-up of the Navaho. And the North American X-10 test vehicle that was developed during the program provided many of the design features that would be incorporated into the Hound Dog GAM-77, a lightweight air-to-ground missile that was developed speedily in place of the never satisfactory Rascal. At the cancellation of the Navaho, moreover, the North American Company was able to use its design team and facilities for the

accelerated development of the Hound Dog when the contract for the development of this missile was awarded on 16 September 1957.[86]

Unlike the Navaho, the Snark would be only a partial casualty to technological progress since it could enter the operating inventory prior to guided ballistic missiles. Although it would not be as efficient as a manned B-52, the Snark ensured against a loss of aircrews, had quick reaction time, and could be programmed for low-level attack. Weighing these factors, the Air Force made the decision to reduce the objective of the Snark program from one wing with 120 missiles to a group with 30 missiles; the Air Force scheduled the unit to be activated in August 1959. Technically the world's first intercontinental missile after its successful 4,400-mile test flight on 31 October 1957, the Snark was considered to be a complement to the manned bomber force since it would compound an enemy's defense problem.[87]

On the basis of the high development priorities that President Eisenhower had extended to the intercontinental and intermediate range ballistic missiles, the Air Force and the Western Development Division—which was designated as the Air Force Ballistic Missile Division on 1 June 1957—assumed that the Atlas, Titan, and Thor would be programmed for full weapon systems development during fiscal year 1958. Alarmed about budgetary ceilings, however, the secretary of defense sent the National Security Council a list of proposed changes in the ballistic missile program. In August 1957 the National Security Council and President Eisenhower concurred in the secretary's recommendations. In brief, only Atlas would continue in weapon system production, while Titan would continue in a status of a little more than development. A Defense Department committee would evaluate Thor and Jupiter to determine which would continue in development.[88] In the summer of 1957, Secretary Wilson promised to make the choice between Thor and Jupiter before retiring from office. This and other decisions, however, were going to be made by Secretary of Defense Neil H. McElroy, who succeeded Wilson on 9 October 1957, just in time to have to reevaluate US missile programs in the light of the Soviet Sputnik I.[89]

In the aftermath of the Soviet's successful launch of the world's first satellite, Secretary McElroy accepted Air Force plans for some acceleration of Atlas production and for programming the activation of nine Atlas squadrons. However, he chose to continue to evaluate the Titan, Thor-Jupiter, and an antimissile defense system. The Thor-Jupiter problem continued to be greatly complicated. In General Taylor's mind the assignment of operational Jupiter missiles to the Air Force amounted "virtually to killing the program, because this Army-built weapon has never appealed to the Air Force."[90] General Irvine, on the other hand, thought that the Thor and Jupiter were "about as alike as the Ford and the Chevrolet," and that one but not both of them ought to be selected for production. To produce both would wastefully duplicate training and ground support equipment. Irvine argued that the Thor had been developed with "hard tooling" and was ready for production, whereas Jupiter was still an "experimental and prototype missile."[91] After deliberation, Secretary McElroy evidently felt that the combination of the two IRBM programs would accelerate the accumulation of knowledge in an area where

little background was available. On 25 November he decided that both Thor and Jupiter would be produced for the operational inventory. At this time McElroy directed the Air Force and the Army to produce and deploy four Thor and four Jupiter IRBM squadrons to NATO nations between December 1958 and March 1960.[92] This decision did not immediately end the interservice difference over the concept as to whether the intermediate range ballistic missiles should be employed from a fixed, but semihardened emplacement as the Air Force conceived or from mobile field positions as the Army wanted. The Army continued to program Jupiter for field mobility until November 1958, when the Air Force concept prevailed.[93]

In its post-Sputnik proposals for an accelerated intercontinental ballistic missile program, the Air Force recommended that the Titan be expanded into a full-scale weapon system and that Minuteman be put into development. On 12 December, the Department of Defense gave its approval for a nine-squadron Atlas force and a four-squadron Titan force.[94] On 27 February 1958 the Department of Defense also authorized the Air Force to proceed with research and development on the SM-80 Minuteman missile, but DOD now appeared reluctant to proceed with the authorized weapon-system status for Titan possibly because of the expectation that the second-generation Minuteman would prove to be a superior missile. At any rate, the Department of Defense demanded many studies of the Titan as compared with the Atlas. As a result of these studies, which it made during the summer and early autumn of 1958, the Air Force admitted that the cost for the logistical support for two ICBM systems would be about $200 million more than for a single system, but the Air Force maintained that the Titan held many potential advantages. It had more growth potential than the Atlas both for the extension of its range and for an increase in its payload, and the solid-structured Titan promised to provide a better vehicle for space exploitation purposes. Bringing both Atlas and Titan into the combat inventory would provide more missile units in a shorter time and would maintain a larger production base for missiles. Neither Atlas nor Titan had been fully tested, and the Air Force was reluctant to risk the security of the nation by adopting a single system until complete research and development proved it to be irrefutably superior. The task of hardening the Titan promised to be easier than would be the case with the thin-skinned Atlas; Titan would use storable liquid fuel, thus giving it a better reaction time.[95]

Jolted as much as the other military services by Sputniks I and II, the US Navy promptly instituted an independent reevaluation of the Polaris intermediate range ballistic missile program that had gotten under way in December 1956. This program involved the deployment of solid-fuel Polaris missiles aboard nuclear submarines. The Navy originally had planned to have the Polaris-equipped nuclear submarines ready for operations in 1963, but the Navy believed that it would be possible to accelerate the program and move deployment up to 1960. Secretary McElroy approved this accelerated program in early December 1957.[96] The Polaris program involved a marriage of solid-propellant missiles that were equipped with lightweight, high-yield thermonuclear warheads, which had not

been perfected, with nuclear submarines that would have to be built. Still the Department of Defense considered Polaris to be a low-risk program. The lightweight warhead had been guaranteed by the Atomic Energy Commission, the solid-propellant missile had benefited from earlier technology, guidance systems were well under way because of the Atlas program, and the nuclear submarine *Nautilus* had been at sea for some time. The only uncertainty was whether or not a submarine would be able to launch the Polaris missiles from under the surface of the sea: if this proved impossible it would still be possible for the submarine to "pop up" and launch its missiles.[97]

Interservice Disputes about Antimissile Defense

Only a small suspicious cloud in the early 1950s, a divergence of Army and Air Force concepts of air defense stormed up rapidly with the development of what appeared to be competing technological capabilities but which were actually, as Gen Thomas D. White pointed out, "a disagreement or different point of view on what is the proper and most economical defense, point defense or area defense."[98] As viewed by General Taylor, the Joint Chiefs of Staff agreement of 1949 that allocated primary responsibility for the development of short-range surface-to-air missiles to the Army and Navy was predicated on the understanding that the line of demarcation in air defense research efforts "was that the Army was interested in extending its traditional antiaircraft artillery role, which is largely point defense of vital targets, whereas the Air Force's legitimate interest was more in the interceptor role, so that the missiles they would go for would perform interceptor-type missions."[99]

As previously noted, the Air Force discontinued its research on short-range surface-to-air missiles after 1949 and began to put together the semiautomatic ground environment (SAGE) systems needed to control an area defense of the United States by fighter-interceptor aircraft and Bomarc ground-to-air pilotless interceptor missiles. Even though an earlier Project Wizard conducted by the University of Michigan Air Research Center revealed no promising technological developments for a defense against a hostile ballistic missile attack, the Air Research and Development Command on 6 July 1953 directed its Cambridge Research Center-Lincoln Laboratory team to prepare a plan (Project Wizard 3) for defense against intercontinental ballistic missiles. Based on the preliminary findings the Air Force awarded three contracts to three aircraft electronic company teams for the purpose of identifying the means needed to detect or identify and to intercept and destroy hostile ballistic missiles. On the basis of these reports, the USAF Scientific Advisory Board concluded that any quick-fix solution, such as the use of modified Talos or Bomarc missiles against hostile missiles, would be greatly expensive and not apt to succeed. Although Wizard 3 did not succeed in its main purpose, it produced important bonus technology in the form of a high-powered radar with a detection range up to 3,000 miles and computers that would permit a quick determination of a ballistic missile's trajectory. Operating at

a site at Milestone Hill near the Lincoln Laboratory, the experimental radar was able to view missile firings from Patrick AFB, Florida.[100]

The production and deployment of the Army's Nike-Ajax ground-to-air antiaircraft missile beginning in 1953 did not contravene the Army-Air Force understanding about air defense since the Ajax was clearly a point-defense weapon with a range of about 25 miles. In mid-1953, however, the Army began to develop the Nike-Hercules, which would have a range of about 75 miles. Since the Nike-Hercules would overlap the range of the Bomarc, General Gavin predicted that conflict in air defense roles and missions would be almost inevitable. In mid-1956 Lt Gen Stanley R. Mickelsen, commander of the Army Antiaircraft Command, had predicted: "Nike is capable of killing any known guided missile and will be effective against the intercontinental ballistic missile when it materializes."[101] In November 1956 the Army approved an additional program for the development of an antimissile system that would be known as the Nike-Zeus.[102] At the same time that the Army was extending the range of its Nike family of missiles, General Taylor denounced the Air Force's rumored intention to procure and deploy Navy-developed Talos air-to-ground missiles as "an invasion of the Army's antiaircraft mission."[103]

In preparing a memorandum to clarify service roles and missions, which he issued on 26 November 1956, Secretary Wilson noted that the Air Force wanted to deploy Talos missile installations around some of its air bases.[104] In an attempt to clarify the air defense mission, Wilson directed that the commander in chief, Continental Air Defense Command, has the authority and duty to state an operational need for new and improved weapon systems and to recommend to the Joint Chiefs of Staff all new installations of any type. The secretary further directed that the Air Force would be responsible for area defense and that the Army would be responsible for point defense. The point-defense surface-to-air missiles would be designed "for use against air targets at expected altitudes out to a horizontal range on the order of 100 nautical miles." Wilson directed that the Army would continue to develop the Nike-Ajax and Nike-Hercules and would assume responsibility for development of the land-based Talos. The Air Force would continue to develop Bomarc, and the Navy was given a free hand to develop ship-based air defense systems.[105]

Even though Wilson's memorandum placed a limit on the range of Army point defenses, it did not change the Army's concept of how the air defense of the United States ought to be built. The Army's concept of continental air defense involved a building-block approach whereby ground-to-air missile protection would first be given to strategic air bases, population centers, and other vital points and then would be extended outward to protect the remainder of the nation as far as funds permitted. To effect this system of air defense, the Army employed Nike missile batteries for high-level coverage, Hawk missile batteries for low-altitude protection, and radar for the control of the individual batteries. The Army argued that independently controlled ground-to-air missile batteries would be difficult to destroy. On the other hand, it said that the elaborate communications through

which the SAGE system would control Bomarc missiles and manned interceptors would be easier for an enemy to destroy.[106] The Air Force doctrine on air defense continued to visualize an area defense in which an air defense commander would maintain the integrity of his forces and would not permit them to be parceled out, and it taught that the enemy should be intercepted and destroyed as far as possible from a defended area. "The principle of air defense," General White explained, "should be to strike the enemy just as far from his target as possible. The best defense is to hit him before he gets off the ground with his bomber or with his missile. . . . The worst and last-ditch business is over his intended target over here."[107]

In 1957 General Taylor, along with other Army representatives, urged the secretary of defense and the Joint Chiefs of Staff to accept a "crash $6 billion program in order to achieve an operational capability with the Nike-Zeus by 1961."[108] At this same time the Air Force took a more measured look at the nation's defense requirements. The Air Force believed that the Soviet Union could have an initial operational capability with prototype intercontinental ballistic missiles sometime between mid-1958 and mid-1959 but would not be able to rely solely on this small capability to launch an attack against the United States. Thus, until about 1962, any attack against the United States would have to be made by a mass of Soviet aircraft supplemented by intercontinental ballistic missiles. Based on these estimates the Air Force visualized a requirement for an air defense system that could counter a mixed-force threat. Since the Soviets would undoubtedly aim their missiles at American strategic retaliatory forces, the immediate Air Force objective was to provide three ballistic missile early warning sites that—with 3,000-mile-range radar developed from the Milestone Hill model—could provide approximately 15 minutes warning of the arrival of hostile ballistic missiles. This short warning time would permit the Strategic Air Command to launch at least a part of its strategic retaliatory force and might save the lives of many people who then would have at least a little time to take cover.[109] Other than this plan, General White was willing to admit that the nation's air defenses were not what they should be. "The active air defense," he said, "is a can of worms, to be real honest; there are so many different kinds of weapon systems. We have got the Nike; we have got the Bomarc; we have manned interceptors; we have the radar for not only the early warning but the actual tracking and control of fighters and of Bomarcs."[110]

Expressing a lack of enthusiasm for the area and point-defense concepts of air defense, Secretary McElroy established the Advanced Research Projects Agency (ARPA) within the Department of Defense on 7 February 1958 and charged it with providing unified direction and management of the antimissile programs and for outer space projects.[111] Before the establishing ARPA, McElroy already had directed the Air Force on 16 January to continue as a matter of urgency that portion of the Wizard program which would perfect early warning radars, tracking and acquisition radars, communications links between early warning radars and the active air defense system, and the data-processing components required to form an integrated system. Simultaneously, he directed the Army to continue its

development effort on the Nike-Zeus as a matter of urgency in order to concentrate efforts on developing a system that would demonstrate the feasibility of achieving an effective anti-ICBM system that could discriminate against electronic countermeasures and decoys. The Army was to limit itself to working on the missile and launch system and to developing of acquisition, tracking, and computer components required for an integrated missile system. In effect McElroy's directive made the Army responsible for designing an antimissile missile, while the Air Force was charged to create an effective missile detection system.[112] Although McElroy stated that the principal officers in the Air Force thought that his plan was "a reasonable way to proceed," General LeMay told senators on 21 January that the decision "does not add up to me, and it does not add up to the Air Force. The Air Force recommended that the two missions go together."[113] A little later, Secretary of the Air Force James H. Douglas expressed the optimistic hope that the directives covered no more than development and that a decision as to the operational assignment responsibilities had not been made.[114] As it was charged to do, the Air Force promptly canceled the three study contracts in which it was seeking means to intercept and destroy hostile ballistic missiles;[115] but Secretary Douglas continued to hope that, once developed by the Army, antimissile defense—following the precedent of the Jupiter—would be placed under the Air Force for operational employment.[116] Chairman Carl Vinson of the House Committee on Armed Services was also disappointed at the split responsibility in the antimissile defense. On 28 January he sent McElroy a letter expressing his committee's recommendation that the total responsibility for antimissile defense, operational as well as developmental, should be promptly assigned to the Army.[117]

While the division of authority within the Defense Department for the development of an antimissile defense system would not be changed, the interest engendered in the subject resulted in some clarification in national air defense responsibilities. One problem that concerned the Air Force was a fear that, in the confusion of a national emergency, friendly Army air defense missiles might accidently shoot down Air Force planes. General LeMay was adamant about the need for a complete integration of Army weapons in a true defense in depth that would prevent losses of friendly aircraft to friendly antiaircraft missiles. "Our air offensive and our air defense," LeMay said, "cannot be permitted to interfere with each other. This requires extremely close direction and control to assure protection of our offensive and defensive forces and the most effective destruction of enemy forces."[118] In its report on the military construction bill for fiscal year 1959, the Senate Committee on Armed Services called attention to the fact that both the Army and Air Force had been making defense plans "without regard to the accumulation of long-range contingent liabilities." Thus, the final bill passed by Congress required the secretary of defense to determine which missiles or combination of missiles were to be employed in specific areas. After more than a year's study of the very complex subject, the secretary of defense approved an air defense master plan on 19 June 1959 that projected the air defense system that was to be operational in the continental United States by fiscal year 1963. In broad

detail the secretary accepted the Air Force concepts of area defense, an integrated air defense in depth, and a centralized control of air defense weapons.[119] However, the air defense master plan required marked changes and reductions in the Air Force continental air defense program.

Integrating Missiles into the Air Force

"To say there is not a deeply ingrained prejudice in favor of aircraft among flyers," stated General White, whose service as vice chief of staff and chief of staff of the Air Force spanned the eight years after June 1953, "would be a stupid statement for me to make. Of course there is."[120] General LeMay, who became vice chief of staff in July 1957 and chief of staff of the Air Force in July 1961, was similarly candid in a speech in Philadelphia in September 1961. "I seek weapon systems," LeMay said, "that I think can do the best job and afford the nation the most protection. In military thinking I am a conservative. I believe we shouldn't discard a proven, reliable weapon system or concept unless we have something that is able to replace it and do a better job. In short, I believe in having protection along with progress."[121]

The Air Force problem of providing "protection along with progress" greatly complicated all phases in the process of providing modernization. "In 1946, right after the end of the war," Dr Edward Teller stated, "we could have said: Let us develop ballistic missiles. . . . Well, we did go into the development of ballistic missiles, but at an exceedingly slow and small rate. We did not start a vigorous development because it could not be proved that these missiles [would] be really important." Although the Soviets apparently were willing to take great gambles in their development programs, Teller noted that Americans were willing to spend billions when they knew there was a big payoff in prospect but were conservative when it came to spending even a few millions on something no one could predict for certain would pay off. "In this intermediate range of practical research," he concluded, "we have been rather poor."[122] Speaking about barriers to Air Force missile development, Colonel Hall, who became chief of the Western Development Division's propulsion development, pointed out: "The barrier to be overcome was not of sound, or heat, but of the mind, which is really the only type that man is ever confronted with anyway." Hall noted that the armed services were compelled "to justify their development activities in terms of the economic validity of the gains to be achieved. No new weapon, however spectacular, can really be justified," he said, "unless it promises to perform military tasks at a lower gross cost than will any weapon system preceding it."[123]

At the same time that new weapons had to be justified in terms of lower gross costs, they also had to be justified within the Air Force in terms of operational suitability. To some extent the concept of force modernization made for a dichotomy between operational concerns and the need for combat readiness on the one hand and research and development on the other; this gap was closed only gradually. The original definition of the Air Force guided missile projects in

1945–46 was generated by a small group of men within the Air Staff who were almost entirely concerned with an expansion and exploitation of technology.[124] Senior Air Force officers accepted the proposition that the Air Force must develop experimental missiles, but they believed that push-button warfare was far from a reality. In consolidating its missile development projects in May 1947, the Air Force gave priority to missiles that could support or defend against a strategic air offensive. The Air Force also accepted the decision that missiles would be integrated into the force structure as an evolutionary undertaking. This policy required the Air Force "to program guided missile units in addition to its manned aircraft units, and as the effectiveness of the missiles is established the extent to which they will replace or supplement manned aircraft units may be considered."[125] In spite of this decision, the Air Force did not form operational concepts for missiles until 1952, nearly seven years after the technical projects had been established. Issued on 18 September 1952, the Air Force policy letter on guided missiles declared:

> Concepts concerning the organization of pilotless aircraft units, their logistic support, and their tactical operation are being developed that basically adhere to existing concepts for Air Force operations In short, it has become clear that the Air Force will incorporate pilotless aircraft into its organization with only slightly more readjustment than is necessary when new models of more conventional aircraft types are made available to its flying units.[126]

The thought that missiles had different characteristics from aircraft matured rather slowly. By 15 August 1955 the Air Force was willing to state a stronger policy that recognized that "guided missiles are weapons with special qualities." "Manned aircraft techniques," noted the new Air Force policy statement, "have, of necessity, been the basis in the past for most of the development practices and planning for use of missiles. Reluctance to depart from such development practices and planning procedures may prevent maximum progress." This policy still contemplated that a limited number of missile units would be formed by appropriate commands to provide operational data, but this action would have to be initiated during the research and development program. Plans for integrating missile units into the combat inventory, moreover, would have to be made even before operational data on the capabilities of the missiles was complete.[127] Apparently since little thought had been given to the conceptual problem earlier, the Air Force found itself in need of answers to many questions about missiles in 1956. Asked deputy assistant for programming Col Jack N. Donohew in December 1956,

> will an airpower represented only by ballistic missiles located in this hemisphere represent a "Maginot line" concept and thereby cause a trend toward military isolationism . . How long will you require a dual force, manned and unmanned, before you are willing to accept the unmanned? How long will you wait before you will be willing to give up a manned unit and take an unmanned unit in its place? What sort of a kill capability will you insist upon in the unmanned weapon knowing that it will give you one

> sortie? How will you assure yourself that the unmanned weapon is always ready to go? Can you shift your thinking from a "control of the air" concept based on actual combat operations to one of "deterrent control of the air" based on unmanned weapon systems in being and capable of instantaneous launch? How much assurance of operational capability must you have before you will be willing to stake the future of this nation on the pressing of a button—a button that launches an attack which cannot be recalled?[128]

Answers to these conceptual questions had to be evolved separately in the Strategic Air Command, the Tactical Air Command, and the Air Defense Command.

Integrating Missiles into the Strategic Air Command

The Strategic Air Command's mission of maintaining a constant state of split-second combat readiness greatly complicated any aspect of force expansion or modernization. In the early 1950s the Strategic Air Command (SAC) devised successful procedures for reequipping and retraining some of its wings while others continued to maintain combat readiness. The success of these procedures, however, demanded that new equipment should be virtually combat ready before it was assigned to strategic air wings.[129] As the result of the requirement established in 1944, the Air Force elected to develop a Boeing six-engine, medium-range B-47 jet bomber. The plane made its first flight in 1947 and entered production in 1948; the Strategic Air Command received the first operational aircraft in 1951. The B-47 became the standard aircraft for replacing the old B-29s and B-50s and equivalent reconnaissance types in the 26 medium bombardment and five medium strategic reconnaissance wings allocated to the Strategic Air Command in the Air Force 137-wing program.

Although design studies had begun in 1945, the Boeing eight-engine, long-range B-52 did not attain a final design configuration until 1950. Produced from a contract issued in February 1951, the first B-52 flew in April 1952. The first operational B-52 was delivered to a SAC combat unit in 1955, and B-52s and RB-52s were programmed to replace B-36s and RB-36s in the seven heavy bombardment and four heavy strategic reconnaissance wings allocated to the Strategic Air Command in the 137-wing program.[130]

In the original planning for the 137-wing Air Force expansion, the Strategic Air Command was allocated eight strategic fighter wings and two strategic fighter reconnaissance wings, but how these wings would be employed or what their equipment would be remained in doubt. In March 1951, the McDonnell Aircraft Corporation's XF-88A won the design competition for a long-range fighter. After substantial modification and redesignation as the F-101A Voodoo, this plane was slated for procurement and delivery to the Strategic Air Command in a fighter and reconnaissance configuration in the 1956–60 time period. What the Strategic Air Command actually wanted was an intercontinental range fighter that could precede bombers to a target area in an advance wave and eliminate hostile interceptors, probably by delivering nuclear weapons against airfields. The only fighter that the Air Research and Development Command could visualize for this

role would be as big as a medium bomber. SAC, declining to receive such a plane, modified the 137-wing program to increase its B-47 wings from 26 to 28, with a corresponding reduction in fighter wing authority. In May 1956 SAC inactivated another fighter wing and replaced it with a unique light strategic reconnaissance wing equipped at first with RB-57 aircraft. The five strategic fighter and one strategic fighter reconnaissance wings that SAC retained continued to be equipped with F-84F and RF-84F aircraft.[131]

Neither the B-47 nor the B-52 were supersonic aircraft, but studies initiated by Boeing and Convair in 1946 indicated the feasibility of a supersonic jet bomber and outlined its characteristics. After renewed studies started in 1949, the Air Force published a general operational requirement for a supersonic bomber in 1952. Both Boeing and Convair submitted designs, and the development contract was let with Convair in February 1953 for an XB-58 aircraft, a bomber that in many respects would resemble a blown-up version of Convair's F-102 Delta Dagger fighter-interceptor. Following the new development concept, the B-58 would be developed as a complete weapon system with Convair as the single prime contractor. After reviewing the B-58 program at a master planning board meeting in December 1954, a Strategic Air Command representative liked the supersonic capabilities of the aircraft but bluntly stated that the plane's lack of intercontinental range was somewhat less than what SAC desired for a replacement for the B-47 medium bomber. The Strategic Air Command continued to have reservations about the B-58 even after it was first flown in November 1956. Whether the Air Force would order procurement of the relatively expensive B-58 remained in doubt through most of 1957, pending performance tests of the prototype model.[132]

As soon as the B-52 was committed to production, General Power, then vice commander of the Strategic Air Command, requested on 30 March 1953 that for the 1960–65 time period the Air Force undertake developmental studies for a new high-performance intercontinental bomber that should "embody the longest range, highest altitude, and greatest speed (in that order of priority) [possible] in the time period under consideration and consistent with requirements of military payload and defensive systems." Power pointed out that missiles would have to attain a high degree of accuracy and reliability before they could replace or supplement manned aircraft units. He further noted: "Regardless of the missile program, it is the opinion of this headquarters that the continued advance in the art of manned flight to high altitudes and long ranges should be at all times a priority objective of the Air Force's development program."[133]

Even though Air Force aircraft had always utilized petroleum fuels, the Boeing Company, when given a one-year contract to study Power's request, proposed a new approach to the twin requirements of speed and endurance. The application of nuclear energy had been under study since 1946, and more recent investigations promised to develop a new high-energy chemical fuel. Boeing proposed to develop a nuclear cruise bomber that would utilize high-energy chemical fuel for a high-speed dash. In mid-1954 both the Joint Congressional Committee on Atomic Energy and the Air Force Council were enthusiastic about the importance of

nuclear power for aircraft and accordingly included a requirement for extensive studies on weapon system 110A (advanced strategic weapon system), a nuclear cruise-chemical dash bomber. In July 1954, however, the Air Force ordered that as a hedge against the failure of the development of a nuclear power plant, parallel development would be devoted to a weapon system designed only for chemical power. After additional study the Air Research and Development Command in April 1955 effectively divided the two power projects: weapon system 110A became the chemical-powered bomber and weapon system 125A was established for the development of a nuclear-powered bomber.[134]

In the autumn of 1950 when it became apparent that research and development might soon provide strategic missiles, the Strategic Air Command established a guided missiles project office in its Directorate of Plans. The Strategic Air Command's criteria for pilotless aircraft were soon stated to be reliability, accuracy, minimum vulnerability, and operational suitability.[135] On 17 August 1951 General LeMay stated that the Strategic Air Command's policy was "to get into the guided missiles business at the earliest possible date and further to get guided missiles into the war plans at the earliest possible date. These two objectives are to be accomplished without sacrificing combat capability."[136] "It is only by staying ahead," wrote Brig Gen R. M. Montgomery, SAC's chief of staff, on 2 October 1953, "that we can stay on top." Montgomery, nevertheless, expressed SAC's concern that the Air Force appeared to want to program the Rascal missile into SAC's wings before the Rascal demonstrated any operational capability; he pointed out that SAC could not afford to modify B-36s or B-47s for a capability that appeared to be of questionable operational worth.[137] In response to an Air Staff request for an exact statement of SAC policy on guided missiles, Montgomery stated on 18 April 1954: "the nature of the mission assigned to the Strategic Air Command by the Joint Chiefs of Staff requires the maintenance of a constant state of combat readiness. This, in turn, established a firm requirement for any weapon system which is integrated into the SAC inventory to possess a proved, and demonstrable combat capability in terms of range, accuracy, and reliability." At this time the Strategic Air Command could see some compatibility between the Rascal and the B-36. However, it believed that, if the B-47s were required to carry the standoff missile, they would be seriously degraded in range and in altitude characteristics. The Strategic Air Command was even more skeptical about the potential operational worth of the Snark: in its existing configuration the Snark appeared to have little potential as an operational weapon system.[138]

In the Air Force in the early 1950s there were predictions that guided missiles would be the "exclusive vehicle for future air war" and that the Soviet Union might skip the jet bomber stage of aircraft development and jump directly into guided missiles. Brig Gen Dale O. Smith argued against the first prediction in November 1953. Smith believed that the art of war would continue to be "a contest of wills, strategy, and quick decision based upon fragmentary information." Only a pilot in a manned air vehicle would be able to appraise situations that could not be predicted in advance.[139] The second prediction appeared invalid when the Soviets

gave no signs of skipping jet bombers and developing missiles. On May Day 1954, in the fly-by over Moscow, the Soviet air force openly paraded new Tu-16 Badger medium jet bombers, which evidently were in quantity production, and a single type-37 Bison heavy turbojet bomber, which apparently was a prototype of an intercontinental aircraft needed to attack the United States.[140] Following an Air Research and Development Command briefing on new weapon systems late in 1954, General LeMay accepted the proposition that the ICBM would be the ultimate weapon in SAC's inventory. However, he asserted that manned bombers would be the primary weapon for a long time to come. He urged the assignment of the highest priority possible to the development of weapon system 110A together with penetration aids to include an air-to-surface missile and early development and production of an air-to-surface missile for the B-52. LeMay recommended discontinuation of the Rascal program and elimination of the Snark if it detracted from weapon system 110A.[141] In a study prepared for the Air Research and Development Command on 27 May 1955, General Yates described the deficiencies in guided missile programs as tracing back to a superficial recognition at top levels of the government of the potential dominance of missiles and to the relative underemphasis on guided missile development within the Air Force that stemmed primarily from a preoccupation with manned aircraft.[142]

In the spring of 1955 American intelligence continued to be fearful of Soviet aircraft development. At the 1955 May Day celebration in Moscow, the Soviets displayed 13 type-37 Bisons and at least three (some observers counted nine) turboprop Tu-95 Bear heavy bombers. This display indicated that the Soviets had put the intercontinental Bison into production fully a year before predicted and that the even more formidable Bear also might be in production. At this same air show the Soviets displayed 43 twin-plate, all-weather Flashlight jet interceptors, enough to make it evident that these very dangerous, swept-wing fighters were already operational in air defense units.[143] These aircraft sightings demanded an immediate reassessment of Air Force capabilities. The size and composition of the Strategic Air Command had been computed early in 1954 on a wargaming of the then existing JCS target list and expected combat attrition rates. Based on a floating D-day, B-52 production rates were fairly leisurely and were predicated on a 40-hour week without overtime at Boeing's plant in Seattle. To reduce the potential vulnerability of a single-source production of B-52s the Air Force had already asked for a second source of production. When he received the news of the Soviet aircraft sighted over Moscow, Secretary Wilson acted swiftly to expand B-52 production and to bring a second Boeing plant into operation in government-owned facilities in Wichita, Kansas. In an expeditious action, Wilson secured Eisenhower's approval for the action within the National Security Council and bypassed the Bureau of the Budget. On 26 May, Secretary Talbott and General Twining appeared in executive session with the Senate Armed Services Committee and received approval for accelerating B-52 production by 35 percent. Emergency budget actions added some $356 million for increased aircraft procurement to the budget for fiscal year 1956.[144]

Even though Secretary Wilson supported the expansion of B-52 production, he announced his opposition to any enlargement of the Air Force beyond its goal of 137 wings by the end of 1956.[145] Since 137 wings had become a magic number representing the ultimate in air power, the Strategic Air Command had to effect changes within its internal force structure in order to schedule more bombers against an expanding target spectrum. Although SAC had programmed seven heavy bomber wings and four heavy reconnaissance wings as separate functions, it quickly determined that the requirement for bombs on targets would be more important than poststrike reconnaissance and secured authority to shift reconnaissance wings into bombardment work on 1 October 1955. This action represented a more than 50-percent increase in long-range B-52 bombardment capability.[146] As soon as it got operational experience with B-52s, the Strategic Air Command found it feasible in the spring of 1956 to program 45 B-52s per wing as opposed to the former allocation of 30 B-36s per wing.[147] Based on these actions and counting additional planes allotted for combat support and testing, the Air Force ended up with a total authorization for 603 B-52s.[148]

In spite of the authorized augmentations of the Strategic Air Command, General LeMay was anything but optimistic when he appeared before the Symington committee hearings on air power in April 1956. LeMay explained that to get the best results from a small number of well-qualified technical personnel, SAC formerly had concentrated its air units on a few air bases. Now LeMay emphasized that SAC would have to expand its base system to reduce its vulnerability. Pending a new wargaming of Soviet capabilities, LeMay was not prepared to say how much larger the SAC force should be but he knew that it should be larger. He wished the Air Force to press forward with the development of an intercontinental ballistic missile, but he doubted that the first models of these weapons could be as efficient as manned bombers. "I think," he said, "it is reasonable to say that the first ICBM will augment the manned bomber force; and at some later date will supplant a portion of the manned bomber force. But I do not believe that in the foreseeable future the ICBM will replace all of the manned bomber force." LeMay urged that the ICBM be developed "with the utmost urgency" and that a follow-on manned bomber to the combination of the B-52 and KC-135 be produced "at the earliest possible time," but "before then," he said, "we need more B-52s."[149] In meetings in Omaha and Washington on 6 and 13 June 1956, LeMay and key SAC officers stated the following priorities for production and development: (1) B-52s, (2) B-52s plus penetration aids, (3) weapon system 110A, (4) weapon system 110A plus penetration aids, (5) Navaho, (6) Atlas, and (7) weapon system 125A. LeMay stated that even after the Navaho and Atlas were fully developed, the Strategic Air Command still would require manned bombers to strike the targets designated for it.[150]

Although the basic idea had long been tacitly accepted, the Air Force definitely announced in 1956 that it would adhere to a concept of maintaining a mixed force of manned air vehicles and guided missiles. In an article published in September 1956, Maj Gen Richard C. Lindsay, Air Force director of plans, pointed out that

missiles had unique characteristics but were still characterized by relatively large circular error probabilities and would be operationally inflexible once they were launched. "It appears unlikely," he wrote,

> that guided missiles will completely replace aircraft in any mission area during the foreseeable future It looks as if the future force structure will be mixed in varying degrees depending upon the job to be accomplished A look at the technical estimates of the surface-to-surface missiles' future capability in relation to manned aircraft and the targets to be attacked indicates that about fifty percent of the Strategic Air Command's mission could sometime be accomplished with guided missiles [151]

General Twining suggested early in 1957 that the phaseout of manned bombers and fighters would have to be slow and could not be undertaken until missiles were operational and had proven their worth. In Twining's opinion, missiles with large warheads would be effective against area targets but would not be effective against precise targets such as enemy airfields for many years. "As I see it now," he said, "I would employ a bomber force to go get the airfields rather than gamble on missiles."[152] Expressing basic agreement with the Air Force chief of staff, General Schriever stated: "This ballistic missile is largely a retaliatory weapon, and it would be used against an enemy's economy."[153] Summing up the Air Force position on a mixed force, Col James B. Tipton of the Air Force plans directorate pointed out, in May 1957, that "the unique characteristics of missiles of all types, both offensive and defensive, make them superior to manned systems in many respects and they will replace manned systems when demonstrated capabilities indicate those tasks which they can do better or cheaper. In most respects, however, missile systems are complementary and not competitive."[154]

As it had been projected to do, the Strategic Air Command completed its expansion to the 51 wings authorized to it under the 137-wing program in May 1956. But even as this objective was accomplished, the changing world environment was already rendering that force level obsolete and it was apparent that the Air Force could not support 137 wings and continue to modernize them without additional appropriations. Based on an appreciation of the fact that "the number of bombers we require is a function of the targets we must hit, the time period in which our strikes must be completed, the effectiveness of the enemy warning and defense system and the degree of protection and dispersal we can provide our force against his attacks," General Twining agreed that the Strategic Air Command needed additional B-52s. In preparing the fiscal year 1958 budget estimates, Twining asked the Joint Chiefs of Staff to accept a requirement for six additional B-52 wings, making a total of 17 heavy bombardment wings. Given the development of air-to-surface standoff missile, Twining estimated that the B-52 could continue to be an effective delivery system through 1965 and very probably beyond that period. As long as the Strategic Air Command's medium bomber groups had been equipped with relatively slow B-36 bombers, SAC required strategic fighter aircraft. However, the B-52s would be expected to defend themselves and SAC's six fighter-type wings could be eliminated, thus making way for higher priority

programs. According to Twining, the Joint Chiefs of Staff refused to accept the requirement for expanding the number of B-52 wings, particularly since the aircraft complement of each of the 11 B-52 wings was being expanded from 30 to 45 aircraft. As a result, the Air Force budget for fiscal year 1958 visualized the already approved 11 wings of B-52s. Twining accepted this decision with evident reluctance. "If the enemy continues his building program of long-range bombers," he warned, "we will again examine the size of our B-52 force."[155] Given this shift to the B-52, the Strategic Air Command divested itself of its fighters. In the first half of 1957, SAC transferred its four most experienced strategic fighter wings to the Tactical Air Command and inactivated its other strategic fighter wing and the strategic fighter reconnaissance wing.[156]

At the same time that he sought additional intercontinental bombers to program against an increasing number of targets in an increasingly severe defense environment, LeMay subscribed to the concept that defined a deterrent force as "an effective nuclear offensive force which is secure from destruction by the enemy regardless of what offensive and defensive action he takes against it."[157] At its establishment, the Strategic Air Command had inherited many bases in the United States that had been built in good-weather areas for use in training units that would fight overseas. Most of these bases were thus in the southern part of the United States and were poorly located for transpolar intercontinental air missions. During the 137-wing expansion, moreover, nearly all SAC bases had to accommodate two wings. Even with in-flight refueling, the medium-range B-47s had to be programmed to conduct their offensive strikes from bases in Europe or in the Pacific, bases which were hazarded by Soviet Tu-16 Badgers during the middle 1950s and would soon be covered by Soviet intermediate range ballistic missiles.[158] Seeking to provide increased security and to compound the enemy's offensive force requirement, General LeMay recommended in 1956 that no more than one squadron of B-52s and one wing of B-47s should be located on a single base. The Air Force accepted the objective of so dispersing the B-52s during fiscal year 1958, but it could not immediately afford to disperse the much larger number of B-47 wings.[159] As eventually worked out, the solution for the dispersal of the B-47 wings included thinning them down to one wing per base and designating an additional 80 to 100 alternate airfields to which B-47s would disperse in periods of international tension.[160]

The survival of strategic aircraft on a given air base was related to the degree of alert practicable and the warning time available. With the distant early warning (DEW) line in operation against Soviet jet aircraft, LeMay counted on getting two hours' tactical warning time and believed that it would be possible to get something like 60 percent of his aircraft into the air in this time. Against a Soviet ICBM attack, however, the zone of interior bases could count only on about a 15-minute tactical warning; overseas bases would be fortunate to get as much as 10 minute's advance notice of Soviet IRBM strikes. As a part of their normal training some aircraft crews were always in a state of readiness for missions and could quickly be diverted to retaliatory strikes. Already looking forward to the era of intercontinental

missiles, LeMay began preparations in 1956 to secure a degree of ground alert readiness that would enable his wings to launch as many aircraft as possible in 15 minutes. "If we can get this alert concept worked out to a point where we can operate under it with a high degree of efficiency," he said, "then I think that even though the Russians have the intercontinental missile that they will still have to consider that question: Will we accept this number of bombs?"[161] The ground alert concept was expensive in requirements for alert facilities and additional aircrews, but by the winter of 1956–57 SAC was planning to keep 30 percent of its crews and aircraft on ground alert. This planning matured quickly after September 1957 and in July 1958 the command placed approximately one-third of its combat-ready fleet on continuous ground alert.[162]

One of the principal reasons why LeMay wished to build up SAC's B-52 and KC-135 intercontinental capability was a realization that overseas bases would become increasingly vulnerable to Soviet medium-range bombers and IRBMs.[163] Rather than to continue to risk entire wings at advance bases, the Strategic Air Command, in July 1957, instituted Reflex—a concept of forward deployment to bases in North Africa. Under this concept, designated B-47 wings periodically rotated small numbers of crews and aircraft to the forward bases where they stood runway alerts for short intervals of time. Reflex was subsequently extended to deployments at bases in Spain, the United Kingdom, and Alaska. In forward deployments to the Pacific, SAC implemented Airmail—a plan under which B-47 aircraft were kept on alert in place on Guam while aircrews were rotated to and from Guam at monthly intervals.[164] As SAC increased its force of intercontinental B-52 bombers, overseas bases became less vital to accomplishing the strategic air mission.[165] In 1959 Rand expert Albert J. Wohlstetter argued that overseas bases had so little warning time as to make them of little value in case of a general war. On the other hand, Air Force officers maintained that the continued use of these admittedly vulnerable bases gave additional flexibility and efficiency to the strategic attack, added complexity to the timing of a Soviet surprise attack, and permitted the B-47s to operate from ranges nearer to their targets. "The knowledge that SAC is a truly global force," pointed out Lt Gen Walter C. Sweeney, Jr., commander of the Eighth Air Force, "complicates Soviet targeting and dilutes his war effort." In view of the increasing danger of Soviet IRBM attack, the Strategic Air Command began to reduce the size of the Reflex deployment in August 1959, but under Airmail continued to maintain B-47s and their crews on alert at overseas bases.[166]

As he was nearing completion of his long assignment as commander of the Strategic Air Command in the spring of 1957, General LeMay was satisfied with the rate of modernization of the strategic air arm. However, he believed that the Strategic Air Command had made plans that would permit it to maintain its effectiveness both as a deterrent and a war-winning force. Looking toward the era of intercontinental missiles, LeMay's plan required the development of an all-intercontinental force, including ICBMs, maximum dispersal of aircraft and crews, and maximum ground alert.[167] Because it was concerned about finances

and the maintenance of combat-ready capabilities, the Strategic Air Command continued to question Air Force plans to put Snark and Rascal into operation. Snark seemed to be of questionable superiority to other strategic systems and Rascal appeared to be practically useless in an environment requiring alert forces. After attending a briefing in Omaha, Secretary of the Air Force Donald A. Quarles stated on 9 February 1957 that a "tried and proven manned bomber force should not be reduced and replaced by an untried missile force. However, it is vital that the Air Force get on with development and procurement of missiles."[168]

Writing in the summer of 1957 shortly after he became Air Force chief of staff, General White agreed that the ballistic missile was "less flexible than the manned bomber." He pointed out, however, that "its addition will definitely add a considerable measure of flexibility to our forces as a whole." General White reasoned:

> Its reaction time and speed of flight are very valuable characteristics in a situation requiring immediate response to an attack. The ballistic missile will also permit greater versatility for our forces by relieving the manned bomber of those heavily defended targets where the cost of attacking with bombers would be too high and where precise accuracy is not mandatory. In considering the characteristics of the bomber and the ballistic missile, it appears that for many years to come an optimum force will make best use of both weapons.[169]

Even though White believed that "there is no question that SAC, as presently constituted, is the only thing between us and oblivion and will be for a long time to come," he also believed that the Air Force was late in realizing the potential of missiles and that "the top level of the Air Force does not know enough about missiles." Addressing an Air Force commanders conference on 30 September 1957, White warned: "The senior Air Force officer's dedication to the airplane is deeply ingrained and rightly so, but we must never permit this to result in a battleship attitude. We cannot afford to ignore the basic precept that all truths change with time." He pointed out that money limitations would not indefinitely permit continuing an overlapping of missile and aircraft capabilities. More thought should be given to missiles and to the effect that antiaircraft missiles would have on high-level bombing. White thought that Air Force officers had never respected antiaircraft artillery; thus, he directed SAC to begin a study of the potential effect of nuclear antiaircraft missiles on high-level bombing. White also stated that he wanted Air Force officers to stop criticizing Snark and Rascal. His guidance was not intended to curtail individual thinking but to stress that the Air Force would need to present a solid front on the subject of missiles. "With the advent of the guided missile," White emphasized, "the US Air Force is in a critical era of its existence. It is essential that we all pull together in the effort to properly utilize this family of new weapons system for the defense of our Nation."[170]

In his address to the Air Force commanders on 30 September, White presented an Air Force credo on missiles; this statement was soon released to all major

commanders and to the public as the Air Force policy on missile development and employment. This policy statement read:

> 1 The USAF has long recognized the potential of missiles. According to current roles and missions the Air Force has the greatest need for such weapons.
>
> 2 Missiles and aircraft can be combined, capitalizing on the performance and characteristics of each, to create a formidable instrument of air power considerably greater than the use of missiles or aircraft alone The creation of such an instrument is a primary object of the Air Force
>
> 3 Missiles, as they are perfected, will supplement and complement the manned aircraft. However, to preserve the required capability and flexibility of operations, it is essential that the Air Force maintain a significant force of manned aircraft during the foreseeable future
>
> 4. The Air Force has and is continuing to develop missiles for use in the strategic, tactical and air defense roles as fast as technology and the availability of funds will permit
>
> 5. As rapidly as missiles become operationally suitable, they will be phased into units either to completely or partially substitute for manned aircraft according to military requirements.[171]

During the 1950s General LeMay had demanded that new weapon systems not be assigned to the Strategic Air Command until they were operationally perfected. In view of this demand as well as in an effort to provide the earliest initial operational capability for intercontinental ballistic missiles, the Air Force had assigned the whole responsibility of readying missile squadrons to the Air Research and Development Command on 18 November 1955. Seeking to compress time schedules to the maximum, the Western Development Division and its successor, the Air Force Ballistic Missile Division, instituted a new concept of concurrent development whereby operating personnel were trained, base facilities were built, and the missiles were developed and tested all at the same time.[172] Several factors impeded this concurrent development planning. Base construction funds were hard to come by and the siting of IRBMs in NATO countries required intergovernmental negotiations. In 1956 Secretary Quarles directed a "poor man's approach" or a stretch-out of programs to save funds. Planning had to be coordinated with SAC and LeMay opposed any rigid initial operational capability plans that might freeze designs and commit missiles to quantity production before a first missile had been tested. Work, nevertheless, was begun on a "soft" missile base at Camp Cooke, California (subsequently Vandenberg AFB), in May 1957. In August the Air Force selected Francis E. Warren AFB, Wyoming, and Lowry AFB, Colorado, for development as Atlas and Titan initial operational capability bases. With Air Staff approval, the Air Research and Development Command activated the 1st Missile Division at Camp Cooke on 1 April 1957 to supervise training and operational phases of the initial operational capability program.[173] By autumn 1957 the Air Force Ballistic Missile Division had the nucleus of an initial

operational missile force in being, and at the commanders conference in September General White told the new SAC commander, Gen Thomas S. Power, that he wanted SAC to get "into the picture as soon as possible without 'rocking the boat' and upsetting the overall program." On 29 November White accordingly announced that he had transferred the 1st Missile Division to SAC, along with responsibility for the initial operational capability of both the ICBM and IRBM programs. The transfer of the 1st Missile Division to SAC and the simultaneous establishment of an Office of Assistant Commander in Chief SAC for Missiles (SAC-MIKE) in Inglewood, California, became effective on 1 January 1958.[174]

After hearing General White's presentation at the September commanders conference, General Power remarked that missiles ought to be kept in perspective lest an impression be created "that the bomber is through."[175] General LeMay shared this same fear. In December, he appeared before a Senate investigating committee in what he described as an "atmosphere of sputniks and intercontinental missiles, when accusations and denials seem to be flying around." LeMay observed: "Our main deterrent power today is a manned bomber and a nuclear-weapons system. It is going to be our main deterrent and our main protection." Believing that "the proposals that are in the mill on increasing the missile program are ample for the time being, maybe a little bit strong," LeMay argued that the main danger lay not so much in the far future but in "not modernizing the force that we are depending on today to keep us out of trouble, not doing it fast enough."[176] To LeMay and Power the modernization of the Strategic Air Command required new manned aircraft as well as missiles.

Representing the culmination of some four years of preliminary studies and intensive design competitions, the Air Force awarded a contract on 1 June 1957 the North American Aviation Company to initiate development of a long-range Mach-3 jet interceptor to be designated the F-108. Following a similarly long, intensive study and design competitions, the Air Force awarded North American another development contract on 24 January 1958 for weapon system 110A—a revolutionary Mach-3 intercontinental jet bomber that would be designated as the B-70. The two development programs were carefully designed to mesh and save developmental costs. The cost of developing common items such as engines, escape capsules, and fuel systems was to be spread between the two programs. It was planned that both new planes would enter the operational inventory by 1965 and would complement missile capabilities in the decade 1965–75. In this period the Air Force assumed that surface-to-surface strategic bombardment missiles would be vitally important. However, because of uncertainties about reliability, accuracy, flexibility of employment, and relative immobility, the use of missiles would be limited, initially at least, to unhardened and accurately located targets. The manned bomber system would provide the only known means of destroying smaller, more fugitive hardened targets that required accurate attacks with high-yield weapons. The manned weapon system would be usable in major conflict, in a limited war with limited weapons, and in lesser conflicts where a simple show

of force would be sufficient. "In addition," as Maj Gen James Ferguson, Air Force director of requirements, pointed out,

> man provides discretionary capabilities for target discrimination, malfunction correction or override, timely evasion maneuvers and judgment in selection and employment of penetration aids These attributes, coupled with the bomber's flexibility of employment (heavy payloads with mixed weapons, intelligence collection, damage assessment, best altitudes, and penetration routes, recallability and recoverability) are important considerations to the probability of success in a strategic campaign.[177]

Speaking of the B-70 and the Atlas in March 1958, Lt Gen Charles S. Irvine, deputy chief of staff for materiel, explained:

> We think we need both We think we cannot afford to pin the hopes of the nation on just one machine and one solution to the military mission .. From the standpoint . of what it costs to take out a target, it costs you more to take it out with an intercontinental ballistic missile than it does to take out a number of targets with bombers, plus, the fact that you have control of the bomber force. You can start bombers toward the target and call them back . I do not know how to show your teeth with a missile, particularly when you have it in the silos, and you do not want the enemy to know where they are.[178]

In the winter of 1957–58 Generals White and LeMay believed that the development of intercontinental ballistic missiles and the supersonic B-70 would take care of the future, but the immediate task was to do something more immediately to continue aircraft modernization and give protection to the Strategic Air Command. In the immediate aftermath of Sputniks I and II, Secretary McElroy asked the Joint Chiefs of Staff to study and recommend highly important items where defense could be augmented with additional funds. To meet this request the Joint Chiefs recommended only the items which they agreed were most important. Originally these items were to have been added to the fiscal year 1959 budget, but McElroy instead secured Eisenhower's approval to submit them to Congress in January 1958 as a supplemental appropriation for fiscal year 1958. This supplemental request totaled $1,270 million, of which $910 million was allocated to the Air Force. Much of the funding was designed to provide the Strategic Air Command with warning, dispersal, and alert facilities and additional personnel to stand the alerts. Of the $1,270 million, $219 million was to accelerate the SAC dispersal and alert program, $329 million was allocated to the construction of a ballistic missile detection system, and $683 million was requested to permit acceleration of the Atlas, Thor, Jupiter, and Polaris programs. In his original submission of items for the added program, White asked the Joint Chiefs to approve the construction of new bases for tanker aircraft in Canada and the Arctic; the Joint Chiefs, however, did not accept this request as a priority item and accordingly did not include it in the supplemental request for fiscal year 1958 funds.[179]

The subject of aircraft modernization plans for the Strategic Air Command came under debate during the consideration of the military budget for fiscal year

1959. Already reduced to a total of 44 combat wings, SAC stood in danger of being "caught with 10-year-old B-47s and B-52s." Since SAC's B-52 strength was fixed at 11 wings, the B-52 production line at Wichita was slated to close after fiscal year 1958 procurement orders were delivered. The last B-47 was delivered to the Air Force in 1957.[180] The Strategic Air Command also had limited numbers of tankers. While in command of SAC, LeMay had proposed that new KC-135 tankers should match the new B-52 bombers on a one-to-one ratio. However, in view of budget limits and with the expectation that with a little warning some bombers might be able to operate from overseas bases, LeMay reluctantly had agreed with the Air Staff decision to procure B-52s and KC-135s on a three-to-two ratio. Even if the Air Staff had agreed to the one-to-one ratio, moreover, the ratio would have been difficult to attain since the KC-135 was put into production about a year and a half behind the B-52.[181] At a meeting of the USAF Aircraft and Weapons Board in June 1957, a SAC representative continued to reject the proposal that his command be scheduled for six wings of the limited-range, but supersonic B-58s. The board supported the B-58 because it was the nation's only hope for attaining a supersonic bombing capability prior to 1966 and because it feared that the B-52 might not be able to penetrate hostile defenses in the early 1960s. At another meeting of the board in November 1957, however, the Air Force Directorate of Operations recommended additional B-52s rather than B-58s. General LeMay also indicated that he favored the B-52 over the B-58 because it could carry more electronic equipment and had an intercontinental range. The Office of Secretary of Defense (OSD) had ruled against procurement of additional B-52s, however. On 26 December General White made the final decision that SAC would receive some B-58s, the final number to be determined after operational testing. As a result of these decisions, the Department of Defense budget for fiscal year 1959, submitted to Congress in January 1958, contained no funds for additional B-52s but included the purchase of 47 B-58s at an estimated cost of $796.6 million. This initial order was intended to be a test quantity rather than a production order, and because of increased cost quotations the number of aircraft to be procured had to be reduced to 36 planes. While the budget hearings were in progress, LeMay emphasized that SAC ought to have one KC-135 tanker for each B-52 bomber, but the Air Force continued to program the three-to-two bomber-tanker ratio.[182]

At least a part of the Office of Secretary of Defense opposition to the procurement of additional B-52s arose from the belief that these planes would be vulnerable to Soviet missile defenses. Early in 1958 two separate developments promised to reduce B-52 vulnerability. The Strategic Air Command demonstrated that it would be feasible to conduct low-altitude attacks with the B-52s, thereby reducing the effectiveness of Soviet antiaircraft defenses. Following the award of a research and development contract on 16 September 1957, moreover, the North American Aviation Company made rapid progress in developing the GAM-77 Hound Dog missile. This turbojet missile would allow B-52s to deliver nuclear warheads against hostile targets or defenses without entering defended areas. The B-52s would be able to carry Hound Dog missiles on pylons under their wings, thus

augmenting their armament. On the basis of these new developments, the Air Force was authorized to submit an amendment to the fiscal year 1959 budget on 2 April 1958. As subsequently approved by Congress, the amendment authorized the procurement of 39 additional B-52G aircraft at an estimated cost of $300.5 million. With these planes the Air Force was able to schedule one of the B-47 wings for conversion to B-52s, and the purchase order continued production lines in being for a possible 1960 reorder of additional aircraft.[183]

When it was tested during 1958, the B-58 Hustler proved potentially useful. Although the supersonic-dash B-58 could not be adapted to air-alert tactics such as were being worked out for the B-52 force, SAC conceived that the B-58s were suited admirably for Reflex operations. They could be deployed rapidly to forward airfields overseas, from which by virtue of their high speed they could get over their assigned targets very quickly. The principal drawback to the B-58 continued to be its high unit cost. To conserve funds, the Air Force Directorate of Operations recommended cancellation of B-58 purchases in August 1958, but by this time General Power was willing to inform General White that "the B-58 is a program vitally important to SAC and the nation."[184]

In an effort to clear up what appeared to be an apparent indecision as to its requirements, the Strategic Air Command stated on 7 July 1958 that basic Air Force programming ought to pursue objectives designed to modernize the bomber force, attain an effective ICBM capability as soon as possible, secure the aggressive support of research and development of the most promising systems for the long term, and attain compatible alert and dispersal programs to ensure maximum response to any situation. At this time SAC criticized "the spoon feeding of many weapon systems in an attempt to satisfy the projected requirements of all agencies." Although it recognized that parallel missile development programs might have been necessary to advance the state of the art, SAC now recommended that the time had come for the immediate termination of such programs as the SM-62 Snark, the GAM-63 Rascal, and the SM-78 Jupiter. In consonance with its force objectives, SAC recommended that the priorities in the procurement of weapon systems should be: (1) KC-135 tankers, (2) B-52G bombers with Hound Dog missiles, (3) B-58 bombers, (4) B-70 bombers, (5) SM-65 Atlas missiles, (6) SM-68 Titan missiles, and (7) Minuteman missiles.[185] Lending emphasis to this command letter, Power stated in February 1959: "[The] no. 1 priority in SAC—and I am talking about the immediate future and taking full consideration of time—in buying this country military posture of deterrent value, is the KC-135 B-52G combination with the Hound Dog missile."[186]

During the summer and autumn of 1958 the Air Force accepted only a part of the Strategic Air Command's recommendations. Unable to forecast the exact capabilities of intercontinental ballistic missiles, General White preferred to pursue a somewhat loose bomber procurement program that would add B-52s and B-58s to the SAC inventory in annual procurements, with two wings of B-47s to be retired for each modern B-52 and B-58 wing that could be organized. These annual procurements of modest numbers of B-52s and B-58s would ensure that the

production lines were kept open. General Power was not happy with this program. He had conceived that the Strategic Air Command might have to stress an air-alert rather than a ground-alert posture, and he wanted 20 wings of B-52s as soon as possible rather than the stretched out Air Force program.[187] Although the initial operational date slipped to December 1960, General White wanted to have one squadron with 30 Snark missiles in place at Presque Isle, Maine, because the Snark would be the world's first operational intercontinental missile and because it would confuse enemy defenses. As SAC had long urged should be done and in view of the fact that it would be phasing out B-47s, the Air Force canceled the SM-63 Rascal program in November 1958; this program had cost $448 million and had not provided a useful air-to-surface missile. Further development on the ground-launched diversionary SM-73 Bull Goose missile—which had cost $136.5 million—was canceled in December 1958. This missile would have been fired while the B-52s were proceeding to their targets and would have compounded the identification problems of Soviet air defense radars; it would not be useful if the B-52s began to operate from an air-alert posture since once launched the missile could not be recalled.[188] In a speech delivered in September 1958, General White summed up the Air Force response to the missile crisis. "First," he said,

> the missile threat did not invalidate our bomber strike force For a long time to come, this force with its great range, its capacity to carry nuclear weapons of various size and yields, and its improved electronic countermeasures, could still perform the job it was designed to do. Furthermore, because of the human intelligence factor aboard, the bomber strike force has the added advantages of recall capability and greater flexibility in target selection and tactics.[189]

Missiles for Air Defense and Air-Ground Support

From a purely theoretical viewpoint, ground-launched guided missiles appeared to have unique qualifications that fitted them for employment in both air defense and tactical air warfare missions. A missile could maneuver more abruptly than a piloted aircraft, it had a greater range per pound of vehicle, it was capable of greater operational altitude, its automatic delivery system eliminated many human frailties and errors, and it could operate at speeds far superior to manned aircraft. Also a missile could operate at night and in all kinds of weather without degraded capabilities. Since no pilot would need to be protected from a weapon's blast, a Bomarc could be provided with a large nuclear warhead. In a 24-hour air defense alert, manned fighter efficiency degenerated as men got tired, but a guided missile did not become fatigued and it did not wear out unless it was fired. In tactical employment, Matador missiles could be operated from widely dispersed field installations, thus augmenting security against hostile attack.[190]

But while missiles appeared to be well fitted to air defense and tactical air missions, few defense strategists agreed on the exact proportions of these missions that could eventually be performed with them. In September 1956 General Lindsay predicted that "only about thirty percent of tactical targets would probably be

suitable for attack by guided missiles," but he thought that in the air defense mission guided missiles "may be capable of taking over a greater percentage of the job than in any of the other areas."[191] Appreciation for the unique qualities of the Matador tactical air missile led to its production and deployment to oversea theaters beginning in 1954. During this same year, the Air Force began research and development on an improved version of this weapon system, which was designated as the TM-76 Mace. Speaking of the Matador in May 1956, however, Gen Otto P. Weyland said: "It is a supplement to, adds to, the flexibility, but it certainly does not replace the manned airplane."[192] But a month later General Taylor visualized that "the trend will be toward the substitution of the missile, the Army-controlled missile, for what we call close support of ground forces."[193] Asked to speculate on the future of manned fighter aircraft in February 1958, General LeMay replied: "I think their importance is going to diminish in the future, particularly in the tactical role—the fighter-bomber types, for instance. I think we are going to require a manned vehicle in the air defense role for some time to come."[194] Only two months later, General Ferguson wrote:

> To an airman, the need for manned aircraft in tactical air operations is obvious. Tactical war is a war of movement After fixed targets have been attacked, the problem is to seek out and destroy the moving targets Often these targets are fleeting. They must be attacked as soon as they are observed, or they are gone. Here, missiles are of very limited use without necessary reconnaissance The manned aircraft, on the other hand, carries with it both a reconnaissance capability to find the target and weapons to destroy it The tactical fighter bomber is designed with the flexibility for attacking not only the fixed and pinpointed target, but also the target that must be located.[195]

In April 1958, Weyland had occasion to repeat what he described as his "long-held conviction that tactical surface-to-surface missiles, ballistic or cruise, can only be considered as a supplementary and secondary offensive tactical weapon to the manned airplane. Their actual tactical usefulness will be limited, will complicate the enemies' defense, but will be more psychological than tangibly destructive in value."[196]

One of the chief reasons for the confused thinking about the comparative values of missiles and manned aircraft in the air defense and tactical air missions arose from the fact that technological potentialities in both media were developing rapidly and posed a constant strain upon the limited research and development funds that could be made available. In the early 1950s both air defense and tactical air units were equipped with first-generation jet aircraft that were procured in quantity during the Korean War. Possibly because of difficulties and costs arising from the quantity production of the F-100 Super Sabre before the plane was adequately tested, the Air Force pursued a very cautious program of procuring new fighter aircraft, which Trevor Gardner described as a fly-before-you-buy philosophy.[197] Because it had great confidence in the North American Company, which had produced the F-86 Sabre, and because it needed an improved day fighter to oppose vast numbers of Soviet MiG-15s, the Air Force put the F-100 Super Sabre

into quantity production in mid-1953 before it was adequately tested. Since the fire control system on the Sabre had been satisfactory, it was assumed that a similar system would be acceptable in the F-100 and no complete weapon system specification was written for the F-100. This was not to be the case; trouble with the Super Sabre's fire control system proved costly to correct and delayed operational availability of the plane.[198]

Afterwards the Air Force was unwilling to gamble and followed the Cook-Craigie production plan quite methodically. Aircraft were put into production at a very low monthly rate for one or two years with a minimum of hard tooling, while engineering tests uncovered deficiencies enabling corrections to be fed back into the production line. This procedure reduced the risk of a loss of money that might occur if production tooling were created too early, but four to six years could elapse before production could provide operational quantities of new aircraft. Only then could operational readiness testing begin. "It has been my unfortunate experience in the aircraft business," remarked General Irvine, "that you can test until you are black and blue in the face on a handful of machines, but you never know what you really have, you never get a real operational capability until you have a whole wing's worth, a tactical unit in operation and actually submit them to the test of a true military mission a number of times."[199]

Even though the modernization of air defense and tactical air wings progressed slowly and methodically, the sharply increased costs of this new equipment, when added to the soaring costs of missiles development, made it impossible for the Air Force to retain a modernized 137-wing force in being, once it was attained in June 1957, without promise of a substantially increased annual budget.[200] As a matter of fact the Air Force attained a 137-wing strength—which included 50 strategic, 32 air defense, and 55 tactical air wings—only by seizing upon the expedient of redesignating a strategic fighter escort wing as a fighter-bomber wing and by counting a Matador wing and four troop carrier assault wings as tactical air wings. Five fighter wings previously scheduled for organization under the 137-wing program were canceled.[201] Reductions in force immediately followed the theoretical attainment of the 137-wing objective. By June 1958 Air Force strength was reduced to 117 wings, including 28 air defense and 45 tactical air wings; continuing reductions were planned.[202]

The Air Force did not attempt to defend the reduction in air defense in terms of the development of either Nike or Bomarc missiles.[203] The severe cuts in tactical air strength, however, closely followed the Wilson memorandum of 26 November 1956, which stated that the Army should reexamine its requirements for air support as it continued to develop surface-to-surface missiles for employment within the battle zone. Admiral Radford justified the tactical air reductions as being "desirable and advisable" since a tactical air force based on "big fields in close proximity to the enemy is very vulnerable to destruction." He said, "Missile support of the Army is probably better dispersed and not so vulnerable."[204] General Irvine justified the deletion of light bombers from tactical air strength because they duplicated the new capability to be provided by intermediate range ballistic

missiles.[205] General White was confident that "the Army [could] with [its] Corporals, Honest Johns, atomic artillery, and so on, supplant the tactical capability that we have eliminated."[206] General Taylor actively urged that the Army perform an increasingly large proportion of its own support with organic missiles; nevertheless, he wished to ensure "that as the Air Force support goes down that of the Army's units is coming up proportionately."[207]

Aircraft and Missile Projection in Tactical Air Command

When they talked about the subject, the top-level defense leaders tended to equate tactical air power with the support of ground forces. However to General Weyland, who was at the head of the Tactical Air Command, the experience of World War II and Korea had demonstrated that close support of ground forces amounted to only 15 percent of offensive tactical air effort. "Attainment of air superiority through offensive operations and interdiction of communications systems," Weyland pointed out, "have always been and continue to be primary missions of theater or tactical air forces."[208] Within the Tactical Air Command it appeared that the portent of tactical nuclear weapons promised to accentuate the lessons of World War II and Korea. Experience obtained from the testing of Army and Air Force forces under nuclear battle conditions during Exercise Sagebrush in November and December 1955 tended to confirm TAC's thinking. "Air superiority," wrote Maj Gen John D. Stevenson, the Tactical Air Command's director of plans,

> has had a different meaning as a result of Exercise Sagebrush. No longer does the force with numerical air superiority alone necessarily enjoy air superiority. Air superiority cannot be established as long as the opposing force retains any bases from which to launch a strike force with an atomic capability One of the most important lessons learned from the exercise was that the force initiating the attack attained a tremendous advantage In fact in both tactical phases the force initiating attack was able to attain and maintain air superiority and to win the counterair war Although initiating an attack is not recommended, an operational concept that will give friendly forces a chance of survival during the initial phase of a nuclear war is very much needed [209]

Based on the lessons of Korea and projected tactical requirements for air atomic warfare, the Tactical Air Command conceived the need for the employment of a family of tactical air fighters in a forward area: fighter-bombers, day fighters (air superiority), and fighter-interceptors (all-weather). Experience indicated that each type of these planes ought to perform the other's missions in the event of an emergency, but the same experience also indicated that it would be difficult, costly, and perhaps impossible to design and procure an all-purpose fighter.[210] In 1952, for example, the Tactical Air Command placed a requirement for a lightweight, high-performance day fighter that would be cheaper, yet able to out-perform heavily stressed fighter-bombers in air-to-air combat.[211] The conceptual difference between the tactical day fighter and the air defense fighter involved

building into the former an ability to close on and destroy multiple air targets in fighter sweeps; the air defense fighter required all-weather capabilities and a high probability of single-pass destruction of hostile bombers and fighters.[212] The fighter-bomber weapon system was designed to destroy enemy targets during daylight hours and in good weather, but its limited night, all-weather, and ordnance carrying capabilities established a companion requirement for a tactical bomber weapon system that would provide a capability to perform missions previously handled by light bombardment and night intruder aircraft.[213] The Tactical Air Command also had a requirement for "a reconnaissance version of the latest day fighter . . . to obtain critical visual and/or photographic reconnaissance of targets, such as airfields and missile sites located in highly defended areas." Even though tactical air forces had in the past needed a reconnaissance version of a light bomber to perform all-weather and electronic reconnaissance, the Tactical Air Command believed that the advancing state of the art could enable these functions to be performed by an all-purpose reconnaissance fighter.[214]

Even before Sagebrush, the Tactical Air Command recognized that any aircraft based on forward airfields would be extremely vulnerable to enemy air attack, especially since the enemy would have the opportunity for the first strike. This vulnerability could be reduced by new concepts of tactical employment and by the development of new tactical air equipment. The new tactical approach to the problem involved establishing forward and rear bases with a minimum number of high alert air units in the forward areas and the bulk of the air units located at safer rear-area bases. Beginning a scheme of operations similar to the composite air strike force (CASF) concept in 1954, the Tactical Air Command kept two fighter squadrons of a fighter group in the United States and rotated a third squadron from the group to such combat airfields in Europe as Dreux and Chaumont in France and Aviano in Italy. Weyland felt that at the outset of hostilities in an oversea area, "one combat squadron, without its dependents, will actually have more combat capability than the entire wing would if it had the families and children around there to worry about." In an emergency or at the outbreak of hostilities, the Tactical Air Command planned that the two squadrons from the United States would immediately join the single squadron that was on the alert in the forward area.[215] The chief difficulty in developing this concept to its fullest was a deficiency in suitable tanker aircraft. To implement the CASF concept, the Tactical Air Command secured KB-29 boom-type tankers that were released as the Strategic Air Command converted its force to KC-97 and KC-135 tankers. The KB-29s that had been employed by SAC were not completely satisfactory: the Strategic Air Command could well employ flying-boom refueling equipment since its tankers normally refueled a single bomber at one time, but the Tactical Air Command needed drogue-type refueling that would permit several fighters to refuel from a tanker in one rendezvous. As soon as possible, the Tactical Air Command secured KB-50 tankers equipped with multiple refueling drogues. All of the tankers allocated to the Tactical Air Command were conventional aircraft, and, just as was the case with the Strategic Air Command, the Tactical Air

Command's jet fighters actually needed jet tankers to accomplish refuelings at jet speeds at altitudes up to 35,000 feet. The jet fighters needed to operate at higher altitudes, and at altitudes where weather would not interfere with refueling operations.[216]

The development of new equipment offered some prospects for reducing the vulnerability of tactical air forces. As has been seen, Weyland considered that the Matador missiles that were deployed to Germany and Taiwan and the follow-on Mace missiles that were slated for service in Germany and Okinawa added to the flexibility of tactical air forces since they could be directed at fixed targets such as ports and airfields and could be employed as necessary at night and in bad weather. But Matador and Mace were air-breathing buzz bombs that could be intercepted and destroyed by an alert enemy. Weyland also favored the development of tactical ballistic missiles, but these missiles lacked flexibility and he could not consider them as substitutes for manned tactical aircraft.[217] The developmental concepts of vertical takeoff and landing (VTOL), short takeoff and landing (STOL), and zero launch (ZEL) aircraft promised to reduce the vulnerability of tactical air units, since these aircraft could be widely dispersed. Weyland was willing to accept the possibility that such aircraft might be developed eventually, but he was not too sanguine about it. By the mid-1950s tactical aircraft already were up to a Mach-2 airspeed; none of the "tail-sitter" aircraft (missiles) could promise anything like this potential performance.[218]

On the basis of a great amount of thinking, Weyland believed that the Tactical Air Command had visualized an evolutionary program that would enable it to continue to perform tactical air missions in a nuclear age.[219] The success of the program would depend on a continuing modernization of the force with new aircraft and with an appropriate expenditure of research and development effort. Seen in retrospect, however, the Tactical Air Command's program required too many different types of aircraft, especially since research and development allocations for tactical air weapon systems enjoyed very poor priorities.[220] As nearly as could be computed, only 8 percent of the Air Force research and development effort was assigned to tactical air weapons in fiscal year 1959.[221] Up until 1958 most fighter-bomber and tactical reconnaissance units were equipped with F-84F Thunderstreak and RF-84F Thunderflash planes. As a result of Weyland's strong protest that the F-84F required more powerful engines to perform an atomic delivery mission, the Republic production line was changed over in 1955 and the remaining planes on order there were turned out as F-84J Super Thunderstreaks.[222] Although the F-100 was originally designed as a day fighter and the F-100A and F-100C continued in this role, the Air Force decided in 1955 to develop an F-100D that would have added provisions for the delivery of external ordnance and would serve as a fighter-bomber.[223] The fact that F-100Ds could double as day fighters made the designations fighter-bomber and day-fighter wings questionable. In the autumn of 1957, moreover, the Tactical Air Command was committed to deploy a fighter-bomber unit on rotation to Europe but was compelled to substitute a F-100D day-fighter unit. For these reasons, effective in

July 1958, the Air Force dropped the day-fighter and fighter-bomber nomenclature in favor of tactical fighter. The mission of a tactical fighter wing became one of either attack or defense.[224] Released when the Strategic Air Command no longer required escort fighters, the long-range all-weather F-101C Voodoo and the RF-101 Voodoo photoreconnaissance aircraft entered the operating inventory of the tactical air forces in May 1957. First flown in February 1954, the lightweight, high-performance F-104 Starfighter air superiority fighter came into use in the Tactical Air Command in 1958.[225]

Although the trend apparently was not identified when it began in the post-Korean War years, the Air Force practice in selecting tactical air weapons moved away from the concept that produced aircraft designed and optimized for specific roles toward a principle of versatility in mission capability. Looking toward an all-weather tactical bomber and reconnaissance plane that could be available at an early date, the USAF Aircraft and Weapons Board recommended in November 1951 that the Air Force use a modified version of the Navy's A-3D attack bomber. The Air Force issued quantity procurement orders for this plane in 1952 and it was designated as the B-66/RB-66.[226] On the basis of a response to a qualitative operational requirement issued in April 1952 for a new tactical bomber to replace the B-66 in the 1958-63 time period, a development contract for an XB-68 was awarded to the Martin Aircraft Company.[227] The action was entirely unrelated at the time to the tactical bomber program, but in February 1952 the Republic Aviation Company proposed to develop an improved F-84X fighter-bomber. So many configuration changes were specified that the plane was designated as the F-105 when the Air Force awarded Republic a contract for its development in September 1952. Although the F-105 thus came into being without a preceding general operational requirement, it was expected to be the first aircraft specifically designed as a fighter-bomber. It was to have a Mach-2 airspeed and an ability to carry either nuclear or conventional weapons. A reconnaissance version of the plane was planned, and both versions were to be operational in 1958.[228]

When necessary design changes were made, the B-66/RB-66 emerged as a virtually new airplane, bearing only a superficial resemblance to the Navy A-3D. But the changes were not all satisfactory: an already developed K-5 bombing system, for example, had to be fitted into the already firm airframe, and the plane would never be suited for low-level operations. After poor results attained in the plane's maiden flight on 28 June 1954, and given the necessities for many modifications, program slippages, and shaky accomplishments, the B-66 program was on the verge of cancellation in May 1955. Finally in January 1956 the Air Force elected to procure only enough B-66Bs to equip the light bombardment wing serving in Europe and to outfit the remaining aircraft on the order as RB-66 reconnaissance aircraft.[229] In these same years the RF/F-105 development program progressed slowly because of scant funding and program reductions, but the YF-105A performed well on its first flight on 22 October 1955 and was heartily endorsed by the pilots who subsequently flew it.[230] Seeking to find some suitable all-weather bombing aircraft after the Air Force restricted procurement of B-66s,

Weyland proposed in June 1956 that the F-105 be developed in a two-place version with a modified K-5 bombing system in order that it might serve as an interim all-weather attack aircraft until the XB-68 was available.[231]

Based on the decision to develop intermediate range ballistic missiles, the Air Force reviewed requirements for light bombers and canceled the Martin XB-68 project on 3 January 1957. Weyland strongly protested against the elimination of all-weather attack capabilities in theater air forces, but General White reminded him that the Air Force could not invest in duplicative capabilities. White believed that tactical missiles should be employed against most fixed targets in a theater and that strategic bombers could destroy such targets as were not susceptible to attack by theater air forces. "Rather than develop a separate tactical air force all-weather bombing capability," White wrote on 17 May 1957, "I feel that a plan of complementary operations between tactical and strategic forces must be perfected, that we must orient our concept of operations to integrate the capabilities of our allies, and that policies and guide lines must be accordingly revised." After a running exchange of correspondence, Weyland salvaged some concessions. As long as replacement parts permitted, one wing of B-57s and one wing of B-66s could continue in the tactical air inventory. The Air Force also agreed to provide F-105s with all-weather attack capabilities.[232] Based on these decisions the F-105 Thunderchief was put into large-scale production in the summer of 1957 as the designated replacement aircraft for F-84s, B-57s, B-66s, and F-100s.[233]

Although he yielded some points to General Weyland during 1957, General White continued to question whether the tactical air forces would have a continued validity in a missile era. Justifying the action by citing the increased effectiveness as well as the increased cost of tactical aircraft and the planned activation of four Army missile commands, White announced early in 1958 that the Air Force would be reduced from 117 to 105 wings during fiscal year 1959, mainly through the inactivation of tactical air wings.[234] At the same time that these reductions were put forth, Air Force program planners offered an informal proposal for a worldwide reorganization of tactical air forces. This study visualized that at the outbreak of a general war, up to 500 tactical fighters and 144 tactical reconnaissance aircraft assigned to the Tactical Air Command might well be isolated in the United States and unable to deploy overseas or to contribute substantially to the war mission. The study recommended that the Tactical Air Command's assigned units be severely reduced, that overseas tactical air forces be augmented, that rotation of tactical air units from the United States to overseas areas be discontinued, and that the Tactical Air Command be reduced to a replacement training mission. The study was based on the key assumption that the Tactical Air Command could not position its tankers to support a mid-Atlantic crossing to implement an emergency war plan without conflicting with the deployments of the Strategic Air Command and the Military Air Transport Service.[235] Weyland protested the drastic changes contemplated in the study. He was willing to accept added training responsibilities, but he was not willing to give up the concept of worldwide tactical air mobility radiating from a central reservoir

of strength in the United States. In response to Weyland's protests, White was unwilling to reject the planning study. However, as had been the case with the tactical-bomber controversy, an interchange of White-Weyland letters resulted in some strengthening of the tactical air position.[236]

The attention focused upon the problem of refueling tactical aircraft during worldwide deployments was wholesome. Tests had already shown that the Strategic Air Command's KC-97 tankers could be equipped with a boom-to-drogue adapter that would permit them to refuel either bombers or fighters. In February 1959 General LeMay directed that the Air Force seek to establish a single fleet of KC-97 and KC-135 tankers equipped to serve all combat aircraft that required aerial refueling; on 3 May 1960 the Air Force established this single tanker force under the management of the Strategic Air Command.[237] Early in 1959 Brig Gen William W. Momyer, now TAC's director of plans, stated that the Tactical Air Command would attempt to move to a standardization of its aircraft. He noted that a "multiplicity of weapon systems had been a plague to the TAC inventory over the years." During 1959 the Tactical Air Command perfected a new concept of tactical air power that hinged upon a clear distinction between the requirements for forces for general and small wars. The new concept visualized that theater-deployed air capabilities ought to begin an evolutionary transition that would prepare them to perform general war missions. These missions could best be performed with missiles. Under the concept, manned tactical aircraft would be returned to the United States and held in a central reservoir from which they could be deployed as necessary for the accomplishment of small war tasks or in support of a nuclear missile exchange in a general war. After being briefed on the new concept early in 1960, General White announced: "Our tactical air effort, both overseas and in the zone of interior, is a prime function for which manned aircraft will be needed as far into the future as I can see. We should retain for ourselves the truly flexible weapon system—aircraft—and turn over to our allies the relative inflexible missile business."[238]

Development in Continental Air Defense

As viewed by the Continental Air Defense Command and the Air Defense Command, the problem of providing an air defense system for the nation was essentially one of preparing forces capable of effective action against a series of rising plateaus of Soviet offensive capabilities. Active air defenses had to be maintained against a current plateau of Soviet threat, and forward air defense projections had to comprehend successive plateaus of Soviet offensive capabilities. Since they were unable to forecast future technological capabilities, the air defense planners saw little choice other than to credit the Soviets with the ability to possess offensive capabilities that would be roughly equivalent to those that would be possessed by the United States at predictable intervals in the future. Air defense doctrine taught that the four major functions to be performed for a successful accomplishment of the mission were detection, identification, interception, and

destruction. These functions would have to be accomplished in the minimum possible time since air defense planners had to accept the probability that the Soviets would achieve tactical surprise and that the first warning of an impending attack would be generated within the air defense system.[239] Predicated upon national aims and objectives, the Air Force accepted the concept of providing an area defense for the continental United States that would: (1) provide for the earliest tactical warning of impending attack to permit deployment of alert strategic offensive forces and to alert active and passive defenses, (2) maintain continuous surveillance of attacking forces throughout the area of combat, (3) apply maximum effect weapons at the maximum possible distance from target areas, (4) employ continuously increasing numbers and types of defensive forces as the attack progressed from a penetration of the combat zone toward the target areas, and (5) provide centralized control of the air battle over large geographical areas.[240]

During World War II the P-47 Thunderbolt and the P-51 Mustang had served as all-purpose fighters. In January 1949 the Air Force Senior Officers Board had believed that it would be impossible to develop all-purpose aircraft in the future. The board pointed out that F-80 and F-84 fighters already were marginal in their capability to intercept aircraft of the B-29 type, and that, based on the design analysis of the few B-29s that had been forced down in the Soviet Union during World War II, the Russians had built a copy of the B-29 known as the Tu-4. Since the Soviets were building a long-range air force around the Tu-4, the mission of American defense would demand the development of a pure interceptor aircraft to be available by 1953-54.[241] Having determined that the new interceptor would be developed as a weapon system, the Air Force put its electronics and control system under development contract in July 1950 and initiated a design competition for the development of an air vehicle. As these decisions were being made, the explosion of a Soviet A-bomb and the beginning of the Korean conflict demanded an immediate augmentation of United States defense against a Soviet Tu-4 air attack capability, which might take the form of one-way missions flown against the United States. A temporary network of radars known as Lashup was rushed to completion in California and in the vital northeastern and northwestern sections of the nation. Other "islands" of air defense radar were established in Alaska and in the Northeast Air Command. Beginnings were made to a more permanent system of modern radars to replace Lashup. On 10 November 1950 the United States and Canada agreed to construct a line of aircraft control and warning radars across southern Canada that would be known as the Pinetree line. In an interim action to provide defense against the Tu-4 threat, the Air Force developed and procured F-94, F-89, and F-86D all-weather fighters for the Air Defense Command. The F-94 and the F-86D were adaptations of existing aircraft.[242]

The Air Force description of the pure interceptor aircraft that would be needed for service in 1954 as issued for design competition on 18 August 1950 contained uncertainties as to the type of ground electronic environment in which the new plane would be employed. The design requirements described a single-place plane

to counter a Soviet threat from B-47 or B-52 type aircraft (Badgers or Bisons) and that could operate in either local or area defense from 5,000-foot runways, have a radius of 375 nautical miles, and be capable of an altitude of 60,000 feet. The requirements description noted that manual techniques of aircraft warning and control would impose intolerable delays in a jet age but did not attempt to describe the new ground environment that would be needed.[243] When the design competition was completed, the Convair Aircraft Corporation was given a contract to develop a prototype for the 1954 all-weather interceptor weapon system in July 1951. Late in 1951 the Air Force recognized that the design specifications for the 1954 interceptor were so advanced that they could not be attained by 1954, and it accordingly directed Convair to work toward the development of an interim interceptor to be known as the F-102A and to continue work toward an ultimate aircraft that would later be designated as the F-106.[244]

While work was beginning on the 1954 interceptor, the United States substantially broadened the ground environment electronics systems in which interceptors would be expected to work. Many of the decisions about the ground environment were intergovernmental decisions, which could not be foreseen exactly in military planning. To provide additional early warning, the Air Force won the right in 1951 to procure Navy-developed RC-121 airborne early warning and control aircraft that could cover the Atlantic and Pacific sea approaches to North America. To push radar defenses farther northward, Canada and the United States agreed in October 1953 to proceed with the construction of a mid-Canada radar line. After extended study and controversy over cost, the United States decided early in 1954 to build the distant early warning line within the Arctic Circle.[245] The DEW and mid-Canada lines were planned for warning rather than for the control of interceptor aircraft, but it was apparent that the ground electronic environment was being spread out over an area that could not be covered with a 375-mile radius-of-action F-102. The short-range interceptor fitted into "island defense" rather than a broad-area air defense. Recognizing these facts, the Air Defense Command and the Air Research and Development Command began to visualize a requirement for a two-place long-range jet interceptor. On 19 February 1954 the Research and Development Command recommended that the single-place F-101 Voodoo, originally programmed as a long-range escort fighter for the Strategic Air Command, be adapted into a long-range interceptor. The Air Defense Command was willing to accept the F-101, but the Air Force preferred to delay a decision until it could hold a design competition to get information on the possibility that an optimum long-range interceptor could be developed. Held in the summer of 1954 this design competition would stimulate interest that would eventually yield the design of the F-108, but it promised nothing that could be available soon. The Air Defense Command apparently wanted more than industry could provide prior to 1960, unless the Air Force would be willing to accept a four-engine fighter of virtually the same size as an airborne early warning aircraft. Facing these facts the Air Council on 16 February 1955 directed the procurement

of two-place F-101B Voodoo fighters to serve as interim long-range interceptors.[246]

In view of the importance of attaining this long-range interceptor capability as soon as possible, the Air Force ordered the expedited development of the F-102. Early in the program the contractor was authorized to construct an initial quantity of 42 test aircraft and to tool up for a production of 125 a month. Even before the first F-102 was produced it was evident that the plane would be subsonic rather than supersonic. In cooperation with the Air Force and the Navy, the National Advisory Committee for Aeronautics (NACA) had been studying supersonic flight, and a NACA scientist provided an area-progression rule that showed that an aircraft with a fuselage shaped in a "Coke bottle" configuration could sustain supersonic flight of the highest regime. By the time that Convair recognized that it would have to redesign the F-102 according to the area-progression rule, the first 10 vehicles were so far along the production line that they had to be built in the original subsonic configuration. The contractor then had to retool, but the next model was also unsatisfactory because it was too heavy. Four of the overweight versions were produced before the contractor was able to tool up a third time for the first acceptable version of the F-102 Delta Dagger, which made its first successful flight on 19 December 1954 and became operational in mid-1956. Development of the follow-on F-106 Delta Dart was slowed by the attention given to the F-102. The F-106A made its first test flight on 26 December 1956; the two-place F-106B was first flown on 9 April 1958. The F-106 was placed in quantity production in fiscal year 1957 when F-102 production was closed out.

Viewed in retrospect the F-102 story revealed a long gap between perception of need and program accomplishment. The time from the establishment of the requirement in 1948 to the completion of the program in 1958 was ten years. The cost of the F-102 program was some $2.3 billion, and at least $30 million worth of tooling was said to have been discarded in the process of developing this plane.[247] In view of the gap that was going to exist before the F-102 and F-106 could become operational, the Air Defense Command accepted another interim interceptor—the F-104 Starfighter. The F-104 had not been designed as a fighter-interceptor and possessed electronic equipment that was not compatible with the semiautomatic ground environment that the Air Defense Command was installing. Although reluctant to take the day fighter, the Air Defense Command recognized that it could get the F-104 without great delay, and in April 1956 it asked for six squadrons of the plane. Although the F-104 was a flashy performer, it never met air defense requirements. In August 1957 the Air Force limited F-104 programming to only two wings of aircraft and canceled further production of the plane. At this time the Air Defense Command was rescheduled to receive only four squadrons of F-104s.[248]

At the same time that it was seeking an optimized interceptor aircraft, the Air Force was visualizing the requirements for a ground control environment that could handle a jet air battle. A modern jet bomber could cross the entire area covered by one radar in a very few minutes. The air defense rule of thumb thus

visualized that the DEW line would provide the initial detection of the hostile attack, the mid-Canada line would confirm the attack and order an interceptor scramble, and the Pinetree line and the permanent radars in the United States would direct the interception.[249] Even before the full extent that the warning network would take had been determined, Air Force planners recognized that the supersonic speeds of jet aircraft demanded a new electronic means of handling the detection-identification interception tasks. The old procedures by which personnel passed aircraft plots by voice and displayed information manually would be too slow for the jet age.[250] Accepted conceptually by the Air Force in April 1953, the Lincoln Laboratory's semiautomatic ground environment (SAGE) system was built and tested in the Cape Cod area in 1953-54 and accepted for deployment throughout the United States. The Air Defense Command's SAGE plan looked toward the division of the continental United States into eight air defense regions with eight SAGE combat operations centers and 32 air defense sectors with 32 SAGE direction centers. The first SAGE installations were located in the northeastern United States, then in the midwest, and then in the northwest and on the west coast. Next, the remainder of the northern and west-central states were provided with SAGE installations, then the southeastern, the southern, the southwestern, and finally the central portions of the United States were filled in. In view of the time and expense involved to do otherwise and given the probability that an enemy would direct first strikes against US strategic retaliatory forces, the Air Defense Command elected to locate its SAGE installations in shock-resistant, reinforced concrete buildings located above ground. Following the Air Defense Command plan to provide priority protection to the heavily industrialized sections of the nation, the first SAGE direction center became operational at McGuire AFB, New Jersey, in 1957 and the entire SAGE system was completed in March 1962. Utilizing large digital computers and digital data transmission equipment, the centralized SAGE system received, displayed, and stored information from many radars and flight control centers. The SAGE system provided air defense commanders with the capability to direct hundreds of interceptors and missiles against hundreds of targets.[251]

In the same years that new interceptors were under development and a modern ground system was being laid out, the Air Defense Command increased its unit strength and moved toward the attainment of a family of four basic weapon units to be employed against any type of hostile airborne threat. The family was to include long-range interceptor, medium-range interceptor, medium-range interceptor missile, and short-range surface-to-air missile squadrons—all to operate within the SAGE.[252] The Air Force 137-wing program included 34 wings (102 squadrons) of fighter-interceptors, of which 23 wings (69 squadrons) were assigned to the Air Defense Command and the others were committed to theater air forces. As the Air Force momentarily attained its 137-wing program in June 1957, the Air Defense Command attained its planned strength (but two fighter-interceptor wings were deleted from the program).[253] During 1953-54 the Air Defense Command maintained that it would require, in addition to its manned

interceptor squadrons, 53 Bomarc missiles squadrons for deployment around the nation's perimeters. In the first firm planning in 1955, the Air Force and the Air Defense Command agreed that 40 Bomarc squadrons was a practicable objective. At Air Force prodding, the Bomarc objective was reduced to 36 squadrons in 1957, some of which were to be located outside the United States.[254]

By 1954-55 the potential scientific advances in air defense appeared to promise a substantial breakthrough in the whole field of activity. "Our objective," stated General Yates in March 1954, "is to develop a completely integrated and automatic air defense network, including interceptor weapon systems, which will provide as effective a defense as is technically possible."[255] Speaking early in 1955 Maj Gen Frederic H. Smith, Jr., visualized an annual expenditure of $7 billion for air defense and a total expenditure of $42 billion for that purpose by 1960. "Such a defense system against manned and unmanned air-breathing weapon systems should inflict an attrition rate of greater than 90 percent upon attacking forces of sizes up to 4,000 flying objects, unless the enemy achieves qualitative surprise."[256] Shortly before his retirement as commander in chief, Continental Air Defense Command, Gen Benjamin W. Chidlaw was similarly optimistic in a letter to General Twining. "I am convinced," he wrote on 28 May 1955, "that an air defense capability which will furnish a comparable deterrent to aggression to that posed by SAC can be achieved, if we put our heart into it."[257] By 1955 the Air Defense Command possessed a good system to meet the threat of the Tu-4 offensive, and there was optimism that the air defense system could continue to outdistance the Soviets.

However, the Soviets achieved qualitative surprise and demonstrated on 1 May 1955 that their offensive capabilities had risen to a new plateau much sooner than had been anticipated. "We now have a good system to fight the Tu-4," observed General Partridge, who became commander in chief, Continental Air Defense Command, on 20 July 1955, "unfortunately the Russians came along a little more rapidly than we anticipated in their technical developments, and they introduced the jet bombers and the Bear more rapidly than was forecast." Partridge also warned that "the defenses which we are . . . planning . . . take care of the Soviet threat up through the manned bomber, but the Soviets are said to be building an intercontinental ballistic missile, and we must somehow devise a defense against this type of attack."[258] The immediate air defense problem in 1955-56 concerned the development of capabilities to counter the Soviet Bison and Bear, both of which would likely possess a standoff missile equivalent to the Hound Dog. With one aerial refueling, moreover, the Soviet Bear would be able to fly a circuitous route and evade existing early warning lines in the Arctic. Since it was a turboprop aircraft, the Bear not only would have a very long range, but also would be able to operate effectively at low altitudes.[259] After General LeMay had assessed the new Soviet bomber capabilities, which would be magnified once they developed intercontinental ballistic missiles, he observed: "The best thing that the Air Defense Command can do for SAC is to provide warning time. That is the most important thing they can do for us."[260] Less optimistic than his predecessors about the kill

capabilities of the Air Defense Command, General Partridge returned to a more limited concept of air defense. "As a matter of doctrine," he stated in April 1956,

> we believe that the best defense is a good offense, and we believe that our primary mission in the Air Defense Command is to defend the bases from which the Strategic Air Command is going to operate. . We believe also that we have to provide a reasonable, an equitable protection for the key facilities, the population centers and our industry. . . . We believe, however, that our primary objective is to convince the enemy that he should not attack, and if we can deter the enemy from attacking, we have achieved a 100-percent air defense.[261]

Partridge continued to emphasize the deterrent aspects of air defense. "First of all," he said in 1957, "we want to be so strong, from an air defense point of view, that the enemy will be deterred from the decision, that fateful decision, to attack. . . . The second thing we're trying to do is to insure our survival in the event we are attacked."[262]

The decision of the Department of Defense to meet the challenge of Soviet Bison and Bear aircraft by increasing procurement of B-52s and permitting some dispersal of the Strategic Air Command, increased the importance of the warning function provided by the Continental Air Defense Command. While Partridge was willing to provide the Strategic Air Command with as much warning as was possible, he believed that the Air Defense Command should be provided with a remote air defense weapon system that would permit it to intercept and destroy approaching Soviet bombers before they could launch standoff missiles. In a search for means to provide air cover over naval forces at sea and for beachhead assaults, the Navy commenced studies in 1955 of a system composed of a subsonic long-endurance control and warning Missileer aircraft that were to be equipped to launch high-performance, long-range air-to-air Eagle missiles.[263] The Air Force had this same option to develop a huge missile-firing interceptor as a remote air defense weapon system, but Partridge questioned whether anyone could determine how to employ an air defense plane outside the air defense ground environment.[264] The North American Aviation Company had been studying the problem of remote air defense for several years; when its approach appeared feasible, the Air Force awarded the company a letter contract on 1 June 1957 to begin development of a long-range Mach-3 jet interceptor. This plane was designated the F-108 and, as it was conceived, was to be a two-place, two-engine stainless steel plane that would maintain a Mach-3 speed. It would be designed to carry a pair of new guided aircraft rockets (GAR-9 missiles), which could be fitted with either nuclear or conventional warheads. The F-108's range and speed would give the ability to police the DEW lines, but it would have an electronic system that would work either inside or outside the ground environment. If operated beyond the ground environment, several F-108s would probably fly together in a line-abreast formation, separated by about the range limits of their self-contained airborne intercept radars. From this disposition the individual planes would pick up anything ahead of them, lock onto their targets, and shoot down the targets with

their missiles.[265] The problem of combating Soviet bombers at longer ranges and at lower altitudes affected the Bomarc development program. The Bomarc A was conceived to be a missile with a 125-mile range that would be effective up to 60,000 feet but would be relatively ineffective at low altitudes. While the Bomarc A continued in development, the Air Force directed that a Bomarc B also be developed that would have a range of action of over 400 miles and would be capable of dealing with a low-altitude threat.[266]

When Partridge retired and yielded command to Lt Gen Laurence S. Kuter on 1 August 1957, the North American Air Defense Command was well on its way to being able to counter the Soviet Bison and Bear threats. The DEW line was nearing completion, SAGE was becoming operational in the northeastern United States, and the Air Defense Command was converting to century-series jet interceptors. Because of the added expense of these planes as well as their greater combat capabilities, the Air Force programmed a cut in its air defense strength to 28 fighter-interceptor wings (83 squadrons) by 30 June 1958. And, since four Bomarc A missile squadrons were scheduled to become operational in fiscal year 1959, the Air Force planned to reduce the air defense fighter-interceptor strength to 27 wings (80 squadrons) by 30 June 1959.[267] To permit this reduction, the Department of Defense had agreed to a plan whereby 12 Air National Guard wings would be equipped with all-weather interceptors and eight with day fighters to augment the Air Defense Command.[268] Once again the United States air defense proved to be a step behind Soviet technological capabilities, since the Soviets', Sputnik I revealed that the enemy could soon possess an intercontinental ballistic missile capability. Quite shortly, moreover, American intelligence recognized that the Soviets had concentrated on the development of missiles and had never produced the number of Bisons and Bears that had been within their capability to produce after 1955–56.[269]

In response to Sputnik the Air Force immediately began the construction of two ballistic missile early warning system (BMEWS) sites at Point Clear, Alaska, and Thule, Greenland. Other than this action and the planned reduction in Air Defense Command strength, General LeMay urged that immediate changes should not be made in the North American Air Defense Command. "Our studies now indicate," he explained, "that even when the ballistic missile becomes very efficient, . . . the most efficient attack will be a combination of the manned vehicle and the ballistic vehicle, using the best characteristics of both weapon systems." Speaking to a question on air defense requirements in December 1957, General White explained that the Strategic Air Command was "perhaps the major contributor to the air defense, because these forces will hit the enemy at his point of launching." More particularly on the subject, he continued: "We need to complete the extension of the DEW line. We need to improve our radar. . . . We need to get on with the more advanced and more sophisticated interceptor system, such as Bomarc. We need to keep modern . . . our manned fighter-interceptors, and we must develop an active weapon against ballistic missiles. . . . I think those are the essentials of the requirements of air defense, and we must get on with it."[270]

During 1958 White continued to defend SAGE. "The SAGE system," he said, "will permit us to meet the combined manned jet aircraft and air-breathing missile threat as one concise problem rather than as a series of various problems. . . . Even on into the future, SAGE will prove valuable because the forces of the future will undoubtedly be mixed forces – that is, composed of various types of weapons – subsonic, supersonic, and hypersonic."[271]

Although the Air Force successfully secured continued budgeting for its air defense programs in fiscal year 1959, many factors began to impinge on the level of air defense progamming during calendar years 1958–59. In January 1958 Secretary McElroy remarked that he was "not enthusiastic about the solution we have among roles and missions . . . in the area of continental air defense" and revealed that the Joint Chiefs of Staff was reviewing the matter. As has been seen the congressional appropriation of military construction funds for fiscal year 1959 called upon the secretary of defense to determine which missile or combination of missiles would be employed in a given area. Early in 1959 McElroy again stated that air defense continued to be a field in which the Department of Defense was having difficulty making decisions.[272] In March 1959 Senator Symington was very critical of the fact that the Air Force was

> spending $5.5 billion every year to defend against . . . bombers, but . . . not spending enough to maintain a position in the modern weapons of reasonable equality with what we agree the Russians are probably doing . We are cutting down on producing Atlas and on producing supersonic B-58s, and so forth, and yet we are still spending $5.5 billion annually to defend ourselves against something which we know the Russians are cutting down very heavily on and haven't many of.[273]

Despite these criticisms, the Air Force continued to program air defenses for fiscal year 1960 that would defend against a mixed aircraft and missile attack. Fighter-interceptor strength would be reduced to 25 wings, this reduction was justified by the increased effectiveness of century-series interceptors, an increase in the number and effectiveness of air-to-air missiles, and the acquisition of an initial operational capability with Bomarc A missiles.[274] Rather than sacrifice funds required for the development of the Mach-3 interceptor, the Air Force elected to procure no additional manned interceptors in fiscal year 1960.[275] Construction of BMEWS installations in Alaska and Greenland was funded. Work on the SAGE system was to continue, with some changes caused by new technology. The first SAGE installations had employed vacuum tubes and had been too large and bulky to be easily hardened, but the development of transistor electronic components permitted more compact and efficient installations. Early in 1959 the Air Force approved a plan to continue to develop the SAGE system around 10 supercombat centers, which were to be hardened, and 27 direction centers.[276]

Although the Air Force was prepared to make some reductions in air defense requirements, it was not prepared for the full extent of the reductions that would be demanded during calendar year 1959. In its report on the fiscal year 1960

military construction bill, the Senate Armed Services Committee concluded that Nike systems were virtually obsolete and should not be funded; the House Armed Services Committee held that Nike was operational and less costly than Bomarc and recommended severely reduced appropriations for Bomarc. In the absence of military agreements on air defense requirements, Secretary McElroy's civilian staff drew together the master air defense plan, which was officially issued on 19 June 1959. As has been seen, this master plan generally confirmed Air Force concepts of air defense requirements. However, it included a severe reduction in Air Force fighter-interceptor squadrons over the next several years; the reduction of Bomarc to a total of 16 squadrons in the United States and two in Canada, all to be deployed in a peripheral setting rather than in depth; and a limitation of SAGE to eight supercombat centers and 22 direction centers. The master plan recommended that the Army's Nike-Zeus antimissile be continued in research and development and that a third BMEWS installation be constructed at Flyingdales, England.[277] The Air Force did not object to the master air defense plan, but another development in the summer of 1959 caused General White "many sleepless nights." In Department of Defense budget guidance for fiscal year 1961, White was told that funds could not sustain the development of both the F-108 Mach-3 interceptor and the B-70 Mach-3 bomber, if indeed they could support the development of either of them. When presented with the problem, the Air Force Weapons Board recommended that the F-108 be continued in development, but the Air Force Council subsequently reversed the recommendations of the board and recommended that the B-70 should be funded for continued development. General White reasoned that a long-range fighter-interceptor would be needed as long as the Russians had a capability to make bomber attacks with standoff missiles, but he decided that the F-108 would be canceled and the B-70 kept in development. Explaining his decision, White said: "I based that largely on what would be the greatest threat to the Soviet Union, and, hands down, the B-70 wins that argument."[278] Even though the F-108 was technically feasible and a long-range interceptor would be vital to continental air defense, the Air Force canceled the F-108 development program on 23 September 1959. Development of the fire control system and the GAR-9 missile continued on a reduced scale for possible use with some other airframe.[279]

"Somewhat of a revolution," General White noted, "took place in the air defense field under the Department of Defense master air defense plan.... I think the No. 1 point... is that the technology and the enemy threat are constantly changing. I think it is fair to state it takes time, maybe too much time, for some of the implications to seep into all the brains that have to work on these things." White noted that in a strict sense the commander in chief, North American Air Defense Command, should have borne the responsibility for making necessary weapon systems recommendations to the Joint Chiefs of Staff. But, General White also asserted, "somebody has to step up to these problems, and it devolves in a military sense upon the Chief of the service to take the initiative... in the light of the overall picture—the integrated threat; the moneys available; the weapon systems which

are present and forthcoming; and the light of other threats."[280] Based on this reasoning, the Air Force increased the effort to translate the master air defense plan into system requirements. White charged Maj Gen H. M. Estes, Jr., Air Force assistant deputy chief of staff for operations, to study changes in air defense programs necessary to respond to the master plan. In this evaluation Estes drew heavily for technical assistance upon the Air Defense Systems Integration Division, MITRE Corporation.* Individuals from the North American Air Defense Command and the Air Defense Command provided technical information, but Estes observed: "We did not ask them specifically for their detailed ideas for the very simple reason we knew already their ideas would not coincide with ours with reference to reductions."

Beginning in mid-February 1960, Estes assembled the some 100 technicians who had been working upon separate phases of air defense systems, and the group went into the exact technical status of every single component of the air defense system, when the component could become operational, and how much it would cost. The group attempted to project an air defense system that would be effective against a combined missile-bomber threat at the earliest possible time with a minimum expenditure of dollars. The Estes group completed its work in late February 1960, after which Estes briefed the Air Force, the North American Air Defense Command, and the Air Defense Command on the study group's recommend actions.[281] While the Estes group was at work, General LeMay established another board of general officers to make a continuous evaluation of Bomarc. This evaluation board made reports in November 1959 and January 1960. Working independently, another ad hoc panel of scientists provided evaluations of the Bomarc B to the secretary of defense.[282]

Since evaluations of air defense requirements were under way within Department of Defense, the fiscal year 1961 departmental budget submitted to Congress in January 1960 represented interim changes recommended by the six-month-old master air defense plan. The Air Force desired to reduce air defense wings from the 27 in being on 30 June 1959 to 23 on 30 June 1960 and to 20 on 30 June 1961. By 30 June 1960, four Bomarc squadrons were to be operational and it was planned that eight Bomarc squadrons would be in operation by 30 June 1961. Altogether the Air Force wanted to bring 16 Bomarc squadrons into the air defense inventory. SAGE was programmed for eight supercombat centers and 22 direction centers.[283] Seaborne extensions of the DEW line—picket ships and "Texas towers"—would be eliminated, but airborne control and warning aircraft would continue to function.[284] On 14 January, the same day that the new Secretary of Defense Thomas S. Gates, Jr., and General Twining appeared before the Subcommittee of the House Committee on Appropriations to defend the budget, Soviet Premier Nikita Khrushchev announced that the Soviet Union would depend on ballistic missiles and was stopping development of manned bombers. While

*Massachusetts Institute of Technology Research Corporation

skeptical of the Soviet announcement, Gates and Twining agreed that air defense requirements ought to be kept under study. "Maybe the Russians will eliminate their air threat completely," Twining remarked. "We do not know. We certainly ought to keep watching this and not spend money on air defense unnecessarily."[285]

In January 1960 Secretary Gates and General Twining were willing to stand behind the fiscal year 1961 air defense program. However, following the completion of the Estes study group's work, General White appeared before the Subcommittee of the House Committee on Appropriations on 24 March to submit a reappraisal of air defense programs. Since study had shown that the planned degree of hardening would be expensive yet inadequate to protect the supercombat SAGE centers fully, White desired to eliminate the eight supercombat centers and 22 direction centers. On the best scientific advice he could get, White believed that Bomarc A and B would work; nevertheless, he proposed to cut Bomarc procurement off with the 10 squadrons that were already funded. These squadrons would be deployed to defend the industrial area of the northeastern United States and southeastern Canada—eight squadrons would be sited in the United States and two in Canada. These reductions would save an estimated $500 million in the fiscal year 1961 budget. White asked for the authority to apply this money to accelerate development of the Midas satellite system, which was designed to detect hostile ICBMs at the earliest possible moment after they were launched; to speed construction of the second and third BMEWS installations; to procure additional Atlas missiles and to accelerate the development of a mobile Minuteman missile; to improve the capabilities of century-series fighter-interceptors; and to continue technical development for an advanced fire control and missile system for a long-range fighter-interceptor.[286]

In justifying the Air Force proposal to divert funds previously committed to air defense to offensive purposes, General White explained: "Of course, our philosophy is based on the fact that offense is the best defense. . . . I am perfectly certain that . . . air defense could absorb the national budget, and still could not guarantee 100-percent defense. So, in the final analysis, it is a matter of judgment at what level you balance out between offense and a minimum of adequate defense." General Estes summed up the North American Air Defense Command's requirement for a "mixed force of weapons, each of which has the capabilities which are not directly attainable in the other type of weapon, to take on any attack." "Manned interceptors," Estes said,

> complement Bomarc by having capabilities that are unique in having a human operator aboard. The manned interceptor provides the only means in peace time for positive identification and in war it is flexible in terms of redeployment to meet threats in different areas and in capability for reattack. The interceptor can kill one bomber and then go on to kill a second It can be recovered, refueled, and rearmed to again enter the battle. . . . On the other hand, if only a force composed of fighter-interceptors were available in a given area, the commander would not have as great a capability at low level, and his ability to concentrate a mass of interceptor weapons in a small area against a mass raid would be degraded to the extent that aerial nuclear blast would affect his interceptor pilots.[287]

In recommending revisions to the national air defense program, White considered that the Air Force had "cut through some of the inhibitions" and the "'clinging' to concepts" and was providing a program that looked realistically to the future. "While I recognize," he said, "the threat of the air-breathing bomber exists as of today as the most important, most deadly threat against this Nation, it is quite obvious that the intercontinental ballistic missile is to become the predominant threat to this Nation."[288] White testified that the new air defense program had been approved by the Air Staff and by the Joint Chiefs of Staff, and Secretary Gates assured Congress that President Eisenhower had reviewed and approved the revisions in air defense.[289] At Colorado Springs where he commanded the North American Air Defense Command, General Kuter did not agree that the new air defense program served national requirements. According to White, Kuter urged that the Bomarc and fighter-interceptor programs be continued at full strength, that the manning of air defense units be the responsibility of full-time Air Force personnel rather than Air National Guard crews on alert, that the F-108 development program be reinstated to oppose the Soviet air-launched missile threat, that the supercombat centers be built, and that Nike-Zeus be produced as the only immediately prospective anti-ICBM defense.[290] During the spring of 1960, Congress displayed doubts about the recommended air defense revisions. The House of Representatives eliminated all funds for Bomarc not already committed and added funds sufficient to purchase enough F-106s to equip two additional fighter-interceptor squadrons. The Senate, on the other hand, voted funds for even more fighter-interceptors, restored Bomarc program cuts made by the House, and granted additional funds to provide two Bomarc bases in the northwestern United States. In a conference committee, Congress agreed to vote $100 million for additional F-106s and $244 million for Bomarc missiles. These amounts were approved in the Department of Defense Appropriation Act of 1961. However, on 9 August 1960 Secretary Gates decided that original appropriation requests had provided substantially for air defense, including "buy-out" procurement of Bomarc B missiles and improvements of existing interceptor aircraft, and that the additional appropriations would not be used.[291]

The Department of Defense and the Air Force considered that the air defense revisions of 1960 marked a recognition of the "imminent shift in the air threat to our security from aircraft alone to ballistic missiles and aircraft."[292] At the helm of the North American Air Defense Command, however, General Kuter continued to disagree with the downgrading of defense. "The course of aerospace defense," he stated upon retiring from the Air Force on 31 May 1962, "is a rather sporty course . . . of slow starts and some quick stops . . . marked by a series of efforts to close gaps—gaps that have been created by advances in offensive weapon systems." As he looked backward Kuter observed that air defense had been moving rapidly ahead in 1957 and had almost closed the gap on Soviet offensive capabilities, but he thought that these efforts to comprehend Soviet offensive capabilities had been suddenly halted in 1959. Kuter argued that the nation could produce, and urgently required, a long-range Mach-3 manned fighter-interceptor. He also felt that the

Army's Nike-Zeus missile be put into production for operational deployment, since it was the nation's only available anti-ICBM defense system. "We know full well," he said, "that we must have complementary strategic offensive and North American defensive forces to present a credible deterrent or to ensure national survival should general war occur."[293]

Origins of Aerospace Doctrine in the Air Force

In a reminiscent remark about pre-Sputnik days, Maj Gen Bernard Schriever recalled that "'space' was a nasty word in certain circles."[294] Initially in the post-World War II period, the subject of space was more amusing than anything else, at least to the public. When Secretary James V. Forrestal disclosed in his first annual report as secretary of defense during 1948 that the Air Force and Navy were studying earth satellite vehicles, amused journalists asked: Will America possess moons of war?[295] As has been seen, the first Rand study completed for the Air Force in 1946 indicated the feasibility of an earth orbital satellite that would be launched by the MX-774 Hiroc missile. However, these early Rand studies emphasized the scientific value of earth satellites rather than their military worth. Believing that progress in booster technology might reduce the individual cost of satellites, General Vandenberg signed a policy statement that the Air Force had "logical responsibility for the satellite." After reviewing Air Force and Navy satellite studies, however, the Defense Research and Development Board's Committee on Guided Missiles reported on 29 March 1948 that insufficient thought had been given to the military worth of such vehicles and that, in any event, the cancellation of the development of the MX-774 missile would delay orbital flight. The committee further recommended that "the only activity directed toward satellite vehicles as such should be a continuation of the Project RAND studies of the utility of a vehicle."[296]

Authorized to continue satellite studies, the Rand Corporation was able to report by April 1951 that "pioneer reconnaissance and weather reconnaissance are suitable with the resolving power presently available to a satellite television system."[297] In view of the reinstitution of the long-range ballistic missile development program in 1951-52, the Air Force directed Rand to proceed with studies of components for a satellite reconnaissance system and, on 16 March 1955, it issued a general operational requirement for the development of WS-117L, a strategic reconnaissance weapon system.[298] After receiving and evaluating proposals from several major contractors, the Air Force selected the Lockheed Aircraft Corporation as the prime manager for WS-117L and issued a contract in 1956.[299] Other factors were involved, but the need to establish military worth was significant cause for the nearly 10-year lapse between first conception and initiation of research and development on a satellite reconnaissance space system.

Another line of development that would lead the Air Force to the fringes of space originated in the waning months of World War II from a general recognition that the nation lacked basic knowledge about supersonic flight. From the date of

its establishment in 1915, the National Advisory Committee for Aeronautics (NACA) had accomplished practically all of the fundamental and basic research in aerodynamics and propulsion for the benefit of the Army, Navy, and civil aviation. Except for unusual cases where results of potential military significance were withheld, the NACA promptly published the results of the investigations that it conducted in its laboratories at Langley Field, Virginia; at Cleveland, Ohio; and at Moffet Field, California. During World War II, NACA had served as the "silent partner of US airpower." Its high-speed airfoil principle, for example, had been employed on the P-51 Mustang to delay the formation of compressibility burbles, thus enabling the Mustang to withstand high-speed dives of over 600 miles an hour. As World War II was ending, however, NACA's chairman, Dr Jerome C. Hunsaker, warned that "the reserve of knowledge available when we entered the war, and without which victory would have been greatly delayed, has been exhausted. . . . As with the Wright brothers at the first flight, we stand at a new frontier where research to establish the scientific principles and laws governing high-speed flight will determine our future in the air."[300]

Although NACA accomplished fundamental and basic research, this research did not normally include the development of specific aircraft or equipment. Looking toward supersonic flight explorations, the Army, Navy, and NACA agreed that the Army or the Navy would fund research vehicles, the contractor would provide initial flight tests, the Army or the Navy would determine the military applicability of the vehicles, and, after that, a test vehicle would be turned over to NACA in order that its tests might provide data to be published for the entire aviation industry. In order to begin supersonic flight probes, the Air Technical Service Command authorized two supersonic airplane projects on 5 and 6 March 1945. The first project authorized the Bell Aircraft Company to fabricate three test aircraft that would have speeds greater than Mach 1 and would be powered by alcohol-liquid oxygen rocket motors. The second project with the Douglas Aircraft Corporation involved a design study of a supersonic airplane.

The Bell plane, which would subsequently be known as the XS-1 and later the X-1, was to be the first of an X or research series of aircraft.[301] Launched from an airborne B-29, the X-1 made its first powered flight on 9 December 1946. Further refinements enabled the conventionally structured X-1 to break the sound barrier on 14 October 1947 with Capt Charles E. Yeager as its pilot. Learning lessons from the X-1, the Army Air Forces contracted with Bell on 27 November 1945 to build two X-2 test planes, with Monel Metal fuselage and stainless steel sweptback wings that would permit them to attain very high speeds. The first X-2 accidentally exploded in the bomb bay of a B-50 on 13 May 1953. In later test flights at Edwards AFB, California, the second X-2 exceeded speeds of 1,900 miles per hour and attained an altitude of 126,000 feet.[302] In this same period the Douglas Aircraft Company built several models of a D-558 Skyrocket plane under Navy contract. These rocket-powered planes were tested at Edwards and eventually turned over to NACA. Flying a D-558-II aircraft on 20 November 1953, NACA test pilot Scott

Crossfield achieved a record speed of 1,328 miles per hour, thus becoming the first man to penetrate Mach 2.[303]

During the spring of 1952, NACA's Committee on Aerodynamics recommended that the several NACA laboratories begin to study problems likely to be encountered in space flight. As a result of these studies, the Committee on Aerodynamics endorsed a proposal to build a Mach-7 research airplane that could explore the fringes of space. Since NACA was not authorized to procure such an experimental plane, Dr Hugh L. Dryden, who was now its chairman, proposed to the Air Force and Navy on 9 July 1954 that these services should procure the plane for cooperative testing. Reacting favorably to the project, the Department of Defense authorized the Air Force and the Navy to finance the needed aircraft development. After a design competition, the Air Force issued a letter contract to the North American Company on 18 November 1955 providing for the purchase of three rocket-powered X-15 aircraft and for modifying a B-52 to be used to launch them. The memorandum of understanding regarding the X-15 provided that NACA would exercise technical development with advice and assistance from a Research Airplane Committee that included Air Force and Navy representatives. The development of the X-15 was extremely costly, and the Air Force was called upon to provide the great majority of the needed funds. Following delivery to Edwards AFB, the X-15 made its first powered flight on 17 September 1959. Equipped with alternate engines, an X-15 flown by Air Force Maj Robert M. White attained a record altitude of 314,750 feet on 17 July 1962. Another X-15 achieved a speed of 4,105 miles per hour on 27 June 1962. Each X-15 flight furnished data for the design of high-altitude hypersonic operational aircraft and also provided data on the physiological and psychological reactions of man in flights along the fringes of space.[304]

While the X-series aircraft were not designed in any way to become weapon systems, Air Force developmental planners were familiar with work that had been conducted in Germany during World War II by Dr Eugen Sanger and his assistant Dr Irene Bredt. Working independently of the Peenemunde ballistic missile people, Sanger had prepared plans for the use of a V-2 rocket as a second stage for a boost-glide manned vehicle that would be launched from Germany, rise above the atmosphere, and then glide back into the atmosphere; it, thus, could become a very long-range bomber capable of circumnavigating the earth and bombing New York. The German government did not give serious consideration to the boost-glide rocket bomber, but both the Russians and the Americans captured interesting data relative to the Sanger concept. Employed as a consultant to the Air Materiel Command in 1947, Dr Walter Dornberger carried the boost-glide concept to the Bell Aircraft Company in 1950 when he left Air Force employment and entered private enterprise. In 1952 Bell approached the Air Force with a proposal to undertake research on a manned, boost-glide bomber-missile, called Bomi. After considerable argumentation within the Air Force, the Wright Air Development Center completed a contract with Bell on 1 April 1954 calling for a study of an advanced bomber-reconnaissance system.

Based on favorable results from the Bell study, the Air Force issued a general operational requirement for a hypersonic strategic bombardment system on 12 May 1955; nevertheless, research and development planners doubted the advisability of investing scarce funds in such a system. The satellite reconnaissance system merited priority funding and the X-15 research aircraft project could well provide data regarding the reentry of a manned orbital vehicle into the atmosphere. In March 1956, the Air Force, therefore, concluded another study contract with Bell for a research study visualizing a piloted boost-glide reconnaissance weapon system to be known as Brass Bell. This reconnaissance system was to be kept separate from the Bomi, now to be known as the rocket bomber or Robo. In November 1956 the Air Research and Development Command formulated a system requirement for a hypersonic weapon research and development supporting system called Hywards. This vehicle was to serve as a test craft for the development of subsystems to be employed in future boost-glide systems.[305]

The significance of advanced boost-glide systems was enhanced on 15 February 1956, when General Power, then commander of the Air Research and Development Command, stated that Soviet technological progress was so marked that the United States ought to stop considering new and novel projects and start developing some of them. During fiscal year 1957, the Air Force was unable to allocate funds for a manned glide-rocket. In April 1957, however, the Air Force directed that the Air Research and Development Command consolidate Hywards, Brass Bell, and Robo into one project. The resultant product provided by this command on 10 October 1957 was the Dyna-Soar (a compound of dynamic soaring) program that appeared feasible for accomplishment in three stages: Dyna-Soar I, an experimental glider; Dyna-Soar II, a reconnaissance vehicle; and Dyna-Soar III, a bombardment system. On 15 November 1957 the Air Force approved the Dyna-Soar development plan and allocated research and development funds for the hypersonic glider test vehicle. Early in 1958 the Air Force reduced Dyna-Soar to two stages: Dyna-Soar I continued to be the unmanned experimental space glider, while Dyna-Soar II would be a composite manned bomber and reconnaissance system. The Soviets also appeared to be doing research on the basis of Sanger's original ideas. In 1958 a Soviet aviation journal referred to a Russian glide-bombing system capable of attaining an altitude of 295,000 feet and of striking targets at distances up to 3,500 nautical miles.[306]

Shortly after World War II, the Air Force also began several studies and experiments concerned with the problem of maintaining life at hypersonic speeds and very high altitudes. In 1946 the Aeromedical Laboratory at Wright-Patterson AFB joined with the National Institute of Health in upper-atmosphere experiments at White Sands and Holloman AFB, New Mexico. Insects, fungus spores, and later small animals were sent aloft in V-2 and Aerobee rocket capsules to reveal the effects of cosmic radiation and high altitudes on living things. In November 1948 the Air Force School of Aviation Medicine had held a symposium on "The Medical Problems of Space Travel"; in February 1949 it organized a department of Space Medicine. The Aeromedical Laboratory began the

development of a T-1 pressure suit in 1943; the suit saved the life of a test pilot in 1951 when the X-1 lost its cabin pressure on a high-altitude flight. The X-15 required an even more sophisticated full pressure suit; the boost-glide vehicles would need a habitable cabin. Looking toward design of space capsules, the Air Force employed High Man manned balloon flights. The first High Man flight occurred 2 June 1957 when Capt Joseph W. Kittinger reached an altitude of 95,000 feet. The second flight on 19 August 1957 carried Maj David G. Simons to 102,000 feet and remained aloft for more than 32 hours.[307] Some of these ventures occasioned heavy-handed sarcasm, but each of them sought to develop more knowledge about man's role in a space environment.

Visualizations of Satellites and Space Stations

During the later 1940s the Army did not officially share the Air Force and Navy interest in space satellites, but even at this time Dr Wernher von Braun was a foremost publicist for a manned space station. By the autumn of 1954, von Braun was advancing a proposal that a complete space station could be built in 10 or 15 years at a cost of about $4 billion. He believed that the nation that first possessed a space station would be in a position to rule the earth. When Secretary Wilson was queried about earth satellites and space platforms at a news conference on 16 November, he said that he knew nothing about US military scientists working on plans for a space platform or earth satellite and would not be alarmed if the Russians built one first. He was quoted as adding: "I would rather keep my feet on the ground, figuratively speaking as well as physically speaking. I don't know that anyone knows how you would rule the world with a space station. It is a little dreamy, I think." A month later at another news conference, when told that the Russians might orbit a satellite before the United States, Wilson retorted: "I wouldn't care if they did."[308] Already on record as opposing "boondoggling research," Wilson told newsmen on 6 June 1955 that he considered the military research and development effort to be fully adequate. Speaking in his usual candid fashion, he went on to describe research and development as like drilling for oil. "The smart people in the oil business," he said, "try to drill their holes in a likely place, so the money that is given to the Defense Department, I like to see spent in an area . . . of some use to us. And maybe some other place in the nation's budget could go the money for fundamental research, I don't know. I don't care what happens to some of the minor things."[309]

Air Force leaders shared von Braun's belief that the development of missiles would provide the booster capability needed to place satellite weapon systems in orbit. In an address in San Diego in February 1957, General Schriever stated that "about 90 percent of the developments in the ballistic-missile program can be applied to advancing in space, satellites and other vehicles." Recalling this address somewhat later, Schriever remarked: "From a technological standpoint, it is, I think, a normal transition to step from these ballistic missiles into satellites, moon rockets, going to planets."[310] General White also conceived that "missiles are but

one step in the evolution from manned high-performance aircraft to true manned spacecraft; and, in the forces structure of the future . . . we will have all three systems."[311] One of the reasons that the Air Force desired to develop the rigid structured Titan as an alternate to the Atlas was a belief that the more sophisticated Titan would be the "prime vehicle . . . for getting large vehicles and apparatus into outer space." Except for certain "long-haired" research and development men, however, General Irvine suggested in December 1957 that there was an insufficient awareness that the ballistic missile was "only a short step in the evolution of advanced weapon systems." "There is too much feeling . . . in the minds of the people in this country and in Government," Irvine continued, "that we air staff folks are perhaps just a little bit crazy when we talk about these modern machines."[312]

Although Air Force leaders saw a hopeful relationship between first-generation military missiles and eventual space technology, President Eisenhower and top officials in the Defense Department did not share their beliefs. In its report of 14 February 1955, the Technological Capabilities Panel of the President's Science Advisory Committee recommended top priorities for the development of ICBMs and IRBMs. The panel also noted that space satellites would be important in the near future as instruments of reconnaissance, but it believed that no satellite as then conceived could be employed as an offensive weapon. If a space vehicle released a bomb, the bomb would not fall to earth but would continue in orbit in the wake of the satellite.[313] When he discussed security matters in a report to the American people on 13 November 1957, President Eisenhower explained the criteria that he desired to use in regard to space projects. "If the project is designed solely for scientific purposes," he said, "its size and its cost must be tailored to the scientific job it is going to do. If the project has some ultimate defense value, its urgency for this purpose is to be judged in comparison with the probable value of competing defense projects."[314]

Highly critical of the Department of Defense criteria for weapon system development, Doctor von Braun charged in December 1957 that military requirements for missiles were conceived narrowly in terms of "a limited end item" and that such development became "a dead-end street." As warheads got lighter the trend in the Department of Defense was to build smaller, less-powerful boosters. "It is very significant . . . ," von Braun thought, "that the development of . . . large rocket engines . . . was not approved by anybody simply because there is no need for these engines within the framework of the existing and approved missile systems." He urged that large and powerful rocket engines, which could not be immediately justified in terms of military worth, would be required to boost manned vehicles into outer space.[315] To Secretary McElroy on 29 January 1959, however, the fact that Soviet rockets had more thrust than American missiles seemed "beside the point" from a military point of view, but he agreed that "it was significant in regard to space." "We have an adequate thrust," McElroy said, "to take a warhead on an ICBM range to selected targets in the Soviet Union. If you have twice that much thrust, it doesn't help you, from a missile standpoint. It does,

of course, help you from an outer space standpoint . . . but it is not of real importance in the ICBM capability."[316]

At the same time that the Department of Defense favored the commitment of defense research and development money to the perfection of low-risk weapon systems of definite military worth, President Eisenhower also hoped that a peaceful regime could be maintained in space. Before and after becoming president, Eisenhower often expressed an ideal of enforced peace through arms limitations and disarmament.[317] Accepting an arms control concept that the United States should retain its nuclear power and yet make clear that its purposes were peaceful, Eisenhower took advantage of an assembly of world leaders at the Geneva Summit Conference in July 1955 to propose a worldwide inspection plan for the prevention of surprise attack. At the conference table Eisenhower proposed that the United States and the Soviet Union would exchange "a complete blueprint" of their military forces and each would facilitate the other's aerial reconnaissance of their countries. Eisenhower believed that such a step would "convince the world that we are providing as between ourselves against the possibility of great surprise attack, thus lessening danger and relaxing tension."[318] Eisenhower's "open skies" proposal at Geneva assumed an immediate relationship to proposals that had been made in October 1954 by a committee of the International Council of Scientific Unions for the launching of small scientific satellites during the international geophysical year (IGY), which would begin on 1 July 1957 and conclude on 31 December 1958. The Soviet Union had announced on 15 April 1955 that it had established a Special Commission for Interplanetary Communications and would produce "a remote controlled laboratory to circle the earth as a satellite and establish opportunities for observation of a hitherto inaccessible character." After Eisenhower returned from Geneva, the White House announced on 29 July that in 1957-58 the United States would launch small space satellites, probably instrument-bearing, that would circle the earth each 90 minutes at a height of 300 miles.[319]

Critical of the open skies proposal from the first, the Soviets finally rejected it early in 1956 when disarmament negotiations reached another stalemate. While the open skies proposal was in conception and under consideration, however, it had important effects upon US space policy. In view of the growing interest in scientific satellites, von Braun had proposed in June 1954 that a Redstone missile should be used to launch a small slug into orbit.[320] Since a Redstone was successfully test fired on 24 May 1955, it appeared to be the most practical booster for launching the American IGY satellite. At a meeting on 26 May, however, the National Security Council expressed the opinion that, because of the soon-to-be-proposed open skies policy, the American scientific satellite ought not to be launched into orbit by a military missile. In the Department of Defense, Assistant Secretary Donald Quarles directed the services to submit plans for a scientific satellite and established a committee of scientists and engineers to evaluate the proposals. The committee evaluated these recommendations during June and July 1955. For their part, the Army and Navy favored acceptance of an Orbiter project to be boosted by the Redstone missile, but the Navy suggested an

alternate plan calling for the use of a modified version of the old Viking test missile that was free from military implication. The Air Force was not able to make a serious proposal for the IGY satellite that would not interfere with the progress of its ICBM program. After evaluating the proposals, the committee was said to have believed that the whole satellite project was actually premature. On 4 August it, nevertheless, reported that a small satellite could be put in orbit during the international geophysical year. The committee noted that use of an Atlas booster would give the greatest assurance of success, but it respected the Air Force belief that such an employment of the Atlas would interfere with the ICBM program. The majority of the committee recommended use of an improved Viking missile that would be known as Vanguard. A minority of three committee members recommended that the booster system for the IGY satellite should use the existing Army Redstone rather than depend on a development of the Vanguard.[321] The Department of Defense approved the Vanguard proposal over the objections of the Army, which warned that time consumed in developing the missile might enable the Soviets to launch the first satellite. Following procurement of a test quantity of improved Redstone missiles, known as Jupiter C, General Gavin again proposed that one of the missiles be used to launch a scientific satellite. On 15 May 1956, however, Gavin received a personal admonition: "The Redstone and Jupiter missiles will not be used to launch a satellite."[322]

Even though the Soviets refused to accept the open skies proposal, Harold Stassen, who was serving as Eisenhower's special assistant for disarmament, continued to believe that some measure of aerial inspection could contribute to the control of arms. "I do believe from our studies," he said in June 1956,

> that if a measure of inspection, particularly against surprise attack, can be obtained, on a basis that must be mutually lived up to or its violation would be immediately discovered, that such a system combined with a moderate, sustained alert, armed strength will give a greater likelihood of security and peace than either an all-out arms race on the one extreme or a complete inspection system and comprehensive disarmament on the other.[323]

In August 1956, Col Martin B. Schofield of the Air War College Evaluation Division completed a study entitled "Control of the Use of Outer Space." Schofield pointed out that the "use of an earth satellite as a reconnaissance vehicle would provide intelligence data of the highest order of coverage and reliability." Satellites that could fire missiles from orbital positions could also be developed, and such an airborne ICBM would be extremely hard to defend against since speed, time, and direction of approach would be in favor of the offensive weapon. Although missile-firing satellites appeared feasible, Schofield recommended the establishment of international controls over space. "The presence of a variety of devastating military forces, of many sovereign states, constantly deployed throughout international space," he noted, "may not be conducive to peaceful living. . . . It might be more sound for the United States, because it may have an early advantage in the exploration of space, to use its position of influence to the

best advantage by strongly advocating a form of international control over the use of space."[324]

In his State of the Union message delivered to Congress on 10 January 1957, President Eisenhower renewed his proposal for the open skies inspection system and additionally called for the establishment of international control over space. "We are willing," he said, "to enter any reliable agreement which would . . . mutually control the outer space missile and satellite development."[325] Four days later Henry Cabot Lodge, US ambassador to the United Nations, presented a more detailed version of space control to the General Assembly. Speaking on 25 July 1957, Stassen reiterated the need to establish control over experimentation with objects traveling through outer space. He warned that the situation was perilously close to that of 1945-46 when the Soviets rejected Bernard Baruch's plan for the control of atomic weapons, an action that had led to an international nuclear arms race. He hoped that the same mistake would not be made in the development of space vehicles, which would involve an equal and perhaps an even greater danger to mankind.[326]

In his Air War College study on space, Colonel Schofield had believed that the United States was in a position to adopt a positive stand on international control because it "presumably enjoys a lead in the current evolution of scientific achievement."[327] The Soviets not only displayed little interest in establishing international controls over space during 1956-57, but they would be the first nation into space effective with the orbital flight of Sputnik I on 4 October 1957. The real tragedy of the situation was summarized by General Gavin: "We have the scientific talent and we have the brainpower, the industrial capacity. . . . The failure was in decision-making, making the wrong decisions."[328] In the opinion of Dr Clifford C. Furnas, who had become assistant secretary of defense for research and development on 22 November 1955, the Soviets had been permitted to get ahead of the United States in space because of the decision to develop a "peaceful" Vanguard rather than to use the "military" Redstone as a booster for a scientific satellite Even with maximum effort Furnas believed that it would have been difficult to expedite the Vanguard program, but he later remembered that the Department of Defense had not considered the Vanguard IGY satellite project to be of "first importance" and had allowed only a "dribbling release" of requisite funds to it.[329]

A Concept of Space Superiority

Apparently failing to recognize that administrative policy favored the establishment of international controls to secure a peaceful regime in space, General Schriever forcefully asserted in an address at San Diego in February 1957 that the United States ought to move ahead and establish space superiority. "In the long haul," he maintained, "our safety as a nation may depend upon our achieving 'space superiority.' Several decades from now the important battles may not be sea battles or air battles, but space battles, and we should be spending a certain fraction

of our national resources to insure that we do not lag in obtaining space superiority."[330] On the day following this address, Schriever discovered that "'space' was a nasty word" since, he recalled, he received instructions forbidding him to use the word *space* in any of his speeches. General Power, commander of the Air Research and Development Command, also learned that it was "inappropriate" for an officer in a responsible position to speak on the military potential of space.[331]

Breaking the silence on space matters in the aftermath of Sputnik, General White defined the Air Force's perspective at what he described as the "dawn of the space age" in an address to the National Press Club on 29 November 1957. "Whoever has the capability to control the air," he said,

> is in a position to exert control over the land and seas beneath I feel that in the future whoever has the capability to control space will likewise possess the capability to exert control of the surface of the earth. . . . We airmen who have fought to assure that the United States has the capability to control the air are determined that the United States must win the capability to control space. In speaking of the control of air and the control of space, I want to stress that there is no division, per se, between air and space. Air and space are an indivisible field of operations... It is quite obvious that we cannot control the air up to 20 miles above the earth's surface and relinquish control of space above that altitude—and still survive[332]

In numerous appearances before congressional investigating committees in the winter of 1957–58, White continued to emphasize the continuum of air and space. He foresaw the use of weapons in space, both offensive and defensive. Although he confessed no "personal expertness in the matter," he believed it would be possible for a man to go to the moon.[333] In similar appearances, Assistant Secretary of the Air Force (Research and Development) Richard E. Horner and Lt Gen Donald L. Putt, Air Force deputy chief of staff for research and development, strongly argued that the moon possessed valuable potential as a military base. "We should not regard control of the moon," Putt added, "as the ultimate means of insuring peace among the earth nations. It is only a first step toward stations on planets far more distant—in turn, from which control over the moon might then be exercised." In summation, Putt said: "The conquest of space—or, at least, its denial to an enemy—is vital to continued United States security. . . . Within the framework of deterrent force as we exercise it today, space flight soon will be employed to great advantage. And eventually, space superiority will become the primary factor in assurance of world peace."[334]

To the leaders of the Air Force, space technology represented a logical progression in the development of Air Force technology. "The Air Force," said Secretary Douglas, "has been engaged in explorations of outer space and all of the associate technical fields since the end of World War II. . . . The techniques and actual developments involved in the X-15 are one path to man's flight into space." Douglas recalled that no one at first had perceived the military worth of the airplane, and he asserted: "We must press forward with projects for the weapons of day after tomorrow, more advanced missiles and aircraft for flight outside the

atmosphere, and satellites even though we cannot foresee precisely their employment." To General White "almost everything in space" fitted into the Air Force mission. "We foresee," he said, "that we are not only going to have manned bombers and missiles, but that eventually we will have manned space vehicles as combat weapons in the future."[335]

The assertions by General White and others that the United States needed to establish military capabilities in space seemed at odds with President Eisenhower's national space-for-peace policy. Conceptual studies done in the Office of the Air Force Deputy Chief of Staff (Plans and Programs) also indicated that control of space would be a far more complex matter than control of the air. The techniques for control of the air had rested on an air force's capability to destroy air bases, to intercept enemy aircraft in flight, and to destroy planes by antiaircraft fire. Aircraft possessed great maneuverability. For the foreseeable future, however, space vehicles would be confined to the general vicinity of courses or trajectories selected at the time of their launchings. They would travel at extremely high velocities and would lack any great degree of maneuverability.[336]

In a major speech delivered to the Air Force Association's Third Jet Age Conference in February 1958, General White indicated that he had given thought to the space-for-peace policy and to means whereby control might be exercised in space. White said:

> The United States must win and maintain the capability to control space in order to assure the progress and preeminence of the free nations
>
> You will note that I stated the United States must win and maintain the capability to control space I did not say that we should control space. There is an important distinction here We want all nations to join with us in such measures as are necessary to ensure that outer space shall never be used for any but peaceful purposes But until effective measures to this end are assured, our possession of such a capability will guarantee the free nations liberty It does not connote denial of the benefits of space to others
>
> In the past, when control of the seas was exercised by peaceful nations, people everywhere profited Likewise, as long as the United States maintains the capability to control space, the entire world will reap the benefits that accrue
>
> There has been some discussion concerning whether or not the military should handle all United States activities in space Under our form of government, I do not feel that this is really a problem Over-all civilian control will be exercised, and rightly so However, space research and development efforts and space operations must give due consideration to the military aspects.
>
> This is necessary because until other ironclad methods are devised, only through our military capability to control space will we be able to use space for peaceful purposes I visualize the control of space as the late twentieth century parallel to the age-old need to control the seas and the mid-twentieth century requirement to control the air.

To control space we must not only be able to go through it with vehicles that travel from point to point, but we must be able to stay in space with human beings who can carry out jobs efficiently.

I look upon the Air Force's interest and ventures into space as being logical and natural as when men of old in sailing ships first ventured forth from the inland seas.

As these ancient seafarers' knowledge of the inland seas increased and they learned more about the elements, they built larger ships and ventured farther away from land The achievement required men who had learned the many things there were to know about the inland seas Similarly, ventures into outer space require men who know the air. There are no barriers between air and space Air and space are an indivisible field of operations

The Air Force progress toward space has been evolutionary—the natural development and extension of speed, altitude, and sustained flight. These qualities have been our stock in trade throughout the fifty years of Air Force history. We have strived continually to fly faster, to fly higher, and to remain airborne longer. . .

The evolutionary process which has brought the Air Force to its high state of development is not going to change in direction because there are additional challenges in space. Aeronautics and astronautics are closely allied . . I feel that a dangerous trap lies ahead of us if we partition our space efforts We must have centralized direction of our national efforts to attain the best results from available resources, talent, and experience. Excessive duplication of effort would not only be a most severe economic drain on our country, but would waste energy and time . .

Once we attain the space capability, a lack of centralized authority would certainly hamper our peaceful use of space and could be disastrous in time of war Failure to properly coordinate peaceful space activities under common direction could cause confusion, might result in wrong decisions, and would be a safety hazard In war, when time is of the essence and quick reaction so necessary, centralized military authority will surely be mandatory

A strong consideration as far as military space operations are concerned will always be the necessity for the failsafe concept. A substantial proportion of our forces must maintain the capability to make last-second decisions. This is one reason I am convinced that man in space will be a most important factor

Ninety-nine percent of the Earth's atmosphere lies within twenty miles' altitude above the Earth To assure effective operations, there can be no division in responsibility between the control of the air up to twenty miles above the Earth's surface and the space above it. Air Force facilities, communications, and experience exist now for centralized control of operations in the Earth's atmosphere This capability can easily be extended beyond the Earth's atmosphere as our operations in space develop.

Before I close, I want to stress that I cannot conceive that mechanical gadgets will control space. Man will develop the equipment, send it off, and bring it back. On many occasions, and probably more than we envision now, man will fly the equipment. The point here is that man's judgment and skills will always be needed.

In his address White also pointed out that "the United States' capability to control space could ultimately approach absolute deterrence" because reconnaissance eyes in outer space would permit "immediate warning of hostile action on the surface of the Earth" and would allow "much faster reaction on our part . . . which is not only quick, but strong and selective." In response to a question as to how space could be controlled, White responded: "One of the ways to control the sea in time of war and stress is the blockade. . . . I think the same thing conceivably could apply to existing from the Earth's natural envelope into space." It would probably be better to seek to control a hostile nation's access to space than its reentry into the atmosphere. "You couldn't have reentry," he said, "if you kept people from getting out there."[337]

Although there was a general recognition that Air Force studies of space "had only scratched the surface of the problem,"[338] the Air Force had made a good start in rationalizing a new aerospace doctrine. On 29 November 1957 an editorial prepared by the Air Force Office of Information Internal Information Division, first combined the words *air* and *space* when it referred to "air/space vehicles of the future." The word *aerospace* was apparently coined by Dr Woodford A. Heflin of the Air University's Research Studies Institute who published an *Interim Glossary, Aero-Space Terms,* on 23 February 1958.[339] In view of the new thinking, the Air Policy Branch, Air Force Office of Deputy Chief of Staff (Plans and Programs) proposed on 25 April 1958 that Air Force Manual 1-2, *United States Air Force Basic Doctrine,* should be revised. The Air Policy Branch proposed that the new doctrine should state that air power had "moved naturally and inevitably to higher altitudes and higher speeds until it now stands on the threshold of space operation." A new term, *aerospace* meaning "air and space," had come into being, and aerospace power was its manifestation. The Air Force was the military agency predominantly responsible for aerospace doctrine just as in the past it had been responsible for air power doctrine. In aerospace the Air Force could not expect to enjoy the situation earlier referred to as a desired dominant position through control of the air. Instead, aerospace power would desirably possess "the capability to exercise the initiative in space: its purpose would be to operate in space and maintain control in space, not of space." Maintaining general supremacy in aerospace would be a desirable function quite similar to the function of gaining and maintaining general air supremacy that was assigned to the Air Force by law. The Air Policy Branch also suggested that the new doctrine should include the statement: "The positioning of aerospace power geographically and/or astronautically may have dominating significance in peace or war."[340]

The concept of aerospace caught on rapidly within the Air Force. In an article published in August 1958, General White remarked that Soviet air power was being rapidly expanded into aerospace power.[341] When he appeared before the House Committee on Science and Astronautics on 3 February 1959, White stressed the word *aerospace* throughout his prepared statement, and then defined it by stating.

> The Air Force has operated throughout its relatively short history in the sensible atmosphere around the earth. Recent developments have allowed us to extend our operations further away from the earth, approaching the environment popularly referred to as space. Since there is no dividing line, no natural barrier separating these two areas, there can be no operational boundary between them. Thus air and space comprise a single continuous operational field in which the Air Force must continue to function. This area is aerospace. . . . Total aerospace power includes manned and unmanned air-breathing vehicles, spacecraft, and satellites and ballistic missiles.[342]

Congressional reaction to aerospace was somewhat less than unanimously enthusiastic. Chairman John W. McCormack of the House Committee on Science and Astronautics described aerospace as "a very sweet term, a very all-embracing term."[343] "Boys," Representative Daniel J. Flood exclaimed, "the Air Force has come up with a new phrase, 'Aerospace.' That is a beauty.... That means everybody is out of space, and the air except the Air Force.... They have now staked out a claim to 'aerospace.'"[344] To Under Secretary of the Air Force Malcolm A. MacIntyre, however, aerospace was not a catchword but an attempt "to identify, in a single word, the continuous operational field in which the Air Force must function as technological progress permits us to operate farther and farther away from the earth's surface." MacIntyre denied that the Air Force claimed exclusive jurisdiction in aerospace. "In the use of the word 'aerospace,'" he explained,

> there is no intention on the part of the Air Force to claim aerospace as an exclusive medium of our particular service. We recognize that the other services also have an interest, or, in the military parlance, requirements that can or should be met in the expanded medium of aerospace. However, each service's interest, or requirements, is justified only to the extent to which it enhances its ability to perform its particular missions.[345]

In its final definition incorporated in the revision of Air Force Manual 1-2 issued on 1 December 1959, the Air Force stated: "Aerospace is an operationally indivisible medium consisting of the total expanse beyond the earth's surface. The forces of the Air Force comprise a family of operating systems—air systems, ballistic missiles, and space vehicle systems. These are the fundamental aerospace forces of the nation."[346]

Except for the recognition that control in aerospace was apt to require different techniques from those practiced in gaining and maintaining control of the air, the Air Force viewed the atmosphere and space as one realm and saw no reason why the Key West definitions of strategic roles and missions should not continue to guide the organization of the Armed Forces. The Department of Defense, the Army, the Navy, and significant portions of the civilian scientific community differed with the Air Force positions on aerospace and aerospace power. The resolution of these diverse views would have a substantial impact on national organization for defense and for the utilization of space.

NOTES

1. House, *Department of Defense Appropriations for 1959· Hearings before the Subcommittee of the Committee on Appropriations, Overall Policy Statements*, 85th Cong , 2d sess , 1958, 25

2. House, *United States Military Aid and Supply Programs in Western Europe· Nineteeth Report by the Committee on Government Operations*, 85th Cong , 2d sess , 1958, 31

3 House, *DOD Appropriations for 1959, Overall Policy Statements*, 403.

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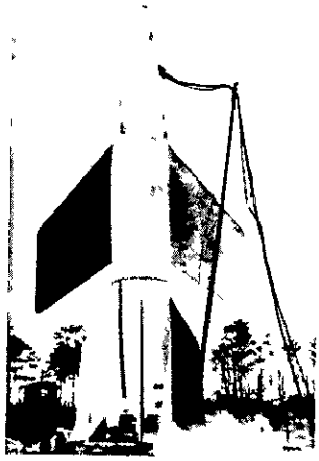
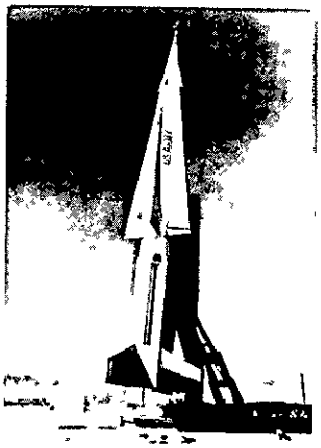
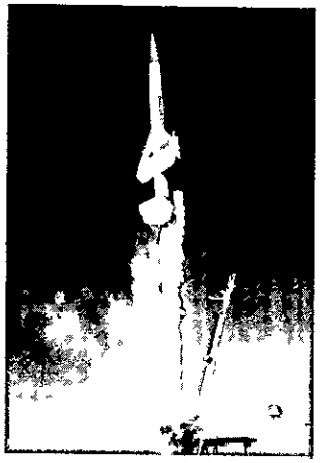


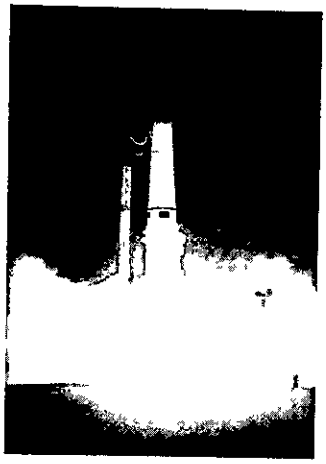
German V-2



Nike-Hercules long-range, high-altitude antiaircraft missile



Bomarc interceptor missile



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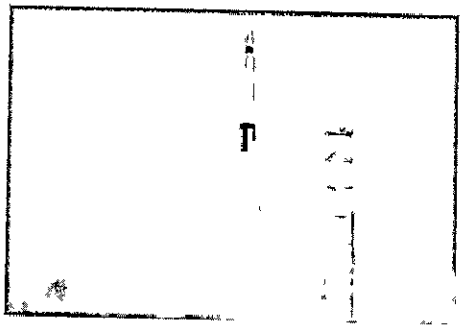

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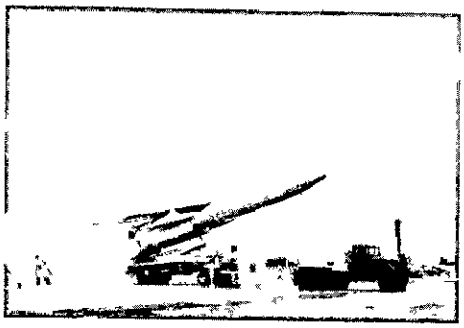
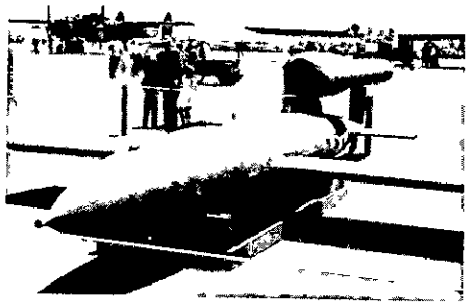
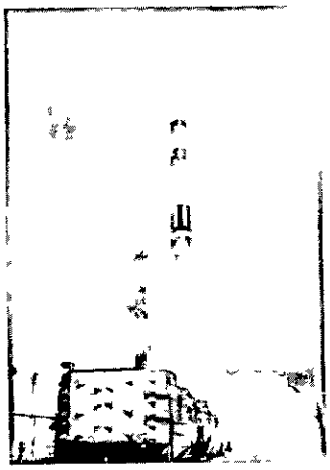


Snark ground-to ground missile

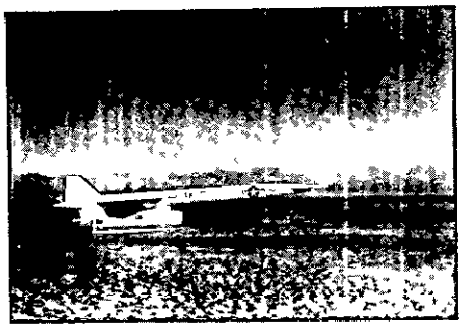


V-1 buzz bomb

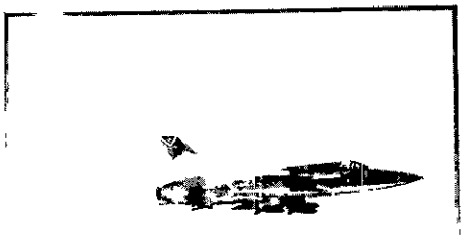


Titan ICBM

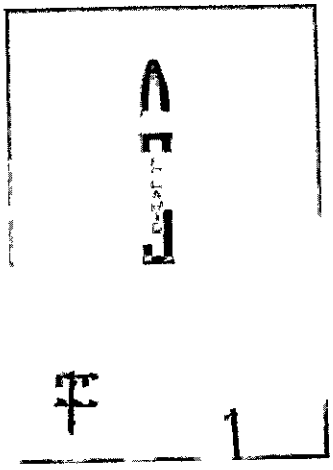
Atlas ICBM



Hound Dog air-to-surface missile.



F-105 Thunderchief



Polaris ICBM

Maj Gen Bernard Schriever, commander, Western Development Division, 1955–59.

Gen Thomas D White, Air Force chief of staff, 1957–61

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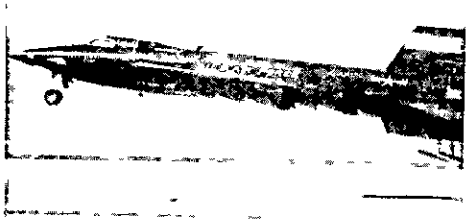

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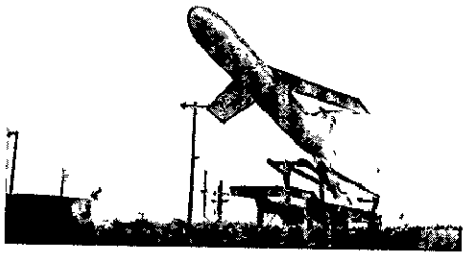

Mace tactical air missile

Gen Earle E Partridge, commander in chief, Continental Air Defense Command, 1955–59

Gen Thomas S Power, commander, Strategic Air Command, 1957–64

CHAPTER 10

IMPACT OF MISSILES AND SPACE ON NATIONAL ORGANIZATION AND STRATEGY

In the aftermath of Sputnik many Americans were inclined to blame interservice rivalry and "service bickerings" within the Department of Defense for the lag in the development of American missile-space technology. In an address to the American people on 7 November 1957, President Dwight D. Eisenhower stated that "such things as alleged inter-service competition" would "not be allowed to create even the suspicion of harm to our scientific and development program." In his State of the Union message to Congress on 9 January 1958, Eisenhower noted that "some of the important new weapons which technology has produced do not fit into any existing service pattern" and that some of them "defy classification according to branch of service." As soon as studies were completed Eisenhower promised to send Congress a recommendation for a defense reorganization that would "achieve real unity" and "end inter-service disputes."[1]

The Defense Reorganization Act of 1958

At the conclusion of its exhaustive air power hearings, Senator Stuart Symington's special investigating subcommittee had already made recommendations regarding a need for defense reorganization in a report made public on 25 January 1957. This report charged that the Department of Defense had "permitted duplication, even triplification, among the three services in the development and production of missiles," had "permitted comparable waste in the allocation to the three services of responsibility in the missile field," and had "delayed in giving overriding priority to the ballistic missile program." The Symington subcommittee concluded: "The duplicating approach characteristic of many research and development programs in the Department of Defense, along with the dollar limitations established for such programs, has retarded needed modernization of weapon systems. These policies have retarded important scientific breakthroughs. They contrast with Soviet policies which have produced extraordinary Soviet progress in the research and development field."[2]

Many of the witnesses who appeared before the numerous congressional committees that investigated missile and space problems in the winter of 1957-58 agreed, at least by inference, with President Eisenhower's apparent belief that interservice rivalry had contributed to a lag in technological development. Supporting such an idea when he appeared before Senator Lyndon B. Johnson's

Preparedness Investigating Subcommittee in December 1957, Dr Wernher von Braun suggested that a national space agency be set up either under the secretary of defense or as an independent agency, with its own budget and an in-house master planning organization "where competent people would plan a course of action, a stepwise course of action, on how to proceed to attain certain milestones. For example, to put a man into orbit on a returnable basis within the next 5 years, and to have a manned space station, say, in 10 years."[3] President Eisenhower's scientific adviser, Dr James R. Killian, had written that "it is unreasonable to expect that ideas for radically new weapons will come from the military services." Elaborating this theme in an appearance before the Johnson subcommittee, Dr J. Sterling Livingston, a Harvard University professor of business administration, urged that radically new weapons had seldom been developed to fill military requirements. "I recommend," Livingston said,

> that we bypass our existing decisionmaking process in weapons development and that responsibility for the development of radically new weapons and scientific equipment, such as earth satellites and space vehicles, be transferred to an independent scientific agency outside the Defense Establishment This agency should have full authority to take advantage of scientific breakthroughs without approval or concurrence of the military services. . . As soon as one of the military services establishes an approved requirement for any weapon under development, appropriate arrangements should be made to transfer responsibility for the production of that weapon to the service. Thus, the military services should be considered as customers of this agency.[4]

Apparently giving some weight to recommendations such as these, the Senate Preparedness Investigating Subcommittee recommended on 23 January 1958 that decisive action should be taken to "reorganize the structure of the Defense Establishment" and to "accelerate and expand research and development programs, provide funding on a long-term basis, and improve control and administration within the Department of Defense or through the establishment of an independent agency."[5]

Drives for Closer Defense Unification

Since the days of William Mitchell and Mason Patrick, Air Force leaders had traditionally favored closer unification of the armed services; hence, early in 1956 when the Soviet Union appeared to be making greater technological progress than the United States, the Air Force opened a campaign aiming toward a new reorganization of the Department of Defense. In a lecture delivered at the National War College in May 1956, Gen Nathan F. Twining, Air Force chief of staff, stated that the matter of organizing defense and using new weapons most effectively was of equal importance with the technological race. "Even today," he pointed out, "our weapons are far ahead of our doctrines and concepts for using them. . . . The real race with the Soviets is to achieve the best doctrines, the best strategy and tactics with new weapons." Twining warned that each service was attempting to attain

"service self-sufficiency," whereas most tasks were becoming the common objectives of all three services. From his point of view as chief of staff of the Air Force, Twining stated that he personally favored the idea of a single service, but he noted that such ideas had been studied and rejected many times. He doubted that they would be accepted except as a war-induced emergency measure. His main hope for increased service unification lay in the establishment of unified commands. "From unified commands," he said, "we get requirements for forces and weapons needed for clearly defined tasks. In this respect, they differ from requirements that develop when you try to plan for meeting all kinds of war, in all areas, with all kinds of weapons." Twining favored the creation of additional unified commands: a joint Strategic Air Command, for example, should be established along the lines of the Continental Air Defense Command. In unified commands, men of all services could become identified as members of a common mission—men of an oriented force.[6]

In its report of Twining's address, the *Washington Daily News* asserted that the Air Force had begun "blowing the bugles for closer unification and eventual merger of the Army, Navy, Marines and Air Force."[7] This assertion appeared to have some validity. In his testimony before the Symington subcommittee in April 1956, retired Gen Carl Spaatz had stated that the Department of Defense should be organized "with a single military chief of staff under the Secretary of Defense plus a general staff."[8] In a speech in San Francisco on 1 June 1956, Gen Thomas D. White, the Air Force vice chief of staff, pointed out that new weapons were causing the roles and missions of the services to overlap more and more. To provide a military organization "that will help us all to be free of conflicting service loyalties and confusing influences," White favored further integration of forces into joint commands and a free transfer of officers between the services. In an appearance on a national television program on 3 June 1956, former Air Force Secretary Thomas K Finletter stated that it was "absolutely necessary that we coordinate all of these services and put them into a single service." During 1956, Gill Robb Wilson (president of the Air Force Association), Professor Barton Leach, and retired Gen Elwood R. Quesada endorsed an integration of the military services.[9]

In an article published during the winter of 1956-57, Col Albert P. Sights, Jr., a member of the Policy Division of the Air Force Directorate of Plans, provided a suggested blueprint to the way in which United States national defense forces could be organized to accomplish the basic tasks of defense deriving from the national objectives. Sights conceived that the basic national defense tasks were maintenance of nuclear deterrence, continental defense, a strategic reserve, and peripheral defenses in the Atlantic and Pacific. He visualized that the various combat functions that were dispersed in 17 unified, specified, and single-service organizations ought to be consolidated into five autonomous task-centered combat commands, which could be designed as the strategic atomic, continental defense, Pacific defense, Atlantic defense, and strategic reserve commands. A chief of military operations should be appointed to provide a centralized direction and control of these combat forces in peace and war. The three military services should

be reduced to supporting elements of the combat organization. The secretary of defense should be provided with an expanded civilian and military staff to assist him in directing the combat organization and the three support commands.[10]

While this discussion was progressing, Secretary of Defense Charles E. Wilson manifested little concern for what he described as the "magic formula" of "complete unification." "The stifling of intelligent discussions for the sake of unanimity," Wilson thought, "will not guarantee the perfect answer. More important, it is foreign to our concept of a free society." He argued that a single chief of staff for the combined armed forces would "risk military dictatorship in our country." Wilson freely admitted that he had encouraged service rivalry in the development of new weapons and he saw no reason why he could not at an appropriate time "simply interpret how the new weapons can fit into the previously agreed division of responsibility."[11] Speaking as chairman of the Joint Chiefs of Staff, Adm Arthur W. Radford suggested that Finletter's advocacy of a single service and a single uniform "would not solve anything . . . we would still have compartmentation within this single uniform." Radford also thought that a single armed forces chief of staff would have a very difficult life. "His lot probably would be an unhappy one because he really would not have the authority that his title would imply unless we changed our system of government."[12]

Representing long-standing Navy views, Adm Arleigh Burke, chief of naval operations, flatly opposed a single armed services chief of staff. "If you have a single Chief of Staff," Burke maintained, "with the power of decision and with authority to develop his staff as he sees fit, sooner or later he can . . . develop an organization that is case hardened on the outside. . . . He can develop his own systems, and some time, some day somebody can misuse that." Touching on the suggestion that the Joint Chiefs of Staff might be separated from their services and made into a high-level strategic planning body, Burke argued: "The trouble with separating the chiefs from the chiefs of services is that when you don't have the responsibility for something it's awfully easy to tell people what to do. . . . Another thing is that for Joint Chief to be effective he must know his answers. . . . He's got . . . to really know the basic things concerning his service pertaining to the problems which the chiefs are trying to solve."[13] Even though Twining officially favored a single service and a single armed forces chief of staff as a matter of policy, he was personally willing to admit that he had some reservations on both matters. "I think it would be less expensive than the present organization," he said. "However, I still feel," he added, "that the three services watching each other is a pretty healthy thing, because no one can get really off the beam. With a single service you might get a sort of military dynasty built up that could make a really bad mistake for the United States."[14]

Acting as a public service in the national interest, a study panel of the Rockefeller Brothers Fund had provided many of the recommendations that had been implemented in the Department of Defense reorganization of 1953. In November 1956 a grouping of seven panels assembled by the Rockefeller Fund began to consider national problem areas in terms of the future. Some 19 distinguished citizens served on panel II, International Security—The Military

Aspect, whose report was prepared under the direction of Henry A. Kissinger and was released late in 1957. This report forecast four trends that would be of particular importance to national security: weapons technology would become increasingly complex, the rate of technological change would increasingly complicate the tasks of defense relative to offense, the Soviet bloc would continue to gain in overall military strength, and the concept of scarcity in nuclear weapons would disappear from the defense calculations of the United States, the Soviet Union, and to a lesser extent Great Britain. Based on this strategic estimate the panel described three major defects in the organization of the Department of Defense:

1. The roles and missions assigned to the individual military services had become competitive rather than complementary because they were out of accord with weapons technology and the principal military threats to national policy.
2. The organization and responsibilities of the Joint Chiefs of Staff precluded the development of a comprehensive and coherent national defense doctrine.
3. The secretary of defense was so burdened with the negative tasks of trying to arbitrate and control interservice disputes that he could not play his full positive part in the initiation and development of high military policy.[15]

To remedy the central weaknesses that it described as inherent in the existing organization of the Department of Defense, the Rockefeller panel recommended changes in service roles and missions, the status of the Joint Chiefs of Staff, and the authority of the secretary of defense. In the matter of roles and missions, the panel recommended that the military departments be removed from the channel of operational command and be charged to support the unified operational commands. It further recommended that all operational military forces of the United States should be organized into unified commands to perform missions dictated by strategic requirements. The units assigned to each unified commander should be organic to his command and not simply placed under his temporary operational control.

Since the chairman of the Joint Chiefs of Staff was believed to be the "only member who can give his full-time attention to problems of over-all strategic doctrine," the panel considered it logical that the chairman should be designated as the principal military adviser to the secretary of defense and to the president. The chiefs of the services would continue to serve on the Joint Chiefs of Staff but only as advisers to the chairman on logistics, training, and procurement. The chairman should also control the staff of the Joint Chiefs of Staff, which would be organized on a joint basis. In order to develop a group of top officers who could "transcend the thinking of any one service," the panel recommended that all officers above the equivalent rank of brigadier general should receive their permanent promotions from the Department of Defense and should become officers of the armed forces of the United States.

Under the existing organization, the panel conceived that the secretary of defense was a referee who could handle disputes only after they came to him in hardened form. To strengthen the secretary's position, the panel recommended that the line of operational command should run from the president and the secretary of defense to the functional commanders through the chairman of the Joint Chiefs of Staff. It recommended that the line of logistical command should be from the president through the secretary of defense to the secretaries of the three military departments. The panel also recommended that the secretary of defense be given absolute powers over research and development and over procurement. Its report stated: "The Secretary of Defense should be given authority over all research, development and procurement. He should have the right of cancellation and transfer of service programs together with their appropriations. He should also be given a direct appropriation for the conduct of research and development programs at the Defense Department level."[16]

The Rockfeller panel's report was especially critical of what it described as the service bias of the members of the Joint Chiefs of Staff. It asserted that "the Joint Chiefs of Staff functions too often as a committee of partisan adversaries engaged in advancing service strategic plans and compromising service differences. Too little in present arrangements permits the Chief of Staff time and opportunity to think spontaneously or comprehensively about overall strategic problems. The result is that our military plans for meeting foreseeable threats tend to be a patchwork of compromise between conflicting strategic concepts or simply the uncoordinated war plans of the several services."[17] Other supposedly informed men supported this same criticism. On 25 November 1957 Dr Vannevar Bush asserted that the Joint Chiefs of Staff had never been able to prepare a "unitary" war plan. "The services themselves," he said, ". . . have prepared war plans, all different, each one of them the best they can produce. From there on, there has been no means by which those could be brought into a unitary plan." Bush's solution was to put the preparation of war plans into the hands of three senior officers (retired officers brought back to active duty if they were the right men) who would be detached from all further obligation to their individual services. "The essential thing," Bush said, "is that in one way or another we get the thing we are looking for, namely a unified war plan."[18]

Virtually no one in authority agreed with the assertions of the Rockefeller panel and of Doctor Bush that the Joint Chiefs of Staff had failed to agree on war plans.[19] While testifying before the Senate Preparedness Investigating Subcommittee early in 1958, the Joint Chiefs agreed that they seldom had specific difficulties in arriving at a joint approval of war plans and related operational matters. War plans were based on capabilities and military forces in being. Most disputes arose from a competition for funds and related resources needed to increase and improve the forces of the future.[20] General White emphasized that split decisions were actually "rare" and were not unwholesome, since minority views were not hidden because a majority might oppose them. "I feel," White said, "that numbers do not necessarily make for correct decisions. There can be good results from JCS splits provided

higher authority resolves the issue with unequivocal decision."[21] Gen Maxwell D. Taylor, Army chief of staff, estimated that out of 2,977 Joint Chiefs of Staff actions in the period between October 1955 and March 1959 only 23 split papers were forwarded to the secretary of defense.[22] These split papers dealt with important subjects upon which compromise was impossible. "There is always," White explained, "tremendous self-imposed pressure to do the best job possible because agreement among the Chiefs on military matters ought ordinarily to result in the best solution of the problem. Based upon past experience, I consider that a compromise solution of a military problem arrived at by the Joint Chiefs of Staff is usually better than a compromise decision made by civilian authority."[23] "If the Joint Chiefs of Staff sent nothing but unanimous recommendations forward to the secretary of defense," Admiral Burke observed, "then we should be apprehensive because it would mean either that the Joint Chiefs were losing their competence, their sincerity, or their expertness, or that the services themselves were becoming ineffective, unready, or insensitive to their duties in national security."[24]

Each of the members of the Joint Chiefs of Staff agreed that their "two-hat" work load as service chief and member of the Joint Chiefs was extremely burdensome, but they believed that the nation's chief military planners, as General Twining put it, had to be "intimately acquainted on a day-to-day basis with the operating capability and effectiveness of their own services."[25] "If you divorce the Chiefs of Staff from their services," General White thought, "then the man who gives the orders and lays the plans has no responsibility for carrying them out, and that makes it pretty difficult for the other fellow, whoever does have to carry them out."[26] Admiral Burke was even more positive: "The responsibility stemming from the importance of JCS military planning and advice," he said, "is so great that the information required is nothing short of the best. The best available information on the capabilities, readiness, and requirements of the armed services can be possessed only by the military chiefs of these services."[27] Twining's suggestion to reduce the terrific load laid upon the individual chiefs was the approach that he had employed while he was chief of staff of the Air Force, namely to delegate as much as possible of the service work to a vice chief of staff.[28] Even though General White thought that the joint chiefs must remain as the heads of their services, he was willing to foresee some change. Taking a "long look out into the future," White visualized that "we are going to have to go to something that is tantamount to a single service." In preparation for this eventuality he thought that officers who served on the joint staffs of the Joint Chiefs of Staff or of unified commands might be divorced from their services and become armed forces officers. Such an Air Force officer could go back to his service, but in a "gray uniform rather than a blue uniform" and with the understanding that he was "eligible for broader service" and had "lost his status as a purely Air Force officer."[29]

The senior military officers who appeared before the Senate Preparedness Investigating Subcommittee displayed little agreement as to the status to be accorded to the chairman of the Joint Chiefs of Staff and as to whether the nation required a single armed forces chief of staff. Asked about these matters, Gen Curtis

E. LeMay observed that such questions would have to be settled by the government outside the military establishment. For the immediate future he recommended that one thing to be done "would be to change the present Chairman from one of a man who just conducts the meetings, to some responsibility, and require him to come out of a meeting with a military decision, and if he can get unanimous opinion from the Joint Chiefs, fine: if he cannot, then he forces the issue and makes the decision himself, if necessary."[30] General White pointed out that the secretary of defense already turned to the chairman of the Joint Chiefs for advice in cases of split decisions. A single chief of staff would provide prompt decisions but less certainly wise decisions, since differing points of view would not be made known to civilian authorities.[31] As he had done before, Admiral Burke bitterly opposed a single chief of staff who might become a military dictator if he were a strong man or a "yes man" if he were weak.[32] In response to a request for their opinions, General Spaatz and Fleet Adm Chester W. Nimitz offered exactly opposite views. Spaatz urged that a "simple efficient system" of a single chief of staff and a competent joint staff was required to direct "a complex military organization." "The Supreme Commander in the Washington area," Nimitz thought, "is the President as Commander in Chief, and any proposal to set up somebody else as a single commander between him and the forces in the field is totally wrong."[33]

Still new to the responsibilities of the Office of Secretary of Defense, Neil H. McElroy remarked that he could have used "just a little bit more time to get acquainted with all my surroundings" before undertaking a reorganization of the Department of Defense, but President Eisenhower's State of the Union address of 9 January 1958 indicated an immediate need for action. To head the reorganization project, McElroy secured the services of Charles S. Coolidge, whom he appointed special assistant for reorganization. He also established a consultative group, including General Twining as incumbent chairman of the Joint Chiefs of Staff, Gen Omar N. Bradley and Adm Arthur W. Radford as former chairmen of the Joint Chiefs, William C. Foster as a former deputy secretary of defense, Nelson A. Rockefeller as chairman of the President's Advisory Committee on Government Reorganization, and retired Gen Alfred M. Gruenther. These men spent some six weeks conducting interviews within and without the Department of Defense before preparing draft legislation that was incorporated in a report that McElroy submitted to Eisenhower. Even before this McElroy had obtained the president's advice on key points on several occasions, and Eisenhower approved the suggested legislation with only a few changes.[34] McElroy later disclosed that he and Eisenhower considered and rejected such proposals as a single armed forces chief of staff, a merger of the armed services, and the establishment of assistant secretaries of defense for the Army, Navy, and Air Force in place of existing service secretaries. They also rejected the Rockefeller panel's recommendations that the chairman of the Joint Chiefs of Staff be made the principal military adviser to the president and the defense secretary, that the Joint Staff be organized on a unified basis and placed under the control of the chairman who would then shape strategic planning, and that all military forces

should be assigned organically to unified commands. "I would say," General Twining added, "that our concept of the Joint Chiefs of Staff organization as written in the administration bill is not along the same philosophy as the Rockefeller report."[35]

As he had promised to do, President Eisenhower transmitted a message to Congress on 3 April 1958 in which he discussed the administrative and legislative changes that he considered essential in the Department of Defense. In explanation of his reasoning, Eisenhower stated:

> First, separate ground, sea and air warfare is gone forever If ever again we should be involved in war, we will fight it in all elements, with all services, as one single concentrated effort Peacetime preparatory and organizational activity must conform to this fact Strategic and tactical planning must be completely unified, combat forces organized into unified commands, each equipped with the most efficient weapons systems that science can develop, singly led and prepared to fight as one, regardless of service. The accomplishment of this result is the basic function of the Secretary of Defense, advised and assisted by the Joint Chiefs of Staff and operating under the supervision of the Commander in Chief. . Additionally, Secretary of Defense authority, especially in respect to the development of new weapons, must be clear and direct, and flexible in the management of funds Prompt decisions and elimination of wasteful activity must be primary goals.[36]

Most of Eisenhower's message dealt with legislative actions required of Congress, but he also revealed his own administrative orders for changes within the Department of Defense. Subject only to exceptions that he would personally approve, he intended that "all of our operational forces be organized into truly unified commands." "I expect," he said, "these truly unified commands to go far toward realigning our operational plans, weapon systems and force levels in such fashion as to provide maximum security at minimum cost " Eisenhower stated that the Joint Chiefs of Staff concept was essentially sound, but he directed that the Joint Chiefs would serve collectively as a staff to assist the secretary of defense in his exercise of direction over unified commands. He directed the secretary of defense to discontinue the existing joint staff committee system and organize the joint staff into integrated staff directorates. Believing that "before officers are advanced beyond the two-star level, they must have demonstrated, among other qualities, the capacity for dealing objectively—without extreme service partisanship—with matters of the broadest significance to our national security," Eisenhower announced that he would consider for promotion or nomination to these high ranks only those officers that were recommended to him by the secretary of defense.[37]

With a very few exceptions the Department of Defense Reorganization Act of 1958 passed by Congress and signed into law on 6 August 1958 incorporated President Eisenhower's recommendations. The act markedly increased the authority of the secretary of defense, particularly in the operational direction of the armed forces and in the research and development field. Where the old National Security Act's preamble had provided for "three military departments

separately administered," the new law provided for "a Department of Defense, including three military departments," and provided only that the departments were to be "separately organized." The administration bill had proposed to delete all reference to the separate status of the departments, but Chairman Carl Vinson and the House Committee on Armed Services inserted the provision that the departments would be "separately organized." The act vested overall direction and control of military research and development activities in the secretary of defense and created a position of director of defense research and engineering, who would be the principal adviser to the secretary on scientific and technological matters, would supervise all research and engineering activities in the Department of Defense, and would direct and control (including assignment or reassignment) research and engineering activities that the secretary of defense deemed to require centralized management. The secretary was also authorized to establish single agencies to conduct any service or supply activity common to two or more military departments.[38] The authority to establish single agencies was added to the bill by an amendment offered by Representative John McCormack and was accepted by Congress with very little debate.[39]

The Department of Defense Reorganization Act of 1958 also provided that the president, with the advice and assistance of the Joint Chiefs of Staff and acting through the secretary of defense, would establish unified or specified commands for the performance of military missions. Forces assigned to such commands were to be under the "full operational command" of a unified or specified commander, but the type forces assigned to such a command would be supported by their respective military departments. Under the 1953 reorganization, designated service secretaries had served as executive agents for designated unified or specified commands. Now the operational line of command for these commands ran from their commanders through the corporate Joint Chiefs of Staff to the secretary of defense and the president. The previous legislative authority of the chief of naval operations and of the chief of staff of the Air Force to command their respective forces was repealed; the chief of staff of the Army had never possessed such authority. The act repealed the meaningless old provision whereby the chairman of the Joint Chiefs of Staff was not permitted to vote (the Joint Chiefs had never conducted business by vote), and the chairman was authorized to manage the joint staff (which could not exceed 400 officers) and its director on behalf of the Joint Chiefs of Staff. The administration bill had omitted any limitation on the number of persons who might be assigned to the joint staff, but Chairman Vinson and the House Committee on Armed Services had insisted on setting a limit on the strength of the joint staff. On this matter Vinson observed: "And no one can now say that there is any danger or apprehension that we are drifting toward a Prussian system. Because we prohibit that, by putting in the roadblock of 400." In the approved law, the vice chiefs of the Army, Navy, Marine Corps, and Air Force were authorized to perform such duties and exercise such powers as their chiefs and service secretaries might delegate or prescribe for them,

thus by inference enabling the service chiefs to devote more time to work of the Joint Chiefs of Staff.[40]

After a period of study, Secretary McElroy began to effect the new organizational framework for the Department of Defense. In the reorganization McElroy attached the largest importance to the institution of the new and more direct lines of command to the unified and specified commands and the next degree of importance to the establishment of the new research and engineering organization.[41] "Emphasis on the unified command," he had said, "constitutes the heart and soul of the President's program of reorganization."[42] In September 1958 Eisenhower and McElroy reviewed and approved the missions of the two specified commands (the Eastern Atlantic and Mediterranean and the Strategic Air Commands) and the six unified commands (the Alaskan, Atlantic, Caribbean, Continental Air Defense, European, and Pacific Commands). That same month administrative and logistical support of the unified and specified command headquarters was assigned out among the military departments: the Air Force was made responsible for supporting the headquarters of the Alaskan, Continental Air Defense, and Strategic Air Commands.[43] All component forces assigned to the unified or specified commands, including the component force headquarters, were to be administered and supported by the military department that provided the forces. The unified and specified commanders were given no budgetary functions: they made plans and stated requirements for forces to the corporate Joint Chiefs of Staff, who correlated all force requirements with across-the-board requirements and capabilities.[44] In an additional directive issued on 31 December 1958, Secretary McElroy described additional portions of the new organization. This directive visualized three groups of agencies under the secretary of defense. Immediate staff assistance to the secretary was provided by the Office of the Secretary of Defense, which now comprised seven assistant secretaries and the director of defense research and engineering. The Joint Chiefs acted as the secretary's principal military advisers and his military staff in the chain of operational command. The three military departments constituted the second group of agencies. Each department was responsible for the preparation of type forces The unified and specified commands comprised the third group of agencies. Two command chains were established: the line of operational command ran from the president to the secretary of defense and through the corporate Joint Chiefs of Staff to the commanders of the unified and specified commands. The line of nonoperational command ran from the president to the secretary of defense and to the secretaries of the military departments.[45]

As enacted into law the 1958 reorganization act went about as far as possible in centralizing authority and control in the Department of Defense as could be managed without abandoning the concept of the separate military services. The major statutory limitations on the powers of the secretary of defense that remained were that the military departments could not be merged, that statutory functions could not be substantially changed without careful congressional review, that a single chief of staff over the armed forces or an overall armed forces general staff

should not be established, and that the secretaries of the military departments and the individual members of the Joint Chiefs of Staff might present any recommendation they deemed proper to Congress. Although the latter authority had not been used since 1949, President Eisenhower had described it as "legalized insubordination."[46]

Air Force Demands for a Single Service

During the hearings in Congress and in the months that followed the passage of the Department of Defense Reorganization Act of 1958, continued criticism of defense organization indicated a prevalent belief in some quarters that the act was only a partial, evolutionary step toward increased unification. As early as 17 April 1958, General White announced that the Air Force was wholeheartedly in accord with the president's proposals on defense reorganization. When he appeared before the House Committee on Armed Services on 2 May, White justified the reorganization on the grounds that it would establish a peacetime organization that could meet wartime requirements, provide a system that would better enable the Joint Chiefs of Staff to act with corporate responsibilities and corporate views, assign clear-cut authority and responsibility to the secretary of defense, and provide better defense at a comparable cost. "I completely agree," White said, "with the President's concept that separate ground, sea, and air warfare are gone forever, and that peacetime preparation and organization must conform to this fact." In response to questions, White admitted that the reorganization measure might mean "that some of the things that we perhaps consider vested interest of the Air Force might go by the board." However, he added, "I think and a great many of us in the Air Force think that even if that happened, it would be for the good of the over-all national defense."[47]

When White appeared before the Senate Committee on Armed Services on 19 June, he continued to support the reorganization bill although he regretted that the House of Representatives had placed limitations on the authority of the secretary of defense to transfer, reassign, abolish, or consolidate combatant functions within the Department of Defense. "This could hold up action for many months," White explained, "on a change of major importance to the security of our country." Even though the law would limit the secretary's authority, White considered that the "best possible organization" of the Defense Department was being effected. He thought that the reorganization would result "in greater uniformity . . . as far as doctrine and training are concerned" since the unified commands would be operating directly under the corporate Joint Chiefs of Staff and "anytime there is a conflict in doctrine . . . it can, and undoubtedly would, be straightened out."[48] In a summary of his position, General White remarked: "I vigorously supported the Reorganization Act of 1958. I think it is a step forward."[49] During hearings on the reorganization bill before the Senate Committee on Armed Services, General Spaatz described the measure as inadequate in that it failed to give the secretary of defense an administrative control over the services. "In my

opinion," Spaatz said, "the Defense Department will never be properly organized until full administrative authority is vested in the Secretary of Defense; and that condition is so stated in the law in no uncertain terms."[50]

In a strong statement made to the Senate Committee on Aeronautical and Space Sciences on 22 April 1959, General LeMay described the Defense Reorganization Act of 1958 as a step in the right direction that ought to be pursued further. "Today more than ever before in our history," he stated,

> there is need for centralized control and direction over our Armed Forces Modern weapons and improved delivery systems are changing the concepts of military operations and confusion or indecision can be fatal in this new era As our weapon systems improve and become more versatile it is becoming more and more apparent that the functions and weapons of individual services are beginning to overlap. Forces are of necessity becoming functionally oriented. To meet this changing condition I firmly believe we will need a modification in our military structure. I believe that we must eventually progress toward a single service, with a single Chief of Staff, and one staff to operate the Armed Forces .. The DOD Reorganization Act of 1958 was a step in this direction. . I feel that sooner or later we must go beyond this Semiautonomous combat organizations are not the complete answer We need central command and control To achieve this, the barriers that are created by service interest must be removed. Combat elements having the same function or mission must be integrated into functional areas under single control . As I see it now, this can best be accomplished under a single chief, one who can make decisions on force structure, approve strategic plans and weapon systems and assign those systems for use by given elements of the Armed Forces.[51]

The Air Force position was regarded favorably in some congressional committees. In its report on the Department of Defense appropriation bill in the summer of 1959, the House Appropriations Committee stated:

> The President, the Secretary of Defense, the Congress, and the American people have a right to expect a better job from the JCS in the way of military guidance As a corporate body, the Joint Chiefs of Staff must set up plans for the guidance of the various commands and the respective services Hard decisions are required, and the President, the Secretary of Defense and the Joint Chiefs must assume the major responsibility for tailoring military forces to requirements Each year the question which confronts us of "who gets what" is becoming more difficult to cope with.[52]

In September 1959 the Committee on Government Operations of the House of Representatives recommended an Army-Air Force merger as a beginning step to end waste and confusion in the Pentagon. "While each service tries to accommodate and adapt its mission concept to the space medium," the committee reported, "the logic of new weapons technology has virtually destroyed the traditional basis for services organized around strategic land, sea, and air missions. . . . There is historical irony in the fact that the Air Force achieved its organic separation from the Army at the threshold of the decline of airpower and the rise of missile power."[53]

In a study entitled "Service Roles and Missions in the Future," completed in May 1958, the Air War College Evaluation Staff had noted that the media of operations

originally had determined the strategic functions of land, sea, and air forces. The emergence of new weapon systems, however, had reduced the effect of media on operations. The Evaluation Staff, therefore, had recommended that "we must begin to relate task or mission to weapon system and to arrange weapon systems into appropriate groupings for management purposes."[54] In a high-priority project assigned on 14 May 1959, the Evaluation Staff prepared a detailed study looking toward the implementation of a single-service concept. The study was completed in basic form on 31 July 1959 and was transmitted to the Air Force plans directorate, which bound extracts from it with other "think papers" in standard black binders and circulated the package for comment. The study also was published in the *Air University Quarterly Review* during the summer of 1960. Entitled "Study on Single Service," the article proposed that the Department of Defense could move toward a single service in five evolutionary steps and that the beginning of the evolutionary changes could be made under authority permitted by the Defense Reorganization Act of 1958. In a preliminary step, a joint reorganization task force should be established to prepare basic planning. In an activation step, the Joint Chiefs of Staff should be divorced from service affiliations and used as the nucleus for a national military council that would advise a single chief of staff of the armed forces, who would be supported by a national military staff. In an operational step, new unified commands would be organized to include a strategic, a mobile strike, a continental US defense, an Atlantic, a Pacific, a research and development, and a logistics command. In a cleanup step, the Departments of Army, Navy, and Air Force would be discontinued and activated as commands, with support and training functions. In the final step, the Army, Navy, and Air Force commands would be integrated into a unified personnel and training command.[55] Navy officers soon began to refer to the single service study as the "Air University Black Book of Reorganization Papers."[56] For his own part, General White defended the Air University's so-called Black Book as a necessary study, which was apparently more familiar to Army and Navy officers than to Air Force officers. He saw no reason why Air Force officers should not be studying the concept of a single service. But he added, "I can tell you right now the Air Force does not advocate a single service."[57]

New Authority for United Commands

The apparent Air Force enthusiasm for increased unification of the military services was not shared by the Department of Defense or by the Army and Navy. In April 1959 Deputy Secretary of Defense Donald A. Quarles expressed confidence that the 1958 reorganization would "discourage improper use of the research and development program as a means of carrying on a kind of warfare between the Departments in an attempt on the part of each to enlarge its area of roles and missions." Quarles also believed that "some degree of this rivalry between departments is wholesome and productive."[58] In his report of the first full year of operations under the 1958 reorganization act, Secretary McElroy stated that the

new defense organization "adequately meets current management needs." Additional adjustments would likely be necessary as technology continued to advance, but McElroy cautioned: "It is important . . . that such adjustments are evolutionary rather than revolutionary in character, for radical changes upset the operational effectiveness of any organization for a considerable time."[59] McElroy's successor as secretary of defense, Thomas S. Gates, Jr., stated on 13 June 1960 that it was his judgment that the defense organization was essentially sound. "I would suggest no further statutory changes," he recommended, "until we have more thoroughly digested this 1958 reorganization and learned, by living with it, of any further changes in the law which might be indicated."[60] Following retirement as Army chief of staff, General Taylor advocated the establishment of a single defense chief of staff who would receive requests for forces from unified commanders, make budget allocations in functional fields, and provide centralized control of operations; but he saw a need to retain the individual military departments in order to "create and maintain the forces as directed by the Secretary of Defense."[61] The new Army chief of staff, Gen Lyman L. Lemnitzer, specifically considered that the suggested merger of the Army and the Air Force would be undesirable. He also believed that "the division among the services is a perfectly natural one—one service to fight on land, the Army; one to fight on the surface of the sea, over it and underneath it, the Navy; and one in the air, the Air Force."[62] The Navy and the Marine Corps strongly opposed a single service. "We have very little duplication now left in the services," Admiral Burke testified. "What could happen is the elimination of one whole element, so you don't have that element at all, and thereby leave yourself wide open, betting that just one thing is going to happen."[63]

In its support for the Department of Defense Reorganization Act of 1958, the Air Force had assumed that the new organization would increase the importance of unified commands and, by vesting primary responsibility for stating force requirements in the unified commanders, would permit a more realistic allocation of available defense dollars. The Department of Defense budgetary allocation of funds by military services remained unchanged, however, and in the summer of 1958 the secretary of defense accepted $41.25 billion as an initial planning objective for the fiscal year 1960 defense budget; he determined that allocations to each service would continue to be approximately the same percentage of the whole as had been the case in fiscal year 1959.[64] Thus, even though they were theoretically reduced in stature by the defense reorganization, the military departments continued to exercise the power of the budget. In explaining the problem, General White observed that "as a service chief, I am always trying to get the best I can for my service." But within the Air Force, White had to resolve the competing requests for funds submitted by the Strategic Air Command, the Air Defense Command, and the Tactical Air Command. Each of their commanders were men who were charged with, as White said, "a specific responsibility and they are exceedingly dedicated to their job."[65] As has been seen, General White and the Air Staff initiated a reduction in the forces to be available to the Continental Air Defense

Command in the spring of 1960 over the strong opposition of the unified commander, who considered that his mission as a unified commander was being jeopardized.

In view of the strong emphasis upon unified commands in Eisenhower's defense reorganization proposals, Air Force leaders assumed that the reorganization act would result in the establishment of unified commands to replace the single-service specified commands. General White saw a good possibility that the Tactical Air Command and the Continental Army Forces might well be placed in a single unified command.[66] In serving at the helm of the Strategic Air Command, Gen Thomas S. Power pointed out in April 1958 that he was charged as the specified commander to coordinate attacks against many strategic targets nominated in separate target lists by other specified and unified commanders. With the advent of missiles, such existing methods of coordinating strategic attacks would be adequate only in the unlikely circumstance that the United States would exercise the initiative and could carefully determine and prepare every facet of the operation in advance.[67] In context with the defense reorganization of 1958, the Air Force also assumed that a unified strategic command might well be organized to control both the Air Force's strategic air and missile forces and the Navy's Polaris-equipped submarine forces.[68]

As early as April 1959 the Joint Chiefs of Staff began lengthy studies as to the manner in which command and control would be exercised over the Polaris weapon system.[69] When early discussions failed to reach a positive decision, General White formally requested the establishment of a unified US strategic command. He urged that both the Strategic Air Command and a Polaris submarine command would be subordinated to the unified strategic command. General Power supported this proposal. "I think," he said early in 1960, "that all strategic weapon systems should be under one central command, whether it is commanded by an Air Force officer, naval officer, or Army officer is a moot question."[70] Admiral Burke, on the other hand, described the Air Force proposal as "unsound and impractical." He argued that it would not be practical to take operational command of Polaris vessels away from fleet commanders since the movements of these submarines would have to be coordinated with those of many other naval vessels that would be operating in the same waters at the same time. Once a Polaris submarine had fired its strategic missiles, moreover, it would be expected to operate on missions similar to those of other submarines. "The Navy," Burke emphasized, "has behind it generations of experience in the operation of sea-based weapons systems. To depart from the principle of the integrated, balanced fleet at this critical time in history by assigning Polaris submarines to a command charged with operating land-based strategic bombers and missiles would weaken our Nation's ability to strike back."[71]

The unified US strategic command was not established. Instead, the question of operational control of Polaris submarine forces was decided on 17 August 1960 when Secretary Gates established the Joint Strategic Target Planning Agency and designated General Power as director, strategic target planning. A Navy admiral

was designated as deputy director, strategic target planning, and the agency comprised officers from each of the services, representatives from the unified commands, and a liaison group from the joint staff of the Joint Chiefs of Staff. The agency was located at Headquarters Strategic Air Command because of the availability of programming equipment and experienced personnel there and because SAC had the majority of assigned targets; but the Joint Strategic Target Planning Agency was directly responsible to the Joint Chiefs of Staff and was charged with the preparation of integrated target plans that would take into consideration all of the strategic warfare capabilities of the United States. The staff was divided into two sections. One section was charged to draw up the target list, the other determined which commander would hit a particular target and how he would do it. The target list was called the national strategic target list, and the operating plan was described as the single integrated operational plan (SIOP). Both of these documents were submitted to the Joint Chiefs for review, modification, and approval. The secretary of defense reviewed them and gave final approval. The first assignment of nuclear weapons to strategic targets by the new agency was to be completed by December 1960. As desired by the Navy, the establishment of the Joint Strategic Target Planning Agency permitted the assignment of Polaris submarines to naval components in unified commands rather than to a unified US strategic command.[72]

Organization of Military and National Space Programs

In the hectic months after Sputnik I in October 1957, a welter of conflicting ideas and concepts regarding the utility of space for military operations provided a background to the efforts to organize military and national space programs. "One of the major provocations of . . . interservice rivalry . . .," Secretary McElroy stated, "arises from the fact that there are certain types of weapons that come into the picture which do not have any obvious and specific connection with one or more of the services." A little later McElroy specifically observed that in his opinion missiles were "weapon systems which do not naturally fall within the responsibilities of individual services." Deputy Secretary Quarles justified the assignment of long-range, surface-to-surface missiles to the Air Force not because of the Air Force mission but because it possessed targeting and reconnaissance capabilities needed to employ them.[73] On 15 November 1957 McElroy named William M. Holaday as defense director of guided missiles and charged him to "direct all activities in the Department of Defense relating to research, development, engineering, production, and procurement of guided missiles."[74] McElroy conceived that Holaday's job had two different aspects: one was to monitor and supervise all research and engineering work in the field of guided missiles, and the other was to assure appropriate priority handling of all guided missile problems in connection with their transition from research and development into production and procurement.[75] Both to alleviate service rivalry and to handle will-of-the-wisp

research and development projects in the fields of satellites and space, McElroy announced on 20 November 1957 that he intended to establish a special projects agency within the Department of Defense. The agency would handle research and development on advanced weapons, which, if operationally feasible, would be assigned to one of the services for production and employment. McElroy announced that responsibility for the development of an antimissile missile would be assigned to the agency, and he implied that responsibility for other missiles might have been assigned to the special agency except that these programs were too far along.[76]

These sweeping decisions by the secretary of defense were not entirely agreeable to some highly placed defense officials, who recognized a need for a defense office with authority to make policy decisions but objected to establishing a defense agency that would have development and contractual powers. Believing that there was need for a staff organization to handle research and development in space flight, the Air Force deputy chief of staff for development established a Directorate of Astronautics on 10 December 1957. However, McElroy rejected recommendations opposing the special defense agency, and the Air Force order establishing a Directorate of Astronautics was revoked on 13 December, reportedly because of pressure from Holaday and Quarles.[77] When he appeared before the Senate Armed Services Subcommittee on 9 January 1958, however, Maj Gen Bernard A. Schriever emphasized that the Air Force already possessed capabilities to initiate an astronautics development program with no dilution or diversion of its ballistic missile programs. Schriever saw a need for a defense authority that would formulate policy and approve programs, but he warned that "any program to establish a separate astronautics management agency would result in duplication of capabilities already existing in the Air Force ballistic missile programs at a cost in funds and time similar to that already expended on these programs."[78]

Overruling service objections, Secretary McElroy proceeded with his plans for the organization of the Advanced Research Projects Agency (ARPA). With Eisenhower's approval, funds for ARPA research and development were included in the fiscal year 1959 defense budget submitted to Congress in January 1958. Without awaiting the new fiscal year, McElroy established ARPA effective on 7 February 1958; Congress soon authorized him to transfer $10 million from the military budget to the new agency. Under its charter ARPA was authorized to direct such research and development projects as the secretary assigned to it, to arrange for the performance of work by other governmental agencies including the military services, to enter contracts with individuals or institutions, and to acquire test facilities and equipment as approved by the secretary of defense.[79] Appointed director of ARPA, Roy W. Johnson secured personnel from the Institute of Defense Analysis, including Dr Herbert F. York, who became ARPA's chief scientist on 18 March. As a matter of policy, Johnson sought to keep the ARPA staff small (not more than 100 people including clerks), to avoid acquiring an in-house research and development capability, and determined not to pursue any

system beyond research and development. His main objective was to provide "a small management staff designed to work with and through the military departments in developing forward-looking programs." He viewed ARPA as an agency that could make for "painless" unification in the field of space technology.[80]

At its establishment in February 1958, ARPA was given a unique position of great potential power in the Department of Defense and it appeared for a time that ARPA might become a fourth military service. McElroy justified ARPA's continuation as "an operating element paralleling the research and engineering organizations of the military departments," but Johnson's self-limiting policies did not permit this. Johnson personally believed that the three services ought to be combined into a single service, and he had no desire to make ARPA into a fourth service thus making things four times as bad as before.[81] Johnson also stated: "To ARPA, space is . . . a place to discover new and better ways to do old military jobs; new ways to warn of impending attack, to communicate the alert to our forces, to actively defend our Nation."[82] If space was thus to be a place where old missions could be performed more effectively, no new concept of space power would supersede the old roles and missions of the military forces. At the completion of ARPA research and development, moreover, operational space weapon systems were to be turned over to a military service for production and employment. As a method of procedure, ARPA allocated most of its research and development projects to the military services. In the disposition of funds so allocated to the military services in the first year of its existence, ARPA placed 80 percent with the Air Force (including original Air Force funds in the Discoverer, Sentry [Samos], and Midas projects that were transferred to ARPA and then reallocated back to the Air Force), 14 percent with the Army, and 6 percent with the Navy.[83]

As enacted in August 1958, the Defense Reorganization Act created the director of defense research and engineering, with authority to direct and control, assign or reassign, and manage research and engineering activities within the Department of Defense with the approval of the secretary of defense. President Eisenhower appointed Doctor York to this position on 24 December 1958 and shortly thereafter York assumed responsibilities for research and engineering responsibilities in the guided missile field that had been exercised by the director of guided missiles. Secretary McElroy desired to retain Holaday as director of guided missiles in order that he might "push forward" the high-priority missile projection programs. McElroy also was determined to preserve ARPA as "a fourth operating agency for research and engineering projects."[84] Until this time ARPA had gotten most of its ideas from the military departments, but McElroy served notice that he wanted it to become "a think factory" and to plan a 10- to 20-year program for the military use of the space environment.[85]

During the spring of 1959, congressional investigators wanted to know whether ARPA should be continued. In an appearance before the Senate Subcommittee on Governmental Organization for Space Activities, Under Secretary of the Air Force Malcolm A. MacIntyre and General Schriever praised the work of Johnson. However, they stated their strong conviction that research and development

management for space systems ought to be returned to the services that would operationally employ the space weapon systems. Without claiming any exclusive Air Force jurisdiction over the realm of aerospace, MacIntyre and Schriever demonstrated that the Air Force's defensive and offensive missions were so affected by potential developments in space as to demand that it be recognized as the nation's primary aerospace force. "The Air Force," Schriever said, "has two combat mission responsibilities: one is strategic air and the other is air defense.... I feel that by 1970, and perhaps long before that, in certain cases, that these combat missions of the Air Force will be taken over, to a large extent, by what you would call space weapons systems—ballistic missiles, satellites, and space craft." Schriever also argued that a separation of research and development from operations prevented an employment of the principle of concurrent development that had so greatly compressed the time required to establish an initial operational capability with ballistic missiles. Responding to a pointed question, Schriever recommended that ARPA be liquidated as of 30 June 1959, that policy guidance and program approval be centered in the Office of Director of Defense Research and Engineering, and that space research and development projects be returned to the military services.[86]

In an appearance before the House Committee on Science and Astronautics, Army spokesmen posited: "Space is a newly entered, largely unknown medium which transcends the exclusive interest of any service or even of the Department of Defense." Secretary of the Army Wilber M. Brucker emphasized the Army position that space exploration was a national effort, and he believed that ARPA had served to prevent "cutthroat" competition in the field.[87] Before the Subcommittee of the Senate Committee on Aeronautical and Space Sciences, Lt Gen Arthur G. Trudeau, chief of Army research and development, argued that since no single service had been assigned sole responsibility for military space activities ARPA filled "a very great need, and should not be eliminated."[88] Dr York also foresaw a continuing requirement for ARPA. "Since it is envisioned that military space activities will cut across all military operations," he reasoned, "it would be difficult to attempt to assign all military space operations to any one military service."[89]

The position of the Navy in regard to ARPA appeared to be somewhat between those of the Army and the Air Force. Secretary of the Navy Thomas S. Gates, Jr., stated that "the Navy's aim in relation to space can be simply stated: To use space to accomplish naval objectives and to prevent space from being used to the detriment of those objectives."[90] Vice Adm John T. Hayward, assistant chief of naval operations (research and development), acknowledged that ARPA had "done an excellent job" in the absence of legislation. He also thought that the agency was a worthwhile Department of Defense interface with the National Aeronautics and Space Administration. But he did not believe that ARPA should be an operating agency, and he thought that as a policy agency ARPA probably ought to be phased into the Office of the Director of Defense Research and Engineering.[91]

As early as February 1959 the Air Force officially requested that, in view of the impending completion of research and development, it should be assigned responsibility for the production and operation of the Sentry (Samos) reconnaissance satellite system and of the Midas infrared missile defense alarm system. When he appeared before the Subcommittee of the Senate Committee on Aeronautical and Space Sciences on 14 April, however, General Trudeau suggested that a unified space command should be established under the Joint Chiefs of Staff to take over operational employment of vehicles or satellites that were under development by ARPA. General Schriever, on the other hand, urged that "it would be well to make a decision as to which service should do what and then give the responsibilities to that service to develop and bring into being, operationally, the particular system required to provide the service." When developed, operational military space systems would be turned over to existing unified or specified commanders.[92] Holaday, who had now been named chairman of the NASA-DOD Civilian-Military Liaison Committee, also recommended that "military operations in space must come under a unified or specified command."[93]

In a formal memorandum for the chairman of the Joint Chiefs of Staff on 18 September 1959, Secretary McElroy ruled that a joint military organization with control over operational space systems did not appear to be desirable at that time. In this memorandum McElroy further expressed his opinion that the number of military satellite vehicles that would be launched in the next several years would not be very large and that the utilization of the existing organization of the military departments appeared preferable to the establishment of a joint military organization to control operational space systems. McElroy, therefore, made the Department of the Air Force responsible for the development, production, and launching of space boosters and the necessary systems integration of payloads incident to this activity. He announced impending transfers of developed systems from ARPA to the military departments: the Air Force would be assigned responsibility for Samos (Sentry) and Midas; the Transit navigational satellite would be assigned to the Navy; and the Army would receive operational charge of the Notus communications satellites, including Courier (a delayed repeater communications system) and Advent (an active instantaneous relay system). These systems would remain under ARPA until development was completed, and, even after the systems were transferred, McElroy indicated that ARPA would continue in being as the Defense Department's agency for advanced military research.[94]

In accordance with McElroy's decision the Air Force was assigned responsibility in November 1959 for the production of Samos and Midas and also for Discoverer, the latter being a project to test components, propulsion, and guidance systems to be used in other satellite projects and to develop techniques for the recovery of space capsules. Secretary of Defense Gates was subsequently asked to reconsider the McElroy decision on space systems; but on 16 June 1960 Gates, too, determined that the establishment of a joint military organization for the control of operational space systems did not appear necessary or immediately desirable. Secretary Gates further directed that the services would make provisions

looking toward an orderly transfer of space systems to using unified or specified commands, thereby accepting by inference the Air Force position that the systems should be so assigned.[95] With the passing of time virtually all defense space projects were taken out of the hands of ARPA and transferred to the individual military services. ARPA continued to conduct projects of very broad interest such as research on materials, solid propellant chemistry, detection of nuclear tests, long-range studies on antimissile defense, and research in the fields of toxics and energy conversion.[96]

In the period of crisis in the autumn of 1957, the Department of Defense had made decisions on the subject of space organization on the basis of a belief that space was a vast unknown that lay outside existing roles and missions of the armed services. From this position the Department of Defense gradually moved toward acceptance of the proposition expressed by General Schriever: "Space . . . is a medium in which many military missions can be accomplished more effectively. Actually, it can be better understood when it is viewed as just what it is, an extension of a medium—aerospace."[97] The tacit acceptance of the concept that space was a continuum beyond the atmosphere was practical, but it was not without limitations. So-called space systems, for example, would not be developed as a means for exploiting a medium but rather in terms of existing military requirements. "The major criterion for the choice of a particular system to satisfy a particular military requirement," explained Lt Gen Roscoe C. Wilson, Air Force deputy chief of staff for development, in February 1960, "must be the relative effectiveness of that system compared with other methods of doing the same job." Thus, orbital or space systems could be developed only if they would perform an essential military mission which could be performed in no other way, perform an essential military mission more effectively at a justifiable increase in cost, or perform an essential military mission in an acceptable manner at a reduced cost.[98]

Establishment of the National Aeronautics and Space Administration

"I think you ought to realize," stated Dr T. Keith Glennan, who assumed duty as the first administrator of the National Aeronautics and Space Administration (NASA) at its establishment on 1 October 1958, "that NASA was born out of a state of hysteria."[99] In the same months that national leaders were attempting to provide a military organization for aerospace, they were also confronting the even more complex problem of establishing a national space program. In order to get guidance in this unknown field, President Eisenhower announced on 7 November 1957 the appointment of Dr James R. Killian, Jr., president of the Massachusetts Institute of Technology, as presidential scientific adviser. One of Killian's first tasks was to visualize a national space program; he later noted that he approached the task with already firm ideas. "From the beginning," he stated,

> it has been my view that the Federal Government had . . only two acceptable alternatives in creating its organization for space research, development, and operation One was to

> concentrate the entire responsibility, military and nonmilitary, in a single civilian agency. The other was to have dual programs—a program of space exploration and peaceful space activity under the management of a civilian agency and the military space program under the management of the Department of Defense. . . . A possible third alternative, that of putting our entire space program under the management of the Department of Defense always seemed to me to have so many defects as to be practically excluded as a solution. This is true because space exploration involves numerous activities and objectives that are outside the defense domain [100]

As has been seen, President Eisenhower's report to the American people, which he made less than a week after Killian took office, stated distinctive criteria for space projects that were undertaken for scientific and defense purposes.[101]

At the same time that President Eisenhower distinguished between scientific and military space technology, the United States already was committed to a line of diplomatic action that sought to secure an international arms control agreement limiting developments in space to peaceful and scientific purposes. This proposal for *ab initio* arms control in space related back to a belief that international control of the military use of atomic energy, as a State Department spokesman said, "could have been attained with relative ease" in 1946. As has been seen, the United States pursued this line of diplomacy throughout 1957 and President Eisenhower continued to advocate it during the spring of 1958. On 12 January 1958 Eisenhower wrote Soviet Premier Nikolai Bulganin saying: "I proposed that we agree that outer space should be used only for peaceful purposes. We face a decisive moment in history in relation to this matter. Both the Soviet Union and the United States are now using outer space for the testing of missiles designed for military purposes. The time to stop is now." Speaking in the Soviet Union, Party Secretary Nikita Khrushchev belittled the Eisenhower offer with the remark: "This means they want to prohibit that which they do not possess." In another letter to Bulganin on 15 February 1958, however, Eisenhower renewed his plea: "A terrible new menace can be seen to be in the making That menace is to be found in the use of outer space for war purposes. The time to deal with that menace is now. It would be tragic if the Soviet leaders were blind or indifferent toward this menace as they were apparently blind or indifferent to the atomic and nuclear menace at its inception a decade ago." Although the Soviets were not immediately responsive to these proposals, the US State Department accepted them as a sincere objective. "The most immediate problem in the field of space foreign policy," a State Department official said on 14 May 1958, "is how to ensure that outer space is used for peaceful purposes only."[102]

In connection with a study of space science and technology that it was making at Eisenhower's request, the President's Science Advisory Committee headed by Doctor Killian prepared a brief report, "Introduction to Outer Space," which was released on 26 March 1958. The panel of scientists distinguished four factors that gave "importance, urgency, and inevitability" to the advancement of space technology. These factors were said to be "the compelling urge of man to explore and discover," "the defensive objective for the development of space technology,"

"the factor of national prestige," and the fact that "space technology affords new opportunities for scientific observation and experiment which will add to our knowledge and understanding of the Earth, the solar system, and the universe." The scientists noted that the development of military rockets had provided the technological base for space exploration, but they believed that the important and foreseeable military uses for military space vehicles lay in the fields of communication and reconnaissance. Visualizations of satellite bombers or military bases on the moon did not "hold up well on close examination or appear to be achievable at an early date." Such military developments would become technologically possible in time, but they would be "clumsy and ineffective ways of doing a job." "In short," the report concluded, "the Earth would appear to be, after all, the best weapons carrier." This report apparently reinforced President Eisenhower's conviction that the world bore a great responsibility to promote the peaceful use of space. "I recommend," Eisenhower informed Congress on 2 April 1958, "that aeronautical and space science activities sponsored by the United States be conducted under the direction of a civilian agency, except for those projects primarily associated with military requirements."[103]

During the early months of 1958, proposals were made looking toward the establishment of an international space agency or an American civil space organization. Senator Lyndon B. Johnson called for joint exploration of outer space by the United Nations. Former disarmament assistant Harold E. Stassen advocated a United Nations space development agency that would send the first man into space and the first photographic inspection satellite around the earth. Senator Hubert H. Humphrey proposed that the United States "take the lead in marshaling the talents and resources of the world to unlock the mysteries of outer space in joint research and exploration under the auspices of the United Nations."[104] Meeting in Washington the National Council of the Federation of American Scientists approved on 3 May 1958 a statement noting the precedent of the Atomic Energy Commission, where under civilian control "both military and civilian uses of atomic energy have prospered in an atmosphere more conducive to scientific progress than that typically available under military direction." Critical "of the failure of the Pentagon leadership to foresee the impact of the first satellites in the popular imagination," the Federation of American Scientists called for the establishment of a civilian space agency in the United States and a united and coordinated international space effort under the authority of the United Nations. "It would be tragic," these scientists said, "if the challenging task of space exploration were carried on in the competitive nationalistic pattern under which it has begun."[105] The persons who believed that the Atomic Energy Commission could serve as a model for a national space agency variously recommended that the Atomic Energy Act of 1954 be amended to add a division of outer space development to the Atomic Energy Commission, or that an entirely new commission on outer space be established following the precedent of the Atomic Energy Commission.[106]

In a speech in Washington on 14 January 1958, retired Air Force Gen Orval R. Cook, president of the Aircraft Industries Association, apparently first proposed the seemingly simple solution that the National Advisory Committee for Aeronautics (NACA) already provided an existing organization capable of accelerating space exploration.[107] Two days later a meeting of the National Advisory Committee for Aeronautics resolved that the NACA statutory authority to "supervise and direct the scientific study of the problems of flight, with a view to their practical solution" was broad enough to cover spaceflight as well as atmospheric flight and that NACA had "an important responsibility for coordinating and for conducting research in space technology either in its own laboratories or by contract, and, therefore, should expand its existing program and add supplementary facilities to those now available as necessary."[108] Following these suggestions, President Eisenhower, in his message to Congress on 2 April 1958, recommended the establishment of a new national aeronautics and space administration into which NACA would be absorbed. When he signed the Space Act into law, Eisenhower remarked: "The present National Advisory Committee for Aeronautics, with its large and competent staff and well-equipped laboratories, will provide the nucleus for NASA. The NACA has an established record of research performance and of cooperation with the Armed Services. The coordination of space exploration responsibilities with the NACA's traditional aeronautical research function is a natural evolution."[109]

The Eisenhower proposal for the legislation, which would be known as the National Aeronautics and Space Act of 1958, was drafted by NACA and Doctor Killian. Since the president was said to be eager to have the legislation go to Congress prior to its Easter recess, the draft bill was sent to the Department of Defense for review and comment on 26 March, with a deadline for receipt of replies set at noon on 31 March. Inside the Pentagon, the Department of the Air Force and other military agencies were given 24 hours to study and comment on the proposed law, identical copies of which were introduced into the Senate and House on 2 April.[110] Even though Eisenhower considered that NASA evolved from NACA, the proposed law, with three exceptions, followed the model of the Atomic Energy Act. The exceptions were that the management of NASA would be vested in a single director, there was no provision for a military liaison committee, and there was no legislative oversight committee as was the case with the Atomic Energy Commission.[111] In NACA, control had been exercised by a 17-member committee (including two members from the Navy, two from the Air Force, and six from other specified federal agencies), which elected a director. In the proposal for NASA, the president would appoint the administrator and an advisory National Aeronautics and Space Board with a maximum of 17 members, of whom not more than eight (including not less than one from the Department of Defense) would be from government departments or agencies. NASA was to have wide authority for developing, testing, launching, and operating aeronautical and space vehicles. The proposed legislation also provided that NASA would exercise "control over aeronautical and space research sponsored by the United States, except insofar as

such activities may be peculiar to or primarily associated with weapons systems or military operations, in which case the agency may act in cooperation with, or on behalf of, the Department of Defense."[112]

As the legislation was originally drafted, the Department of Defense was not given a clear mandate for space activities. Speaking of this later on, Dr Edward C. Welsh, executive secretary of the National Aeronautics and Space Council, observed: "It is possible that this omission was a result of careless drafting or evidence of disinterest in military application to space or just optimism regarding our military position relative to that of the Communists."[113] During April and May 1958 a progression of distinguished witnesses appeared before the House Select Committee on Astronautics and Space Explorations and the Senate Special Committee on Space and Astronautics as they held hearings on the Space Act. Many of the scientists who came before the committees argued that a civilian scientific program was essential because the nonmilitary aspects of space exploration were too important to be entrusted to a purely military program. Professor James A. Van Allen of the State University of Iowa spoke very strongly of the need for civilian supremacy in space. "I feel," he said, "the language of this bill should be strengthened substantially to make it clear that the NASA will have primary and dominant cognizance of space matters among all Government agencies, and that only in case it is clearly demonstrated that an endeavor has a direct importance to our military preparedness . . . should the primary cognizance reside in the Defense Department."[114]

Believing that the favorable relations previously enjoyed with NACA would continue, Department of Defense witnesses initially supported the administration's space agency bill. Navy representatives, however, suggested the desirability of adding a military liaison committee to NASA similar to the committee that functioned with the AEC.[115] Air Force Under Secretary MacIntyre stated his understanding that the measure intended that military activities in space would be the province of the Department of Defense; that civil space activities would be handled by NASA; and that "in the broad twilight zone of dual usefulness, the two agencies should operate in close mutual cooperation with each other, under overall executive direction, without domination of either over the other."[116] When queried about this statement, however, the Bureau of the Budget did not agree with MacIntyre's understanding. The bureau understood that

> the space responsibility of the Department of Defense would include only those programs peculiar to or "primarily associated with weapons systems or military operations." All other space programs would be the responsibility of the civil space agency. . We recognize that there will probably be programs of military interest which are not, however, peculiarly or primarily military. The new agency would be responsible for those programs, but we expect that the Department of Defense would participate in their planning and implementation.[117]

Because of this new interpretation, ARPA director Johnson returned to the hearings of the House committee on 12 May to protest the restrictive language of the administration measure toward defense research and development in space.[118] Both the House and Senate committees and then Congress noted and objected to the narrow field evidently intended for the military in space and to the permissive rather than mandatory authority accorded for even this narrow field.[119] Congress also objected to the lack of formal liaison specified between the NASA and the Department of Defense. As a result of this dissatisfaction a Senate-House conference committee made substantial changes in the administration bill.[120] "We carefully wrote into the basic law," stated Congressman Gerald R. Ford, "that the military should have certain responsibilities in the area and by no means should the executive branch of the Government permit NASA to preempt certain areas which the military believes will be important in space."[121] In the preamble to the National Aeronautics and Space Act of 1958, which was signed by President Eisenhower on 29 July, Congress declared that the general welfare and security of the United States required that adequate provision be made for aeronautical and space activities. The Congress further declared

> that such activities shall be the responsibility of, and shall be directed by, a civilian agency exercising control over aeronautical and space activities sponsored by the United States, except that activities peculiar to or primarily associated with the development of weapons systems, military operations, or the defense of the United States (including the research and development necessary to make effective provision for the defense of the United States) shall be the responsibility of, and shall be directed by the Department of Defense

To Lt Gen Bernard Schriever, who viewed the matter from the perspective of his duties as commander, Air Research and Development Command, this section of the Space Act clearly indicated the intent of Congress that "the military must continue to conduct a vigorous research and development program of components and subsystems, as well as basic research, if the full potential of military space systems is to be realized on a timely basis."[122]

The Space Act established the National Aeronautics and Space Administration (NASA) headed by a presidentially appointed administrator who was vested with authority to plan, direct, and conduct aeronautical and space activities. NACA ceased to exist and its personnel and facilities were transferred to NASA. Other departments and agencies were to make "their services, equipment, personnel and facilities available" to NASA as required. NASA was charged to arrange for the participation of the scientific community of the nation in space activities and was permitted, under guidance from the president, to engage in programs of international cooperation Recognizing that there was "a grey area between civilian and military interests," the Space Act authorized the president to determine which agency, civilian or military, should have responsibility for specific projects. The Space Act provided for the National Aeronautics and Space Council, to consist of the president, the secretary of state, the secretary of defense, the NASA

administrator, and four additional members to be appointed by the president. The council was charged to assist the president in surveying aeronautical and space activities and to provide for effective cooperation between NASA and the Department of Defense. Congress also added a provision for the establishment of the Civilian-Military Liaison Committee, which was to consist of a chairman appointed by the president and a membership of an unspecified number of military and civilian representatives from the Department of Defense and NASA. Through the liaison committee, Congress intended that NASA and the Department of Defense should advise and consult together with respect to their activities. In case of unresolved disagreements the NASA administrator and the secretary of defense would refer the matters to the president.[123]

Getting about the implementation of the National Aeronautics and Space Act of 1958, President Eisenhower on 8 August appointed Dr T. Keith Glennan, president of the Case Institute of Technology, and Dr Hugh L. Dryden, director of NACA, as the administrator and deputy administrator of NASA, respectively. NASA began to operate on 1 October 1958, and in a series of executive orders it received projects and facilities from the Department of Defense. The projects included the responsibility for launching Vanguard earth satellites, three scientific satellite projects, four Pioneer probes, and a number of basic research undertakings looking toward the development of nuclear rocket engines, fluorine engines, and a million-pound-thrust single-chamber rocket engine. NASA took over the Army's Jet Propulsion Laboratory in California on 3 December 1958, the Project Tiros meteorological research satellite on 13 April 1959, and the Centaur launch vehicle comprising an Atlas booster with a second stage liquid hydrogen engine on 30 June 1959. In a transfer requested in 1958 and announced as impending in 1959, NASA assumed control over the Army Ballistic Missile Agency's Development Operations Division under von Braun at Redstone Arsenal, Alabama, effective on 1 July 1960.[124] Authorized a broad authority to request the transfer of space projects and facilities from the Department of Defense, Administrator Glennan observed that only a fuzzy line seemed to separate military and civil space projects. "I tend to regard the military elements under the law," he said, "as those matters that relate primarily to weapon systems and military operations in the defense of the Nation, those items which are moving toward operational systems, such as a satellite early warning system or a missile warning system, or some such thing."[125]

The organization of the National Aeronautics and Space Council was completed when President Eisenhower appointed the additional members from civilian status. Chaired by the president, the space council held its organizational meeting on 24 September 1958 and met thereafter as required to provide broad policy advice to the president on such matters as transfers of projects and facilities to NASA, international cooperation in space, assignment of national priorities for space development, and the organization and operation of the nation's ground support facilities. Critics of the council pointed out that this body was only one source of advice to the president, who also got guidance from his scientific adviser

and from the executive departmental heads.[126] According to Doctor Welsh the space council really was "left dormant" under Eisenhower and did not exercise its broad and comprehensive advisory authority.[127] The Civilian-Military Liaison Committee was not set up until after 31 October 1958, when Eisenhower named William Holaday as its chairman. The Defense Department and NASA agreed that the liaison committee's membership would include its chairman, four representatives from NASA, and single representatives from ARPA and the Army, Navy, and Air Force. The liaison committee held its first meeting on 25 November and thereafter assembled about once a month. The committee dealt successfully with some matters, but neither Glennan nor McElroy was said to be "willing to delegate to junior people settlement of major issues." Holaday soon reported: "The committee, because of its composition, that is, membership made up of representatives who are subject to a higher internal authority, is incapable of making firm decisions."[128] When it was unable to secure a single point of contact with the Department of Defense through the mechanism of the liaison committee for handling the tracking and recovery of planned Mercury astronaut flights, NASA finally appealed directly to McElroy for action. On 10 August 1959 McElroy designated Maj Gen Donald N. Yates, commander of the USAF Atlantic Missile Range, as the Department of Defense representative under the Joint Chiefs of Staff for the support of Project Mercury. Yates was provided an assistant from the Navy for command of recovery forces.[129]

Speaking in March 1959 before the full impact of the National Aeronautics and Space Act became apparent, Secretary McElroy observed that it was the "responsibility of the military in this overall programming of outer space to make certain that those things which are specifically military objectives are taken care of one way or the other either by NASA or by ARPA . . . that division seems to me to be less important than the assurance that the job is being done by competent people in one or the other."[130] Admiral Hayward, on the other hand, suggested that "NASA should have been set up similarly to the Atomic Energy Commission, with a division of military applications in this agency," and "that we should have one space program."[131] General Schriever differed with both of these opinions. "I feel," he said, "that the world in which we live—being what it is our national security must have first priority. In other words, our ability to maintain the peace has to have first priority. Therefore, I can only conclude that the important military programs should have first priority." The most important equation in research and development was management as a function of time: the best means of beating the clock was the concept of concurrency that had permitted rapid acceleration of the intercontinental ballistic missile capability. Already, Schriever said, NASA was placing competitive orders with contractors working for the Air Force. Schriever considered that the most serious threat to concurrency, however, was the idea being suggested that NASA "could become a ministry of supply type of organization which develops complete systems and turns them over to the military." Believing firmly in the concurrency concept whereby weapon systems were developed by the operating service, Schriever firmly opposed any idea that NASA

should be designed to become a national space commission and allowed to develop space weapon systems for operation by the military services.[132] Although Schriever apparently feared the effect of NASA's competition on military space programs, the official Air Force policy sought to get an acceleration of aerospace hardware even if it had to divert key officers from its own programs. In March 1959 General LeMay stated that the Air Force would make its personnel freely available for service in agencies of the Department of Defense concerned with space activities and in NASA.[133]

Only mildly apparent in the spring of 1959, discontent with the National Aeronautics and Space Act among certain elements within the Department of Defense burst into full flame in the autumn of 1959 and centered around the transfer of the Army's Saturn rocket to NASA. Up until this time the Saturn program had been replete with starts and stops, allegedly because of a feeling within Defense Department scientific circles that there was no military requirement for ballistic missiles larger than those programmed and that there would be no necessity for a military space platform. As a part of the continuing evaluation of the large multithrust booster problem, Doctor York convened a review committee in September to study the three planned boosters—Titan C, Saturn, and Nova. As a result of this study Doctor York was said to have agreed that the Saturn should be continued under development but that the project would have to be transferred to NASA since the Department of Defense could not finance it within its budgetary limitations. On 21 October President Eisenhower announced that he would transfer the Army's rocket development team and the Saturn booster to NASA.[134] The commander of the Army Ordnance Missile Command, Maj Gen John B. Medaris, described the Army's agreement to the transfer of the Saturn and the von Braun missile team to NASA as a Solomon's choice. "First," he said, "by the assignment of the space vehicle development, production, and launching mission to the Air Force, and secondly, the Army's total inability to secure from the Department of Defense sufficient money or responsibility to do the Saturn job properly, we found ourselves . . . in the position of either agreeing with the transfer of the team, or watching it be destroyed by starvation and frustration."[135] In the middle of this winter of Army discontent, President Eisenhower sent Congress a message on 14 January 1960 proposing amendments to the National Aeronautics and Space Act. "In actual practice," Eisenhower explained, "a single civil-military program does not exist and is, in fact, unattainable; and the statutory concept of such a program has caused confusion." Eisenhower considered that the Department of Defense had ample authority outside the Space Act to conduct research and development work on space-related weapon systems. He, therefore, proposed to eliminate the statutory requirement for the National Aeronautics and Space Council and for the Civilian-Military Liaison Committee and to allow NASA to become responsible for the formulation and execution of its own program in its own right, subject to the authority and direction of the president.[136]

In the early months of 1960, related hearings held by the House Committee on Science and Astronautics in review of the space program and on the proposed amendment to the Space Act served as a forum for the presentation of the divergent views on space organization. In a valedictory interview given as he was retiring from the Army during the last week of January, General Medaris raked the civil-military separation of national space programs as "fundamentally unrealistic" and called for the creation of a single missile-space agency as a unified command within the Department of Defense.[137] Testifying in Washington on 18 February, Medaris charged that the national space program was "splintered into four agencies, NASA and the three branches of our armed services." He criticized the Department of Defense directive that compelled the Army and Navy to "buy" their space boosters from the Air Force, since under this directive the "problem of wedding the payload and the vehicle must be settled by such anemic devices as committees, coordination officers, and other such inadequate administrative devices." He again proposed that responsibility for a national space program ought to be unified within the Department of Defense. Continued division of efforts in missile-space technology, he said, "cannot but result in delay, duplication, and waste of both money and manpower."[138] When asked how much support he had for his proposal to establish a unified missile-space command, Medaris replied: "I can only comment that within the evening councils of the renegades of our business, I have a great deal of support."[139] This support, however, failed to appear during the congressional hearings. Lt Gen James M. Gavin (US Army, Retired) observed that he would be "very worried to see major portions of our space program in DOD; however well intentioned they were, they couldn't get money, whereas I know that NASA can and very likely will for several years."[140] Admiral Hayward reiterated his familiar proposal that the United States should follow the "Atomic Energy Commission approach to the whole space program " The Army now apparently subscribed to this same approach to the problem, for General Trudeau also came out for "the creation of a Military Liaison Committee patterned after the committee provided by law to function between the Department of Defense and the Atomic Energy Commission." Trudeau thought that his committee could well replace the ineffective Civilian-Military Liaison Committee.[141]

When he appeared before the House Committee on Science and Astronautics, Dr William H. Pickering, director of NASA's Jet Propulsion Laboratory, agreed that the nation required a single space program; but he asserted that the program should be attained by strengthening NASA "to the point where it effectively controls a complete national space program." Pickering charged that the divided authority in the space field was powerless to "prevent military space systems of only peripheral value from demanding such a large share of research support in both the Department of Defense and perhaps the NASA that these efforts dominate the space program to the detriment of our real objectives." His concluding remarks summarized his position:

> I feel that at the present time it is more important that the primary effort in space be civilian oriented rather than military oriented. In other words, my feeling is that the military applications of space are not clearly defined at this time, that this may very well develop; in fact, past experience would say almost surely that it will develop, but I would regard this as being a natural development out of a program which is oriented in the direction of a civilian space program.[142]

In their testimony, Under Secretary of the Air Force Joseph V. Charyk, General White, and General Schriever opposed all of the proposals to establish "a single monolithic space agency." "From a national standpoint," Schriever stated, "progress in space research is essential for both security and prestige. Civilian and military space operations complement each other, and both should be pursued vigorously." Asked to explain the thoughts behind his assertion that NASA and national defense objectives in space were divergent, Schriever explained that this divergence had been obscured by the fact that NASA was compelled to use military rockets as boosters. Looking toward the future, he pointed out that NASA would develop unique experimental equipment that might be used for only a few scientific probes under controlled circumstances. Most NASA probes would be handled by temporary task force organizations, and NASA would not require a large and permanent field organization. Military space systems, on the other hand, would be required in quantity, would have to be simple and reliable, and would need to be standardized and made capable of fairly long employment life. The defense systems would have to strive to reduce the cost per launch, while NASA could afford to pay larger prices for the lesser numbers of scientific probes that it would mount.[143] Based on this line of reasoning as well as the fact that the Air Force was enjoying harmonious relations with NASA, Schriever interjected "that we are fast approaching the old, very good relationship that we had with the old NACA." Thus, the Air Force was not only eager to continue the existing space organization but was also entirely willing to support Eisenhower's proposed amendments to the Space Act.[144]

The statements of Charyk, White, and Schriever in support of the existing NASA-Defense Department relationship apparently indicated that the Air Force policy of cooperation had borne positive results. Schriever's earlier fears that NASA and the Department of Defense might compete for the services of scarce space technologists had apparently not materialized. In reference to this widely expressed belief that the nation's technological resources could not support two space programs, Dr Simon Ramo, vice president of the Thompson-Ramo-Wooldridge Corporation, pointed out that there was no shortage of national technical resources to support a vastly increased and even duplicative missile and space program. Ramo said: "If we chose to do so—and this is only a slight exaggeration—we could almost have space probes or ICBM's coming out of our ears."[145] By the spring of 1960 Brig Gen Don R. Ostrander and several other Air Force officers had been assigned to NASA. In the same period that the congressional hearings were under way on the proposed reorganization of the

national space effort, NASA requested the assignment to it of still more key project officers from the Ballistic Missiles Division—men whom Schriever considered to be greatly needed for his own developmental programs. Learning of Schriever's reluctance to assign the men to NASA and concerned about the proposals to reorganize NASA along the lines of the Atomic Energy Commission, General White believed that the time was right for "a sermon from the Chief of Staff to his staff." On 14 April 1960, White issued a memorandum saying:

> I am convinced that one of the major long range elements of the Air Force future lies in space It is also obvious that NASA will play a large part in the national effort in this direction and, moreover, inevitably will be closely associated, if not eventually combined with the military It is perfectly clear to me that particularly in these formative years the Air Force must, for its own good as well as for national interest, cooperate to the maximum extent with NASA, to include the furnishing of key personnel even at the expense of some Air Force dilution of technical talent

White later explained why he had issued the memorandum. "The sole purpose," he said, "of this memorandum—and I think I stated it very clearly—is that I want to make it crystal clear that the policy is we will cooperate with NASA—and to the very limit of our ability and even beyond, to the extent of some risk in our own programs."[146]

In the early stages of the hearings of the House Committee on Science and Astronautics, Deputy Secretary of Defense James H. Douglas expressed support for Eisenhower's proposed amendments of the Space Act. He agreed that the Civilian-Military Liaison Committee had been ineffective and ought to be eliminated, but he still wished to see effective liaison established between the Department of Defense and NASA. Accordingly, on 14 March 1960 Douglas proposed that cooperation between the Defense Department and NASA be attained by establishing an aeronautics and astronautics coordinating board; the deputy administrator of NASA and the director of defense research and engineering would serve as co-chairmen of the board, with supervision over subordinate board panels that would be established from NASA and Defense Department managerial personnel to handle matters of mutual interest. Under Secretary Charyk warmly supported this proposal, which he described as a broader projection of the Air Force-NASA discussions looking toward the establishment of a committee of responsible people to handle launch vehicle matters.[147] Doctor Glennan agreed that much of the improvised coordination that already existed between the Defense Department and NASA would well be formalized; he also announced his support for the establishment of the aeronautics and astronautics coordinating board.[148] When it reported out the space organization bill in the first week of May 1960, the House Committee on Science and Astronautics added a provision establishing the Aeronautics and Astronautics Coordinating Board.[149]

After the matter had been further discussed Glennan and Douglas signed an administrative agreement on 1 July 1960 that established the Aeronautics and Astronautics Coordinating Board (AACB). As officially promulgated on 13

September, the agreement specified that the deputy administrator of NASA and the director of defense research and engineering would serve as co-chairmen of the board, whose membership would comprise the chairmen of the board's panels plus enough additional members to ensure that each military department was represented and that NASA had equal representation with the Department of Defense. Six panels were established: manned spaceflight, unmanned spacecraft, launch vehicles, spaceflight ground environment, supporting space research and technology, and aeronautics. The joint directive charged the AACB to facilitate the planning of activities in a manner calculated to avoid undesirable duplications and to achieve efficient utilization of available resources, to coordinate activities in areas of common interest, to identify problems requiring solutions, and to exchange information between NASA and the Department of Defense. The board was to meet at least bimonthly, or more frequently on the call of its co-chairmen; it was provided with a small secretariat to maintain its records.[150]

Since the Senate proved unwilling to approve Eisenhower's proposed amendments to the Space Act, the establishment of the Aeronautics and Astronautics Coordinating Board proved to be the only positive accomplishment of the lengthy debates on the national space program. In establishing the AACB, Glennan and Douglas carefully avoided the defects found in the Civilian-Military Liaison Committee, which had failed to work primarily because its members lacked authority. Within the AACB, panel members were picked in accordance with their responsibilities within their agencies. Meeting as necessary, the panels examined problems, arrived at suggested solutions, and made recommendations to the AACB. When the AACB approved the recommendations, they were passed down within the Department of Defense and within NASA for implementation by the same officers who served on the panels. The Civilian-Military Liaison Committee continued in legal existence, but Eisenhower did not appoint another chairman for it when Holaday resigned the position, and the committee lapsed into inactivity. Some senators criticized the administration for failing to execute an existing law, and *Missiles and Rockets* magazine observed that the "spidery problem of defining clear-cut national objectives in space exploration" was evidently going to be passed on to a new Congress and a new administration that would take office in January 1961.[151]

Strategic Dialogue: Minimum Deterrence or Counterforce

"The arm holding the hammer and sickle," General White observed in the aftermath of the Sputnik, "has grown longer and stronger."[152] At the same time that the sudden establishment of Soviet missile and space capabilities demanded a reorganization of American military and space establishments, the new Soviet threat touched off an intense examination of strategic thinking. Many persons conceived that the employment of nuclear missiles would lend a virtual mathematical certainty to the conduct of war, and new electronic computers

promised to provide ready answers to the complex equations of missile warfare. Early in 1958, for example, the Air Force put a high-speed electronic air-battle model computer into operation that was able to work through three days of two-sided, strategic global air war in about seven hours, maintaining and recording a net capability position by fifteen-minute increments for the opposing forces as the wargame progressed. "We have come a long way since World War II," said Maj Gen James H. Walsh, Air Force deputy assistant chief of staff for intelligence, "in being able to predict the effects of our bombing campaigns, largely through the continued development or skilled target personnel, the magic of computers, and above all the quantum jump available in nuclear firepower."[153] Even though computers provided a facile means of wargaming, General White insisted that "war is an art and always will be an art" and protested the philosophical approach that wanted to reduce war to mathematical equations. "In the age of missiles," he warned,

> it is so easy to add up the number of missiles, the CEP [circular error of probability], number of missiles required to knock out a particular target, and come up with a table of equations and give it to a Ph D. and tell [him] to push XYZ buttons I do not think war will be that way, because I feel that in this age of nuclear weapons the greatest confusion that mankind has ever faced will reign We will have variables and we must be prepared for the unexpected. Decisions must be based on human judgment, able to fit many variable reactions to variable situations.[154]

The deterrence of war had been an American objective since 1945 and the concept of nuclear stalemate had been talked about since 1954, but Sputnik precipitated an immediate and intense discussion of both of these matters. "It is a grim enough world," said Dr Vannevar Bush in November 1957, "if two countries face each other with such weapons that, if all-out war broke out, both countries would be completely demolished. . . . But we feel that under those circumstances, all-out war would probably not break out, because no man would deliberately throw us into that sort of a holocaust where he and everything else would be destroyed."[155] For some time General Taylor believed that the Navy and the Marines had been moving closer to the Army position that nuclear stalemate was likely and that the United States should emphasize developing forces for limited war. In the winter of 1957-58 Taylor observed that "the Navy and Marine Corps were ready to join in recommending changes that would take into account the implications of nuclear parity, establish finite limits on the size for atomic retaliatory force, and in general make for a flexible strategy for coping with limited aggression."[156] "Given a shield of mutual deterrence," said Secretary of the Navy Gates, "power to prevent limited aggression and win limited war becomes decisive."[157] "A general nuclear war now means," agreed Admiral Burke, "that both the United States and Russia would be most severely damaged. Under these circumstances, initiation of a general war by Russia seems unlikely so long as we have the capability of destroying her "[158] In appearances before congressional committees early in 1958, Burke pointed out that aircraft carriers were useful to

both general and limited war and that Polaris submarines, which promised to be "invulnerable to preemptive action by an enemy," would be a positive deterrent to war. "As long as an enemy knows that no matter what kind of blow he may first strike at us, he will himself be destroyed in reprisal," Burke suggested, "then he will not rationally decide to start a war."[159]

Many civilian strategists accepted the concept of a nuclear stalemate and the requirements for limited war forces. Governor Rockefeller and the Rockefeller study panel "felt that there was increasing possibility that as the Soviets and ourselves reached equal capabilities of destruction there might—under the cover of our reluctance to use all-out force to oppose an action which did not seem warranted now knowing that such all-out action would bring major destruction in this country—be a nibbling away at the periphery by small wars [and] that we would not want to use all-out retaliation to oppose."[160] In January 1958 Paul H. Nitze published an article entitled "Atoms, Strategy and Policy" in which he strongly endorsed the concept of graduated deterrence that he had found to be popular in Europe. Nitze's proposal was not so much concerned with deterring war as in confining war. He considered that the requirements for graduated deterrence involved the maintenance of a superior western nuclear posture; the meeting of aggression without the use of atomic weapons where this was possible; the determination not to extend geographically limited hostilities to other areas unless the situation could not be resolved effectively otherwise; an avoidance of attacks against industrial and population centers and the use of atomic weapons against military objectives primarily for attainment of control of the air; and the building of western nonatomic elements of strength in order to reduce the extent to which security would depend on atomic weapons.[161]

In discussions as early as 1956, General LeMay had been willing to admit in theory that a smaller size force might present a deterrent effect upon an enemy, but he still held to his definition that effective deterrence required the United States to maintain a force strong enough to absorb the losses from a Soviet surprise attack and then to inflict damage that would be "unacceptable" on an enemy. "It is reasonable to assume," he observed, "that the original force without losses should certainly be initially stronger than the Soviet force."[162] Speaking in August 1956 Secretary of the Air Force Quarles believed that "the problem before the world today is a problem of deterrence" and that "the build-up of atomic power . . . makes total war an unthinkable catastrophe." Quarles proposed that the relative force strength of the United States and the Soviet Union was less important than "the *absolute power* in the hands of each, and in the substantial invulnerability of this power to interdiction." He argued that it was necessary only to maintain a level of strength which he called "mission capability" and pointed out that it was "neither necessary nor desirable . . . to maintain strength above that level."[163] Quarles's statement was useful in explaining why the Air Force could safely reduce its force from the 137-wing level, which had been justified as critical to the security of the nation; his statement seemed to equate deterrence with the maintenance of capabilities for massive retaliation. Also speaking in 1956, while he was still Air

Force chief of staff, General Twining emphasized counterforce rather than massive retaliation when he said: "If we are attacked, the Air Force's main job is to knock out the Russian long-range air force and their capability to deliver strikes against the United States."[164]

Partly to cause uncertainties among the enemy, neither President Eisenhower nor Secretary of State John Foster Dulles ever exactly defined massive retaliation. As has been seen, the acceptance of massive retaliation in 1954 did not lead the Joint Chiefs of Staff to change the categories of target systems for strategic air war planning purposes. During the Sputnik crisis, however, the Air Force gave some serious thoughts to a counterforce strategy and for the first time assigned some specific meanings to massive retaliation. Speaking in 1959 General White said that the strategic target priorities continued to be: "One, to destroy the enemy's capability to destroy us—that would be the first priority; next would be to blunt the enemy attack against our deployed military forces in Europe and in Asia; and, third, systematically destroy the Soviet Union's ability to wage war." If it were given strategic and tactical warning, White pointed out that the United States could implement these orderly attack priorities, but he noted that the growth of Soviet capabilities to attack the United States made it likely that a United States second strike might have to be somewhat improvised. "In case of a surprise attack," he suggested, "the mission would be . . . to do the greatest possible damage to the Soviet Union as a whole with attention to applying that destruction in such a way as to do as much damage as possible to their residual military striking force."[165] Following this same line of reasoning, Col Robert C. Richardson demonstrated that massive retaliation had always been a specific response within the whole American strategy. "Massive retaliation," Richardson wrote,

> relates principally to what happens after the enemy tries a surprise attack against the United States proper. The deterrent to an attack of this nature lies in the Strategic Air Command's capability, even after having been hit first, to strike back, "retaliate," with sufficient atomic power to wipe out the enemy's major urban centers. This is massive retaliation The targets are cities; the forces used are those that survive the initial attack; and the objective is to devastate the enemy nation to the extent that it would not be able to capitalize on its act of aggression . Now, the ability to destroy cities—the main target of massive retaliation—may constitute a deterrent to surprise attack against the United States It does not, however, in any way deter aggression anywhere in the world, including NATO. What has deterred aggression in Europe and in other vital areas for the past ten years has been primarily the counterforce aspect of the general-war capability backed up by the expressed willingness to use any and all forces to defend the free world if it should become necessary[166]

On the conceptual level, General Walsh reasoned in December 1957 that Air Force thinking had turned full circle away from the Mitchell-Douhet doctrines of waging strategic air war against enemy industrial capabilities and had returned to the older doctrines of Carl von Clausewitz and Alfred von Schlieffen that considered enemy military forces in being as the prime objectives of war effort.[167] Seen in terms of a counterforce strategy the requirements for strategic air striking

forces had to be calculated in terms of its capabilities and vulnerabilities in destroying hostile target systems—not in terms of the residuum that might remain after an enemy surprise attack. By early 1959 the United States air war plan was based upon an analysis and screening of over 20,000 targets in Soviet-bloc nations. Although nothing was immediately published on the extremely sensitive subject, air targeting apparently became much more exact in the years after 1955-56 when the very high altitude U-2 reconnaissance aircraft began operating over foreign soil. "We know what targets must be destroyed," stated an Air Force planner in 1959. "Our war plans are based on this target analysis."[168] Although the Air Force was apparently willing to accept counterforce as an objective, the Strategic Air Command (SAC) continued to plan operating tactics which envisioned that strategic air attacks would be speedily accomplished against all target systems in one mighty effort. Such an all-out attack would provide the largest degree of protection to SAC crews. By a predominant use of large nuclear weapons, moreover, one crew could be counted upon to destroy many individual targets with single weapons, thus achieving a "bonus effect" that was thought to be quite important in view of the many targets requiring destruction and the limited size of the Strategic Air Command. Even though Soviet cities were not targeted for air attack, many of them would be destroyed by nuclear weapons aimed at military objectives in their vicinity.[169]

Meeting Crises in Lebanon and the Taiwan Straits

Although General Taylor considered that the conversion of the Navy and the Marines to his views on nuclear stalemate-limited war was "quite an achievement," the Army position was not accepted by the Department of Defense or by the Air Force. "One of the most pressing objectives of the Defense Department," Secretary McElroy stated in January 1958, "must be to make it obvious to any potential enemy that we have available and are prepared to use weapons of retaliation so devastating that the cost to an aggressor of an attack on us would be unbearable."[170] In April 1958 McElroy foresaw "less and less likelihood of limited war that would demand sizable forces." While he granted that limited conflict "could occur in primitive countries," he argued that the United States would never consider a Soviet attack against NATO as a limited war. "We better never let anyone," he said, "get the mistaken idea that we are not going to use our big weapons if they are needed."[171] Speaking as chairman of the Joint Chiefs of Staff, General Twining said: "I personally do not believe you can say that any particular form of war is more likely than any other."[172] Both Secretary Dulles and General Twining were on record with the view that the use of tactical nuclear weapons would not necessarily cause a small war to expand into a general nuclear war.[173] General LeMay pointed out that deterrence was in the enemy's mind. "It is my belief," he said, "that the enemy will not consider as a deterrent a force which he considers weaker than his force. . . . I think we would be gambling more than we should with the security of the country if we should assume that a weaker force will deter him from attack."[174]

Appearing before the National Security Council early in 1958, General Taylor asked that the annual basic national security policy directive be changed to accord limited war forces an active role in future military operations and the atomic-retaliatory forces a passive role. Where ground forces in Europe had been the "shield" behind which the United States could wield its atomic sword, Taylor urged that the atomic retaliatory forces had become the shield that would ward off hostile atomic attack while the limited war forces would constitute the flexible sword. Failing to agree with General Taylor, the National Security Council found no changes in the international situation that justified a change in the basic security policy. In midsummer the Department of Defense issued guidelines providing that the defense budget for fiscal year 1960 would approximate that of 1959 and would retain the same percentage allocations to individual services.[175] As a result the 1960 fiscal year budget proposed a total of $41.2 billion in new obligational authority, to be subdivided $9.5 billion for the Army, $11.7 billion for the Navy, and $19.1 billion for the Air Force.[176]

While the Department of Defense budgetary decisions were being made, two separate incidents tested the capabilities of United States forces. The first incident occurred in the Middle East, where, in an effort to stabilize chaotic affairs, President Eisenhower had announced, with congressional approval on 5 January 1957, that the United States would provide economic and possibly military aid to any nation that asked for it and would employ armed force "to secure and protect the territorial integrity and political independence of nations requesting such aid against overt armed aggression from any nation controlled by international Communism." In November 1957 the Joint Chiefs of Staff directed the commander in chief, Naval Forces Eastern Atlantic and Mediterranean, to plan for limited action in the Middle East in the event of an overthrow of the Jordanian government or a coup d'état in Lebanon.[177]

For several weeks after political unrest and riots first broke out in Lebanon on 9 May 1958, the Lebanese government made no request for assistance and it seemed that the country would be able to settle its own internal problems; but in the early hours of 14 July a military coup d'état overthrew the prowestern government of Iraq. Because of widespread unrest both Lebanon and Jordan feared a similar fate. In this crisis the government of Lebanon immediately sought military assistance from the United States, while Jordan appealed to the United Kingdom to send in troops to prevent disorder. Following President Eisenhower's decision to assist Lebanon, Adm James L. Holloway, Jr., the commander in chief, Eastern Atlantic and Mediterranean, was designated commander in chief, Specified Command Middle East, to execute Operation Blue Bat for the reinforcement of Lebanon. Within 24 hours, elements of the US Sixth Fleet landed a battalion of Marines near Beirut. Augmented by C-124 transports of the Military Air Transport Service (MATS), the United States Air Forces in Europe (USAFE) airlifted Army Task Force Alpha from Rhein-Main Air Base to Lebanon via Adana Airfield in Turkey and began to provide logistical support to the Americans in Lebanon and to the British forces in Jordan. At 1000 hours on 15 July the Joint

Chiefs of Staff directed that the Tactical Air Command dispatch Composite Air Strike Force (CASF) Bravo under the command of Maj Gen Henry Viccellio to Incirlik Air Base at Adana, Turkey. Taking off within two hours from Myrtle Beach, South Carolina, the first F-100s refueled three times en route; after following a circuitous route to avoid certain Mediterranean countries, they arrived at Incirlik in less than 13 hours. Within 24 hours 36 F-100s were at Incirlik and ready to support the ground forces. Troop carrier congestion at the forward base then forced Task Force Bravo to hold a part of its forces in France. However, within 50 hours the entire CASF—two F-100 squadrons, one B-57 tactical bomber squadron, and one RF-101/RB-66 composite tactical reconnaissance squadron—was in Europe, and in less than four days it was established at Incirlik. The Tactical Air Command employed its own tanker aircraft on the Atlantic crossing; it also kept several of the tankers in the air over Beirut to refuel the tactical aircraft that covered the air landings of Army troops. Flown with USAFE C-130s and MATS C-124s, the airlift effort of 110 planes moved 3,103 troops and 5,078 tons of equipment from Europe to Adana, while the CASF airlift effort amounted to the movement of 860 personnel and 202 tons of equipment from the United States to Adana. At the peak of the buildup in early August, about 6,000 Marines and 8,000 Army troops were in Lebanon. The crisis cleared rapidly after the election of a new Lebanese president, and the American forces were withdrawn between mid-August and October 1958.[178]

As the situation in the Middle East was beginning to resolve itself, the Soviet Union and Communist China provoked another crisis in the Formosa or Taiwan Straits on the other side of the world. In this area Chinese Nationalist garrisons held the offshore islands of Quemoy and Matsu. In accordance with the Formosa resolution of January 1955, the president of the United States was authorized "to include the securing and protecting of such related positions and territories of that area now in friendly hands and the taking of such other measures as he judges to be required or appropriate in assuring the defense of Formosa and the Pescadores." In July 1958 the Chinese Communists intensified their threats to "liberate" Taiwan (Formosa) and began to move jet fighter aircraft into previously vacant airfields in Fukien Province opposite the Nationalist base on Taiwan. After four days of secret talks in Peking, Premiers Mao Tse-tung and Nikita Khrushchev issued a communiqué on 3 August demanding withdrawal of Anglo-American forces from the Middle East. The Communists (Reds) began to overfly Quemoy and Matsu and improved their interceptions of Nationalist reconnaissance sorties over the coastal mainland of China. On 18 August the Reds began to bombard Quemoy with artillery sited in nearby coastal positions. After an intensified bombardment, the Communist radio beamed a warning on 29 August that "a landing is imminent" and urged the Quemoy garrison to withdraw.[179]

As a part of a general reorganization in the Pacific on 1 July 1957, the US Pacific Command (PAC)—as the unified theater headquarters superior to the Pacific Fleet, Army Pacific, and Pacific Air Forces—had assumed general responsibility for theater operations, including the United States commitments in defense of

Taiwan. On 6 August 1958 the Air Force directed its commanders to examine their plans to support the CINCPAC plan for the defense of Taiwan. With the worsening of the crisis, the Joint Chiefs of Staff ordered the aircraft carriers USS *Essex* in the Mediterranean and the USS *Midway* at Pearl Harbor to join the Seventh Fleet off Taiwan. On 25 August the Joint Chiefs also authorized the deployment to Taiwan of a Marine fighter-interceptor group from Japan and an Air Force fighter-interceptor squadron from Okinawa. The Army was directed to expedite the shipment of a Nike battalion from Texas to Taiwan. Since the Nineteenth Air Force was already committed to the CASF operation in the Middle East, the Tactical Air Command directed its Twelfth Air Force to prepare CASF Xray Tango for movement to the Far East if needed. At 1400 hours on 29 August the Tactical Air Command was directed to deploy the force, and under the leadership of Brig Gen Avelin P. Tacon the first planes carrying the task force departed their home stations at 1630 hours on the same day. Had the CASF made nonstop flights its planes could have arrived in the Far East within 48 hours flying time, but deliberate rest stops were scheduled for the crews in Hawaii, at either Midway or Wake Islands, and in Guam. With a strength of two F-100 squadrons, one B-57 squadron, two RF-101 squadrons, and two C-130 squadrons, CASF Xray Tango was completely in place on Taiwan by 12 September. Mainly as a psychological gesture, a squadron of 12 F-104 Starfighter interceptors was transported aboard C-124 transports, and these planes were put into action on 12 September after they had been reassembled. In these movements a total of 137 four-engine aircraft of the Military Air Transport Service and the Tactical Air Command airlifted 1,718 personnel and 1,088 tons of cargo. As this strength was building up, Chinese Nationalist Air Force pilots proved able to handle the Red Chinese MiG-17 aircraft in a series of engagements over the Formosa Straits. In 25 separate air encounters, the Nationalists lost four aircraft and destroyed 33 of the Red planes—four of the victories being scored with Sidewinder air-to-air missiles After firing more than a half million rounds of artillery at Quemoy, the Reds announced a week's suspension of the shelling on 6 October. From this time onward the crisis abated, and the United States forces that were deployed to Taiwan returned to their permanent stations within the following two months.[180]

While there was no doubt that American policy had been accomplished in the Lebanon and Taiwan operations, evaluations made by high-level officials revealed a difference of opinion as to lessons to be drawn from these operations and about the nature of limited war as well. To Secretary McElroy the Lebanon and Taiwan operations gave assurance as to the United States capability for limited war. He considered that the response in Lebanon had deterred the outbreak of hostilities and that the action in Taiwan had confined the conflict and had permitted a discontinuation of it to be worked out "The speed with which you respond," McElroy observed, "is really as important as the force with which you respond." McElroy considered that Lebanon and Taiwan were examples of limited wars. "We do not consider that Korea [was] a limited war," he added. "We consider that if you had to do Korea again, you probably would handle things somewhat differently "

He also emphasized that the United States did not intend to fight a limited war with the Soviet Union. "The people of this country," he said, "should realize that if we are going to fight Russia, we are not going to fight them on the ground in the main. There will be some conflict on the ground, but general war is the only kind of war that we visualize fighting with Russia."[181] Speaking on the subject of Lebanon and Taiwan, General Twining called attention to the fact that in each case the United States had been given several weeks to ready its forces and to react. Since no shots had been fired by American units supply problems had been simple. Twining, nevertheless, estimated that the United States "could carry a half dozen" engagements like these, but an engagement of the size of Korea would be a different matter. In Twining's view the Korean conflict was "a big limited-war operation" and if a limited war of similar size occurred in the future its requirements would have to be met by the mobilization of reserve forces.[182]

In presenting the Air Force assessment of the Lebanon and Taiwan crises, General White asserted: "The Soviets have been contained not by the US battalions and ships and tactical aircraft that we deployed but to a great degree by the established capability of American long-range air power." In the case of the Quemoy crisis, however, White added that "the Chinese Communists and perhaps the Russians themselves received a considerable shock with the rapidity with which we reacted and with the efficiency of our forces that were there – and by 'our forces' I am including the Chinese Nationalists."[183] General Power saw Lebanon and Quemoy as illustrations of the deterrence of both general and small wars. "Quemoy," he said, "was even better than Lebanon, because here we took a firm stand for a pile of so-called useless rocks. But it was notice to the world that this country stands for something, that we have principles and oppose the principle of blackmail through military force. If we were willing to stand up and risk war for some so-called useless rocks, what better proof could we give of our determination to stand up to a more serious incident?" Power said that during the Quemoy crisis the Strategic Air Command had been prepared to back up the other forces with planes that could carry "any yield weapon." While he did not think it would be efficient to employ SAC crews to drop conventional weapons, Power pointed out that he could "convert into that posture very rapidly in a matter of hours." Lebanon and Quemoy, Power said, "were real actions to deter war. The reason we could prevent those actions from expanding is that we had the Strategic Air Command backing these forces up."[184] In a delayed analysis General LeMay emphasized the role the American military aid and friendly foreign forces had played in the Lebanon and Taiwan efforts. "Assets such as bases and support capabilities as well as many additional items which comprise an effective small war readiness," he said, "are direct results of the Military Assistance Program. Without these benefits, such operations as last year's deployment of units to . . . both the Mideast and Far East to assist our allies could not have been accomplished."[185]

According to Secretary Brucker and General Taylor, the Lebanon and Quemoy crises were the latest incidents in a pattern of 18 episodes since World War II in which the presence or pressure of Communist forces had been felt and exploited

either directly or indirectly. From this pattern, Brucker drew the lesson that the Communists were using limited war as a device to achieve their objectives on a piecemeal basis. When he was asked to define a limited war, Taylor found it easier to say that a general war was "a war between the United States and the Soviet Union in which they are participating and in which atomic weapons are used freely from the outset." A limited war was "any military conflict short of a general war, one in which our national existence is not at stake." Taylor described Lebanon as "perhaps the extreme of the small limited war," and he believed that the advanced warning, limited force requirement, and lack of combat operations made conditions so favorable for the success of the Lebanon operation as to make it imprudent to attempt to draw conclusions from the experience. Taylor also admitted under questioning that no Army forces would have been required in a Formosan operation. "If we had to go into Formosa in sizable strength," he said, "... it would be largely an air and naval operation." As he looked at the problem of limited war, however, Taylor saw "primarily an Army requirement related to sustained combat on the ground, which is an Army task." Viewing the problem of limited war in this light, he urged a five-point program to improve limited war capabilities; namely, the modernization of appropriate equipment, the improved strategic mobility of limited war forces, the use of preplanned airlift and sealift, expanded joint planning and training, and the advertisement of such limited war strength once it was a reality.[186]

While the national military leaders tended to draw different lessons from Lebanon and Quemoy, there were some essential elements of agreement In its report of the fiscal year 1959 military budget, the House Committee on Appropriations had called for a new study of the role of the super aircraft carrier in modern warfare After Lebanon and Quemoy, Admiral Burke could state that "the deployed attack carrier task force with modern aircraft—teamed with a marine landing force—is the logical ready military force to counter the threats of limited war in many areas of the world "[187] Without derogating the importance of the aircraft carrier, General Taylor's personal opinion was that "we have an ample number of carriers." Taylor remembered that "in Korea, which was a large limited war, we never had nor needed more than four carriers on station."[188] General White accepted the new implication that an aircraft carrier was more suited for limited than general war, but he opposed a new carrier because he preferred "to see the money that must go into the carrier go on some other weapon system which I would conceive to be more important."[189] Responding to a question, Doctor York was quoted as saying that the Lebanon emergency had demonstrated the importance of carriers, destroyers, and possibly cruisers as "distant bases." He added, however, that in a major war against a "highly sophisticated enemy like Russia, they are going to be blown up."[190] Nonetheless, as a result of what Secretary McElroy described as "soul searching ... at the very highest level of Government," the Department of Defense budget for fiscal 1960 included the construction of another *Forrestal*-class aircraft carrier. "The importance of the carrier as a means of projecting our military power for a limited war situation into the peripheral areas

of the world," he explained, "was very clearly demonstrated in both Lebanon and Taiwan."[191] Where the CASF deployment to Lebanon had encountered problems where overflight rights were denied and where available airfields were scarce and became congested, the Department of Defense noted that the aircraft carrier was "a very important cold war instrument" since it provided "a very effective limited warfare capability in places where overflight rights for aircraft are often unobtainable and in place where landing fields often do not exist."[192]

In the months prior to Lebanon and Quemoy, both Secretary Dulles and General Twining had voiced the opinion that tactical nuclear weapons might be used without necessarily expanding a small war into a general nuclear war. During these crises, however, the Soviets attempted to convince the world that any use of atomic weapons would mean general war. At the height of the Quemoy crisis on 7 September, Khrushchev wrote Eisenhower, warning: "An attack upon the Chinese People's Republic . . . is an attack upon the Soviet Union."[193] In another letter on 19 September, Khrushchev declared that: "Those who carry out plans of atomic attack on the Chinese People's Republic should not forget that not only the US but the other side possesses not only atomic but hydrogen weapons and also the corresponding means of delivery, and should such an attack be delivered on the Chinese People's Republic, then the aggressor will receive a fitting rebuff by the same means." President Eisenhower rejected Khrushchev's threat as abusive.[194] But the threat that local war could expand into general war if nuclear weapons were used could not be ignored. Vice Adm Charles R. Brown, commander of the US Sixth Fleet in the Mediterranean, subsequently stated: "I would not recommend the use of any atomic weapons no matter how small, when both sides have the power to destroy the world. . . . I have no faith in the so-called controlled use of atomic weapons."[195]

The experience of Lebanon and Quemoy thus appeared to justify General Taylor's argument before the National Security Council earlier in 1958 that, in many limited war situations, the United States would not wish to employ nuclear weapons. "We would always go into a military operation prepared to use nuclear weapons," Taylor explained in March 1959, "because we never know what the outcome is going to be. The decision to use them . . . would be determined by the President."[196] About this same time, Gen Henry I. Hodes, commander in chief, US Army Europe, defined limited war as a conflict "in which atomic weapons may not be used freely or on a large scale in the beginning and one in which our national survival is not at stake at least initially."[197] Much of this thinking on tactical nuclear weapons coincided with Gen O. P. Weyland's already expressed belief that flexibility demanded the retention of conventional ordnance delivery characteristics in tactical aircraft.[198] A Tactical Air Command officer who visited Adana during the Lebanon crisis found a considerable doubt as to whether the CASF crews could have performed conventional weapon delivery missions, although all of them were fully qualified in the delivery of nuclear weapons. "Only a few of the F-100 pilots had strafed," he stated, "none had shot rockets or delivered

conventional bombs." The B-57 crews were also regarded as "incapable of performing efficient conventional weapon delivery."[199]

Despite a recognition that it would have had difficulty conducting a conventional, limited war operation with crews that had been trained for the delivery of nuclear weapons, the Air Force remained somewhat less than enthusiastic on the subject of conventional weapons. "We will carry out any instruction we are given," noted Lt Gen Charles S. Irvine, deputy chief of staff for materiel, "and we can fight an iron bomb war if that is what the President says he wants us to do.... We can only say if you want to destroy targets efficiently, we can do it better with a nuclear bomb."[200] As commander in chief, US Air Forces in Europe, Gen Frederic H. Smith, Jr., believed that many men in scientific, governmental, and military circles evidently lacked an understanding that tactical nuclear weapons would be employed without destroying countries or populations. In the spring of 1960 he accordingly published an article designed "to demonstrate that not only can the intelligent use of nuclear firepower in limited war give us the greatest possible opportunity to win such wars at a minimum cost to us and to the country we may be defending against aggression, but that it is highly probable that without the use of such weapons our chances of winning in many areas are slim indeed." Smith ruled out the possibility of a limited war in Europe, but he suggested that tactical nuclear weapons could have been precisely employed with great effect in Korea and in Indochina without serious danger of having provoked all-out war. To prevent haphazard employment of nuclear weapons in a limited war, he stated that higher authority would have to provide a local war commander with explicit objectives, including a restriction on strikes outside a delimited zone of hostilities. He noted that new criteria for tactical nuclear targets needed to be developed: these could include "situation-control" targets such as narrow gorges in mountains that could be closed by landslides or forest cover which could be defoliated with nuclear weapons, thus denying concealment to an enemy. "We must achieve through education and through the development of clear-cut, logical tactical doctrine," Smith concluded, "a general acceptance by the United States of the requirement for the use of nuclear weapons in limited war. This country cannot afford the tremendous outlay in dollars, resources, and men needed to defeat aggression by man-to-man combat on the ground, supported only by high-explosive bombs and rockets, napalm, and machine-cannon fire delivered from the air."[201] Although General Smith's article was well reasoned, the Lebanon and Taiwan crises, nevertheless, had demonstrated that American political and military leaders were reluctant to commit nuclear weapons to limited wars. After a study of the matter, Col Albert P. Sights, Jr., concluded: "The crises in Lebanon and in the Taiwan Strait... marked a turning point in relying on nuclear weapons for limited wars. Thereafter planners were more inclined to accept the premise that such crises—if they turned into wars—would be conventional, at least at the outset."[202]

Minimum Deterrence or Counterforce?

Speaking in support of the Department of Defense fiscal year 1960 budget in January 1959, Secretary McElroy accepted the Air Force position that the military forces which deter or win general wars would also be able to deter or to win small wars. "It is erroneous to view the US military posture," he said, "as containing a distinct general war capability per se. In reality, those capabilities which the United States has for a limited war are equally applicable to general war and those capabilities which the United States has for general war are, with a few exceptions, equally applicable to limited war."[203] In this statement McElroy also indicated that the United States defense policy was not prepared to accept the concept of minimum deterrence, but the congressional budget hearings held early in 1959 were marked by a growing vocalization of the concept.

Initially held by a ground of diverse European intellectuals, the rationale of minimum deterrence was perhaps best summarized by Britain's nuclear physicist-neutralist P. M. S. Blackett, who reasoned: "If it is, in fact, true, as most current opinion holds, that strategic airpower has abolished global war, then an urgent problem for the West is to assess how little effort must be put into it to keep global war abolished."[204] The proposition of minimum deterrence was persuasive to many persons, including General Taylor, who in an unpublished article prepared in 1956, expressed the view that:

> The avoidance of deliberate general atomic war should not be too difficult since its unrenumerative character must be clear to the potential adversaries. Although actual stockpile sizes are closely guarded secrets, a nation need only feel reasonably sure that an opponent has some high-yield weapons, no matter how indefinite their exact number, to be impressed with the possible consequences of attacking him.[205]

In his appearance before the Subcommittee of the House Committee on Appropriations on 29 January 1959, General Taylor first informed the public of the schism in strategic thought within the Department of Defense. Taking note of the fact that he would retire as Army chief of staff on 30 June, Taylor stated flatly that the nation had an excessive number of strategic weapons and weapon systems in its atomic retaliatory force—the aggregate of bombers in the Air Force, the Navy, and the oversea American and allied commands; the ICBMs and IRBMs in the Air Force; and the Polaris system in the Navy. Taylor reasoned that it was

> possible to establish the fact Taylor reasoned that it was possible that "x" targets successfully attacked with "y" megatons is equal to the destruction of the enemy....Then, having determined the bombs required on target, you can calculate all the possible losses due to enemy action, aborts, ineffectiveness of the weapons, and so forth, and determine how many delivery vehicles are required When such a computation is made, you end up, in my book, not with thousands, but with hundreds of vehicles as a requirement

In response to a question, Taylor estimated that the United States possessed a capability to annihilate the enemy some 10 times. In a subsequent appearance before the Preparedness Investigation Subcommittee of the Senate Armed

Services Committee on 11 March, Taylor urged that the defense budget ought to be made functional by mission areas rather than to continue to make appropriations by services. Such mission areas could include general war forces and limited war forces. "There is," he explained, "a fundamental need to determine standards of sufficiency in the various categories of military forces which we maintain and to which all services contribute."[206]

General Taylor's charge that the United States possessed thousands of units to deliver strategic nuclear strikes when only hundreds were needed—a condition soon popularly described as "overkill"—drew support from Navy officers in appearances both in and out of Congress. Early in February 1959 Admiral Burke informed the House Subcommittee on Appropriations that he believed the United States possessed too much retaliatory power and ought to put more money into limited war capabilities. "Right now," he said, "I think there is nothing Russia can do to prevent her from being destroyed. . . . What we can destroy would be the ability of Russia to continue a war. . . . We would break her back. . . . You would not strike every military target, but you would strike enough of them to prevent Russia from recovering. You would break her back."[207] Admiral Hayward reasoned that deterrence of war comprised "what the Russian planner thinks, not what you or I think. If he thinks he is going to be destroyed no matter what he does, he is not going to start it." Hayward added: "If you have a system that is invulnerable to surprise attack and effective so it would be possible to be effective even if a man read in the *New York Times* we were attacked, and still destroy your enemy, this is the thing you are working for. . . . Any system completely vulnerable to a surprise attack is a weak one, deterrence should be inevitable."[208] Some days later Hayward told inquiring senators that he believed "in the years to come, any system that is vulnerable to surprise attack will fade from the scene."[209] What the Navy had in mind in the way of future deterrent capabilities began to be evident on 5 February when Admiral Burke stated: "To knock out the *Polaris* weapon system . . . the enemy would have to knock out all the *Polaris* submarines simultaneously. They would have to kill all of these submarines at the same time they initiated their attack. I think that this is impossible."[210] When asked during a national television interview on 22 March how many *Polaris* submarines would be needed, Burke replied: "You can take from the number of Russian cities the number of megatons it takes to destroy a Russian city, the reliability of the missiles, the accuracy of the missile, and you can compute it pretty accurately yourself. And then you double it just to make sure and you come out someplace in the neighborhood of perhaps 30."[211]

As advanced by Navy spokesmen, the strategy of minimum deterrence—or finite deterrence as it was soon called apparently to avoid a connotation of gambling with the nation's safety—visualized that a positive threat and a capability of destroying between 100 and 200 Soviet civilian centers of population would be sufficient to deter the enemy.[212] Writing under the title, "Finite Deterrence, Controlled Retaliation," in the *US Naval Institute Proceedings* in March 1959, Comdr P. H. Backus, executive secretary of the Navy Ballistic Missile Committee, provided a coherent description of the strategy of minimum or finite deterrence.

Backus reasoned that the Soviet capability to deliver thermonuclear intercontinental ballistic missiles had rendered obsolete the strategy and the force commitment of massive retaliation. Because of its vulnerability the Strategic Air Command was being compelled to disperse to hardened bases, but the hardening of SAC bases promised to set off an arms race since the Soviets could also harden their bases. To plan upon the blunting operations of the massive retaliation strategy—Backus equated blunting with counterforce—would also set off a spiraling arms race since proportional additions to the US deterrent or retaliatory forces would be required each time the Soviets added a new missile or a new air base. The weakness of the United States deterrent posture was its vulnerability. "If then," Backus reasoned, "our deterrent/retaliatory forces were relatively invulnerable, no matter what the Russians tried to do, we might in fact truly put behind us the frightening possibilities of general nuclear war." Backus asserted that the Polaris submarine would be the perfect weapon for finite deterrence since it possessed inherent invulnerability to a considerably higher degree than any other weapon system. If the Soviets knew that even if they launched a surprise attack the majority of their industrial concentrations would be reduced to rubble, they would not initiate a deliberate attack. In the event that the Soviets accidentally initiated a general war, Backus proposed that the United States should hit back instantly and hard by destroying two or three predesignated Soviet cities. In this case the United States would retaliate in a controlled manner, allowing time for negotiation between strikes. Such controlled retaliation would be destructive, but it would not reduce the world to rubble. Backus pointed out that the United States had compelled Japan to surrender in World War II by progressively destroying her cities.[213]

Both in public statements and in his book *The Uncertain Trumpet,* which he published in 1959 following his retirement, General Taylor wrapped up the proposals for finite deterrence, the avoidance of overkill, and the determination of standards of sufficiency in various categories of forces in one comprehensive outline for a new national strategy of flexible response. Taylor visualized

> the rejection of a strategy of massive retaliation and the adopting of one of flexible response; the determination of how much is enough for all categories of operational functions; the subsequent building of a small mobile and secure missile force and a fully modernized Army and supporting services, a revised structure for the military budget to show clearly what it buys in terms of operational forces; and a new statement of roles and missions to show, then, what we really mean by the Army, Navy, and Air Force [214]

The grave need to prevent nuclear war without draining the national economy provoked a great debate on the subject of flexible response, overkill, finite deterrence, and the other proposals offered by Taylor and Burke. A new generation of civilian military analysts—many of whom had worked in the think factories such as Research and Development (Rand) Corporation and the Army's Operations Research Office—joined political and military thinkers in the great debate on strategy. In the debate, Department of Defense and Air Force

spokesmen found it difficult to engage in a many-faced discussion of a new strategy without disclosing security aspects of the existing United States war plan. As the Department of Defense pointed out, moreover, it was practically impossible to answer General Taylor's question: How much is enough? This question had always been one of the most difficult ones faced by military planners and was under constant study. But it was impossible to determine standards of sufficiency in neat categories of force commitments and still preserve the versatility and flexibility requisite to the fact that there was no clear line of demarcation that would be drawn between limited war forces and general war forces in all cases.[215] Under these circumstances Air Force spokesmen found it necessary to debate the proposed new strategy in detail rather than in its generalities.

The central theme of the new deterrent strategy was the proposition that a general nuclear war had lost its utility as a means of resolving international conflict. "A nuclear war," the proponents of finite deterrence warned, "is too horrible to contemplate, too mutually annihilating to consider." For many years the Strategic Air Command had used the motto Peace is Our Profession, and a ranking Air Force commander had said, "if nuclear war breaks out, SAC has failed in its mission." General White, however, was unwilling to agree that all participants in a nuclear war would be defeated. "I think," he said, "nuclear war is something that is horrible and difficult to contemplate, but I am afraid that is the sort of thing civilization is faced with."[216] White consistently maintained that the United States and its allies "must possess combat capabilities which can deter or—if necessary—defeat" Soviet aerospace forces.[217] In briefings and papers prepared at the Rand Corporation and published as a book entitled *On Thermonuclear War,* physicist Herman Kahn presented the case that thermonuclear war was not unthinkable but probable, and he reasoned that with proper precautions the United States could survive such a war even though great casualties were incurred.[218] While many Defense spokesmen began to visualize the prospect that the United States would seek to "prevail" rather than to "win" in a thermonuclear war, an Air Force policy paper submitted to Congress in March 1960 insisted that the nation must possess a "war-winning capability."[219] The Air Force considered that there were sound strategic reasons for maintaining a war-winning capability in its strategic striking forces. Retired Air Force Brig Gen S. F. Giffin also suggested that the rationale of a military man required a concept that conflict could be resolved. "The military mind," he wrote, "cannot but accept General MacArthur's dictum that there is no substitute for victory. Yet the meaning of victory in a total nuclear war would be more in terms of the *survival* of the United States as a self-determining power—and the elimination of the present principal threat to the integrity of the United States—than in terms of classic military triumph."[220]

In view of the long-standing policy that the United States would not strike the first blow in a war, the Air Force had followed the policy during the 1950s that strategic capabilities must be prepared to accept the enemy's first strike and then be able to strike back effectively. As long as the Strategic Air Command was the

nation's main deterrent force, the matter of first or second strike was relatively unimportant since the maintenance of the command at a level of strength needed to survive a hostile first strike ensured that it would possess capabilities needed for a first strike. The concept of finite deterrence vastly changed this strategic equation, and in January 1959 General Power insisted: "You always must have a capability to strike first, because obviously if these people thought we never could start a war, why, then they could just take this world away from us, piece by piece, because they would know that as long as they do not strike us, we could never do anything about it. So you must have a capability to strike first."[221] Unless the United States possessed a superiority of force, General Schriever demonstrated that it could not possess what he called a positive deterrent. He defined positive deterrent as a posture

> which permits this country to take the initiative militarily if it wants to take the initiative, or one which inhibits the Soviet from taking the initiative in the fields of limited warfare, in the field of economic and psychological warfare Such a deterrent posture is achieved only if we can knock out all of this military capability to strike us This means hard targets, in fact every military target which has the capability of waging total war against this Nation.[222]

In the process of developing the reasons for maintaining a first-strike capability, Air Force spokesmen were careful to note that they did not contemplate preventive war or the initiation of a war on a nation's own timing. Nevertheless, they offered the opinion that the first-strike capability might be used for preemptive war, or attacks that might be made by a nation which had received positive tactical warning of an impending enemy attack. A preventive war might be launched months in advance of an anticipated attack, but a preemptive attack could be made hours or even minutes before the launching of a hostile strike.[223] If the United States strategic force had the ability to make an almost instantaneous reaction, the United States, moreover, would be able to make strikes while enemy aerospace vehicles were en route to their targets but before they reached their assigned targets.[224]

The Air Force leaders found it difficult to determine what the exact size of a minimum deterrent force would be, but they were sure that it would not be a small aggregation of nuclear missiles capable only of destroying Soviet cities. "People sometimes ask me," said General Power,

> what I think the minimum deterrent force is. They ask as though it were a package that one could get at the local store and buy off the shelf with a price tag on it . . I tell these people, I don't know what the minimum deterrent is, and what is more, there is nobody in this world who knows. . . . If anybody tells you they know what the minimum deterrent is, tell them for me that they are liars. The closest to one man who would know what the minimum deterrent is, would be Mr. Khrushchev, and frankly I don't think he knows from 1 week to another He might be willing to absorb more punishment next week than he wants to absorb today.

Power also pointed out that no one should assume that what would deter the United States would deter the Soviet bloc. The United States had sustained some

600,000 casualties in its Civil War; the Soviet Union had killed an estimated 9,000,000 people in the Revolution and had lost some 20,000,000 people in World War II; while the Chinese Communists were said to have "liquidated" as many as 20,000,000 to 30,000,000 persons in their revolutionary effort. Americans and Communists, thus, attached different values to human life. As for the overkill charge, Power estimated that the Strategic Air Command received about 18 percent of the defense dollar while it carried more than 90 percent of the responsibility for deterrence. "If that is babying and pampering," he concluded, "I do not agree with you."[225]

Although the Air Force began to advance counterforce as a more desirable alternative than finite deterrence, Air Force leaders were initially unable to provide a complete rationale for a counterforce strategy. At least at first, counterforce evolved not as a positive statement but in opposition to the "counter-city" aspects of finite deterrence. Writing in March 1959, as has been noted, Colonel Richardson determined that the counterforce aspect of the United States general war capability—rather than the massive retaliation aspect which would have been directed against Soviet cities—had been the effective deterrent to Soviet worldwide attack. "Failure to maintain the flexible counterforce capability we now have in our strategic effort," Richardson wrote, "will lead to establishing unlimited requirements for local defense operations. This is a policy which could lead to political, economic, and military bankruptcy, and which would almost inevitably spell defeat."[226] Again, as has been seen, General Schriever informed a congressional committee of the need not only for a first-strike force but also for a positive deterrent force that could knock out "every military target which has the capability of waging total war against this Nation." Treading lightly in discussing a sensitive area, Schriever observed that because "we may not know where some targets are located today, it does not follow that we may not know where these targets are at some future date."[227]

In an Air Force anniversary statement in September 1959, General White categorically disagreed with the overkill arguments. "Our strategic objective, in the event of global war," he said, "is to eliminate an enemy's war making capacity in the minimum period of time. In determining the force requirements needed to do this, we must take into account not only the number, location, and vulnerability of the targets but the reliability, accuracy, and warhead yield of our weapons—as well as countless operational variables and our evaluation of expected enemy defenses."[228] During the winter of 1959-60 the Air Force accepted the position that an effective force was a force in being, a force in place, and a force of such size and capability that, when measured against enemy surprise attack, retaliation by that force would be sufficient to ensure clearly unacceptable damage to the enemy; that it could destroy the enemy's nuclear delivery capability in the event the United States was forced to take the initiative; and that it would ensure that the United States would prevail regardless of the circumstances under which deterrence might fail. Even though Air Force leaders now made a clear distinction between deterrence and war-winning capability, they continued to explain counterforce by revealing the

fallacy of minimum deterrence. If the United States limited the size of its long-range nuclear delivery force to a capability that would do nothing more than destroy some 100 Soviet cities, the US forces might be able to deter attack against the United States proper. However, if the Soviets attacked an ally of the United States, the possession of a minimum deterrent force would not permit the United States (even if it possessed strategic warning) to launch its forces against Soviet cities, thereby exposing itself to Soviet attack with forces that were undamaged by US strikes. On the other hand, if the United States finite deterrent failed and the enemy attacked, his first targets would doubtless be the US strategic forces. The enemy would do this to reduce the US ability to strike back, and he could well afford to save American cities as hostages for later attacks. With a minimum deterrent attrited by the enemy's first strike, the United States would lack strength for any kind of counterforce effort. If the few remaining US forces attacked Soviet cities, the Soviets could return and easily destroy American cities. "Finite deterrence," the Air Force reasoned, "is purely a bluff strategy and does not include the capability for military victory. On the other hand, the clear capability to attain military victory would be the most reliable, longest lasting, and most widely applicable deterrent that the enemy could face. Thus we must plan a counterforce strategy and back it with the weapons systems needed in the amounts needed."[229] At least three civilian strategists found reason in the Air Force arguments, for Robert Strausz-Hupe, William R. Kintner, and Stefan F. Possony soon described the strategy of finite deterrence as "a mutual suicide pact."[230]

Because they appeared to offer economy, a check on the arms race, and reduction of devastation, the proposals for minimum deterrence plus limited war and arms control were said to have been accepted by many intellectuals interested in military affairs, a vast majority of foreign and domestic lay analysts, and many military planners.[231] In December 1959, however, James E. King, Jr., Paul H. Nitze, and Arnold Wolfers, research associates of the Washington Center of Foreign Policy Research, completed a study for the Senate Foreign Relations Committee that gave a limited endorsement to counterforce. This study recommended that top priority be given to reducing the vulnerability and improving the penetration abilities of American and allied strategic forces, to accelerating the development of solid-fuel intercontinental ballistic missiles and emplacing them in hardened and mobile configurations, to strengthening the forces capable of dealing with lesser aggressions ranging from subversion to very substantial conventional attacks on free overseas nations, to equipping American and allied troops with dual-purpose nuclear and conventional weapons, and to exploiting space technology for defense. It recommended that the overriding purpose of the US strategic weapons program ought not to be the matching of assumed Soviet capabilities in intercontinental missiles but the early attainment of an inventory of diverse and relatively secure systems that would prevent the enemy from risking a surprise attack. It suggested that the United States ought not to seek to maintain a first-strike strategic force, since such action would negate a more desirable alternative "aimed at increasing the stability of the strategic equation by

unilateral action, by the encouragement of reciprocal action, and by an arms control policy directed at strategic stability." The United States, nevertheless, should retain in its second-strike strategic force "a measure of counterforce ability sufficient for rational target selection in a retaliatory strike, as well as for limited war capabilities and other purposes." Although the goal of maintaining an effective first-strike force would become increasingly difficult and even undesirable in terms of strategic stability, there were several reasons for making a continued effort to maintain counterforce capabilities. First, if a local or limited war should break out, the United States would be severely handicapped in its choices of action if it had no means of hitting elements of the enemy's strategic force, while the enemy had substantial counterforce capabilities. Second, in a general nuclear war following a hostile first-strike, counterforce capabilities would enable the United States to conduct militarily useful operations and to minimize the damage to its population and industrial centers that might be inflicted by subsequent Soviet strategic strikes. Third, only by continuing research in counterforce weapons could the United States ensure against still unforeseen technological developments that might upset the strategic balance. Finally, American possession of counterforce weapons would force the Soviets to divert funds to expensive defense efforts that might otherwise be expanded for the creation of an overwhelming Soviet first-strike counterforce capability. In the chaos and confusion attending the launching of a second strike following an initial Soviet attack, the United States would quite probably attack both city and counterforce targets The study, nevertheless, recommended that "in order to maximize the military value of such a strike and to minimize the dangers to civilian populations, a major effort can and should be made to direct the retaliatory attack against the enemy's strategic forces and targets as much as conditions permit."[232]

If the proponents of finite deterrence expected a change in security policy when newly appointed Secretary Gates began to put together the defense budget for fiscal year 1961, they were doomed to disappointment. According to General Taylor there was to be no change in the basic national security policy. The Eisenhower administration ruled that the international situation, the state of military technology, and the general economic situation which prevailed in the autumn of 1959 demanded that the fiscal 1961 military budget not exceed the level of expenditures during fiscal 1960.[233] Although service requests for fiscal 1961 budgeting totaled $43.9 billion in new obligational authority, the final defense budget submitted to Congress in January 1960 amounted to $40.5 billion.[234] When he appeared in defense of this budget on 13 January 1960, Secretary Gates pointed out that military forces could not be arbitrarily categorized as general or limited war forces. "All forces," he emphasized, "are a deterrent to and would be employed in a general war. Most of our forces could be employed in a limited war, if required For example, air defense aircraft and antiaircraft missiles can be, and in fact are, deployed overseas. The aircraft of the Strategic Air Command could also be used if needed." When he spoke of the enemy, Gates asserted that

> in order to maintain a valid deterrent we have to maintain a deterrent force capable of knocking out his military power and not just bombing his cities. What we would actually do depends on circumstances, but we are adjusting our power to a counterforce theory; or a mixture of a counterforce theory plus attacks on industrial centers and things of that character We are not basing our requirement on just bombing Russia for retaliation purposes . The validity of our deterrent must be of such a character . . . that an enemy will believe his military power will be devastated [235]

In his appearances before congressional committees during the early months of 1960, Gen Lyman Lemnitzer, the new Army chief of staff, voiced his personal belief that the Soviets and the free world were approaching a period when both would possess "a virtually indestructible nuclear capability" and that this situation would render limited war more likely. "Under such circumstances," he remarked, "it seems to me that the most likely form of conflict may well involve the use of integrated land, sea, and air forces in their modernized, yet basically traditional, roles." Lemnitzer was not as adamant on the subject of overkill as his predecessor had been: he recognized that the development of highly effective Soviet surface-to-air missile defenses promised to increase the attrition of American bombers.[236] Appearing before these same committees, Navy officers continued to argue the case for finite deterrence and to stress overkill. Admiral Burke subscribed to all the statements he had made on these matters a year earlier, and he still felt that the United States was overconcentrating in retaliatory forces, although the balance was getting better. Just as he saw no reason why the United States should build overkill forces, he professed not to fear Soviet overkill. "No matter what Russia does," he said, "there is no possibility she can avoid destruction. She is going to get a terrific beating if she starts a war, no matter how or when. . . . If she builds 500 missiles or 2,000 missiles and does it in 7, 8, 10, or 15 years, sometime in the future, it does not affect our deterrent capability."[237] Speaking even more positively than previously, Admiral Hayward asserted that if he could have his way he would put the entire deterrent force at sea. He specified the total number of megatons placed on targets in Russia that he considered to be adequate as a US deterrent. Although this total was not disclosed in the public record, Hayward noted that 45 *Polaris* submarines would "come close" to providing the total deterrent that the United States needed.[238]

In stating the Air Force requirement for a first-strike counterforce capability, General White characterized finite deterrence as equating with the abandoned Fortress America concept. He pointed out that finite deterrence would be extremely dangerous since such a posture would not provide the military forces needed "to minimize the damage on the United States under any circumstances." He also found finite deterrence inconsistent with requirements of modern war. "Modern warfare," he said, "has as its objective—No. 1, the destruction of the enemy's capability to fight; and secondly, his will to fight." Finally, White pointed out that a finite deterrent posture would strip the United States of its influence in the world. "A nation which does not have the capability to go on the initiative, have

the capability to knock out the enemy's military power," he asserted, "is hopeless in my opinion, politically, diplomatically, and militarily."[239] In an article describing the fallacy of minimum deterrence, which he published in the spring of 1960, Brig Gen Robert C. Richardson III stated that city-bombing violated two basic principles: "The only rational military objective in war is the enemy forces, or targets that affect forces. Destruction which does not affect the outcome of the war in one's favor is irrational and politically and morally unjustifiable." Although the strategic bombing campaigns of World War II had been directed against hostile industry for good reason, production and mobilization would contribute little or nothing to the outcome in an atomic war. "Today," he wrote, "victory lies not in the ability to destroy the enemy industrial and manpower potential but rather in the ability to destroy his *existing* capability for delivering destruction." As for the allegation that Soviet missile sites could not be targeted, Richardson pointed out that new intelligence techniques should provide knowledge of the construction of hardened missile sites, that the vulnerability of mobile missiles to slight overpressures should allow them to be targeted and attacked on an area basis with the help of reconnaissance, and that within the time frame of concern the United States would have constant satellite surveillance that should provide intelligence on missile movements or site construction. "The minimum-deterrent strategy sought by critics of the existing counterforce deterrent capability," Richardson wrote in summary, "is one which would lead to unlimited requirements for limited war."[240]

While Admiral Burke was presenting the case for finite deterrence to the House Subcommittee on Appropriations in January 1960, Congressman Daniel J. Flood exclaimed: "This theory I do not believe. This is terrible."[241] When it reported the defense budget bill out in April, the House Committee on Appropriations expressed disbelief in finite deterrence. "In the final analysis," the committee noted, "to effectively deter a would-be aggressor, we should maintain our Armed Forces in such a way and with such an understanding that should it ever become obvious that an attack upon us or our allies is imminent, we can launch an attack before the aggressor has hit us or our allies. This is an element of deterrence which the United States should not deny itself. No other form of deterrence can be fully relied upon."[242] When final action was completed in July 1960, Congress voted $41.4 billion for defense, approximately $500 million more than President Eisenhower had requested. Most of the additional funds were allocated to the Atlas, Minuteman, Polaris, and the B-70 programs; and the total fund was to be divided to include $9.6 billion for the Army, $11.8 billion for the Navy, and $18.9 for the Air Force.[243]

Despite verbal statements by Secretary Gates, the Department of Defense budget for fiscal year 1961 did not clearly implement either a counterforce or a finite deterrence concept but actually augmented both strategic and limited war forces. It did not provide the first-strike strategic force that the Air Force considered necessary to the counterforce strategy. The compromise pleased neither side of the strategic controversy, and the great debate on strategy continued

to brew.[244] "Our national policy at this writing," Herman Kahn observed in 1960, "seems to be drifting (mostly as a result of decisions evaded or decided for relatively minor technical reasons) toward accepting a strategy between finite deterrence or counterforce as insurance."[245] Strausz-Hupe, Kintner, and Possony described the official United States position as being one of "win strike second" counterforce, but an *Air Force Magazine* reviewer of their book commented: "We do not now have the capability to fight such a war even though this strategy is the most desirable. . . . We lack the forces needed to replace the so-called 'massive retaliation' policy."[246] On the other hand, the Naval Warfare Analysis Group issued a "Résumé of Major Strategic Considerations" on 17 October 1960 that continued to argue for a finite level of deterrence. Distributed by Navy officials and said to represent a good summary of naval views, the résumé argued that United States efforts to build counterforce capabilities, to harden missile sites, or even to construct civilian defense shelters would accelerate the arms race by forcing the enemy to develop additional overkill capability, and might even cause the enemy to fear that the United States was preparing to attack and to unleash a preemptive strike, thus starting a war rather than deterring conflict.[247]

During 1958 and 1959 the Air Force advanced counterforce as an alternative and wiser strategy than finite deterrence, but the full implications of a damage-limiting, no-city counterforce war did not become exactly evident until the early months of 1960. Working in the Pentagon, Brig Gen Noel F. Parrish, assistant for coordination to the Air Force deputy chief of staff for plans and programs, and Lt Col Donald F. Martin began to wargame existing strategic plans as opposed to a new strategic concept that made the most scrupulous efforts to employ appropriately sized weapons only against purely military targets. The new concept made sense in its own right since a good many missiles would be required to kill enemy military forces in the first place, but the real surprise was that a no-city attack plan promised a tremendous saving of civilian life in the event of a thermonuclear war between the United States and the Soviet Union. War would remain horrible, but it would not necessarily be suicidal. Taking their scratch-pad figures to General White, Parrish and Martin obtained approval to wargame the no-city counterforce strategy on the Air Force's air-battle-model computer. No matter how the situation or the force levels were changed, the no-city counterforce plan promised tremendous savings of American and Soviet life.[248]

Although the no-city plan was not yet a strategy, the air-battle-model results confirmed General White's belief that a city-destroying war did not make sense. In a landmark address delivered to the Air Force Association in September 1960, White stated: "As I see it, effective deterrence includes the possession of military forces to deter and, should war occur, the military strength to prevail. There are two key thoughts here: deter and prevail. It might appear that this is a contradiction since the ability to prevail in war is needful only if our policy of deterrence fails. Nevertheless, the ability to prevail is what provides real and effective deterrence."[249] In a subsequent message to all air commands, White soon directed that all Air Force personnel should understand counterforce and its difference

from minimum deterrence. "By counterforce," the message stated, "the Air Force means the ability to selectively and decisively destroy enemy military forces that could otherwise destroy us."[250]

Writing in the winter of 1960-61, Colonel Martin explained the Air Force conception of counterforce. Martin defined the Air Force's objectives in general war as being to gain military dominance over the enemy by the destruction of his military force, to limit damage to the United States and its allies, and, by so doing, to achieve a favorable outcome of the hostilities. On the basis of the no-city wargame studies, Martin presented a comparison of the costs of the finite deterrence-terror strategy as opposed to a warfighting counterforce strategy. If an aggressor launched an attack against United States military forces and the United States responded against the enemy's military forces, some 5 percent of the US population would not survive. On the other hand, if the aggressor launched an attack against United States military forces and the United States retaliated against hostile military forces and cities, some 90 percent of the US population would not survive a counterattack against US cities. Looking ahead to 1965 when increased numbers of nuclear weapons would be available, the counterforce strategy would result in 5 percent destruction of US industry while the terror strategy would lead to the destruction of 50 percent of the industry of the United States. "The foregoing," Martin observed, "are powerful arguments for accepting a counterforce strategy favoring survival rather than a strategy tantamount to suicide. The difference in the strategies can be measured in terms of this Nation's continued existence."[251] The Air Force had provided a conceptual justification for a counterforce strategy, but acceptance or rejection of it would await the new national administration that would take office early in 1961.

NOTES

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