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THE SPACE SYSTEMS DIVISION - BACKGROUND

(October 1957-June 1962)

History of the Space Systems Division  
January-June 1962

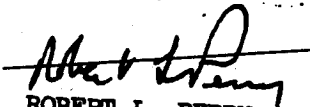
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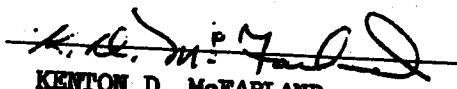
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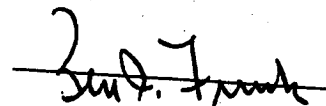
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TABLE OF CONTENTS  
VOLUME I

	<u>Page</u>
FOREWORD .....	vii
CHRONOLOGY.....	viii
CHAPTER 1	
ESTABLISHMENT OF WESTERN DEVELOPMENT DIVISION...	1
Notes .....	6
CHAPTER 2	
MISSION AND PROGRAMS.....	7
Discoverer .....	12
Midas.....	14
Samos .....	16
Anti-Satellite Systems.....	19
Launch Vehicles.....	23
Communication Satellites.....	32
Nuclear Effects Detection .....	34
Space Biomedicine .....	36
Man-In-Space .....	38
Nuclear Auxiliary Power.....	39
Ballistic Missile Defense.....	41
Lunar Projects .....	42
Support of Space Operations .....	44
Notes .....	51
CHAPTER 3	
ORGANIZATION TO MEET THE TASK.....	62
1959 Reorganization .....	69
Space Comes of Age .....	77
Notes .....	91

	<u>Page</u>
<b>APPENDIX</b>	
<b>ORGANIZATION CHARTS</b>	
1 April 1958 . . . . .	95
15 January 1959 . . . . .	96
1 October 1960 . . . . .	97
1 July 1961 . . . . .	98
1 July 1962 . . . . .	99
<b>GLOSSARY OF ABBREVIATIONS . . . . .</b>	<b>100</b>
<b>INDEX . . . . .</b>	<b>103</b>
<b>LIST OF ILLUSTRATIONS</b>	
<b>FRONTISPIECE . . . . .</b>	<b>vi</b>
<b>LIST OF DEVELOPMENT PROGRAMS . . . . .</b>	<b>48</b>
<b>TABLE OF FUNDS ALLOCATED TO AIR FORCE SPACE PROGRAMS . . . . .</b>	<b>50</b>
<b>AFBMD ORGANIZATION, NOVEMBER 1959 . . . . .</b>	<b>75</b>
<b>MAP OF BALLISTIC MISSILE AND SPACE DEVELOPMENT COMPLEX . . . . .</b>	<b>82</b>



**Gen B. A. Schriever**



**LtGen H. M. Estes**



**MajGen O. J. Ritland**



**MajGen B. I. Funk**

**COMMANDERS WHO DIRECTED THE EARLY BALLISTIC MISSILE AND SUBSEQUENT SPACE DEVELOPMENT ORGANIZATION LOCATED AT LOS ANGELES, CALIFORNIA, FROM 1954 - 1962. GENERAL SCHRIEVER, JULY 1954-MAY 1959. GENERAL RITLAND, MAY 1959-MAY 1962. GENERAL ESTES, MAY 1962-OCTOBER 1962. GENERAL FUNK, OCTOBER 1962--.**

## FOREWORD

One purpose of this study--a part of the first formal history of the Space Systems Division--is to trace the main currents in organizational development and mission growth which resulted in the creation of an Air Force organization exclusively concerned with military space systems.

The narrative follows the evolution of a small Western Development Division organization of 1954, initially responsible for development of a single ballistic missile system, into the substantially larger complex of 1961, which was actively engaged in developing and activating missile and space systems. The chief concern thereafter is the transition of the Air Force Ballistic Missile Division into two entities, the Ballistic Systems Division and the Space Systems Division.

The Air Force space mission was not the product of dramatic change in development emphasis or of technical "breakthroughs," but rather emerged from the evolutionary exploitation of ballistic missiles and very early military satellite programs. The space vehicle program began with modest concentration on a single military satellite, was stimulated by overwhelming public reaction to the first Soviet Sputniks in late 1957, and proliferated into a series of varied, heterogeneous programs. Despite the presence of divergent objectives which led the Air Force at one point to describe its space effort as "confused and inhibited," the Air Force systems development command tenaciously continued its attempts to acquire the facilities, specialized manpower, and program stability essential to the creation of a militarily useful competence for operations outside the earth's atmospheric envelope.

Documentary sources for this brief study were the files of the Space Systems Division historical and program offices, and project files located at Air Force headquarters in Washington, D. C. The influences, trends, and mission assignments associated with concern for an Air Force "space identity" were, of course, far more extensive and complex than those brought forward in this historical summary. For these omissions and even less excusable faults of construction and composition the author accepts full responsibility.

R. F. P.  
February 1963

## CHRONOLOGY

- 1954 Jun 21 Air Force headquarters instructs the Air Research and Development Command (ARDC) to attain an operational ballistic missile at the earliest possible date.
- Jul 15 ARDC General Order Nr. 42 provides for "Reorganization of Headquarters ARDC and Establishment of the Western Development Division," effective 1 July 1954, duty station at Inglewood, California.
- 1955
- The Air Force affirms its need for a long lived auxiliary power unit in reconnaissance satellites. The Atomic Energy Commission (AEC) begins to develop subsystems for nuclear auxiliary power to meet the need.
- Jul Western Development Division (WDD) is reorganized to include a deputy commander for plans.
- Oct 10 ARDC transfers responsibility for management of Weapon System 117L from Wright Air Development Center to WDD.
- 1956 Jan 14 Preliminary development plan covering a scientific satellite version of the 117L system is published; WDD emphasizes urgency of support requirements if the program is to succeed.
- Mar 1 Lockheed proposes to develop a capability to detect ballistic missile launchings by means of satellite-borne infrared sensors.
- Apr 2 WDD publishes a first full development plan for the 117L system, proposing a military reconnaissance satellite program which would be fully operational by July-September 1963.
- 11 ARDC submits to Air Force headquarters a proposal for development of a family of ballistic, orbital and lunar research and test vehicles.
- Jul 24 Air Force headquarters approves 117L development plan.
- Aug 28 ARDC issues System Requirement 143 for a determination of the feasibility of weapon systems to combat hostile satellites.

- ██████████
- Oct 3 WDD recommends expansion of the division's mission to include additional space projects.
- 1957 Jun 1 Western Development Division is redesignated Air Force Ballistic Missile Division (AFBMD).
- Jul AFBMD and AEC establish a joint committee to insure compatibility of nuclear power source and 117L satellite vehicles.
- Oct 4 Sputnik I
- Nov 1 Secretary of Defense (OSD) approves "in principle" acceleration of the 117L program.
- 1958 Jan 6 Lockheed proposes to accelerate the 117L program by using Thor boosters and 117L (Agena) upper stages.
- 29 AFBMD issues a contract to Lockheed covering Thor-boosted test vehicles in the basic 117L configuration.
- Feb 3 President D. D. Eisenhower directs the highest and equal national priority be accorded development of the intercontinental and intermediate-range ballistic missiles (ICBM, IRBM) and the 117L military satellite system.
- 3 Air Force headquarters reveals tentative plans to use Thor boosters to orbit instrumented satellites in support of the 117L program.
- 7 DOD Directive 5105.15 activates the Advanced Research Projects Agency (ARPA) with authority to assume responsibility for all Department of Defense (DOD) space programs during research and development phase.
- 12 AFBMD establishes a deputy commander for Military Space Systems.
- 27 ARPA assumes direction of the 117L program.
- 28 ARPA states its awareness of Air Force interest in developing a manned space flight capability.
- Mar 3 OSD approves acceleration of the 117L program, including the launch of test vehicles using the Thor booster.
- 6 ARDC commander requests AFBMD assistance in preparing a development plan for a manned satellite test system.

- [REDACTED]
- 31 AFBMD is instructed to prepare a development plan for a military space system program leading to a manned flight to the moon and return.
- Apr 7 AFBMD publishes a "Lunar Probe Program Development Plan" for a series of three moon flights scheduled in the fall of 1958.
- 25 AFBMD prepares a "USAF Manned Military Space Systems Development Plan," the first of seven such plans prepared during 1958.
- May 13 AFBMD Service Building (Bldg 11) housing cafeteria, dispensary and club, is opened.
- 22 Biomedical experiments are added as a secondary objective in from three to five of the planned Thor-boosted 117L flights.
- 28 ARPA gives the name "Sentry" to the 117L program.
- 28 AFBMD development plan for a manned space flight proposes use of an Atlas booster and Agena second stage to place a man in an 150 nautical mile orbit during October 1960.
- Jun 18 AFBMD begins to identify positions and recruit personnel for a space program.
- 19 GOR 140 establishes an Air Force requirement for a satellite tracking and control system and a satellite defense system.
- 30 ARPA advises AFBMD that the OSD had assigned full responsibility for management of the 117L development program to ARPA.
- Jul AFBMD begins preliminary arrangements to establish a special military unit equipped with C-119J aircraft and trained for aerial recovery of 117L data capsules returned from orbit.
- 1 Start of Geneva negotiations on discontinuing nuclear testing.
- 11 ARPA requests Air Force headquarters to direct ARDC to prepare an abbreviated development plan for a communications satellite.
- 29 National Aeronautics and Space Act creates National Aeronautics and Space Council and National Aeronautics and Space Administration (NASA).



- [REDACTED]
- Aug 1 6593rd Test Squadron (Special) organizes at Hickam AFB, Hawaii.
- 5 Total number of Thor-117L vehicles on order is extended from 10 to 19.
- 17 The first Able-1 lunar probe vehicle is launched from the Atlantic Missile Range (AMR). The Thor booster exploded 74 seconds after launch.
- 26 Commander ARDC informs the Air Force Vice Chief of Staff, General C. E. LeMay, that because of increased Air Force interest in military space programs he had instructed AFBMD to establish and man an organizational element for space systems development.
- Sep 10 ARPA separates Midas, the infrared attack alarm system, from the 117L program.
- Oct 11 A second lunar probe, Pioneer I, is launched from AMR. Although the payload did not reach escape velocity it set a new altitude record of 71,700 statute miles.
- 22 ARPA informs the Air Force of its plans to develop a satellite communications system. The Army is to develop the communications payload and the Air Force the booster and satellite vehicle.
- Nov 12 AFBMD is assigned responsibility to furnish the vehicle portion of the 24 hour communications satellite program.
- 17 ARPA orders design and construction of the first 117L launch complex at Point Arguello.
- Dec 4 ARPA directs Thor - Sentry launches be managed as a separate program called Discoverer.
- 9 NASA requests AFBMD to procure, modify and launch nine Atlas Series D missiles for manned "Project Mercury" program.
- 18 ARDC completes an abbreviated development plan for a Hyper-Environment Test (Blue Scout) System, Nr. 609A.
- 1959 Jan 28 ARDC assigns management of System 609A, "Blue Scout" test rocket, to AFBMD.
- 30 AFBMD issues a Midas program plan calling for an accelerated full-scale system development effort.

- [REDACTED]
- Feb 5 ARDC directs AFBMD to prepare a detailed plan for development of a solid propellant multi-stage Blue Scout vehicle to perform a wide range of space assignments.
- 20 AFBMD completes preparation of development plans for Transit and Tiros satellite systems.
- ~~28~~ ~~29~~ Discoverer I launch successfully boosts Agena satellite into a polar orbit.
- Mar 6 General C. E. LeMay, Vice Chief of Staff, states that both a 24-hour equatorial satellite and polar satellite system are essential to Air Force communications.
- Apr 6 6594th Test Wing organized at Palo Alto, California.
- 25 Major General B. A. Schriever is promoted to Lieutenant General, relieved as commander AFBMD, and assigned as commander ARDC. Brigadier General O. J. Ritland is assigned commander AFBMD.
- May 22 ARPA directs development of communications satellite system by means of a three phase program called Steer, Tackle and Decree.
- Jun 1 Operational control of the 6593rd Test Squadron (Special) is assigned to 6594th Test Wing. ARDC establishes 6594th Launch Squadron at Vandenberg AFB which is also assigned to the 6594th Test Wing.
- Jul 1 6594th Data Processing Squadron, Lowry AFB, and 6596th Instrumentation Squadron, Vandenberg AFB, are established by ARDC and assigned to the 6594th Test Wing.
- Aug 6 ARPA changes the name Sentry to Samos.
- 10 AFBMD issues a preliminary plan for a satellite interceptor and inspection (Saint) system.
- 25 President approves a high priority Samos program encompassing high resolution photography, recovery, and ferret readout to be managed "with the direction that the Air Force has used on occasion, with great success, for programs of over-riding priority."
- Sep 9 The first Project Mercury test flight vehicle, an Atlas topped by a NASA developed flight capsule, is successfully launched from AMR in a ballistic trajectory.

- [REDACTED]**
- Sep 17 Transit 1A, navigation satellite, is launched from the Atlantic Missile Range. The payload failed to achieve orbit.
- 18 ARPA directs ARDC to undertake a contractual study for evaluation of technical and operational factors associated with the detection and location of all high altitude nuclear explosions.
- 21 OSD assigns all responsibility for developing and launching all military space boosters and associated systems integration to the Air Force.
- Oct 1 6594th Instrumentation Squadron is organized at Grenier Field, Manchester, N. H., and assigned to the 6594th Test Wing.
- 1 6594th Data Processing Squadron, Lowry AFB, is redesignated the 4999th Data Processing Squadron and moved to Offutt AFB without change in parent organization.
- 6 AFBMD issues an abbreviated Vela Hotel development plan for detection and location of nuclear detonations in space.
- Nov 1 ARDC organizes 6594th Recovery Control Group, Hickam AFB, Hawaii, and the 6593rd Instrumentation Squadron, Wheeler AFB, Hawaii. The 6593rd Test Squadron (Special) is assigned to the 6594th Recovery Control Group.
- 16 AFBMD, in part of the command wide reorganization of ARDC, is reconstituted and activated as a new military organization with the same name, personnel, equipment and location.
- 16 6592nd Support Group is organized and assigned to AFBMD and the 6592nd USAF Dispensary is assigned to the 6592nd Support Group. 6594th Test Wing, Palo Alto, is reassigned from ARDC to AFBMD.
- 17 Discoverer, Samos and Midas programs are approved for transfer from ARPA to Air Force management.
- Dec 21 6555th Test Wing (Development) is organized at Air Force Missile Test Center and assigned to AFBMD.
- 23 A Ramo-Wooldridge study proposes a satellite based random barrage system as a defense against intercontinental range missiles.
- 1960 Jan Aerojet-General Corporation completes development of the Able-Star, a new second stage compatible with Atlas and Thor boosters.

**[REDACTED]**

- [REDACTED]
- Feb 12 A biomedical space capsule successfully sustains the life of a primate for 55 hours. The test included full simulation of orbital flight through re-entry and recovery.
- 26 A Midas I is launched from the Atlantic Missile Range but a staging malfunction resulted in activation of the destruct system.
- 29 The three-phased satellite communications program is cancelled in favor of a single Advent 24-hour microwave satellite system.
- Mar 11 Thor Able-4 (Pioneer V) is launched from the Atlantic Missile Range. A highly successful deep space probe revealed new and valuable scientific data and demonstrated feasibility of communications over interplanetary distances.
- Apr 1 A Tiros three stage Thor-Able with a camera equipped satellite is successfully launched from the Atlantic Missile Range. The experiment demonstrated feasibility of long range weather forecasting by satellite.
- 13 Transit 1B, second in a series of navigational satellite vehicles sponsored by ARPA, is launched from the Atlantic Missile Range and successfully placed in orbit.
- 21 Satellite Inspector Program, called Project Saint, is assigned to AFBMD.
- May 24 Midas II is launched from the Atlantic Missile Range into an almost perfect circular orbit. Malfunctions in a payload subsystem prevented collection of useful infrared data.
- 27 AFBMD publishes an abbreviated development plan for a nuclear system orbital flight test program.
- Jun 22 A Transit IIA vehicle (Thor Able-Star) successfully places a Transit navigation satellite and a smaller parasitic radiation measuring satellite, called Greb, into orbit, using an Able-Star restart second stage.
- Jul 1 NASA's Scout 1 (basically the same vehicle as the Air Force's Blue Scout), carrying vehicle instrumentation, is successfully launched on a ballistic trajectory.
- 1 The government chartered non-profit Aerospace Corporation begins replacing Space Technology Laboratories in furnishing technical staff assistance, advanced systems analysis, administrative and technical support services and general systems engineering and technical direction to Air Force space programs.

- [REDACTED]
- Aug 10 Discoverer XIII is launched from Vandenberg AFB, orbited, and successfully recovered on 11 August after 17 passes. This was the first recovery of an orbiting payload from outer space.
- 12 An Office of Vice Commander for Satellite Systems is established at AFBMD for management of the Samos project.
- 18 Discoverer XIV is launched from Vandenberg AFB. After the 17th orbit the payload ejected on command to be recovered in mid-air over the Pacific by an Air Force crew flying a C-119 "Flying Box Car."
- 26 Discoverer program is increased to a total of 41 launches.
- 26 The Air Force Ballistic Missile and Space Committee is briefed on AFBMD facility requirements and possible alternate locations which would alleviate the physical space problems existing at the Los Angeles location of the division.
- Sep 6-9 Twelve scientists from the President's Science Advisory Committee, chaired by Dr. W. K. H. Panofsky, review the Midas program and report that, in their view, the Midas concept is sound and its development should continue.
- 15 The Secretary of Defense directs transfer of administrative and technical responsibility for the Advent program to the Army.
- 21 The first Air Force Blue Scout rocket is successfully launched from the Atlantic Missile Range.
- Oct 14 The Secretary of the Air Force establishes a Directorate of the Samos Project (SAFSP) at AFBMD. The new directorate is responsible to and reports directly to the Secretary on Samos project management and is a field extension of his office.
- 20 6565th Test Wing is organized at Vandenberg AFB and assigned to AFBMD.
- 31 Air Force headquarters announces a move of the Ballistic Missile Center from Los Angeles to Norton AFB, California, on an orderly timed basis extending from November 1960 to late 1961.
- Nov 30 A Transit 3A vehicle launched from the Atlantic Missile Range is destroyed after 152 seconds of flight.

- [REDACTED]
- Dec 15 AFBMD establishes a Deputy for Program 624A (Titan III).
- 15 Secretary of the Air Force instructs all major commands that effective immediately no new internal or public information concerning Samos is to be originated by any Air Force organization.
- 15 A Vela Hotel Joint Management Team, consisting of members from AEC, NASA and ARDC, convenes at AFBMD to begin planning a high altitude satellite system for nuclear detection.
- 1961 Jan 9 Air Force headquarters urges AFBMD to continue efforts to define the need for a space payload capability between the Atlas-Centaur booster vehicle and the early Saturn.
- Mar General Thomas D. White awards the MacKay Trophy for 1960 to the 6593rd Test Squadron (Special), Hickam AFB, Hawaii, for the squadron's work in recovery of Discoverer payloads returned from orbital space flights.
- 6 OSD assigns the Air Force exclusive responsibility for the development of military space systems and vehicles, and launching operations.
- Apr 1 Effective date for establishing Air Force Systems Command, Deputy Commander for Aerospace Systems, (DCAS), Space Systems Division (SSD), and Ballistic Systems Division (BSD).
- May 1 Air Force Secretary E. M. Zuckert forwards to the Secretary of Defense a proposal for a long term national space program.
- 13 SSD offers a preliminary plan for developing high lift boosters by wrapping large solid fuel engines around a liquid rocket second stage.
- 25 President J. F. Kennedy announces that manned lunar exploration is a national space objective and that NASA would conduct the program.
- Jun 3 Aerojet-General single-segment, 100-inch diameter solid propellant motor delivers 450,000 pounds of thrust for 45 seconds.
- 5 Under Secretary of the Air Force J. V. Charyk instructs the Air Staff to prepare a solid booster program to satisfy the requirements of the Air Force and NASA.
- 20 ARPA furnishes additional funds to support the first four Discoverer-Vela Hotel piggyback flights and to pay for technical assistance from the Aerospace Corporation.
- [REDACTED]

- ██████████
- Jul 5 SSD creates a solid booster development program office.
- 12 Midas III (Atlas/Agna B) is launched into a polar orbit to furnish data readout for five passes.
- Sep 15 Director of Defense Research and Engineering (DDR&E) asks the Air Force to study potential usefulness of Titan II as a core for a standardized space launch vehicle (Titan III).
- Oct 3 Because of delays in the Centaur program and Advent management difficulties, Air Force headquarters recommends cancellation of the Advent program and the start of a new satellite communications development effort.
- 13 DDR&E authorizes the Air Force to begin early actions for development of the Titan III (modified Titan II with strap-on solid boosters).
- 20 Air Force headquarters directs SSD to begin expedited actions leading to Phase I of the Titan III program.
- 21 Midas IV is launched into an orbit which furnished payload data for 34 passes before power failure occurred.
- Nov 17 NASA, DOD, and the Air Force arrive at a mutual decision to cancel 240-inch class solid rocket motor program but, at the same time, continue state-of-the-art effort in large solid rockets.
- 18 DDR&E approves the start of Phase I of the Titan III program "subject to availability of funds."
- 30 The Ruina Committee, appointed to evaluate the Midas program, reports that early operation of the Midas system would be technically premature.
- Dec 12 SSD completes preliminary contractual arrangements for Phase I development of the Titan III program.
- 1962 Feb SSD asks Douglas Aircraft to define performance and design of a "Standard Thor", Model DSV-2C, with three strap-on solid propellant motors (Thrust-Augmented-Thor: TAT).
- Mar The Air Force and AEC Joint Working Group schedule the first orbital flight of a nuclear power unit during September 1963.
- Apr 9 Midas V is launched into orbit.

- [REDACTED]**
- Apr 17-18 Study Group on National Military Communications Satellite Systems recommends a new start on developing a single medium altitude system operational by 1965.
- 30 Space Technology Laboratories (STL) and SSD complete negotiations of a definitive cost-plus-incentive-fee contract for the Vela Hotel spacecraft.
- May 3 Designated System Management Group approves the Titan III Proposed System Package Plan.
- 23 The Secretary of Defense issues directives to the Army, Air Force and Defense Communications Agency which, in effect, cancel the Advent program and approve a new development to meet a minimum essential satellite communications system requirement.
- Jun 1 SSD and Aerospace Corporation complete a review of the ballistic boost intercept concept of an anti-missile defense weapon. They conclude that current data was insufficient to affirm or deny the plan's technical feasibility, but that its economic feasibility was highly questionable.
- Jun 25 The DDR&E restates his view that Midas "must remain an R&D program oriented toward developing techniques."
- 28 DDR&E suggests that the Air Force make several significant changes in the Titan III program including use of a modified Titan II guidance system, five segment solid motors, and an improved upper stage for 24-hour orbit.





CHAPTER 1

ESTABLISHMENT OF WESTERN DEVELOPMENT DIVISION

On 21 June 1954, Lieutenant General D. L. Putt, Air Force Deputy Chief of Staff Development, directed the commander of the Air Research and Development Command to attain ". . . an operational long-range ballistic missile at the earliest possible date." This was to be accomplished through reorientation and acceleration of an Atlas program revitalized with the highest priority of any program conducted by the Air Force. Putt further instructed the development command to "establish a field office on the west coast with a General Officer in command having authority and control over all aspects of the program." <sup>1</sup>

It was, without question, an assignment of some magnitude. The task was to include not only hardware development but a much wider mission: ". . . development of a complete weapon system including ground support and the development of recommended operational logistic and personnel concepts." It was with this assignment that Brigadier General B. A. Schriever, formerly assistant for development planning, deputy chief of staff development at Air Force headquarters, arrived at Inglewood, California, during early July 1954, with a small and highly competent staff to get the program going. <sup>2</sup> \*

From the very beginning of the new command, unusual departures in normal Air Force organization and procedures were apparent. On 29 July 1954, Lieutenant General Thomas S. Power, then head of the Air Research and Development Command, informed Schriever that, "In your assignment as Assistant to me you will occupy the status of a Deputy Commander for all matters pertaining to Project Atlas." Elsewhere in the letter, Schriever was

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\* The first facility occupied by the newly named Western Development Division was the premises of a parochial school at 409 East Manchester Boulevard in downtown Inglewood.

[REDACTED]

advised that, "In the accomplishment of your mission you will be responsible and accountable directly to me. Under my policies and such instruction as I may issue from time to time, you are authorized to issue orders direct to ARDC Commands in the name of the Commander, ARDC. . . ." In a final clarification General Power added, "The Western Development Division is not a staff agency of the Headquarters ARDC but is an operating location of the Headquarters as defined in AFR 2-27."<sup>3</sup>

Interestingly enough, the main elements of a new approach to weapon system management underway in Inglewood had their genesis some years before. In 1951, then Colonel Schriever, on the staff of the Deputy Chief of Staff, Development at headquarters Air Force, had prepared a study entitled "Combat Ready Aircraft." Although the study undoubtedly expressed the views of other forward looking officers it broke new ground in suggesting--in the context of the 1951 Air Force--a unified development effort which would have as its chief aim the compression of the weapons development time cycle. The study proposed establishment of a single management agency which would assure rapid, adequate, and suitably balanced consideration of the interests of each element involved--technical, operational-procurement-funding--in developing a weapon system. Management was to be ". . . continuously effective during development, procurement, test and operational use." It was apparent that adoption of such an organizational concept was intended to greatly enhance the rapid delivery of combat weapons to the Air Force.<sup>4</sup>

In the following three years Schriever had the opportunity to develop and mature his ideas on effective management of weapon system development programs and the most significant element of management, to which he later applied the descriptive and single word "concurrency." This was more precisely defined in the weapon system acquisition process as a ". . . shortening of lead time from weapon concept to operational availability (lead time was becoming greater as systems increased in complexity) by conducting all critical elements of the development, test, and procurement process simultaneously."<sup>5</sup> In any event, the application of this principle became one of the chief management characteristics of the ballistic missile development program.

[REDACTED]

Increasing impetus for strong new direction in this undertaking was furnished, not surprisingly, by groups of scientists enlisted by the Air Force to provide advisory guidance on its weapons development programs. As far back as December 1952, an ad hoc committee of the Air Force Scientific Advisory Board had reviewed the Atlas program, then a glacial Project MX-1593 under the prime contractor direction of Convair.\* The committee vigorously recommended development of an intercontinental ballistic missile designed to carry an atomic warhead.<sup>6</sup> Additional recommendations contained proposals for drastic changes leading to a completely re-oriented program to assure its successful early development. Sometime later, the Armed Forces Policy Council established a Department of Defense Study Group on Guided Missiles to evaluate various missile programs of the military departments. The group's report contained the important recommendation ". . . that intercontinental ballistic missiles could best be evaluated by a special group of the nation's leading scientists."<sup>7</sup>

Thus was established in October 1953 the Air Force Strategic Missiles Evaluation Committee -- more frequently called the "Teapot" or Von Neumann Committee -- under the chairmanship of Professor John Von Neumann, Institute of Advanced Study, Princeton University.\*\* This group proposed far reaching changes in the Atlas program to assure its rapid development. In addition to prompt revision of Atlas military specifications in the light of new thermomuclear warhead technology a bold new management entity was proposed to direct the entire program, including the Convair effort. Additionally, the committee contended that, "The nature of the task for the new agency requires that over-all technical direction be in the hands of an unusually

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\* The committee was composed of C. B. Millikan (chairman), H. W. Bode, M. V. Clauser, C. S. Draper, G. B. Kistiakowsky, G. F. Metcalf, H. J. Stewart, and M. J. Zucrow.

\*\* In addition to the chairman the committee included Clark B. Millikan, Charles C. Lauritsen, Louis G. Dunn, Hendrik W. Bode, Allen E. Pucket, George B. Kistiakowsky, J. B. Wiesner, Lawrence Hyland, Simon Ramo and Dean Wooldridge.

[REDACTED]

competent group of scientists and engineers capable of making systems analyses, supervising the research phases, and completely controlling the experimental and hardware phases of the program."8

At subsequent meetings the committee continued to urge a completely revamped and accelerated missile development effort. Trevor Gardner, Special Assistant to the Secretary of the Air Force for Research and Development and one of the chief proponents of a new program for development of long range ballistic missiles, felt that ". . . the ICBM program should be aggressively pursued, and that the existing Air Force organizational set up and the present Atlas program could not achieve an ICBM capability within the time period desired. A group responsible for 'systems engineering and scientific management' was needed."9

Thus the general outlines of a management structure began to take form. The Air Materiel Command moved quickly to assign contracting personnel to the Inglewood office. Western Development Division assumed entire control of all aspects of the development program, even to the systems engineering and technical direction effort, which was contractually assigned to Ramo-Wooldridge Corporation, a newly created scientific-engineering research firm of particular competence. Moreover, as the program advanced it received the strongest support from higher managerial levels of the Air Force and Department of Defense. On 8 September 1955, the Atlas program was assigned the highest national priority. A little more than a week later, on 17 September, the Secretary of Defense directed the Secretary of the Air Force to, "Prosecute within his assigned responsibilities the ICBM research and development program with maximum energy and recommend to the Secretary of Defense such additional actions or administrative arrangements as he considers necessary . . ."10

This was, in effect, an opportunity for the Air Force to institute radically new patterns in administrative and managerial procedures. For this task, Hyde Gillette, Deputy for Budget and Program Management, Office of the Air Force Assistant Secretary, Financial Management, was appointed chairman of a special study committee to work out a genuinely streamlined management system. The group brought forward a "Gillette Committee Plan" proposing

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drastic short cuts in normal Air Force administration of its development programs. Approval by Secretary of the Air Force Donald A. Quarles followed on 21 October 1955. The Secretary of Defense acted with equal speed on 8 November stating that he ". . . approved new management procedures designed to achieve maximum acceleration. . ." of long range ballistic missile programs. 11

The crux of the new management procedures involved creation of two ballistic missile committees at Air Force and Department of Defense level. Both committees were composed of Assistant Secretaries, one chaired by the Secretary of the Air Force and the other by the Deputy Secretary of Defense (later the Department of Defense Director of Guided Missiles). The two committees were to weigh and approve, in turn, major ballistic missile development actions. Western Development Division (later re-named Air Force Ballistic Missile Division) was to prepare for their periodic review complete development plans containing funding and facilities requirements for step by step progress to an operational system. When the submitted programs received the approval of the two committees it became the responsibility of General Schriever's development division to carry them out. In the words of a subsequent reviewer, ". . . the requirement for rapid decisions which was implicit in the concurrency approach was now provided for, and all elements necessary for the effective functioning of the unique management complex were present." 12 It was perhaps the best management structure for its mission ever developed by the Air Force.

NOTES - CHAPTER 1

1. Ltr, LtGen D. L. Putt, to Cmdr, ARDC, 21 Jun 1954, subj: Project Atlas, in SSD Hist Ofc files.
2. GO No. 42, ARDC, 15 Jul 1954, in SSD Hist Ofc files.
3. Ltr, LtGen T. S. Power, Cmdr, ARDC, to BrigGen B. A. Schriever, Asst to the Cmdr, 29 Jul 1954, subj: Assignment of Authority, Responsibility and Accountability, in SSD Hist Ofc files.
4. Rpt, Combat Ready Aircraft, A Special Report Based on an Air Force Study Completed April 1951, prep by DCS/D, USAF, SSD Hist Ofc files.
5. Rpt, The Ballistic Missile Program, Evolution of a Management Thesis, 2 Mar 1962, prep by DCAS Hist Ofc, in SSD Hist Ofc files.
6. Memo, SAB to C/S, USAF, 13 Dec 1952, subj: Report of the USAF Scientific Advisory Board's Ad Hoc Committee on Project Atlas, 8-13 Dec 1952, in SSD Hist Ofc files.
7. Trevor Gardner, Spec Asst for R and D to SAF, in transmittal ltr, Recommendations of the Strategic Missiles Evaluation Committee, 16 Feb 1954, in SSD Hist Ofc file.
8. Recommendations of the Strategic Missiles Evaluation Committee, 10 Feb 1954, p 7, in SSD Hist Ofc files.
9. Rpt, Overall Ballistic Missile Program, 16 Aug 1960, Vol II, p 47, in SSD Hist Ofc files.
10. Rpt of the Atlas Scientific Advisory Committee Meeting, 20-21 July 1954 and Subsequent Actions, in SSD Hist Ofc files.
11. Memo, C. E. Wilson, SOD, to All Asst SODs, et al, 8 Nov 1955, subj: Establishment of the OSD Ballistic Missile Committee, in SSD Hist Ofc file.
12. Rpt, The Ballistic Missile Program, Evolution of a Management Thesis, 2 Mar 1962.

## CHAPTER 2

### MISSION AND PROGRAMS

Western Development Division (after June 1957, Air Force Ballistic Missile Division) rapidly augmented the dimensions of its operations to include development of additional ballistic missile weapon systems and initial efforts in the new arena of military space systems.

Briefly, these major development programs included the addition of Titan, a more advanced intercontinental ballistic missile, an intermediate range Thor ballistic missile and, most significant in terms of planning and expended resources, development of a ballistic missile initial operational capability. At about the same time (October 1955) the division acquired responsibility for developing a reconnaissance satellite system, designated Weapon System 117L, which had earlier been assigned to Wright Field. Because of Department of Defense hostility to the space flight thesis, relatively little progress was recorded in the 117L program until Sputnik I, in October 1957, forced a complete revision of national space policies. Finally, in February 1958, the division started one of its most important projects, development of an advanced "second generation" solid propellant intercontinental ballistic missile.

These varied increments and outgrowths from each were to create, by January 1962, a development program of truly monumental proportions.\* The division mission, until 1 April 1961 when the Air Force Ballistic Missile Division was divided to create the Ballistic Systems Division and the Space

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\* Aptly illustrated by a statistical study conducted February 1960. At that time the division was allocated \$2.6 billion of total Air Force fiscal year 1960 budget of \$18.5 billion. The division, on the other hand, retained only 0.3 percent of the total Air Force manpower of 833,000. This comparison would also generally hold true for fiscal years 1961 and 1962.

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Systems Division, was to "Plan, program, budget for and manage the development of all ballistic missiles, military space systems, space projects and other specifically directed programs." 1

The mission of the space division after April 1962 was not greatly different although it was possibly phrased in more formal terms and, of course, excluded any reference to ballistic missiles. It was to "... plan, program, develop, and manage space projects and systems, make timely delivery of complete operable space systems to user organizations; provide a continuous assessment of the effectiveness of weapon systems concepts and developments. . . ." and conduct applied research to insure the utmost advance in new techniques and engineering; and finally, "... collaborate with other AFSC development agencies, other services, the DOD, and civilian agencies in furnishing payload services, booster, launching, and on-orbit control services in the attainment of national space objectives." 2

As the work of the division continued there were inevitable adjustments to completed tasks and advancing technology. For example, formal development of the Thor intermediate range ballistic missile was completed on 1 January 1960; Thor engineering maintenance heretofore performed by the division was transferred to the Air Materiel Command. Similarly, by mid-1962, the SM-65 Atlas was for practical purposes a completely installed and operational system. Titan I and II, successful development completed for the former and underway for the latter, were destined soon to fulfill a vital strategic role in the nation's defense. Finally, the solid propellant Minuteman, embodying radically new technology, was moving rapidly toward operational status. 3

After 1955, and particularly after October 1957, the planning and management of space programs occupied, in division activities, an increasingly significant role. With interest and emphasis on space systems heightened by the first spectacular Soviet satellite successes, the Department of Defense, Air Force, and the National Aeronautics and Space Administration assigned additional programs to investigate spatial phenomena.