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MISSILE LOGISTICS, 1951-1959
(Unclassified)

VOLUME I: TEXT

Historical Study No. 328



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# MISSILE LOGISTICS, 1951-1959
(Unclassified)

VOLUME I: TEXT

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# PREFACE

This history traces the evolution of missile logistics from 1951 through 1959. In these nine years missiles developed from relatively crude experimental models limited in range to a few hundred miles into models capable of traveling almost one-third the distance around the world. Each individual aspect of missile logistics--supply, maintenance, procurement, transportation, and production--in itself, provides enough material to justify a separate history, but the factors of time and space prevented the author from preparing such detailed accounts. Therefore, this history presents only some of the major milestones which occurred in the field of missile logistics and the management steps taken by the Air Materiel Command to meet the challenge of these new weapons during the years from 1951 through 1959.

The author gratefully acknowledges the cooperation and assistance rendered by the personnel of the Headquarters AMC Logistics Plans Division, Directorate of Plans and Programs.

# I. EARLY LOGISTIC STUDIES AND PROJECTS

## Harvard Analysis of the 1951-1952 AF Logistics System

(U) With the Air Force expansion after the start of hostilities in Korea came the realization that a detailed survey of the USAF logistics system was necessary. As a result, the Air Force asked Harvard University to make the necessary analysis. This request later became supplemental agreement No 1 to contract AF 33(038)-19572 dated 22 June 1951.[1] A group from the Mobilization Analysis Center, Harvard Graduate School of Business Administration, undertook the study and issued its final report in October 1952.*

(S) The group made a comprehensive study of Air Force procurement, Zone of Interior (ZI) and overseas base and depot stockage, packaging, transportation, and the time cycle from the decision to buy an article until its delivery to a unit. It found that the actual consumption of spare parts was out of phase with procurement. The long lead time** required for the procurement of spare parts was a major factor which led to this condition. It also found that, in some cases, a 100 year supply existed in some items while shortages in other items plagued the system. The group concluded that the system was both expensive and far from satisfactory.[2]

(S) In addition to its conclusions, the group made a number of recommendations to improve the system. The first of its recommendations covered the inventory and stock control areas. Some of the new procedures the group outlined for improving these areas called for storing, at operating locations, varying quantities of items for which there was a frequent and predictable rate of use, storing only limited quantities of low-priced or medium-priced items for which no predictable issue rates could be developed,

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* This report is often referred to as the Cherington Report, since Dr. Cherington served as Chairman of the group.

** Time that elapsed from the initiation of procurement action until the receipt of the materiel in the Air Force supply system.

and for developing central stock locations for all other items and placing them under individual control offices. They also called for the decentralization of stock control responsibilities for a limited family of items, and at the same time, increasing the span of control to include ordering and buying. Finally, they called for establishing procedures so that more attention would be paid to qualitative consumption data, and creating a system so that item control would vary with value--the more expensive an item, the more control exercised over it.[3]

(S) The group also called for the establishment of product managers for small families of parts. It suggested that the Air Force experiment with using contractors as product managers.[4]

(S) Other actions recommended by the group were buying only limited numbers of consumption and insurance spares at the time the Air Force entered into production contracts (this became known as phased provisioning), allowing manufacturers to stock raw materials to decrease lead time, and entering into experimental contracts with manufacturers for establishing separate spares producing facilities. The group also suggested that the Air Force press for the development of electronic devices for handling data and information at bases and central stock control points, use air transportation for moving expensive items, accelerate the development of large cargo aircraft, and press for the acceptance of the airlift concept within the Joint Military Transportation Committee (JMTC).[5] Many of these recommended actions the Air Force later adopted and they formed the backbone of its logistic system.*

## Spares Study Group

(U) At the time the Harvard Group studied the Air Force logistics system, the specific problem of high cost spare parts caused grave concern in Congress and the Air Force.[6] In an attempt to solve the problem, the Air Force created the Spares Study Group and appointed Mr. H. O. King, an industrialist, as its chairman. This group started its work on 15 July 1952.[7]

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* See p. 46.

(U) After just a few months of work the Spares Study Group concluded that about 60 per cent of the aircraft spare part dollars were spent for about three per cent of the items. The group outlined a program for reducing costs and recommended that the materiel command be organized along vertical rather than horizontal lines.[8]

(C) The first point in the group's program for lowering costs called for greater Air Force control over the more expensive spare parts.[9] At the time, the Air Force exercised the same degree of control over all items, regardless of cost. Air Force procedure gave a 10-cent item the same attention that it gave to a $500 item. Next, the group advocated the airlift of engines, since they and their spare parts accounted for more than 50 per cent of all funds spent for spares and spare parts.[10] The group felt that any cut in the length of the pipeline would result in considerable savings. It pointed out that the savings would result from the purchase of fewer engines and from lower manpower and packaging requirements.[11] The group established a B-47 service test program at Oklahoma City. Air Force adoption of the program followed within a short period of time. By the end of 1954 AMC considered it a "part of the Air Force's logistic modernization program."[12] This Hi-Valu Program--as it eventually became to be called--was first applied to missiles in 1954. The first missile included in the program by AMC was the GAR-1 (Guided Air Rocket) Falcon. The GAM-63 (Guided Air Missile) Rascal became the second one.[13]

(U) The organizational changes the group outlined in January 1953 called for a vertical rather than a horizontal (functional) organization of operating units within the Air Materiel Command.[14] For example, offices would be organized according to special aircraft or engine projects rather than by such titles as supply, maintenance, and procurement. The group felt that the efficiency produced by this type of organization far outweighed the disadvantages.[15] The Air Force later adopted this type of organization in the WSPO (Weapon System Project Office).*

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* See pp. 59-60.

## Logistics for 1956

(U) For some time the Air Force recognized that, along with studying its logistics system, it had to develop new methods of support for the weapons in the planning and research stages. These new weapons, referred to as missiles, could never be considered complete until systems for their support had been developed and tested. In January 1952--while the Harvard Group studied the logistic system--Brigadier General W. T. Hudnell, Assistant for Logistics Plans, Deputy Chief of Staff, Materiel, presented to the Air Force Council a new concept of logistics called "Logistics for 1956."[16] The Council recommended approval of these new logistic concepts on 17 January 1952; and, in February 1953, the Chief of Staff requested that they be carried out immediately.[17]

(U) The concepts General Hudnell outlined called for the elimination of prestocking supplies overseas, reducing the workload at oversea depots, and a reduction of supplies in the pipeline. This would be accomplished by fast electronic requisitioning, simplified supply procedures, and airlifting of supplies from the United States to the oversea bases. This required changes and improvements in requisitioning procedures, communications, stock control, packaging, traffic management, and the use of all modes of transportation.[18]

## Project Red Head

(S) On 26 June 1952 the Air Force initiated a project to test some of the concepts General Hudnell outlined in January. This project attempted to reduce the quantity of supplies in the pipeline, and therefore costs, while at the same time improving logistic support.[19] It involved the aerial resupply of engines and electronic spare parts to a medium SAC (Strategic Air Command) bombardment unit deployed in England and operating under simulated combat conditions for a 90-day period.[20]

(S) The 2nd Bombardment Wing, consisting of 45 B-50D and 20 KB-29P aircraft, was designated the test unit. Major General George W. Mundy was named project director. The project actually started on 10 July 1952 and was completed on 30 November.[21]

(S) The project's final report concluded that the test "confirmed the theories and demonstrated the practicability of those portions of the concept of 'Logistics for 1956' as were service tested."[22] The report indicated that the service test should be continued within Air Force capability. It pointed out that the supply procedures employed during the test provided adequate support to allow the wing to meet its commitments.[23]

(S) In addition to its conclusions, the final report made three important recommendations. First, it recommended that the Air Force formally approve the "Logistics for 1956" concept. Next, it suggested that Headquarters USAF approve and adopt a supply system that used improved management procedures and reduced stock levels. Third, it recommended that the Air Force place more reliance on manufacturers and air transportation.[24]

(S) Most of the project participants were convinced that the procedures used during the test were practicable. Some, however, questioned the validity of the results obtained during the project. Major General Joseph H. Hicks, Commander of the 73d Air Depot Wing, was one of these people. He stated:[25]

> There is some doubt in my mind as to whether a universal "Redhead" would be as effective as the test case. Because of the high quality of leadership in back of the test project, I am sure it received No. 1A priority. Any crash program that has a high priority can be put over more effectively than a general program unless the present AMC organization is beefed up or performs a lot better than it does now. Also, the "Redhead" system might not be so effective with units in the field less competent than the 2nd Bombardment Group. Further, as the system is totally dependent upon aerial transport, you must recognize that there are times when aerial transportation bogs down.

(U) Brigadier General Joseph C. A. Denniston, Acting Assistant Chief of Staff, USAFE, also felt that the experience

general in that the project was an inconclusive basis for developing a future logistics system. General Denniston's arguments closely paralleled those of General Hicks, for he felt that the project was conducted "under what might be called the most optimum circumstances."[26] In addition, General Denniston felt that additional research should be made in the area of depot maintenance before supply support was modeled after the "Logistics of 1956" concept.[27]

## Project Sun-Kist

(U) In 1951 and 1952 the logistic system did not provide adequate management controls over items. No single organization had complete authority and responsibility for end items. It was impossible to place responsibility on any one unit for ineffective support. The final report issued by the Mobilization Analysis Center of Harvard University recognized the problem and suggested that the Air Force establish product managers to improve supply management.[28] Project Red Team also indicated that reductions in pipeline time and quantity of stocks could be obtained through improved management.[29]

(U) In April 1953 Air Force headquarters directed that the product manager concept be service tested. This test received the title Project Sun-Kist, but in August 1953 it was changed to the "Advanced Logistic Planning Project."[30] Air Materiel Command (AMC) established the project at Oklahoma City Air Materiel Area (OCAMA) and selected the B-47 support program as the system to test. The project was divided into six phases and was programmed to cover an 18-month period.[31] Some of the objectives of the test were to determine the following: (1) the scope of responsibility and amount of control that the product manager should possess; (2) the manager's relationship with operating units and those agencies responsible for maintenance, procurement, and storage; (3) the operating procedures to be followed by the manager, bases, and operating units; (4) the type of organization necessary for supporting the product manager concept; and (5) the best method for "identifying assets of common items applicable to a particular end item."[32] The service test was discontinued in May 1954.

## II. DEVELOPING THE NEW LOOK IN LOGISTICS

### Airlift

(U) The Air Force's first practical experience with airlift occurred in World War II when its planes flew the "Hump" between India and China. Airlift came of age in 1948 with the Berlin crisis. Final figures showed that Operation Vittles had airlifted more than 2 1/4 million tons of cargo into the German city.[1] The Air Force's next experience with airlift occurred during the Korean conflict. Supplies and troops were flown from the Zone of Interior over the Pacific to Japan and from Japan to Korea. Therefore, the Air Force learned to organize limited airlift operations long before the concept became an integral part of the new logistics program.

(U) The final report issued by the Mobilization Analysis Center of Harvard University in October 1952 advocated the use of airlift for transporting expensive items.[2] The "Logistics for 1956" concept and the statement of logistic objectives released by the Deputy Chief of Staff, Materiel, in August 1953 also advocated the use of airlift, but on a larger scale than what was called for in the Harvard report.[3]

(U) Two Air Force projects tested the airlift concept. Project Sky-Way, a part of the Spares Study Group program, tested the economic feasibility of airlifting aircraft engines.[4] These engines were transported by air from overhaul and production points to eight SAC (Strategic Air Command) bases. This project, solely a domestic operation, proved that airlift could cut the engine pipeline from 135 to 77 days.[5] Sky-Way, however, restricted its airlift to high cost items and those which completed a cycle--items which were used, repaired, used, repaired, and so on. Project Red Head involved the aerial resupply of engines and electronic parts to a bomber wing stationed initially in the United States and later in England. This project also confirmed that pipeline time could be materially reduced by airlift while improving the service rendered.[6] The normal supply cycle of 50 days was cut to about 11 days during the project.[7]

(U) MATS (Military Air Transport Service), one of the world's largest air transport operations, was formed on 1 June 1948 to provide a single air transport system for the defense department. Creation of MATS marked the first time that two separate services (Air Force and Navy) were integrated into one permanent organization.* While the Air Force organized and operated MATS, the Joint Chiefs of Staff controlled airlift allocations.[8]

(U) By 1952 the Air Force discovered that it could not rely on MATS for required transportation and opinion varied on how to solve the problem. Some felt that a separate and distinct Air Force organization should handle Air Force transportation, but others felt that the solution lay in correcting MATS deficiencies.[9] This latter group pointed out that the creation of a separate Air Force organization would only encourage the other services to do the same. They felt this would provide duplication and unnecessary expense.[10]

(U) AMC first stated its official position on airlift at the USAF Air Transport Symposium held in October 1953. The command took the position that the airlift resources divided among separate Air Force units should be placed in a single organization.[11] AMC did not want to become an airline operator, but it did want guaranteed airlift so it could reduce pipeline time and logistics costs. It proposed that reputable civilian air carriers, operating Air Force-owned aircraft, provide the Air Force's airlift. These air carriers would be selected on a competitive bid basis.[12] After numerous studies, proposals, counter-proposals, and meetings, AMC received permission to inaugurate Mercury Service (later called Logair). This airlift service, using carrier-furnished aircraft rather than Air Force-owned airplanes, started operations on 5 February 1954.[13]

(U) RAND, in a study completed in 1956, discussed the role of airlift in the light of the existing logistics system and

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* The Air Force unit was the Air Transport Command and the Navy unit the Naval Air Transport Command.

the one required for the decade of the 1960's.* This RAND study indicated that deployment rather than routine re-supply generated the greatest demand for airlift.[14] It also repeated what many studies and Air Force advocates of airlift had stated earlier. First, it indicated that airlift could greatly increase the responsiveness of the logistics system.[15] This increased responsiveness formed an essential condition of any logistics system. Next, it stated that airlift could provide economy--a second necessary condition for a logistics system and a primary Air Force goal.[16] This economy would result from increased effectiveness, shorter pipelines, and reduced inventories. RAND also indicated that the primary mission of any peace-time military air transport force was not transportation, but training and preparedness for the great surge of war-time demands.[17]

## Weapon System Concept**

(U) Many of the Air Force logistic system studies conducted during 1951, 1952, and 1953 advocated what later became known as the weapon system concept.[18] The statement of logistic objectives issued by the Deputy Chief of Staff, Materiel, in the summer of 1953 gave official recognition to this concept.[19] It emphasized close integration of planning, engineering, supply, procurement, and production functions throughout the development and production life of a weapon. Under the concept, the people who designed, produced, and eventually used and serviced a weapon, started working together in the earliest phases. This group continued to function as a team throughout the testing and production phases of the system.

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* RAND is the common name applied to the Research and Development Corporation. The United States Air Force Dictionary describes RAND as "a nongovernmental, nonprofit organization, dedicated to research for the welfare and national security of the U. S."

** A weapon system is defined in the Air Force Dictionary as "a total entity consisting of an instrument of combat (a single unit of striking power), such as a bomber or a guided missile, together with all related equipment, supporting facilities, and services, required to bring the instrument upon its target or to the place where it carries out the function for which built."

(U) As part of the weapon system concept the Air Force transferred prime responsibility for the development and procurement of materiel to a single contractor. The Air Force moved in this direction because of the ever increasing complexity of weapons. In 1955 Major General David H. Baker, AMC Director of Procurement and Production, explained it as follows:[20]

> In the ten years since World War II, the performance of our weapons has increased further than they did in the 25 years between World War I and World War II. Our operational speeds have tripled, our altitudes doubled and our firepower increased ten fold. We have had to pay for this performance in greatly increased complexity, much of which has resulted from the rapid advancements in the state of art, the compactness of the air vehicle, and the greatly increased use of electronics. For example, all of you are familiar with the B-36 bomber. This aircraft was developed and produced under the earlier AF practice of individual component development and production. The airframe contractor was expected to assemble the multitude of components into the airframe and make the total system conform to all the applicable airframe and equipment specifications. Despite great efforts at correlation, the complexity of an airplane such as this is so great that nearly every type of equipment furnished to the B-36 contractor had to undergo modification varying from minor adjustments to major design changes in order to perform as required.

(U) At the same time, General Baker explained that the Air Force adopted the weapon system concept because it established single weapon responsibility. Too, the contractor could eliminate red tape, act quickly and decisively, and employ highly qualified people. This allowed new weapons to be placed in the inventory faster than before. A secondary advantage was that it allowed the Air Force to reduce the number of people it needed in the development, procurement, and production functions.

(U) General Baker also pointed out that adoption of the weapon system concept produced some disadvantages. One disadvantage was that the Air Force lost some control over the aircraft industry.[21] Contractor movement of the development and production processes into their own plants created a second disadvantage.[22] This consolidation threatened to eliminate component manufacturers and small business from the aircraft industry. This consolidation, in turn, created a third disadvantage--concentration of the aircraft industry in a few cities.[23] This increased the industry's vulnerability to attack and forced funds to flow into just a few locations. A fourth disadvantage of the weapon system concept was that it tended to destroy the Air Force's standardization efforts.[24] Each contractor attempted to use only what he developed. Greater control and monitoring of contractors during the development of weapons, General Baker felt, offered the best means for overcoming the disadvantages.[25]

(U) AMC had been organized originally to support the Air Force on a property class system of logistic responsibility.[26] Along with this idea of specialization by class of materiel had grown up the method of staff control based on function. This control system originated at a time when the Air Force possessed few models of airplanes but, by 1953, it had more than 40 types. Air Force Regulation 5-47, dated 29 September 1953, defined the weapon system and gave AMC the responsibility for developing all support plans.[27] The weapon system project offices were established two weeks later by Air Force Regulation 20-10, dated 16 October 1953.[28]

(U) AMC established the position of Deputy Commander (Weapon Systems) in the Office of the Commander on 1 September 1954.[29] However, the Command made no major reorganizations as a result of the weapon system concept. It merely superimposed the weapon system offices on the existing organization.[30]

## AMC World-Wide Logistic Responsibilities

(U) On 30 March 1953 Air Force headquarters directed AMC to study the concept of expanding the command's "jurisdiction to overseas areas at such time as determined to be appropriate."[31] This occurred just a few weeks after the

Chief of Staff requested that the "Logistics for 1956" concepts be carried out immediately. In its presentation, AMC suggested (but did not recommend) that both ZI and oversea support be placed under one command.[32]

(U) The presentation pointed out that the Air Force's logistic system had to be changed to keep pace with the new concepts. Some of these new concepts were: future wars would be global in nature, American forces would be deployed over widely dispersed areas, and the timing and location of a war would be in control of an adversary. The logistic system, therefore, had to be versatile, adaptable, economical, effective, and capable of absorbing losses and of recouping.[33]

(U) The AMC study indicated that, under the existing logistics system, it was difficult to control materiel sent overseas. Some specific difficulties AMC experienced were: world-wide production potentials and maintenance capabilities were unknown, oversea pipelines could not be controlled, oversea consumption data were incomplete and inaccurate, and procedures were not standardized. The study pointed out that "the theory of superabundance is the only solution to the problem of providing adequate support for the Air Force with the present logistics system."[34] It indicated that this type of support was not economical, could not be used to support widely scattered forces, and resulted "in stockpiling in one area and a shortage in another."[35] Unification of the ZI and oversea logistic systems, according to AMC, would allow the Air Force to shift emphasis more easily from one theater to another, reduce shortages and excesses, simplify operations, speed supply actions, and improve management.[36]

(U) The AMC plan set forth in the presentation called for the ZI logistics system to absorb the Northeast Air Command (NEAC), Alaskan Air Command (AAC), and Caribbean depot support responsibilities as soon as possible. The depots in Europe would be reorganized into three areas similar to the air materiel areas. Each area would report to the commander-in-chief of the theater. AMC would first set up a liaison office in Europe, and, later, would establish an Air Logistics Force to replace the liaison office. This Air Logistics Force would supervise the three areas. Finally, AMC would bring the Air Logistics Force under its direct supervision.[37] Headquarters USAF approved the plan;

and, on 1 January 1956 directed that it be carried out.[38] In 1957 AMC began to plan the phase down of European depots over a five year period. The command felt it would be able to support overseas forces direct from the United States by 1962.[39]

## Electronic Data Processing

(U) Air Force interest in applying high-speed computers to its management and mobilization problems began in 1947. In 1952 Air Force headquarters received its UNIVAC. The statement of logistic objectives issued by the Deputy Chief of Staff, Materiel, in June 1953 called for the development of new electronic communications and data processing equipment.* In November 1953 Air Force headquarters directed AMC to work with ARDC in developing electronic computers. Headquarters USAF also directed AMC to conduct necessary service tests and develop a world-wide communications program utilizing electronic equipment.

(U) In July 1954 Headquarters AMC received its UNIVAC. At the same time, the headquarters ordered electronic equipment for two other AMC organizations--Memphis Air Force Depot and Oklahoma City Air Materiel Area (OCAMA).[41] AMC leased similar equipment in Fiscal Year 1956 for Dayton Air Force Depot, Topeka Air Force Depot, Sacramento Air Materiel Area (SMAMA), and San Antonio Air Materiel Area (SAAMA).[42] Between August and November 1954 Headquarters AMC organized Logistics Data Processing Development Offices in each depot to develop management techniques for using the new electronic equipment.[43] By May 1958 the AMC electronic development program reached the point where it became necessary for the headquarters to outline detailed procedures for the use of the equipment.[44]

## New National War Concepts and Policies

(S) Toward the end of 1953 the National Security Council appraised the nation's defense needs and issued a directive which changed national policy.** This directive recognized that airpower, combined with nuclear power, formed the primary force

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* See p. 15.

** National Security Council Directive 162/2, about December 1953.

to be employed in war. It established the Air Force as the free world's first line of defense.[45] Directive 162/2 also outlined new concepts of war. It eliminated the traditional build-up phase of war and reduced the decisive phase to 90 days.[46] The build-up phase of World War II took from two and one-half to three years time, and the decisive phase about two years. While this concept was not entirely new, it did stress the need for quick Air Force action in the area of logistic improvement.

(S) AMC, in reappraising the logistic system in the light of the new concepts, discovered that the support system was still geared to the old. Its analysis revealed that the command could not receive, process, and deliver all the required support during the 90-day decisive phase.[47] To correct the situation, the AMC Council appointed the Assistant for Programming as its agent for orienting command directives to the new war concepts.[48] The command also issued a directive which authorized all AMC components to notify the Assistant for Programming whenever any data were not compatible with the new concepts.[49]

## New Logistic Policies and Concepts

(U) In February 1953, after the Chief of Staff directed that the Air Force implement the "Logistics for 1956" concepts, the office of the Chief of Staff, Materiel began to develop a statement of long-range logistic objectives.[50] These objectives were circulated within Air Force headquarters in June and July 1953. Lieutenant General Orval R. Cook, Deputy Chief of Staff, Materiel, requested that the objectives be considered official policy and that they be carried out as soon as possible.[51] The objectives were forwarded to AMC in August 1953.[52]

(U) These objectives pointed out that the new logistic program the Air Force planned to develop had to have three characteristics not found in the existing system. First, it had to contain a greater degree of flexibility. Next, the new system had to allow close, selective, and continuous control over material. Finally, it had to be manned by high quality personnel. The Air Force planned to develop new recruiting and training procedures for both military and civilian management personnel to attain the third characteristic.[53]

(U) The statement of objectives outlined new Air Force procurement, manufacturing, distribution, and maintenance programs.

It also contained specific actions for attaining the new program. In the area of procurement, the Air Force wanted a system that allowed rapid, accurate, economical, and effective purchasing.[54] Some of the specific actions listed for attaining this new program were testing and evaluating the product manager concept, creating a system which produced more accurate consumption information, and purchasing only limited spares at the time an aircraft or item is bought while postponing the purchase of the major portion of spares until accurate requirements forecasts could be made. In addition, the statement of objectives called for concentrating management attention on high dollar cost items, increasing the use of manufacturers' facilities for the storage and shipment of equipment, making greater use of reparable items, expanding the local purchase field, improving the quality of personnel, and reducing the high turnover rate of military personnel.[55]

(U) The primary aim of the new manufacturing system was to reduce lead time. One way the Air Force hoped to accomplish this was by encouraging manufacturers to stock long lead time raw materials and semi-fabricated parts.[56] Another way was through the creation of special "short order" facilities at manufacturers' plants.[57] These facilities would produce only spare parts, but would be capable of producing them rapidly. The statement of objectives indicated that these "short order" plants could be used by the manufacturers as part of their overhaul and repair facilities.[58]

(U) The goal of the new distribution system was rapid and effective support with a minimum of inventory investment and administrative overhead. Before it could achieve this goal, the Air Force had to exert greater control over the funds invested in supplies; improve the flow information, materiel handling, and transportation; and centralize responsibility for specific classes, categories, or types of major equipment. The statement of objectives outlined three other steps for attaining the improved distribution system. These were using manufacturers to operate the supply function, utilizing air transportation, and developing new electronic communications and data processing equipment.[59]

(U) The statement of objectives called for development of a maintenance system exercising greater control over the factors of time, quality, and funds. It called for increased reliance on industry--especially the original manufacturers--for maintaining items that could be repaired on a "production line" basis. The

maintenance objectives also called for moving the major portion of maintenance from the unit to the depot. In addition, they called for the return of oversea depot maintenance facilities to the Zone of Interior.[60]

(U) In January and May 1954 Air Force headquarters outlined its logistics policies. The January policies called for greater Air Force use of contractor resources whenever "effectiveness, efficiency or economy will be increased thereby without impairing mobilization potential or combat effectiveness."[61] They also called for the development of a flexible logistic system. This flexibility was to allow the system to expand and contract as required by changing budgets and world conditions. Other policies listed by Headquarters USAF in January were as follows:[62]

> Stimulating the development of improved communications and transportation systems and techniques to achieve more rapid, reliable and responsive distribution consistent with need and cost.
>
> Emphasizing the development of cost control and reporting systems and techniques to better aid management in arriving at appropriate and timely decisions.
>
> Emphasis will be placed upon continuous improvement of coordination between R&D and logistic activities to increase the effectiveness of logistic support of end products.
>
> Stimulate the development of career logistic personnel so as to effectively and economically administer the material programs of the Air Force.
>
> Avoidance of duplication of Army and Navy facilities, resources or services when Air Force needs can be satisfied through definition of missions and inter-service agreement.

(U) On the whole, the May 1954 statement of logistics policies repeated those presented in January. However, in addition to the

policy statements. Headquarters USAF pointed out that the primary responsibility for modernizing the logistics system rested with AMC.[63] It also requested that AMC start the modernization program at once and "that it be vigorously pursued."[64] AMC immediately incorporated the new policies into its operations planning guide and made the accomplishment of the new logistics program its number one objective.[65] By 1955 many of the recommendations presented in earlier studies formed a part of the AMC logistics program.[66]

# III. GUIDED MISSILE POLICIES, CONCEPTS, AND SUPPORT PLANS

## Preliminary Missile Concepts 1951-1952

(S) The Air Force missile program started during World War II, but was allowed to drift during the immediate postwar years. The Korean War produced only a slight acceleration and increase in emphasis. Evidence of rapid Russian missile progress in 1955 aroused the United States from its indifference. As a result, funds for the development and production of missiles were raised to one billion dollars for Fiscal Year 1957.[1] This amounted to an increase of 250 million dollars over 1955 missile expenditures.[2] By the end of 1955 the Fiscal Year 1957 procurement program called for 11,184 missiles--an increase of 4,610 over the number ordered in Fiscal Year 1956.[3]

## Early Maintenance Concepts

(U) AMC began planning guided missile maintenance concepts as early as August 1951. These concepts were based, in large measure, upon preliminary plans Headquarters USAF made in April. The plans indicated that Matador missile squadrons would perform their own field maintenance, air launched missiles (Rascal and Falcon) would be integrated into the normal wing-base structure, and ground launched missiles (Matador, Snark, and Bomarc) would not be integrated into the wing-base structure.[4]

(U) Planning personnel within the Maintenance Division, Headquarters AMC, interpreted this to mean that the Air Force levels of maintenance established to fit the squadron-group-wing organizational plan could not be readily adapted to missiles.[5] They felt Air Force headquarters wanted all missile units to be supported from the Zone of Interior. Their missile maintenance plan reduced the three normal levels of organizational, field, and depot maintenance to two--organizational and depot.[6] The plan indicated this change became possible because guided missile units would contain a greater maintenance capability than other units.[7] This increased capability, in a sense, developed from missile complexity. Greater complexity demanded that only highly skilled personnel--those who would be able to perform a greater variety of repairs--be

assigned to missile units.[8] Elimination of field maintenance, the plan pointed out, reduced costs considerably since a third set of expensive repair equipment would not have to be purchased.[9]

(S) During this early period the Air Force planned to store missiles at two depots--Warner Robins Air Materiel Area (WRAMA) and San Antonio Air Materiel Area (SAAMA).[10] Headquarters AMC maintenance personnel recommended that three additional storage facilities be added to the original two. These three new depots were Ogden Air Materiel Area (OOAMA), Sacramento Air Materiel Area (SMAMA), and Griffiss Air Force Base, Rome, New York.[11] The five depots were to store, preserve, repair, and modify missiles.

(U) AMC personnel outlined maintenance concepts for the Falcon, Snark, Bomarc, and Rascal missiles in October 1951. These individual concepts, just as the general ones outlined in August, were based on the preliminary plans outlined by Headquarters USAF in April. As late as June 1952, AMC still considered all of the maintenance concepts it developed during 1951 as temporary, at best. The command had no other choice since it received no firm planning information from higher authority.[12] It based a great deal of the concepts on assumptions and estimates. This became necessary, the command pointed out, because Air Force headquarters did not establish firm missile budgets, operating programs, tactical concepts, and provided only incomplete missile deployment information.[13] At a logistics conference held at Headquarters USAF in June 1952, AMC personnel indicated that it was both "extremely difficult and dangerous" for the command to formulate ground rules and assumptions since "decisions regarding strategic concept must of necessity be made and may adversely influence future Air Force actions."[14]

(S) Falcon (GAR-1) Concepts. In April 1951 Air Force headquarters called for the deployment of nine F-89D/Falcon squadrons within the United States and three in Alaska. The maintenance concepts worked out by AMC to support these squadrons indicated that future Falcon production rates would equal the amount normally expended each month by the 12 squadrons. AMC placed this production figure at 3,000 missiles per month.[15]

(U) The concept indicated that Falcon missiles would be shipped in three air tight dehydrated containers. One package

would contain the missile's forward section, the second container would hold the aft section including the rocket motor, and the motor's igniter would be placed in the third package. Each of the containers, for safety reasons, would be placed in separate buildings. Normal storage time was estimated by AMC to be two years. No spare parts requirements were included in the concept since final figures depended on the results obtained during Operational Suitability Tests (OST).[16]

(U) This tentative AMC concept placed the heaviest maintenance workload on the depot. It limited organizational maintenance to missile assembly and checkout, and the replacement of defective assemblies. The manufacturer (Hughes Aircraft Co.) specifically designed the missile to facilitate component replacement at the organizational level. This eliminated the requirement for large stocks of "bits and pieces" at the unit. On the other hand, it required that the depot always be prepared to ship repaired components and new missiles to both Zone of Interior and oversea units. It also required that the depot provide special teams for modifying missiles stored at the squadrons.[17]

(S) Maintenance of Snark (SM-62). The April Headquarters USAF plans announced that two Snark squadrons were to be located in Maine. They listed October 1953 and April 1954 as the squadron operational dates. These plans also revealed that two additional Snark squadrons might be activated later and placed in the state of Washington.[18]

(S) The maintenance concept indicated that each squadron required a total of 70 Snark missiles--20 operational and 50 in storage. The 50 stored missiles would provide the squadron with a 10-day supply. AMC expected each squadron to fire five missiles a day after the initial 20 were expended. Close depot support would be needed to provide the squadrons with spare parts, components, and missiles. The squadrons located on the east coast would be supported by a depot located at Griffiss Air Force Base, Rome, New York and, if activated, those on the west coast by a depot located at Spokane, Washington. These two depots would perform all necessary repairs and missile modifications. Special teams would modify those missiles located at the squadrons.[19]

(S) Bomarc (IM-99) Maintenance. The Air Force planned to use Bomarc squadrons to defend industrial areas within the United

States. It indicated that the first three squadrons would be located near Buffalo, Boston, and Washington, D. C. It also disclosed that five additional squadrons might later be placed in the northeast section of the country. These squadrons would not necessarily be located on Air Force bases, but would receive their support from the closest base. The Bomarc concept listed June and October 1954 as the operational dates for the first three squadrons.[20]

(S) Each of the three squadrons would receive 100 operational missiles and be backed-up by an additional 150 missiles stored at Griffiss Air Force Base, New York. The remaining five squadrons, when activated, would receive missiles. However, the concept recommended that the reserve missiles for the additional squadrons be stored at WRAMA and not Griffiss Air Force Base. Each Bomarc squadron would receive 27 launchers--three flights in a squadron with nine launchers per flight. The squadrons would have a total of 27 missiles ready for launch at all times and 73 missiles in storage. The reserve missiles would be periodically inspected to assure that they were operational.[21]

(U) Squadron maintenance would consist of only component replacement and "very minor repairs." The depots would overhaul all missile components and provide teams to inspect those missiles stored at the squadron. All special test equipment and facilities would be located at the depot.[22]

(S) Rascal (GAM-63) Maintenance. Support of the Rascal posed few special problems, since the Air Force planned to use the missile with regular bomber squadrons. Normal supply and maintenance channels would be used by the Air Force to support the Rascal. The AMC concept pointed out that Zone of Interior squadrons would receive a 30-day supply of missiles with all reserve missiles stored at SAAMA. Those squadrons located overseas would receive enough missiles for a "maximum effort strike" and a 60-day supply would be kept at an oversea depot.[23]

(S) AMC planned to ship and store Rascals in five parts using sealed pressurized containers. Command personnel estimated that the missile could be stored for five years. They also pointed out that a Rascal could remain fueled for 36 hours, but

after that time, squadron personnel would have to drain the fuel and recheck the missile.[24]

## Early Matador* Support Concepts

(U) AMC developed preliminary logistic concepts for the Matador--the Air Force's first operational missile--as early as November 1952. These early concepts outlined a support system which deviated somewhat from established procedure, since the new system called for direct manufacturer support of peculiar (contractor produced or controlled) items. These items would flow from the manufacturer (Martin Company) to the using organization without entering the normal Air Force supply system.[25]

(U) In addition to support procedure, the concept covered packaging, transportation, and maintenance. However, the only packaging requirement listed in the concept was that in-transit damage must be held to a minimum. It specified no particular packaging materials or methods. The concept stated that air transport would be used to move all items except those already in the Air Force supply system, but listed no specific airplane or procedure. In the area of maintenance, it required the contractor to perform all field and depot repair. The concept proposed that Zone of Interior maintenance be performed at the manufacturer's plant in Baltimore, Maryland, and that oversea maintenance be accomplished by the contractor's technical representatives.[26]

(U) AMC studied the entire problem of missile support, with special emphasis on the Matador, at the same time that it wrote the TM-61 concepts. The command studied the problem in order to answer some questions posed earlier by the Air Council and to generate acceptance of a new logistic concept which it felt would "insure adequate and timely support" for missiles.[27]

(U) The study first emphasized that too often people overlooked the restrictions under which the military operated. These

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* The Air Force first considered the Matador a bomber and called it the B-61. It later changed the missile's designation to TM to signify tactical missile.

were the restrictions of too little money and too little manpower. It cautioned the Air Force not to support missiles with unrealistic and expensive systems, since this made it impossible to exploit the weapons fully and created the danger of pricing missiles out of the weapons market. The study pointed out that missiles could very easily be priced out of the market because their initial high cost was pushed even higher by the factors of poor accuracy and low reliability.[28]

(U) Two important factors, the study indicated, became readily apparent to AMC planners when they considered missile logistic support concepts. First, the planners discovered that the Air Force had not published any approved operational concepts for missiles. Next, they found that no information was available for determining missile supply and maintenance requirements. The study warned that waiting for the necessary information only invited additional delay. It suggested that logistic implications be determined as soon as possible by the the best method available, but did not specify how this was to be done.[29]

(C) As for the Matador, the study pointed out that both Tactical Air Command (TAC) and United States Air Forces in Europe (USAFE) had submitted proposed operational concepts to Headquarters USAF. While these operational concepts did not quite agree, AMC assumed that the missile would be used immediately upon the outbreak of hostilities and would continue to be used until stocks were exhausted. The study's position on operational concepts differed from the one presented earlier by AMC personnel at Air Force headquarters. This new position indicated that the lack of operational concepts was not serious. The study stated it as follows:[30]

> The lack of an approved operational concept and operational plan, however, is not as serious as it may seem. True, the logistician has been forced to make operational assumptions in certain cases, but this is equally true with the majority of our conventional aircraft weapon systems. In this specific case, AMC and other agencies were given, piecemeal, broad directives and bits of information.

These, taken together, may be considered a logistic plan of sorts. Also, these agencies, to a large extent, have generated their own guidance in certain critical areas.

The net result of this admittedly unorthodox procedure has been the formulation of a generally accepted plan which will be outlined and then analyzed in light of the characteristics of the weapon and its probable techniques of employment.

(C) This approach produced a Matador logistics plan based on the deployment of nine squadrons in Europe by the end of Fiscal Year 1954. The plan allocated 60 missiles, an estimated one-month supply, to each squadron. It also called for an additional total of 810 missiles to be placed in the European supply depots. It established WRAMA as the Matador Zone of Interior depot and required that 450 missiles be stocked there before the end of Fiscal Year 1953. These plans outlined an oversea support system that ran from the squadrons through an air depot wing, through Burtonwood, through the Zone of Interior depot, to the manufacturer.[31]

(C) The AMC study indicated that an analysis of the support plan revealed certain weak areas. It pointed out that the desired squadron firing rates could not be maintained with missiles stored at the locations specified in the plan. It emphasized that these rates could only be met if all missiles were kept at the squadrons. A second weak area, according to the study, was that, with planned production rates, it would take the Air Force nine years to meet all supply requirements. It also questioned the validity of establishing storage facilities in depth when there was actually little or no storage requirement.[32]

(C) The study proposed a Matador logistic concept based on "direct support, from manufacturer to user, completely deviating from our present support system, except for control elements essential to the logistic operation."[33] The essential features of this concept were as follows: (1) using air transportation for the movement of all items except initial issues of common squadron equipment; (2) distributing items from factory to user by the most direct route; (3) using both military and contractor personnel

for organizational maintenance and contractor personnel for field maintenance; (4) providing common and peculiar components, sub-assemblies, and individual items in kit form; (5) basing spare part quantities on airlift pipeline time; (6) evacuating damaged items from the squadrons by air, utilizing most direct routes.[34] According to the study, utilization of this proposed concept would result in a number of advantages. Some of the more important were:

1. Operational units would no longer be tied to depots. This would allow greater latitude in selecting operational areas and greater flexibility.

2. Modifications could be completed faster and more efficiently. Missiles would be located only at the unit or factory and not throughout the pipeline.

3. UR (Unsatisfactory Report) processing would be speeded.

4. Spare quantities could be reduced.

5. Costs for classifying and cataloging new parts would be reduced. Noncommon items would not be brought into the Air Force catalog system until all engineering changes were stabilized.

6. The number of military personnel needed in the support system could be reduced and diverted to operational areas.[35]

(C) The study also revealed that the proposed concept might be subject to criticism because it relied on contractor storage and maintenance. This reliance would reduce the Air Force's control over the support system and deprive military personnel of new weapon "know-how." The study answered the loss of control problem as follows:[36]

> Regards military control, the facts must be faced. The Air Force can no longer afford the luxury of absolute control and self

> sustaining capability for these expensive end items, particularly when support constitutes such a great percentage of that cost. Further, military control can be retained without the necessity of handling every nut and bolt and repairing every component and subassembly. As a matter of fact, this principle of military control, if there is such officially stated, has been violated in several instances. Among those most easily mentioned are the Hughes Company, performing contractor maintenance on the E-1 fire control systems being used in Korea; several contractors performing maintenance on the components of the K-bombing system; and KLM in Holland, foreign nationals no less, who are or soon will be, performing aircraft overhaul.

It indicated that economy requirements ruled out the aspect of having "every man entirely familiar with the inner workings of these new weapons." It also pointed out that the expenses involved in training military personnel and procuring extra equipment could not be accepted, considering the short service life of technically trained enlisted personnel.[38]

Direct Contractor Support

(U) At the end of 1952 the Munitions Board and Air Force headquarters announced that maximum use would be made of commercial facilities for the support of Air Force weapons. These organizations officially sanctioned this policy in order to allow the Air Force to "accomplish workloads in excess of military depot capacity" and to "minimize military constructions."[39] Headquarters USAF asked AMC to develop a Matador logistic system based on maximum contractor support. Air Force headquarters selected the Matador as its test weapon because it promised to become the Air Force's first operational missile.[40]

(U) A number of conditions developed at the time which led to the formulation of the contractor support concept. Some of the more important conditions were: (1) weapon systems were becoming increasingly complex, (2) the logistics system was too unweildy for the weapon system concept, (3) new weapon complexity

made the cost of filling existing pipelines prohibitive, (4) the supply system's large inventories and long pipelines produced inflexibility and slow responses, and (5) the maintenance system limited the Air Force's ability to support weapon systems.[41]

(U) In March 1953 the Matador Weapon System Project Office (WSPO) forwarded a copy of the interim TM-61 supply plan to the Martin Company. This plan disclosed that air transportation would be used to supply oversea missile units, and that trucks would continue to supply the Matador test program within the United States. It informed Martin that the company would be responsible for manufacturing, supplying, storing, and distributing those missiles and spare parts bought by the Air Force.[42]

(U) On 28 December 1954 Headquarters AMC authorized WRAMA to launch a one-year test of the direct support concept and specified 1 January 1955 as the starting date.[43] Through this service test, the command hoped to receive enough information to evaluate the effectiveness and quality of direct support, to determine what methods could be used as standard practice for the support of all missiles, and to decide what changes or revisions must be made in the concept's procedures.[44] Under the conditions of the test, the Martin Company became responsible for supplying and maintaining only those items which were provided by or through the company.[45] All standard Air Force items were still provided and maintained through the normal USAF supply system.

(U) In September 1955, nine months after the test started, AMC extended its span of life six months beyond the original one year.[46] This moved its completion date from 31 December 1955 to 30 June 1956. While poor data collection methods produced unreliable information during the first part of the test, the last few months produced worthwhile results.

(U) In October 1955--while AMC conducted the service test--Martin representatives outlined a Matador support concept at WRAMA which placed all items under contractor control.[47] WRAMA Commander Major General K. E. Tibbetts informed Headquarters AMC that he felt the Martin proposal conflicted with the Air Force policy of depot flexibility, since it eliminated the need for WRAMA maintenance facilities.[48] General Tibbetts

indicated that adoption of the Martin plan "would result in duplication of stocks at contractor and Air Force facilities."[49] The general also maintained that expansion of the plan to other weapon systems would produce "a tremendous expenditure of monies for duplicating stocks."[50] Headquarters AMC notified General Tibbetts that the command planned to make no change in its original philosophy that Martin would be responsible only for company designed or controlled items.[51] The headquarters also emphasized that no artificial conditions must be introduced into the test program.

(U) Three months before the service test ended, Air Materiel Force, European Area (AMFEA), reported to Headquarters AMC that the direct support program was unsuccessful and recommended that the contractor's oversea facilities be eliminated at the end of the test.[52] AMFEA stated that the program's failure "is not attributable to fallacies in the concept but lies instead in the implementation which has never tested the 'manufacturer to user' system."[53] WRAMA's report, issued at the test's conclusion in July 1956, took a position exactly opposite the one held by AMFEA. The WRAMA report maintained that contractor support was both efficient and economical.[54] However, it did point out that a high degree of Air Force control must be maintained over the system at all times. The report recommended that the Air Force continue to base Matador logistics on direct contractor support.[55]

Development of an Air Force-
Contractor Support Policy

(U) The Air Force attempted to develop an acceptable contractor support policy throughout 1957 and 1958. In June 1957, one year after the Matador service test ended, Headquarters AMC outlined its missile support plans to the Chief of Staff and issued a policy statement to its field units. AMC notified the Chief of Staff that it planned to continue supporting first line weapons with Air Force personnel and facilities. It described its missile support plan as follows:[56]

a. Contract logistic support will normally be used in the research and development stage with the AMC maintaining an "over the shoulder" surveillance.

b. As the weapon phases into production for inventory, the AMA will normally phase into the logistic support with contractor assistance so that the AMA/Depot complex has the capability to logistically support our first line weapons during their operational stage.

c. As the weapon enters the obsolescence phase, contractor support will be depended on for that portion of logistic support which must be phased out of our AMA/Depot system to provide sufficient resources for additional first line weapons coming into the Air Force inventory.

(U) The command assured the Chief of Staff that it did not intend to make a sudden transfer when shifting support responsibilities. It indicated that it would use contractors when the required support went beyond Air Force capability and when it became evident that the contractor could support a missile more economically than the Air Force.[57] Headquarters AMC merely repeated the program it outlined for the Chief of Staff in its policy statement to the field.[58]

(U) In 1958 Congress became interested in the Air Force's policy on contractor support. Lieutenant General Clarence S. Irvine, Deputy Chief of Staff, Materiel, became alarmed over statements made by some Congressmen which indicated they would exert pressure to increase the amount of Air Force work performed by civilian contractors. General Irvine informed AMC that he thought it unwise for the Air Force to establish a missile support capability (referred to as in-house support) immediately in light of (a) the diminishing depot workload brought on by streamlined operations and the introduction of missiles, and (b) the rapid obsolescence of missiles and test equipment.

(U) The general pointed out that, on several occasions, members of the Appropriations Subcommittee inquired about the level of depot overhead costs. This meant, he indicated, that the Air Force would probably have to justify the existence

of its air materiel areas. General Irvine suggested that, because of the circumstances, the Air Force immediately re-evaluate its depot maintenance capacity.[59]

(U) AMC received a missile support policy statement from General Curtis E. LeMay, Vice of Chief of Staff, on 1 March 1958. The Vice Chief of Staff indicated that he did not consider it feasible or economical to expend large sums of money and manhours to achieve an "in-house" capability when only a few missiles of each type would enter the Air Force inventory. At the same time, the general stated that the Air Force must not delay the development of its logistic support plans until the missiles met all flight requirements. To solve the problem, General LeMay called for contractor support of peculiar items until the missile program stabilized and the Air Force gained support experience. The general indicated that the Air Force would change to "in-house" support only when it could provide "better support at lower cost." He suggested that AMC continuously evaluate each missile weapon system and "when conditions indicate the desirability of establishing an 'in-house' depot capability for peculiar items and equipment, appropriate plans and recommendations be forwarded to this headquarters for review."[60] General LeMay also informed AMC that all future missile logistic concepts published by Headquarters USAF would reflect this policy.[61]

(U) Personnel within the Headquarters AMC Logistic Systems Planning Division analyzed General LeMay's policy. According to this analysis, the policy limited the command's effectiveness, and probably more important, would eliminate its operating supply and maintenance activities by 1970. The analysis indicated that the policy, because it called for contractor support of peculiar items, placed manufacturers in a better position than AMC for supporting operational units with mobile maintenance teams. This requirement allowed the contractors to develop weapon experience and maintenance skills long before the command. It also made it difficult for the command to support these items when they became common. The analysis predicted that the contractors would be able to show that they could support common items cheaper than AMC.[62]

(U) The Vice Chief of Staff's policy also prevented AMC from establishing an "in-house" capability until it could provide better support at lower cost. This meant, according to the analysis, that the command had to wait until the Air Force committed itself to large quantity purchases. In the meantime, the contractors would have established support capabilities and it would be difficult for AMC to justify the creation of duplicate facilities.[63]

(U) The policy analysis revealed that personnel within the Office of the Deputy Chief of Staff, Materiel, felt that "the AMC has been prone to select missiles for 'in-house' capability because of a desire to create AMC workload rather than on the basis of the best and least expensive support system."[64] It pointed out that Headquarters USAF cited the creation of in-house support capabilities for the Mace and Snark missiles as examples of poor AMC judgement.[65]

(U) In the middle of March 1958, Major General M. D. Burnside, Director of Maintenance Engineering at Headquarters AMC, outlined for Assistant Secretary of the Air Force Dudley C. Sharp the command's views on the Air Force maintenance policy. General Burnside informed Secretary Sharp that the Air Force "depot work force is used to accomplish work projects which will contribute most to a full tactical capability in the event of an emergency."[66] The general indicated that, simply stated, the command required first line equipment to be maintained by the Air Force, and second line equipment to be maintained by contractors. He explained that there were certain exceptions to this general rule. Under all of the exceptions, however, work moved from the Air Force to contractors and never in the other direction. Some of the examples listed by General Burnside of maintenance which moved to contractors were: (1) work the Air Force considered excessive to maintaining an adequate readiness capability, (2) work requirements which exceeded depot capabilities, (3) work which required prohibitively expensive tools, equipment, or facilities, and (4) work which required special skills not found in the Air Force.[67]

(U) The general summed up the advantages of the Air Force maintenance policy for Secretary Sharp as follows:[68]

> The USAF policy, as presently stated, allows the flexibility which the Air Force

> must have in making decisions as to whether a given workload will be accomplished within our depot system or placed on contract. Military requirements should be a prime consideration in the decision as to where maintenance will be accomplished. Since weapon systems are vital to the operational mission of combat forces, success or failure may well depend upon the responsiveness of the depots to military need. The importance of this responsiveness is best illustrated during the Suez emergency when SAC terminated all aircraft input to depot and contract facilities. OCAMA and SAAMA had the flexibility to divert their technical skills to SAC bases to accomplish essential area support work.

(U) AMC issued a new logistic support policy to the air materiel areas and depots on 19 March 1958.* This policy stated that the decision as to whether AMC or a contractor would support a weapon system depended on the result of two factors weighed against each other.[69] These were (a) the risk involved in delaying support planning until the weapon proved itself, and (b) the using command's requirement for continuous support (24 hours a day, 7 days a week) once the weapon entered the Air Force inventory. The policy indicated that large sums of money would be invested in a weapon only after it showed "good growth potential, excellent operational capabilities, and a long first line life."[70]

(U) On 2 April 1958 General Rawlings, AMC Commander, informed the Vice Chief of Staff that his February policy statement was "a timely confirmation of the policy we have pursued in preparing AMC for the missile era."[71] General Rawlings assured General LeMay that support of those missiles which might become obsolete would remain the contractors' responsibility. The AMC Commander also assured General LeMay that the command (1) developed "in-house" support capabilities only for those missiles which were important to the nation's deterrent force, (2) used only approved Air Force program figures for determining the

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* Headquarters AMC issued its first policy statement to the field on 28 June 1957. See pp. 28-29.

number of missiles entering the inventory, and (3) delayed the commitment of funds for "in-house" support until the Air Force made its final recommendations. The last factor, General Rawlings pointed out, allowed the Air Force to delay final decisions as late as possible without jeopardizing support plans and allowed all of the latest program information to become available. General Rawlings informed General LeMay that AMC had amended its policies to assure their "consonance with the policy guidance contained in your letter of 28 February."[72]

(C) Just two months later, in June 1958, Headquarters USAF asked AMC to revise its proposed Quail (GAM-72) and Snark (SM-62) logistic plans. Air Force headquarters notified the command that both plans violated Air Force policy since they called for "in-house" support. Headquarters USAF pointed out that the Quail program had not stabilized, nor was there enough support information available to justify "in-house" support.[73] The small size of the Snark program prevented it from being considered eligible by Headquarters USAF for "in-house" support.[74]

(S) During the same month the AMC Commander, in a letter to General Irvine, indicated that there appeared to be a lack of understanding "within the Air Force on the kind of logistics structure towards which we should be building."[75] General Rawlings expressed concern over the fact that he and General Irvine, while they agreed on general policy, apparently differed on how the Air Force was to carry out this policy. He again repeated the AMC arguments that military considerations should come first in determining how a weapon system should be supported and that it was too great a risk to depend on contractors alone for first line weapon support.[76]

(U) An AMC study on the risks inherent in contractor support, completed in July, pointed out that industrial dependability could be disrupted by factors other than labor-management disputes. It indicated that effective logistic support depended on effective management control. It indicated that effective logistic support depended on effective management and that this management was subject to rapid change through corporate raids and the assumption of control by foreign groups. The study emphasized that changes through either method could easily be accomplished since corporate raiding was an accepted business practice and finance tended to be international in character. It concluded that

disruptions could not be tolerated in those areas of logistics which were necessary to guarantee instant operational readiness.[77]

(U) A Headquarters USAF missile supply policy forwarded to General Rawlings in August allowed AMC to determine whether contractor or Air Force depot facilities would be used. It only asked that the command, before making its decision, consider the factors of (a) locating the supply site next to the maintenance site and (b) transportation costs.[78]

(U) In October 1958 the Air Force approved a maintenance support policy written by AMC for insertion into the USAF Materiel Guide.[79] This maintenance policy introduced the expression "best mix" into the logistics vocabulary, and used it to describe a compromise support program.* It dealt with the problem of Air Force vs contractor support as follows:[80]

> Planning for the support of a given weapon must be kept flexible and not committed too early to hard and fast policies of either AMC depot or contractor support. The "best mix" will be determined in each individual case, based on detailed consideration of its own merits. The "best mix" does not preclude consideration of either all depot support or all contractor support where it is evident that one of these courses of action is the soundest approach, all things considered.

## The Early Guided Missiles and Their Support

### Matador

(U) In December 1952 Headquarters USAF approved the Matador logistic concepts worked out by it and AMC during the preceding months.** At the same time, Air Force headquarters asked the

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* The policy statement defined "best mix" as "the term used to describe the apportionment or division of depot level repair work between depot and commercial facilities." For a fuller discussion of this policy, see pp. 64-66.

** For these concepts, see pp. 22-24.

command to prepare detailed support plans based on these concepts.[81] AMC published the approved logistic plans in March 1955.[82]

(C) The command's plan described a support system in which the prime contractor maintained and supplied those items that it designed and manufactured. It designated the Glenn L. Martin Company* (the prime manufacturer) facilities at Middle River, Maryland, as the off-base storage point for new parts and components, and as the maintenance center for those peculiar items returned for repair from oversea units.[83]

(C) This plan established two separate supply systems for the oversea Matador units. One system dealt with standard or common Air Force items, while the other dealt with those items designed and controlled by Martin and used only with the TM-61. In the case of standard Air Force equipment, requisitions and returning items followed normal Air Force supply channels. For the second group, or those items controlled by Martin, the operational units submitted their requisitions by the fastest means available directly to the contractor. The required items, if available at Martin, were sent direct from the contractor to the using organization by premium transportation, usually by air.[84] This system was referred to as the "source-to-user" concept.

(C) The maintenance program outlined in the AMC logistic plan, just as the one for supply, consisted of two separate phases: (1) support of standard Air Force items, and (2) support of peculiar items. The operational commands, in the case of common Air Force items, became responsible for unit, field, and depot maintenance. The logistic plan required those units which actually used the missile to maintain both common and peculiar items at the organizational and field levels. However, the plan restricted this maintenance to that which could be done by using only authorized squadron equipment and personnel. The contractor became responsible for all depot level maintenance on peculiar items. Therefore, Martin had to assign personnel and maintain repair facilities both in the Zone of Interior and overseas.[85]

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* The name of the firm was later changed to the Martin Company.

(U) In February 1958 Headquarters WRAMA published a Matador logistic plan to replace the one written by AMC headquarters in 1955.[86] This new plan, however, incorporated almost all of the support procedures used in the plan it replaced.

Rascal (GAM-63)

(U) The Rascal, a rocket propelled air-to-ground missile, was manufactured by the Bell Aircraft Corporation. The missile was capable of carrying a 3,000-pound nuclear warhead 90 nautical miles at a maximum speed of Mach 2.95. A director aircraft (DB-47)* carried the Rascal to within 90 nautical miles of a target. Some of the principal dimensions of the missile's airframe were: over-all length, 32 feet; maximum outside body diameter, 4 feet; horizontal span, 17 feet; and height, 12.5 feet.[87]

(U) The Rascal mission was the destruction of peripheral targets having strong local defenses. When possible, the missile was to be used as an initial attack weapon. With the Rascal, the Air Force hoped to keep manned aircraft losses at a minimum when attacking well defended targets. However, the missile could only be used against those targets which presented well defined radar returns.[88]

(U) Bell completed the first Rascal in July 1951. When Headquarters USAF cancelled the program in December 1958 the Air Force had contracted for a total of 136 missiles and received 131.[89]

(U) AMC released its proposed Rascal support concept during a meeting held at the contractor's plant on 3 February 1954. At the time, the concept did not reflect official Air Force opinion. This occurred because the command had not coordinated the concept with the Air Staff prior to its release.[90]

(U) Bell had delivered only 16 missiles when AMC released its concept. As a result, very little Rascal information was available and command personnel had to base the concept on

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* Both the B-36 and B-47 airplanes were to become carriers, but the system finally evolved as a Rascal/B-47 combination.

certain assumptions. First, the concept assumed that the Rascal would develop from the Research and Development (R&D) and Operational Suitability Test (OST) stages into a combat ready system within military requirements. Next, it assumed that the R&D and OST programs would provide tested missiles, director aircraft, ground handling and test equipment, engineering data, and allied support in time so all could be properly integrated into a combat weapon system. Third, it assumed that all missiles would be produced in "blocks of uniform configuration, with maximum interchangeability and compatability within blocks."[91]

(U) The concept indicated that the Rascal supply system would use only the most advanced distribution and property accounting methods. In addition, it pointed out that economy and restricted numbers of spares made it mandatory that all assets be used efficiently. It also stated that all oversea Rascal units would be supported, after initial stockpiles were established, by the methods outlined in the "Logistics for 1956" concepts.* [92]

(U) The Rascal maintenance program outlined by the proposed concept consisted of five main points. These were: (1) common items would be repaired within the established Air Force maintenance organization, (2) organizational maintenance would be performed by the using unit within its capabilities, (3) facilities for the repair of peculiar items would not be placed between the organizational and depot levels of maintenance, (4) AMC would determine to what extent contractor facilities and capabilities would be used at the depot level, and (5) AMC did not foresee any need for oversea depot facilities.[93]

(U) AMC devoted a portion of its concept to the operational conditions under which it felt the support system would have to operate. Some of these conditions were: (1) both B-36 and B-47 aircraft would carry the Rascal;** (2) B-36 squadrons would operate only from the United States, while B-47 squadrons would operate both from ZI and oversea bases; (3) each B-36

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* See p. 4.

** The Air Force eliminated the B-36/Rascal squadrons in June 1955, 16 months after the command released its concept.

squadron would consist of 10 aircraft and 45 missiles; and (4) each B-47 squadron would have 15 airplanes and 45 missiles.[94]

(U) AMC prepared a preliminary Rascal supply plan early in 1954--at about the same time that it released its proposed concept. This plan, just as the Matador plan, called for two supply systems--a new contractor organization and the established Air Force system.[95] The plan created the contractor support system only to supplement, not to replace, the existing Air Force organization. In May 1956 AMC adopted the system described in the preliminary plan as the Rascal support program.[96]

(U) Air Materiel Command completed a preliminary maintenance plan (dated 15 February 1954) at the same time that it finished the supply plan. The maintenance system described in the plan called for organizational, depot, and only limited field maintenance. The plan indicated that maintenance at the depot level could be performed contractually or through normal Air Force facilities.[97]

(U) In May 1956 AMC prepared an official Rascal logistic plan. This plan indicated that, generally, only two levels of maintenance would be used for peculiar items. The maintenance program outlined in the plan closely resembled the Matador system, because it, too, consisted of two phases--support of common Air Force items and support of peculiar items.[98] In the case of the Rascal, however, the plan also provided for the repair and overhaul of director aircraft. It pointed out that the director aircraft would be repaired at the same depots as conventional aircraft of the same model. It also indicated that contractor maintenance would be used for at least one year, or to the completion of OST. This, the plan stated, would enable the Air Force to evaluate contractor support and recommend either its continuance or discontinuance.[99] The logistic plan prepared by the Middletown AMA in October 1956 and the logistic plan written by the Oklahoma City AMA in 1958, in large measure, merely duplicated the maintenance system described in the earlier Headquarters AMC plan.[100]

(U) AMC originally considered a two-container system for transporting the Rascal. However, the command subsequently

realized that the factors of weight and size made the two-container method impractical.[101] The preliminary AMC supply plan indicated that a van used both as a packaging and transportation vehicle appeared to be the most advantageous method for moving the missile.[102]

(U) In the summer of 1954 SAC recommended that initial supplies of Rascal missiles be airlifted to operational units and it suggested that the B-50 airplane be used as the ferry aircraft.[103] AMC, in its logistic plan of May 1956, adopted air ferry of assembled Rascals by B-50 airplanes as the primary mode of transportation for the missile. The command also outlined an alternate and emergency transportation system. The alternate method consisted of dividing the missile into four parts, mounting the parts on skeletal supports, and carrying them in a C-124 airplane or Trailmobile van. The emergency method called for attaching an assembled missile to a director aircraft which ferried it to its destination.[104]

## The Falcon (GAR-1*)--Development of Missile Weapon Support Management

(S) The Hughes Aircraft Company manufactured the Falcon missile--a small** supersonic air-to-air guided rocket. This missile was designed for use under all-weather conditions against subsonic and supersonic bombers at altitudes from 5,000 to 50,000 feet.[105] The Air Force planned to place the missile on defense interceptor aircraft as part of their armament. While the initial AMC Falcon maintenance concept written in 1951 specified only the F-89D airplane as a carrier, the Headquarters USAF logistic concept of August 1954 expanded the number of carriers to include the F-89H, F-102, and all future ADC (Air Defense Command) interceptors.*** [106]

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* Guided Air Rocket.

** The missile's dimensions were as follows:
length - 77.8 inches
diameter - 6.4 inches
span - 20.0 inches
weight - 125 pounds

*** By January 1957 Hughes produced a total of six different Falcon models. These were the GAR-1, GAR-1D, GAR-2, GAR-2A, GAR-3, and GAR-4. The January 1957 San Bernardino AMA "Falcon Logistic Plan" listed the following airplanes as carriers: F-89J, F-89H, F-101B, F-102A, and F-106A.

(U) In the latter part of 1953 SBAMA learned that it would become the prime depot for the Falcon missile. SBAMA personnel determined that the missile, because of its complexity, would have to be depot repaired during the life of first production items. They felt that the entire missile would have to be returned to the depot whenever parts required repair.[107] However, they soon changed their minds and decided that personnel in the field could remove major components from the missile and replace them with serviceable units.[108] The Headquarters USAF logistic concept, published in August 1954, also called for field replacement of defective components.[109]

(U) In August 1954 and February 1955 SBAMA asked Headquarters AMC for permission to control all spare items and support equipment peculiar to the missile.[110] At the time, SBAMA controlled 750 of an estimated 1100 items in this category. The air materiel area informed Headquarters AMC that its concept of prime control by a depot encompassed "world-wide budgeting, funding, requirements, procurement, storage, and distribution responsibilities."[111] This type of control, SBAMA indicated, would greatly assist the AMA in providing world-wide Falcon logistic support and would simplify provisioning procedures.[112]

(U) Major General F. J. Dau, Director of Supply at Headquarters AMC, granted SBAMA the requested control authority.[113] General Dau, while he recognized that the new concept might produce difficult problems, asked SBAMA to work out all necessary plans and procedures for implementing the prime control concept.[114]

(U) On 27 and 28 April 1955 SBAMA personnel presented their plan to Headquarters AMC and were informed by General Dau that the plan was acceptable to the Headquarters.[115] The plan pointed out that, under the existing system of commodity class management, no one logistically managed end products, since managers tended to place emphasis only on those individual items for which they were responsible.[116] As a result, the plan indicated, support of tactical units was both inadequate and untimely.[117]

(U) Under the SBAMA plan the prime depot would budget, fund, initiate procurement, catalog, identify, store, distribute, and dispose of all peculiar and common spares and support equipment (test and ground handling equipment and special tools). All using

activities, regardless of location, would submit their requisitions for equipment and spares to the prime depot. The depot, in turn, would schedule and arrange for the equipment's shipment back to the using organization.[118]

(U) In the area of provisioning, according to the plan, the prime depot would organize and conduct all procurement conferences for spare parts, special tools, and test and ground handling equipment. The prime depot would send its requirements to the depot responsible for the individual items (prime commodity depot). In the case of common items only, the quantity recommended for purchase would be submitted for screening to the prime commodity depot. If procurement became necessary, the commodity class depot would initiate procurement and arrange for the delivery of items and quantities according to schedules provided by the prime depot. The commodity class depot would arrange for the delivery of items from stocks if assets on hand indicated that procurement was not necessary.[119]

(U) Other specific duties to be performed by the prime depot, according to the SBAMA plan, were (1) to compile and maintain a list of the items to be controlled by the depot, (2) to develop, furnish, and defend budget estimates in the 150 fund series (procurement of complete guided missiles) presented to Headquarters AMC, (3) to develop, furnish, and defend budget data presented to the applicable commodity class depots in the 200 fund series (major procurement other than aircraft) and 400 fund series (maintenance and operation), (4) to source code all items manufactured by the prime contractors and vendors, (5) to control the distribution of all peculiar and common support items and spares, (6) to maintain all balance and consumption reports for peculiar and common items, and (7) to process and dispose of all excess materials.[120] On 20 May 1955 Headquarters AMC informed all air materiel areas and depots that SBAMA was authorized to establish stocks, store, and distribute both peculiar and common items (irrespective of property class) used in direct support of the Falcon.[121]

(U) The SBAMA Directorate of Supply and Services immediately organized a Missile Division which began to operate on 1 July 1955. SBAMA created this new division because it

wanted an office that would be free to concentrate on Falcon supply problems. However, the division exercised no direct transportation or packaging control over the Falcon.[122]

(U) In January 1955 Headquarters AMC granted SBAMA the authority to allocate Falcon missiles. This action allowed the Missile Division to assign specific missiles according to its schedules. One of the major problems the division encountered when assigning missiles was that if often did not receive accurate programming data or program revisions. The lack of this information upset all of the division's plans and schedules. Too, the division did not receive monthly Falcon requirements prior to provisioning conferences. As a result, the division bought either too few or too many spares.[123]

(U) In September 1955 representatives from the SBAMA Missile Division, Headquarters AMC, AFPGC (Air Force Proving Ground Command), ADC, and the Hughes Aircraft Corporation met to work out detailed base supply procedures for supporting the Falcon.[124] The procedure developed at the meeting called for isolating all Falcon items located at bases in a structure called the test and support building so they would not be mixed with other stocks. All Falcon items would be identified as belonging to the weapon system. The bases would requisition all initial stocks and maintenance spares for common GSE (Ground Support Equipment) from the appropriate zonal AMA or depot. Items required for follow-on support would be requisitioned by the bases from a Falcon WSCC (Weapon System Control Center).

(U) The plan designated the SBAMA Directorate of Supply and Services as the Falcon WSCC. This center was to manage and control all Falcon supply actions. The bases would maintain separate Falcon stock record cards so that consumption and inventory data could be computed easily and quickly. The plan placed the stockage objective for major items at 30 days and maintenance spares at 360 days. The Falcon WSCC would maintain world-wide stock balance and consumption reports and would forward the reports covering common ground support equipment to the AMA or depots responsible for the various items.[125]

(U) Although never officially published by the Air Force, these procedures were used by the commands concerned when new Falcon squadrons were activated.[126] AMC and the command to which the squadron was assigned (ADC or TAC) made verbal agreements to cover the lack of official regulations.[127]

(U) Headquarters AMC, in a regulation dated 20 March 1956, listed SBAMA's responsibilities in order to clarify the AMA's position as Falcon weapon system manager and to clarify its relationship with other depots and air materiel areas.[128] The headquarters indicated that SBAMA was responsible for managing the weapon system's logistic support and for determining whether or not contractor support was in the Air Force's best interest. It indicated that some of SBAMA's specific duties were (1) to establish and maintain supply control over world-wide inventories of peculiar items and those common items required to support the Falcon effectively; (2) to compute both common and peculiar item requirements; (3) to maintain at SBAMA, the contractor's facility, or some other storage point, a complete range of items required in direct support of the weapon system; (4) to control the shipment of reparable items; (5) to compile, publish, and distribute TTE's (Tentative Tables of Equipment); and (6) to control the initial distribution of missile components maintained at base or depot level.[129]

(U) At the same time, Headquarters AMC outlined a Falcon maintenance program. This program consisted of three major points. First, it called for all organizational maintenance to be performed by the tactical units. Next, it required the units to complete all field maintenance on peculiar ground support equipment within their capabilities. Lastly, it called for contractor repair and overhaul of missile components at depot level until the Air Force could establish its own repair capability.[130]

(U) SBAMA experienced delays when initiating procurements because new shipping instructions had to be sent through other prime depots in order to obtain packaging requirements.[131] As a result, on 12 January 1956 SBAMA asked Headquarters AMC for authority to control the packaging of all items used to support the Falcon.[132] On 10 February 1956 Headquarters AMC granted SBAMA the authority to approve peculiar item packaging and

packaging requirements. Two weeks later, on 28 February, the headquarters granted SBAMA the same control over common item packaging.[133]

(U) SBAMA originally shipped Falcon missiles, support items, and spare parts direct from the production line to using activities. This agreed with the Air Force "factory-to-user" concept of distribution. However, in March 1956 SBAMA signed a contract which authorized the prime contractor to distribute Falcon items.[134] A number of factors led SBAMA to take this step. First, 80 per cent of the items that came off the production line were used by the contractor operated repair facility. Second, SBAMA had to find an intermediate storage point since continuous program changes made it impossible for the AMA to ship items direct from the production line. Third, studies completed by Hughes indicated that the Air Force could save money on forms and paper work if items were shipped from the contractor operated depot. However, SBAMA retained control over the receipt and distribution of all items stored and shipped by the contractor.[135]

(U) On 28 June 1957 Headquarters AMC realigned the weapon system responsibilities of the air materiel areas. As a result of the headquarters realignment, responsibility for the GAR family of missiles was moved from SBAMA to the Middletown AMA.[136] In place of the GAR family, SBAMA became responsible for ballistic missile weapon systems. After June 1957 Headquarters AMC continued to assign all new models of the Falcon missile to MAAMA.[137]

## IV. BALLISTIC MISSILE LOGISTICS

(S) By 1954 the United States had developed hydrogen bombs high in yield, low in weight, and small enough for missile airframes. These advances in nuclear warhead development made ballistic missiles practical. A successful Russian hydrogen bomb test, completed in mid-August 1953, made their development not only desirable but necessary. As a result, on 21 June 1954 the Air Force gave the development of an intercontinental ballistic missile (ICBM) a number one priority.* [1] In September 1955 the President approved a National Security Council recommendation that the ICBM project receive a number one national priority. [2]

(S) Funds expended by the Air Force probably best portray the acceleration in missile programs that followed. In Fiscal Year 1955 the Air Force released 298.5 million dollars for the procurement of missiles and missile ground support equipment. It raised this figure to 586.4 million dollars in Fiscal Year 1956, and to 1,392 billion dollars the following year. [3] The Fiscal Year 1957 figure represented an expenditure of more than twice the amount released the preceding year and more than four times the amount expended two years earlier.**

(C) On 1 July 1954, a few weeks after the Air Force tagged the ICBM development project with a number one priority, the Air Research and Development Command (ARDC) activated its Western Development Division (WDD). This division became responsible for managing the ballistic missile development

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* The Air Force titled this development program "Project Atlas."

** General E. W. Rawlings, AMC Commander, in a speech made at Salt Lake City, Utah, on 29 March 1958, described the rise in missile expenditures as follows: "Since 1953 our job has been increasingly influenced by the advent of missiles. In Fiscal Year 1953, about 2 cents of every defense procurement dollar was spent for missiles. In Fiscal Year 1959 that figure will be up to 24 cents of every defense dollar, and still rising."

program and for formulating all initial operational, logistic, and training concepts.[4] A few weeks after ARDC activated its western division, AMC created an aircraft project office (on 15 August 1954) as its west coast ballistic missile component.* [5]

## The Logistic Plan

(S) Both WDD and AMC employed the RAND Corporation to assist in developing ballistic missile concepts. In March 1956 personnel from RAND, WDD, Headquarters USAF, and BMO discussed possible approaches which could be used to support ballistic missiles during their initial operational phase. The BMO representatives recommended the creation of a new support system based on the advanced procedures service tested one by one by AMC on various guided missiles during the last few years.[6] They pointed out that, while AMC could not apply all of the procedures to any of the older weapon systems, the advent of ballistic missiles offered an excellent opportunity for using all of the procedures at one time. ARDC agreed, and asked the BMO to refine the concepts so they could be placed in ballistic missile logistics plans.[7]

(S) The ICBM logistic plan, published by AMC in November 1956, incorporated nothing revolutionary nor extraordinary. The command had tried almost all parts of the program on other weapon systems in its attempts to modernize Air Force logistics. The plan was based on maximum use of electronic data processing equipment, minimum stock levels, minimum pipeline time, direct support from source-to-user, minimum administration at the operational level, and optimum use of contractor maintenance.[8]

(S) Ballistic missiles, however, presented some peculiar implications. First, the operational units required reliable and swift support. Manned aircraft could be launched and could

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* The Special Aircraft Project Office (SAPO) became the Ballistic Missiles Office (BMO) in March 1956 and the Ballistic Missiles Center (BMC) in September 1958. For a detailed description of the organization, duties and responsibilities of these units, see the BMC histories in Headquarters AMC Historical Archives.

complete missions when some components of the weapon system were out of commission, but a failure in any critical part of a ballistic missile's ground equipment prevented the missile from leaving the ground. Too, the failure of an airborne component prevented the missile from successfully completing its mission. It was impossible for units to recall a ballistic missile, once airborne, because of component malfunction. Limited numbers of available missiles and the 15-minute reaction capability demanded that all operational units possess enough properly functioning air and ground equipment to assure successful missions.[9]

(S) Air Force compression of ballistic missile development and test programs produced a second peculiar requirement which called for new measures. The normal development pattern usually took from 8 to 12 years and consisted of (1) a research and development period, (2) an Operational Suitability Test (OST) period, and (3) a final period of varying lengths during which the Air Force made its decision on whether or not to produce for inventory.[10] Under this system the Air Force gathered rather extensive logistics data on how to support the weapon during the development and OST phases. The Air Force changed this time honored system for ballistic missiles to get weapons into the inventory within a shorter period of time. The system the Air Force adopted for ballistic missiles consisted of a research and development phase closely followed by an Initial Operational Capability (IOC) phase.[11] This IOC phase, while really a part of the research and development program, exhibited the same characteristics as the operational phase. It also marked the start of the operational build-up. The logistics system selected to support the weapon had to be created at the start of IOC and had to remain, essentially, the same throughout the IOC and operational phases.[12]

(S) A third factor that made ballistic missiles rather unique was the fact that these missiles required a much higher percentage of extremely complex ground support equipment than manned aircraft. As a result, the cost of providing and supporting the necessary ground equipment, in some cases, equaled the cost of the missile. Cost reduction, an extremely important item in the light of budgetary limits, required the Air Force to develop effective requirements determination techniques and the use of relatively new procurement and production concepts.[13]

(S) One procurement technique the Air Force used consisted of purchasing only a minimum number of parts until designs became firm.[14] This prevented the accumulation of large stocks of obsolete items. A second Air Force procurement technique was referred to as the Delayed Procurement Concept. This concept, while differing slightly in method, was designed to serve almost the same purpose as the first plan. It required the Air Force to delay the procurement of any high cost spares as long as possible. This delay not only allowed programs to become firm and prevented the accumulation of excess stocks, but also allowed the Air Force to accumulate a maximum amount of spares usage data. This type of data allowed the Air Force to determine more accurately how many of the high cost spares would be required.[15]

(S) The Air Force also adopted two relatively new ballistic missile production plans. One of these called for the start of IOC production while missiles were still in the development and test phases.[16] As these phases progressed, manufacturers gradually increased their productive capacity. This considerably shortened the time normally following the testing period required for the fabrication of production tooling. At the same time, ground equipment, subsystem, and component manufacturers aligned their production programs with airframe production.[17] This provided the Air Force with a third method for preventing the accumulation of large stocks of obsolete items. The second plan was sometimes referred to as the Responsive Production Concept. It consisted of two parts--(1) buying a portion of spares in unfabricated, unassembled form; and (2) holding this materiel at contractor's plants as buffer stock.[18] Use of this plan considerably reduced the lead time required for the production of spares.

(S) The deployment pattern of ballistic missile units also created a rather unique situation. A number of factors dictated that ballistic missile units be scattered across the United States

and separated from each other.* This separation from other organizations produced within each unit a tendency to accumulate stocks for a possible "rainy day."[19] Procuring enough initial spares to support each individual unit and providing each unit with additional spares to replace obsolete parts required unlimited funds. Only by creating a support system which guaranteed both adequate and timely support could AMC prevent stock hoarding and unnecessary duplication. AMC, to meet the requirements of speed and adequacy, created a logistic system which used source-to-user support and airlift to cut supply pipelines, mobile maintenance teams and contractor maintenance to speed repairs, and electronic data processing to speed resupply actions.[20]

## How the System Worked

(S) The ballistic missile logistic system worked something like this. Missile units, satellited on host bases, received normal housekeeping support from the base. After initial issues, all items required for day-to-day operations were sent direct to the units by the weapon system manager. These were the items needed for missile launch and flight. Under the system, the Air Force held the weapon system managers and not the units accountable for these items.[21] Weapon system managers, on the basis of periodic emergency and routine reports, automatically supplied the units. Electronic computing equipment

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* The SAC preliminary operational plan for the Atlas (dated 15 May 1958) indicated that the following factors were of primary importance in site evaluation:

(1) Economic Investment
  (a) Manpower
  (b) Available facilities
  (c) Available Air Force installations for support centers
(2) Operational Considerations
  (a) Vulnerability
  (b) Target coverage
  (c) Climatic conditions
(3) Technical Considerations
  (a) Terrain features
  (b) Geological formations to support massive construction
(4) Community Support

made resupply automatic since it provided the weapon system manager with all necessary information on each unit's needs. As a result, units did not have to submit formal requisitions through channels to obtain their operational supplies.[22]

(S) Each unit performed only such maintenance which could be completed with available skills, facilities, and spares. Items requiring maintenance beyond unit capability were sent to appropriate contractors or depots for repair and return to stock. The weapon system manager, when it became impossible to forward items for repair, sent maintenance teams to the units. Within the United States, the Air Force used Logair to transport components to and from squadrons and the depot support agencies. The Air Force also used airlift to transport the weapons.[23]

(S) The weapon system managers monitored and controlled all supply assets required in direct support of the weapons. These assets included all peculiar items furnished by airframe and associate contractors, standard Air Force items necessary for successful mission completion, and other items critical to missile and ground equipment operation. AMC determined which of these critical items would be used most often and stored a small supply in Weapon System Storage Sites (WSSS) which were managed and controlled by the weapon system managers. Placing such items in a WSSS made them available immediately and allowed the weapon system managers to exercise greater control over their movement. Each operational unit maintained a 10-day supply of these fast moving items while the WSSS stocked a 45-day supply. When operational units required a part, it was airlifted from the WSSS to the host base. At the base, personnel transferred the items from the aircraft to the vehicles selected to carry the supplies to the unit. No need existed for these items to pass through the host base stock record accounts. Common and standard items not normally stocked in storage sites were airlifted from the appropriate AMA or depot, wherever located in the AMC system, to the host base.[24]

(S) A fully integrated electronic data processing system, along with a communications system (transceiver network), linked the weapon system manager, the operating units, the

WSSS, and the applicable contractors. The Electronic Data Processing Center allowed the weapon system manager to control all assets in the system and to know the exact location of each part at all times.[25]

## A New Possible Approach to Missile Support

(U) The Logistics Plans Division of the Headquarters AMC Directorate of Plans and Programs completed a study in October 1957 which dealt with the problem of providing support at missile sites. This study listed two possible methods for supporting missile units. The first method called for the establishment of an AMC Annex within a complex of sites to administer the logistic requirements of the area. The study recommended this type of support for those missiles small in number but high in cost. Second, it suggested that those missiles both high in cost and required in large numbers be supported by roving logistic teams. It indicated that the Logistic Support Manager (LSM)* responsible for the missile would manage the support system and furnish all necessary equipment and personnel.[26]

(U) While the study only pointed out that the roving teams it envisioned would be similar to the ones used by AMC to support the Strategic and Tactical Air Commands, it discussed the stationary annex plan in detail. The annex plan pointed out that the establishment of a maintenance shop at the annex was an absolute necessity. Too, it contained a general guide for determining whether an item should or should not be repaired at the annex. This guide called for the repair of items in the field if (1) the cost of repair fell below 65 per cent of the item's original cost, or (2) the item was considered in critical short supply, or (3) tooling and facilities were available at the annex. The plan called for the activation of a non-permanent contractor repair team only to accomplish those engineering changes which were over and above AMC capability.[27]

(U) That portion of the annex plan dealing with supply pointed out that the supply organization would support both

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* For a detailed discussion of LSM's and LSM responsibilities, see pp. 60-61.

missile sites and maintenance shops. It indicated that the supply unit would maintain all area missile records and would operate and maintain the annex's transceiver station.[28]

(U) The plan's transportation section consisted, basically, of five main points. First, helicopters designed to carry personnel would be used to transport people from the annex to any missile site requiring service. Second, helicopters designed to carry cargo would be used to furnish supplies to the sites when normal methods would take too long. Third, vans fitted to serve as portable supply and maintenance shops would be used on a regularly scheduled basis to service the sites. Fourth, trucks or helicopters would be used to move vans equipped to calibrate equipment from site to site. Finally, air transportation (preferably C-124 airplanes) should be available from the annex to the depot or contractor's facility.[29]

(U) Headquarters AMC sent the BMO a copy of its study and asked for comments. The BMO replied that, while the study indicated that it discussed economical methods of maintaining new missiles, it actually examined "the ways in which the alternate methods of providing support would work."[30] The BMO pointed out, on the one hand, that SAC opposed the idea of establishing a support center or annex, but, on the other hand, indicated that SAC might consider their use if they proved feasible. The BMO concluded its analysis of the study as follows:[31]

> In summation, we feel that the study leans more toward a discussion of the current approach being taken in the ICBM/IRBM program than to indicate a new course of action to be followed, such a course of action being based on a balance between the factors of economy and effectiveness. We feel that the actual merit of having a roving team-type of support versus an "on-site" facility-type AMC capability will be demonstrated as a result of actions now underway in the ballistic missiles program.

## The Thor (SM-75) in England--Testing the Support System

(S) The establishment of Thor bases in the United Kingdom became possible as a result of agreements signed by representatives of the two governments in February and June 1958.[32] Under the terms of the agreements, the United States consented to furnish all missiles and necessary special equipment, spare parts for five years operation, modification kits, and to train Royal Air Force (RAF) personnel. The United Kingdom, on the other hand, promised to furnish all necessary land and prepared sites, supporting facilities (including utilities and fixed installations), common ground support equipment, and some technical items. While the RAF controlled and manned the four squadrons, the USAF controlled all warheads.* The governments agreed that missiles would be launched only by mutual consent.[33]

(S) The Air Force, anticipating the successful signing of both agreements, held a Thor logistics conference in London, England, at the end of January 1958. Personnel at this meeting agreed that point-to-point airlift would be used to the greatest extent possible for equipping the initial squadron at Feltwell.** They also agreed that the RAF station at Lakenheath, England, would become the air head for Feltwell bound items. The planning dates used by the conferees for full deployment of the four squadrons were Feltwell, December 1958; Hemswell, June 1959; Great Driffield, October 1959; and Dishforth, March 1960.[34]

(U) A few days after the meeting, the BMO, Air Force Ballistic Missile Division (AFBMD), and SAC-MIKE agreed

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* While the February agreement indicated that the USAF would man and command the first squadron until RAF crews could be trained, the June agreement stated that the RAF would man and command all four squadrons from their inception.

** The Air Force units represented at the conference were Headquarters USAF, Headquarters AMC, Headquarters SAC, Headquarters 3rd Air Force, Headquarters 7th Air Division, Headquarters AMFEA (Air Materiel Force, European Area), and Headquarters CAMAE (Central Air Materiel Area, Europe).

to establish a joint liaison office in England following the same organizational structure as that used at Inglewood.* Each component comprising the Ballistic Missiles European Task Office (BMETO), the name assigned the joint liaison office, reported to its parent command. AMC activated its component, the Ballistic Missile Managers European Field Office (EFO), on 20 April 1958.[35]

Problem Areas

(S) Thor supplies began to flow into the United Kingdom in April 1958, and the first missile arrived four months later.[36] As summer progressed into fall, however, a number of problems appeared which delayed completion of the first squadron. Some of these problems were (1) delays in equipment and spares shipments, (2) lack of blueprints and drawings, and (3) large numbers of necessary equipment modifications.[37]

(S) To some extent different causes accounted for each of the problems. However, there was one cause which helped create all of the problems. This was the Air Force attempt to establish an operational capability in the field before the completion of research and development. Directly related to this was the change made in operational dates for the first squadron from June 1959 to December 1958. These causes, in great measure, led to equipment shortages and delays in spares shipments. Manufacturers, as a result of program compression, had not even designed some of the equipment to be used with the operational missile. In addition, they could not meet the production deadlines imposed by the new schedules. Other causes, such as the diversionary effects of other missile projects along with transportation and handling problems, also contributed to the shortages and delays.[38]

(S) While the governmental agreements required the first squadron to be fully deployed by 31 December 1958,

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* These three units formed the ballistic missile complex at Inglewood, California, and represented AMC, ARDC, and SAC. SAC-MIKE was the name Headquarters SAC assigned to its office at the complex.

only 1,728 line items of an estimated 14,000 were on hand in the United Kingdom at the end of the first week in December.[39] The situation immediately improved, for, by the middle of the following month, 40 per cent of all scheduled spares had arrived. However, not until the end of June did spares shipments match schedules.[40] The improvement in the spares situation resulted, in great part, from the actions agreed upon at an Air Force-contractor meeting called by the Ballistic Missile Manager (BMM) and held at the California ballistic missile complex. These actions were (1) identification of those items that would not be available on target dates, (2) substitution of higher assemblies for those lower components not available, (3) diversion of items from installation and checkout (I&C), or research and development production, and (4) closer monitoring of the program by the Air Force.[41]

(S) Equipment modification was another serious problem in the United Kingdom as a direct result of program compression. The 7th Air Division* reported that, by the end of January 1959, the number of modifications required on airborne equipment reached 195, while ground equipment modifications totalled 925.[42] Of the 1,120 total, only 222 were completed by the end of January 1959, and the situation promised to become much worse before it improved. A 7th Air Division description of the situation reported:[43]

> Estimates presented by Douglas on 4 March 1959 concerning the scope of modifications to be accomplished after squadron turnover indicated that the number of man-hours required per position would approximate 13,000, with one or more emplacements to be closed down for a total period estimated at 46 workdays. It would therefore take nine to ten months to complete the first squadron. This program was considered unrealistic not only in view

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* SAC's 7th Air Division, located in England, served as "quarterback" for the Air Force Thor deployment team. It was responsible for supervising and monitoring the project to insure its successful and timely conclusion.

of the manhour requirements but because it would cause too many missiles to be non-operational at any one time. Preliminary study was begun on the matter with a view to eliminating all modifications non-essential to an operational or maintenance capability. While no immediate solution was in sight, this question necessarily began to receive considerable attention in the spring of 1959.

(S) Item identification, or the arrival of equipment in the United Kingdom without proper blueprints and drawings, also caused serious problems for a short time. Two things accounted for this lack of proper documentation. First, program compression did not allow contractors sufficient time to prepare proper documents; and, secondly, contractors feared that the release of drawings would compromise proprietary information. This problem became somewhat acute in the ballistic missiles program, because of the many contractors, sub-contractors, and vendors involved. Not until the Air Force assured these manufacturers that proprietary information would be protected did they withdraw all reservations about the release of drawings and blueprints.[44] On 4 March 1959 the Air Force formally transferred and the RAF accepted the first series of Thor materiel.[45]

[redacted]

## V. AMC MANAGEMENT AND LOGISTIC POLICIES

### Organizing for Ballistic Missiles

(C) At the same time that the Air Force elevated Project Atlas* to its number one priority program on 21 June 1954, it made the Air Research and Development Command (ARDC) responsible for completing the project.[1] Headquarters USAF directed ARDC to establish a west coast field office to manage and control the development program.[2] This included the development of ground support equipment and operational, logistic, and personnel concepts. ARDC complied with the Headquarters USAF request on 1 July when it activated the Western Development Division (WDD). Six weeks later, on 15 August 1954, AMC created the Special Aircraft Project Office (SAPO) as its ballistic missile office on the west coast.[3]

(U) Headquarters AMC authorized the special project office to perform, within limits, all elements of the command's procurement functions. This included the authority to issue letter contracts, approve definitive contracts below $350,000, appoint contracting officers, make determinations in support of contracts, determine contractor financial resources and production capabilities, authorize sole procurements, approve requests for normal progress payments, sign purchase requests, and issue stop-work orders.[4] In addition, the headquarters authorized SAPO to represent the command in weapons phasing groups and in the areas of spare parts provisioning, and production administration.[5] On all of these matters SAPO reported to the headquarters Director of Procurement and Production and served as an extension of that office.

(U) The SAPO Chief also served as the AMC Commander's special assistant for ballistic missiles; and, as a special assistant, reported directly to the Commander. However, the Commander did not authorize SAPO to perform the full range of

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* The name the Air Force assigned to its long range ballistic missile development program.



[redacted]

AMC logistic functions. He limited SAPO's actions in this area to identifying those items which required command support and to notifying the appropriate headquarters staff agency as promptly as possible.[6]

The Gillette Report

(S) The long range or inter-continental ballistic missile (ICBM) development project moved from a top-priority Air Force program to the number one national project in September 1955. At the same time, the Deputy Secretary of Defense asked the Secretary of the Air Force to recommend actions or administrative changes which would help accelerate the program.[7] Assistant Secretary of the Air Force (Research and Development) Trevor Gardner, anticipating such a request, established a working group just a few days earlier.[8] This group, later called the Gillette Committee, studied the related problems of administrative changes and program acceleration. The committee completed its work late in October 1955 and sent its recommendations to Secretary of Defense Wilson. On 8 November Secretary Wilson approved those recommendations which concerned his office and, at the same time, assigned the development of a land based intermediate range ballistic missile (IRBM) to the Air Force.[9] As a result of the new assignment, the Air Force revised its plan. Air Force Secretary Quarles approved the revised plan on 14 November 1955 and asked the Chief of Staff to issue all necessary directives.[10] General Thomas D. White, Vice Chief of Staff, issued these directives on 18 November 1955.[11]

(S) The Gillette Report recommended that both the Secretary of Defense and Secretary of the Air Force establish new committees for handling ballistic missile matters.[12] It suggested that each committee serve as the single program review and approval authority at its level. In addition, it suggested that the committee established within the Office of the Secretary of Defense (OSD) serve as the Air Force Secretary's single point of contact at that level. The Gillette Report also recommended that the Chief of Staff take the following actions: (1) place the Office of the Assistant Chief of Staff for Guided Missiles in charge of the ballistic missile program within Headquarters USAF; (2) delegate to the ARDC Commander the responsibility for creating an initial ballistic missile operational capability

"in the closest harmony with AMC, SAC, ATC and other commands concerned"; and (3) extend ARDC responsibility to include all steps necessary for establishing an early ballistic missile operational capability.[13] The report indicated that it considered the preparation and submission of development plans--consisting of individual operational, logistic, training, and facilities plans--as one of these steps. It also called for the establishment of ballistic missile offices in each of the air commands directly concerned with the development of an operational ballistic missile.[14]

Creation of the Ballistic Missiles Office (BMO)

(U) On 15 March 1956 AMC, following the Gillette Report recommendations, expanded its west coast project office into the Ballistic Missiles Office.[15] As a result of the changes, the BMO Chief (Brigadier General Ben I. Funk) reported to the Headquarters AMC Director of Procurement and Production as the Deputy Director for Ballistic Missiles. However, the change did not alter the BMO Chief's status as the AMC Commander's special assistant. At the same time that it created the BMO, Headquarters AMC authorized it to perform the full range of the command's logistic functions. All of the BMO's actions in this area, however, were to be coordinated with the headquarters directorate and staff offices, the depots, and the air materiel areas.[16] In November 1956 the AMC Commander appointed the BMO Chief the AMC ballistic missile weapon system manager.[17] Both the WDD Commander and the BMO staff recommended this appointment during the preceding months.[18]

Development of Logistic Support Management (LSM)

(U) Starting in 1952, Headquarters AMC decentralized many procurement, supply, and maintenance functions to its air materiel areas and depots. At the same time, the Air Force started to make greater use of the weapon system approach. Under this system, the Air Force placed responsibility for the development of all parts of a new weapon in the hands of the prime or airframe contractor.* As a result, AMC began to slant its support

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* For a fuller discussion of weapon systems, see pp. 9-11.

of weapons around a single manager for each weapon system. This, in turn, led to a system where one air materiel area supported all of the weapon systems produced by the same prime contractor.

(U) In May 1955 AMC began to refer to those air materiel areas assigned prime responsibilities for an aircraft, missile, drone, or engine as Lead Air Materiel Areas (LAMA).[19] Headquarters AMC assigned a LAMA prime responsibility for a weapon as soon as the Air Force selected the contractor. Normally, a headquarters Weapon System Project Office (WSPO) retained executive management control of the weapon system during the development and early production stages. It usually transferred this control to a LAMA when the weapon system became an in-service model. At this point, the LAMA really began to perform its support duties. Prior to the transfer of management responsibility, the LAMA was represented in the WSPO only through membership in the Weapon System Phasing Group. However, it did serve as the AMC point of contact for the using commands and for industry on such matters as ground support equipment requirements, types of maintenance, and logistic support plans.[20]

Creating the LSM

(U) Because AMC kept the development of missiles under close scrutiny, it decided in June 1957 to re-examine its logistic policies in order to determine their applicability to the new weapons. The command felt this examination necessary since it developed these policies during the manned aircraft era. After studying the problem, the command concluded that it did not have to revise its policy of maintaining an "in-house" support capability for first line weapons.[21] At the same time, AMC designated individual air materiel areas as managers for specific missile groups or families. This changed the old system of managing according to prime contractor. The command based its new assignments on the ability of the air materiel area to provide "in-house" support from available resources.[22] The new assignments Headquarters AMC made were as follows:[23]

| Missile Family | Air Materiel Area |
|---|---|
| Guided Air Rocket (GAR) | Middletown |
| Guided Air Missile (GAM) | Oklahoma City |
| Tactical Missile (TM) | Warner Robins |
| Interceptor Missile (IM) | Ogden |
| Cruise Strategic Missile (SM) | Ogden |
| Ballistic Strategic Missile (SM) | San Bernardino |

(U) Three air materiel areas (San Antonio, Mobile, and Sacramento) did not receive missile assignments. General E. W. Rawlings, the AMC Commander, indicated that these materiel areas received no missile assignments because manned aircraft still formed the Air Force's first line of defense and the command had to reserve certain AMA's for their repair and overhaul.[24] General Rawlings pointed out that these materiel areas would receive missile assignments as more missiles replaced manned aircraft in the Air Force inventory.[25]

(U) Headquarters AMC, when it assigned the weapon families, informed the air materiel areas that they were responsible for insuring complete support of the weapon package for its inventory life.[26] It designated the air materiel area commander assigned a missile family as the Logistic Support Manager (LSM) for that family.[27] Each LSM became responsible for supporting its weapons throughout the world.

Clarifying Management Responsibilities

(U) AMC, in November 1957, was still trying to determine exactly what impact missiles would have on the Air Force logistics system. The command realized that, because of missiles, Air Force requirements for facilities, personnel, reaction time, and data processing would, in the near future, undergo significant changes. It listed such factors as differences in operational requirements and practices between manned aircraft and missiles as causing these changes in Air Force requirements. Of primary concern to the command at the time were the organizational changes it would have to make in order to meet the missile challenge successfully.[28]

(U) On 19 March 1958 Headquarters AMC, to clarify LSM responsibilities, forwarded a logistic support policy letter to

all air materiel areas and depots.[29] This policy letter pointed out that the LSM's duties consisted of (1) planning, forecasting, and computing requirements for all materiel and services, both peculiar and common, required for the direct support of assigned weapons; (2) budgeting, funding, supplying, and maintaining all peculiar materiel and services; (3) determining whether depot level support would be provided "in-house" or by contract; (4) procuring peculiar materiel and services, subject to Headquarters AMC approval; and (5) training personnel to perform all support functions.[30] It indicated that AMC normally established, with Headquarters USAF approval, all initial specialized "in-house" maintenance facilities at the air materiel area designated as the LSM. The letter pointed out, however, that, at times, the command might consider it more prudent to use depot or AMA facilities other than those located at the LSM.[31] When this occurred, the depot or air materiel area performing work for an LSM other than itself served as a subcontractor to the LSM. An LSM subcontracted work to other depots or air materiel areas only with the approval of Headquarters AMC.[32]

(U) Air Materiel Area Reorganization. From June through September 1958 AMC worked on various proposals for reorganizing the air materiel areas in order to separate their world-wide logistic support responsibilities from their depot industrial operations. The subject of air materiel area reorganization along these lines was discussed within Headquarters AMC on two occasions: (1) when the command received control of the oversea depots, and (2) when the command began to phase out these depots. This reorganization, headquarters felt, would allow the AMA Commanders to devote more time to their world-wide logistic support responsibilities.[33]

(U) General E. W. Rawlings, the AMC Commander, decided on 28 May 1958 to establish a board of General Officers to study the air materiel area reorganization problem. This board* met for

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* The board members were Major General E. W. Anderson, the San Bernardino AMA Commander; Major General A. V. P. Anderson, the Warner Robins AMA Commander; Major General G. E. Price, the Sacramento AMA Commander; Major General T. C. Odom, the San Antonio AMA Commander; and Major General P. E. Ruestow, the Headquarters AMC Director of Personnel and Support Operations.

two days during the second week of June and concluded that AMA reorganization was timely, desirable, and feasible.[34] It recommended a two-phase reorganization: (1) an immediate partial change, (2) a more complete eventual change.[35] One member of the board, Major General A. V. P. Anderson, did not agree with the recommendations. General Anderson felt that the command should implement no reorganization at the time because of the disruptive impact it would have on personnel. He also felt that the resulting improvements did not justify this disruption, and that the quality of logistic support granted customers would be drastically cut as a result of the change.[36]

(U) A Headquarters AMC working group grappled with the AMA reorganization problem for two weeks and came up with a plan on 2 July 1958.[37] This plan, sent to the command's field units for comment, gave birth to a range of answers which varied from wholehearted acceptance to definite refusal.[38] However, five of the units did agree that weapon system management should be separated from depot operations.[39] On 30 July the Board of General Officers rejected the working group's reorganization plan, but, at the same time, recommended that each air materiel area and depot establish a Directorate of Logistics Support Management.[40] Discussion of the problem continued within AMC. At an Executive Control Meeting (ECM) held on 30 September the AMC Commander decided to go ahead and agreed to establish the new directorate on 1 January 1959.[41] This new directorate became the central point of contact for all world-wide logistic matters within the air materiel areas and depots.

(U) Missile Maintenance Policy. The Director of Maintenance Engineering, Office of the Deputy Chief of Staff, Materiel, attempted to clarify missile maintenance policy in a letter, dated 15 May 1958, sent to all major commands.[42] This Headquarters USAF policy stated that the using commands were responsible for all organizational level maintenance. It announced that this maintenance included preflights, periodic inspections, routine site servicing, preventive maintenance, and the removal and replacement of specified components. It limited using command field level maintenance to such things as missile assembly, major periodic inspections, technical order compliance, and the repair of components and parts. To clarify what it meant by the repair of components and parts, the policy pointed out that using

commands could perform field maintenance on these items only if the repairs (1) were practical and did not affect the weapon's reliability; (2) did not require the creation of large stocks of peculiar hi-value items; and (3) did not require special skills, facilities, tools, and test fixtures above the number normally assigned to a unit.[43]

(U) Headquarters USAF, to standardize organizational and field maintenance, directed AMC to develop, by missile type, a master list of the items which could be repaired by using commands. It made AMC and the prime contractors responsible for the major repair, overhaul, and modification of sub-systems and major assemblies. However, it indicated that AMC would manage all depot level maintenance programs, whether performed by contractors or the Air Force.[44]

(U) In October 1958, five months after Headquarters USAF announced its missile maintenance policy, Headquarters AMC prepared a paper to clarify the command's position on depot maintenance. Air Force headquarters approved the paper and cleared it for insertion into the USAF Materiel Guide.[45]

(U) The first part of the AMC paper contained some of the command's ideas on the factors which shaped Air Force logistics. These were:[46]

a. Air Force weapons systems are undergoing rapid technological improvement. The decision to produce in quantity for the AF inventory must usually be delayed until testing has proven the worth of the weapon system and its proper role in the arsenal of defense.

b. Mass production of air weapons is no longer necessary; fewer can deliver tremendous destructive power.

c. First line tactical weapon systems are deployed around the world and are on a constant alert as a deterrent force.

d. Strategic planning indicated a short decisive period in global war. The logistic impact is that the decisive period will be won with the force which is in being and operationally ready at that moment.

e. Logistic support systems must match the weapon systems in aspects of speed and precision. Operational readiness of the air fleet is adversely affected by a logistic system which cannot provide positive, accurate, and timely support.

f. Management of the AF (AMC) logistic support is an inherent military responsibility and cannot be redelegated.

g. The Air Force and the Department of Defense have determined the need for and provided an Air Force (AMC) repair establishment responsive to military needs.

(U) The paper emphasized that the Air Force must establish an "in-house" capability for total management of maintenance engineering programs. It also emphasized that the Air Force must always possess the capacity to direct, approve, and control its programs to assure their continuous support. It pointed out that the Air Force could use a single repair source or a balanced combination of four sources--Air Force depots, commercial manufacturing facilities, commercial maintenance facilities, other governmental agencies--to perform necessary maintenance or modifications. It referred to this balanced combination as the "best mix." In addition, the paper disclosed that AMC considered a number of factors before determining what single or combination of sources to use. These factors were (1) the timing and required degree of support, (2) military requirements and their impact on national security, (3) nature of the weapon's mission, (4) military significance of the program, (5) the weapon's programmed inventory strength, (6) projected first and second line life of the weapon, (7) relative reliability and availability of contract and depot support under

emergency conditions, (8) depot and contractor resources, (9) contract and depot facility requirements, (10) stability of the weapon's configuration, and (11) overall contractor and depot costs.[47]

(U) The paper described the framework within which a support program would operate in the event the Air Force decided to use interim contractor support for peculiar items. It emphasized that contractor developed programs would use, to the greatest extent possible, available skills, equipment, and resources. It also announced that contractors would not generally be provided permanent maintenance facilities or equipment. While the paper did not completely rule out this type of support, it indicated that, all things being equal, the Air Force preferred to have permanent facilities constructed at government installations rather than on private property.[48]

(U) The October 1958 AMC Policy Letters. During October 1958 Headquarters AMC again attempted to clarify its policies and management procedures. On 24 October Lieutenant General W. F. McKee, the AMC Vice Commander, sent a letter to the command's field units. The purposes of General McKee's letter were:[49]

a. To restate basic AMC logistic support concepts and policies.

b. To realign certain responsibilities among the command's managerial and operating activities.

c. To delineate the relationships among and between these activities in the execution of these concepts and policies.

(U) The letter announced that each air materiel area and depot possessed three essential responsibilities. These were first, worldwide management of weapon systems or commodity classes; second, operation of industrial facilities such as maintenance shops and supply warehouses; and third, command of assigned personnel, units, and installations. In addition, the Vice Commander's letter described the command's procedure for supporting weapon systems. During the development and

early production phases, the AMC, BMC, Aeronautical Systems Center (ASC),* or Rome Air Materiel Area Commander managed the system. This management responsibility shifted to the air materiel area or depot commander designated the LSM when the weapon system became operational.** The LSM, in turn, supported the weapon system for the remainder of its inventory life.[50]

(U) General McKee's letter also pointed out that since commodity class managers (CCM) served as subcontractors to the

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* AMC General Order #97, dated 15 September 1958, both created this organization and changed the Ballistic Missiles Office into the Ballistic Missiles Center. The general order outlined the ASC's responsibilities as follows:

> This activity is responsible for the acquisition and delivery of Aeronautical Weapons and Support Systems and will manage the operational activities pertinent to Procurement, Production, Supply, Maintenance, to attain integration of Air Force effort during the development and production phases in the field of Aeronautical Weapons and Support Systems.

** The letter described management responsibility as follows:

> Management responsibility includes the planning, organizing, coordinating, controlling, and directing of those operations necessary to accomplish the assigned mission, in this instance the logistic support of the USAF upon the basis of assigned weapon support systems or commodity classes of materiel.
>
> The objective of management is unified, economic, and coordinated effort, oriented in this instance toward the provision of logistic support to the combat commands. Management responsibility at the AMA/AFD level, therefore, also includes the resolution of problems encountered in providing that logistic support to combat commands.

LSM's they must be responsive to their needs. It explained that commodity class managers were the air materiel area or depot commanders who managed individual items or related groups of items (property classes). When economically feasible, Headquarters AMC assigned commodity management responsibility for items peculiar to a weapon or support system to the responsible LSM. The letter described the CCM as the "major internal management element within AMC."[51]

(U) Although the Vice Commander's letter listed five appendices, it contained only one. This appendix was devoted to supply and contained, basically, the same information as a letter signed by Major General F. J. Dau, the Headquarters AMC Director of Supply, and sent to the field three days earlier.[52]

(U) General Dau's 21 October letter outlined the command's future policy for assigning commodity class management responsibility in the areas of supply and maintenance engineering. It indicated, just as did the 24 October letter, that the policy's general objective was to streamline the support system. To accomplish this, it placed commodity class management responsibility for a weapon system's peculiar items with the LSM for the system. General Dau's letter listed the areas of responsibility for management groups such as LSM's, CCM's, Engine Managers (EM), Nuclear Ordnance Commodity Managers (NOCM), and Armament System Managers (ASM). In addition, it outlined the procedures for changing from the old to the new system.[53]

(U) General E. W. Rawlings, the AMC Commander, discussed the command's future development in a brochure, dated 27 February 1959, and sent to the Chief of Staff.[54] General Rawlings pointed out that the Air Force possessed, in AMC, the necessary logistic organization to effectively support a global combat force. He further indicated that the LSM served as the command's key element in providing this effective support. General Rawlings expressed this as follows:[55]

> The Air Materiel Command is dedicated to the proposition that the most effective support can be furnished to all combat forces by placing each combat unit commander in direct contact with a single

individual within the logistic system whose sole duty is the solution of support problems associated with the command's specific type and model of weapon system. We call this individual a Logistic Support Manager. His responsibility recognizes no barrier of time or distance. He is available around-the-clock to meet the logistic requirements of his specified customers. We are constantly trying to provide him with the most advanced tools of his trade in the fields of logistic communication, data processing and transportation. He is empowered to furnish materiel support and services directly to his customers in accordance with exactly the same priorities that they, as combat units, are accorded in force structure precedences.

One of the most important attitudes we can adopt towards improving both the effectiveness and efficiency of these Logistic Support Managers is an unwavering determination to support them with an integrated, military-operated logistic structure of appropriate capability.

(U) Air Materiel Command Regulation (AMCR) #400-1. Headquarters AMC, in November 1959, again realigned its logistic management responsibilities and attempted to clarify procedures through publication of regulation #400-1. This regulation (1) consolidated information published earlier (it replaced 15 Headquarters AMC letters), (2) introduced some new factors into the command's management structure, (3) changed the name of Commodity Class Managers to Inventory Managers (IM's), and (4) changed the name of the air materiel area and depot Directorate of Logistic Support Management (D/LSM) to the Directorate of Materiel Management (D/MM). It also described the responsibilities and duties of the various management elements in the system and explained their relationships. In addition, AMCR #400-1 outlined the ground rules for assigning Specialized Repair Activity (SRA) functions to air materiel areas and depots.[56]

(U) The regulation established a support system which consisted, basically, of weapon system management and item management. It referred to the management of weapon or support systems as Logistic Support Management and to item management as Inventory Management. It assigned items to the air materiel areas and depots according to (1) Federal Supply Groups (FSG's) or Federal Supply Classes (FSC's), (2) special groups or designations, and (3) Materiel Aggregation Codes (MAC's). The IM air materiel area or depot rather than the LSM became the contact point for the worldwide users of those items for which it was responsible. In those cases where an air materiel area or depot served both as the LSM for a weapon system and the IM for related items, the regulation required that the IM functions be separated from the LSM functions.[57]

(U) AMCR #400-1 contained six attachments. These attachments listed the AMA's assigned Logistic Support Manager responsibilities for various weapons or support systems, and the command's Inventory Manager assignments for aircraft, missiles, engines, and the Materiel Aggregation Codes.[58]

## NOTES, CHAPTER I

1. Ltr., Mr. George P. Baker, Co-Dir. for Mil. Projs., Graduate School of Bus. Admin., Harvard Univ., to Dr. Francis H. Clauser, Chairman of the AF Steering Comm., Harvard Log. Study Gp., Pentagon, Washington, D. C., 29 Sept. 1952, in "Summary Rpt., A Prog. for AF Log." [This letter served as the transmittal letter for the group's final report.]

2. Mob. Anal. Center, Harvard Univ., "Summary Rpt., A Prog. for AF Log." [hereinafter cited as "Summary Rpt."], Oct. 1952, p. 2, in AMC Hist. Archives.

3. Ibid., pp. 3-5.

4. Ibid., p. 3.

5. Ibid., p. 3.

6. "Presentation of the Spares Study Gp. on the Latest Devels. in and Present Status of the Spares Study," at Hq. AMC, 10 Nov. 1952, Doc. 9.

7. Memo. for Under Secy. AF, 31 Dec. 1952, subj.: Airc. Spares Study, Doc. 12.

8. Ibid.; Memo. for Under Secy. AF, 9 Jan. 1953, subj.: Recommendation for Changes in AF Org. and Procedures, Doc. 13.

9. "Presentation of the Spares Study Gp. on the Latest Devels. in and Present Status of the Spares Study," 10 Nov. 1952, Doc. 9.

10. Ibid.

11. Ibid.

12. Ltr., Maj. Gen. F. J. Dau, Vice Chairman, Spares Study Gp., to D/S&S, Hq. USAF, 29 Dec. 1954, Doc. 38.

13. Ibid.

14. Memo. for Under Secy. AF, 9 Jan. 1953, Doc. 13.

15. Ibid.

16. Dorothy L. Miller, "Hist. of Sup. of Overseas Air Forces, 1947-1954," p. 41, in AMC Hist. Archives.

17. Ibid., pp. 5, 43.

18. Presentation, "Logistics for 1956," by Col. C. C. Andrews, Plans Div., Hq. AMC, Doc. 8. [Colonel Andrews made this presentation during a tour of depots in July and August 1952.]

19. "Final Rpt., Proj. Red Head," 19 Jan. 1953, p. 8, in AMC Hist. Archives.

20. Ltr., Brig. Gen. John K. Gerhart, Dep. Dir. of Ops., DC/S, O, Hq. USAF, to Maj. Gen. George Mundy, Dir., Proj. Red Head, 26 June 1952, subj.: Proj. Red Head, in "Final Rpt., Proj. Red Head."

21. Proj. Dir.'s Presentation to AF Council in "Final Rpt., Proj. Red Head," 19 Jan. 1953.

22. "Final Rpt., Proj. Red Head," 19 Jan. 1953, pp. 3-4.

23. Ibid.

24. Ibid., pp. 4-5.

25. Ltr., Maj. Gen. J. H. Hicks, Comdr., 73d ADW, to Maj. Gen. Mundy, D/S&S, Hq. USAF, 29 Nov. 1952, in Annex E, "Final Rpt., Proj. Red Head."

26. Ltr., Brig. Gen. J. C. A. Denniston, Actg. Asst. C/S, USAFE, to Maj. Gen. Mundy, Dir., Proj. Red Head, 25 Nov. 1952, in Annex E, "Final Rpt., Proj. Red Head."

27. Ibid.

28. "Summary Rpt.," Oct. 1952, p. 3.

29. "Final Rpt., Proj. Red Head," 19 Jan. 1953, p. 5.

30. "Hist. and Progress Rpt., Proj. ALPP," 30 Sept. 1953, p. 1, in AMC Hist. Archives.

31. Presentation, "Proj. Sun Kist," circa June 1953, Doc. 16.

32. Ibid.

## NOTES, CHAPTER II

1. Dorothy L. Miller, "Hist. of Sup. of Overseas Air Forces, 1947-1954," p. 101, in AMC Hist. Archives.

2. Mob. Anal. Center, Harvard Univ., "Summary Rpt.," Oct. 1952, p. 3, in AMC Hist. Archives.

3. Presentation, "Logistics for 1956," by Col. C. C. Andrews, Plans Div., Hq. AMC; "A Statement of AF Long Range Log. Objectives," prep. by Asst. for Log. Plans, DC/S, M, Hq. USAF, circa Aug. 1953, Docs. 8, 19.

4. "Presentation of the Spares Study Gp. of the Latest Devels. in and Present Status of the Spares Study," at Hq. AMC, 10 Nov. 1952, Doc. 9.

5. Ibid.

6. "Final Rpt., Proj. Red Head," 19 Jan. 1953, p. 8, in AMC Hist. Archives.

7. Robert M. Kipp, "Hist. of the AMC Contract Airlift System (Logair), 1954-1955," p. 13, in AMC Hist. Archives.

8. Miller, "Hist. of Sup. of Overseas Air Forces, 1947-1954," p. 105.

9. Ibid., p. 106.

10. Ibid., p. 106.

11. Ibid., p. 107.

12. Ibid., p. 107.

13. Kipp, "Hist. of the AMC Contract Airlift System (Logair), 1954-1955," p. 16.

14. RAND, "AF Log. - Some Recent Devels.," 3 May 1956, p. 10, in Ops. Anal. Office, Hq. AMC.

15. Ibid., p. 11.

16. Ibid., p. 11.

17. Ibid., p. 13.

18. "Summary Rpt.," Oct. 1952, pp. 3-5; Memo. for Under Secy. AF, 9 Jan. 1953, Doc. 13.

19. "A Statement of AF Long Range Log. Objectives," circa Aug. 1953, Doc. 19.

20. Speech, "Weapon System Concept," by Maj. Gen. D. H. Baker, D/P&P, Hq. AMC, 26 Jan. 1955, Doc. 40.

21. Ibid.

22. Ibid.

23. Ibid.

24. Ibid.

25. Ibid.

26. "Hist. of AMC, 1 July--31 Dec. 1955," pp. 108-109.

27. Miller, "Hist. of Sup. of Overseas Air Forces, 1947-1954," p. 47.

28. "Hist. of AMC, 1 July--31 Dec. 1955," p. 121.

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## GLOSSARY

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|---|---|
| AAC | Alaskan Air Command |
| Actg. | Acting |
| ADC | Air Defense Command |
| Add. | Addendum |
| Admin. | Administration, Administrative |
| ADW | Air Depot Wing |
| AF | Air Force |
| AFA | Air Force Association |
| AFBMD | Air Force Ballistic Missile Division |
| AFD | Air Force Depot |
| Airc. | Aircraft |
| ALAMADEP | All Air Materiel Areas and Depots |
| ALPP | Advanced Logistic Planning Project |
| AMA | Air Materiel Area |
| AMC | Air Materiel Command |
| AMCL | Air Materiel Command Letter |
| AMCR | Air Materiel Command Regulation |
| AMFEA | Air Materiel Force, European Area |
| Anal. | Analysis |
| APGC | Air Proving Ground Command |
| App. | Appendix |
| ARDC | Air Research and Development Command |
| Arm. | Armament |
| ASC | Aeronautical Systems Center |
| ASM | Armament System Manager |
| Asst. | Assistant |
| ATC | Air Training Command |
| AU | Air University |
| AWC | Air War College |
| Bd. | Board |
| BMC | Ballistic Missiles Center |
| BMETO | Ballistic Missiles European Task Office |
| BMM | Ballistic Missile Manager |
| BMO | Ballistic Missiles Office |
| Bomb. | Bombardment |
| Br. | Branch |
| Bus. | Business |

| | |
|---|---|
| CAMAE | Central Air Materiel Area, Europe |
| CCM | Commodity Class Manager |
| CG | Commanding General |
| Char. | Characteristics |
| Com. | Command |
| Comdr(s). | Commander(s) |
| Comm. | Committee |
| Conf. | Conference |
| C/S | Chief of Staff |
| DAFD | Dayton Air Force Depot |
| DC/S, C | Deputy Chief of Staff, Comptroller |
| DC/S, M | Deputy Chief of Staff, Materiel |
| DC/S, O | Deputy Chief of Staff, Operations |
| Dep. | Deputy |
| Devel(s). | Development(s) |
| DF | Disposition Form |
| Dir. | Director, Directorate |
| Div. | Division |
| D/LSM | Directorate of Logistic Support Management |
| D/ME | Director, Directorate of Maintenance Engineering |
| D/MM | Directorate of Materiel Management |
| Doc(s). | Document(s) |
| D/Plans & Progs. | Director, Directorate of Plans and Programs |
| D/P&P | Director, Directorate of Procurement and Production |
| D/P&SO | Director, Directorate of Personnel and Support Operations |
| D/S | Director, Directorate of Supply |
| D/S&S | Director, Directorate of Supply and Services |
| ECM | Executive Control Meeting |
| ed. | edition |
| EFO | European Field Office |
| Elect. | Electronics |
| EM | Engine Manager |
| FSC | Federal Supply Class |
| FSG | Federal Supply Group |
| GAM | Guided Air Missile |
| GAR | Guided Air Rocket |

| | |
|---|---|
| Gp. | Group |
| GSE | Ground Support Equipment |
| Hist. | History, Historical |
| Hq. | Headquarters |
| ICBM | Intercontinental Ballistic Missile |
| IM | Interceptor Missile, Inventory Manager |
| Incl. | Inclosure |
| Ind. | Indorsement |
| IOC | Initial Operational Capability |
| IRBM | Intermediate Range Ballistic Missile |
| JMTC | Joint Military Transportation Committee |
| LAMA | Lead Air Materiel Area |
| Log. | Logistic(s) |
| LSM | Logistic Support Manager |
| Ltr. | Letter |
| MAAMA | Middletown Air Materiel Area |
| MAC | Materiel Aggregation Codes |
| MAFD | Memphis Air Force Depot |
| Maint. | Maintenance |
| Mat. | Materiel |
| MATS | Military Air Transport Service |
| Memo. | Memorandum |
| Mgmt. | Management |
| Mil. | Military |
| Min. | Minutes |
| MOAMA | Mobile Air Materiel Area |
| Mob. | Mobilization |
| Msg. | Message |
| Mtg. | Meeting |
| NEAC | Northeast Air Command |
| No. | Number |
| NOCM | Nuclear Ordnance Commodity Manager |
| OCAMA | Oklahoma City Air Materiel Area |
| OOAMA | Ogden Air Materiel Area |
| Opl. | Operational |
| Ops. | Operations |

| | |
|---|---|
| Org. | Organization |
| OST | Operational Suitability Test |
| p. (pp.) | page(s) |
| Partic. | Participation |
| Plan. | Planning |
| Prelim. | Preliminary |
| prep. | prepared |
| Proc. | Procurement |
| Prog(s). | Program(s), Programming |
| Proj(s). | Project(s) |
| RAF | Royal Air Force |
| RAFD | Rome Air Force Depot |
| RAND | Research and Development Corporation |
| R&D | Research and Development |
| Reorg. | Reorganization |
| Res. | Research |
| Ret. | Retired |
| Rev. | Revised |
| Rpt(s). | Report(s) |
| SAAMA | San Antonio Air Materiel Area |
| SAC | Strategic Air Command |
| SAPO | Special Aircraft Project Office |
| SBAMA | San Bernardino Air Materiel Area |
| Sect. | Section |
| Secy. | Secretary |
| Serv. | Service |
| SM | Strategic Missile |
| SMAMA | Sacramento Air Materiel Area |
| SRA | Specialized Repair Activity |
| Std. | Standard |
| Subdiv. | Subdivision |
| subj. | subject |
| Sup. | Supply |
| TAC | Tactical Air Command |
| Tact. | Tactical |
| Tech. | Technical |
| TM | Tactical Missile |
| TTE | Tentative Table of Equipment |

| | |
|---|---|
| UK | United Kingdom |
| Univ. | University |
| UR | Unsatisfactory Report |
| USAF | United States Air Force |
| USAFE | United States Air Forces in Europe |
| VC/S | Vice Chief of Staff |
| WDD | Western Development Division |
| WRAMA | Warner Robins Air Materiel Area |
| WS | Weapon System |
| WSCC | Weapon System Control Center |
| WSPO | Weapon System Project Office |
| WSSS | Weapon System Storage Site |
| ZI | Zone of Interior |

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