~~SECRET~~ [redacted]

1c 2227

RECEIVED
WDD ARDC
ACTION WOZ
5 MAR 1959 14 56
INFO: WOGE WDG WDGW
WOP
WDT

NFA003
RR INCL 2352
DE RJWZNF 2F
R 041736Z
FM OSD WASH DC
TO COM AFBMD LOS ANGELES
INFO COM ARDC ANDREW AFB
COM AFCRC L G HANSCOM FLD MASS
BT
~~//S E C R E T//~~DEF 955766 FROM OSDARPA SGD ROY W JOHNSON
THERE HAVE BEEN MANY QUERIES FROM AGENCIES SUCH AS UCRL /LIVERMARE/, NATL SCIENCE FOUNDATION AND NASA AS TO THE FEASIBILITY OF INCORPORATING FILM PACKS OR EMULSION BLOCKS PROVIDED BY THESE AGENCIES IN THE DISCOVERER SERIES SHOTS. THE PURPOSE IS TO OBTAIN RADIATION DATA AND NATURALLY, THE INTEREST LIES IN THE RECOVERY ASPECTS OF THE DISCOVERER.
ENGINEERING AND WEIGHT DIFFICULTIES INHERENT IN INCORPORATING ADDITIONAL ITEMS ARE RECOGNIZED. IT MAY BE, HOWEVER, THAT DATA TO BE DERVIED FROM PLANNED PAYLOADS WILL BE ADEQUATE TO SATISFY THE AGENCIES

PAGE TWO RJWZNF 2F
REQUIREMENTS OR THAT SUBSTITUTIONS COULD BE MADE ON THE BASIS OF REDUCED WEIGHT AND/OR BETTER QUALITY OR AMOUNT OF DATA TO BE OBTAINED. AS A BASIS FOR PROVIDING ANSWERS TO THESE QUERIES, IT IS REQUESTED THAT THE FOLLOWING INFORMATION BE FURNISHED TO ARPA AS SOON AS POSSIBLE CLN

A. SIZE AND WEIGHT OF INDIVIDUAL PACKS OR BLOCKS.
B. NUMBERS TO BE INCLUDED IN INDIVIDUAL SHOTS.
C. DESIGNATED SHOTS.
D. SPECIFICATIONS OF PACKS OR BLOCKS.
E. DATA TO BE OBTAINED

BT
THIS IS CAT "AC" MSG
05/0109Z MAR RJWZNF

NNNN

[redacted] CONFIDENTIAL

~~SECRET~~

MC-1-59-709
Cy #2

[redacted]

RECEIVED WDGN IC 205
WDZW WDP
WDZ
WDGE, G, GUL

C — PARAPHRASING NOT REQUIRED — COPY PRIOR TO CAPT
PORY & ENCRYPTION. PHYSICAL [illegible] INTERNAL REF.
FENCES BY DATE-TIME GROUP PRIOR TO DECLASSIFICATION.
AD UNCLASSIFIED REFERENCE IF DATE-TIME GROUP IS QUOTED.

NFA003
PP INGL2382
DE RJWZNF #F
P 2722302
FM OSD WASH DC
TO COMBR AFBMD LOS ANGELES
BT

//C O N F I D E N T I A L//DEF 955609 FROM ARPA SIGNED CLARK
REFERENCE YOUR WBXW-2-12-E OF 23 FEB 59, IN GENERAL, REPLACEMENTS AND
MODIFICATIONS OF DISCOVERER LAUNCH VEHICLES UNCLASSIFIED. GENERAL
REASONS FOR REPLACEMENTS OR MODIFICATIONS ALSO UNCLASSIFIED.
HOWEVER, USUAL DISCRETION AND GOOD JUDGMENT REQUIRED AS TO TIMING
AND FORM OF RELEASE, IF ANY, OF SUCH INFORMATION. TO AMPLIFY,
SEE PREPARED STATEMENT BY COL DEAN HESS AT PRESS LOGISTICAL
BRIEFING, LOS ANGELES PRESS CLUB, 19 FEB
BT
THIS IS AN AC MSG
26/0402Z FEB RJWZNF

NNNN

[redacted]

JOINT MESSAGE FORM

SECURITY CLASS [redacted]

SPACE BELOW RESERVED FOR COMMUNICATION CENTER

FEB 23 22 44 '59

OCL 1008

PRECEDENCE	TYPE MSG (Check)			ACCOUNTING SYMBOL	ORIG. OR REFERS TO	CLASSIFICATION OF REFERENCE
	BOOK	MULTI	SINGLE			
ACTION PRIORITY		X		AF	DEF 955243	Confi
INFO PRIORITY						

FROM: COMDR AFOSR, LOS ANGELES, CALIF

SPECIAL INSTRUCTIONS

TO: DIRECTOR, ARPA, WASHINGTON , D. C.

INFO: COMD USAF, WASH, DC

DOWNGRADED AT 3 YEAR INTERVALS; DECLASSIFIED AFTER 12 YEARS. DOD DIR 5200.10

Ltr Msg DEF 955609 27 Feb 59

CONFIDENTIAL FROM WDZM 2-12-E FOR AFOSR HQ USAF. REFERENCE MESSAGE DEF 955243, AFBMD INTERPOSES NO OBJECTIONS TO THE PROCEDURES OUTLINED IN REFERENCED TWX. IT IS SUGGESTED THAT ADDITIONAL INSTRUCTIONS BE ISSUED TO CLARIFY THAT PORTION OF YOUR MESSAGE WHICH STATES IN GENERAL QUOTE NO REPEAT NO ATTEMPT WILL BE MADE TO CONCEAL UNCLASSIFIED REPLACEMENTS OR MODIFICATIONS AND PRE-LAUNCH PRESS BRIEFINGS WILL PROVIDE ACCEPTABLE OFF THE RECORD INFORMATION ON SUCH CHANGES WHILE RETAINING THE NUMERICAL DESIGNATIONS OF THE LAUNCH IN ACCORDANCE WITH THE CRITERIA STATED ABOVE. UNQUOTE. THIS POSES A PROBLEM AS TO WHAT IS MEANT BY UNCLASSIFIED REPLACEMENTS OR MODIFICATIONS. FOR INSTANCE IS IT ARPA'S INTERPRETATION THAT THE REPLACEMENT OF THOR 160-VEHICLE 1019 BY THOR 163-VEHICLE 1022 IS CLASSIFIED OR UNCLASSIFIED? IF SUCH REPLACEMENT IS CONSIDERED UNCLASSIFIED, WHAT IS THE CLASSIFICATION OF THE INCIDENT WHICH RESULTED IN THE REPLACEMENT.

DATE	TIME
20	
MONTH	YEAR
FEB	1959

WRITER

SYMBOL: WDZM

TYPED NAME AND TITLE (Signature, if required): HARRY L. EVANS, Colonel, USAF/ce

PHONE 1822 | PAGE NR. 1 | NR. OF PAGES 1

SECURITY CLA [redacted]

RELEASER

SIGNATURE

TYPED (or stamped) NAME AND TITLE
HARRY L. EVANS
Colonel, USAF
Director for MS 117L

DD FORM 1 MAY 55 173 REPLACES DD FORM 173, 1 OCT 49, WHICH WILL BE USED UNTIL EXHAUSTED

RECEIVED
WDD ARDC
WDG

"AC—PARAPHRASING NOT REQUIRED EXCEPT PRIOR TO DATE 20 FEB 1959 09 35

WDGE
WDG
WDGV

IL-1755

[redacted]

FA004
P INCL 2352
E RJWZNF 6F
1922442
W OFFICE OF SECRETARY OF DEFENSE WASHINGTON DC
Q COMMANDER AFBMD LOS ANGELES CALIFORNIA
EN/COMMANDER PACMISRAN PT MUGU
EN/AFCCH WASHINGTON DC
NFO ZEN/SECRETARY OF NAVY WASHINGTON DC
EN/SECRETARY OF AIR FORCE WASHINGTON DC
EN/SECRETARY OF DEFENSE WASHINGTON DC
EN/BAFIS WASHINGTON DC

C O N F I D E N T I A L// CITE DEF 955243. FROM ARPA SIGNED JOHNSON.
N ORDER TO TAKE ALL REASONABLE PRECUATIONS TO PREVENT ADVERSE PUB-
LICITY ON THE DISCOVERER PROJECT, IT IS NECESSARY TO INSURE THAT OFFICIAL
EPORTING PROCEDURES, INSOFAR AS PRACTICABLE, ACCOMMODATE THE PUBLIC
NFORMATION ASPECTS OF THE PROJECT.
T THE PRESENT TIME, PROJECT CHANNELS ARE REFERRING TO THE PLANNED FEB-
RUARY 25 LAUNCH AS DISCOVERER II WHILE PUBLIC INFORMATION CHANNELS PLAN
O IDENTIFY IT AS DISCOVERER I. AS THE DISCOVERER SERIES PROGRESSES, THE
UMERICAL DISCREPANCY MAY WIDEN AND LEAD TO OTHERWISE UNPUBLICIZED DIF-
ICULTIES IN THE PROGRAM. SUCH PUBLICITY IS NOT IN THE NATIONAL INTEREST.

[redacted]

AGE TWO RJWZNF 6F
T IS THEREFORE REQUESTED THAT BOTH OFFICIAL AND PUBLIC INFORMATION
UMERICAL SEQUENCE DESIGNATIONS BE IDENTICAL. THE FOLLOWING IS SUG-
ESTED AS A MEANS FOR ACHIEVING THIS OBJECTIVE CLN

1. PUBLIC INFORMATION NUMERICAL DESIGNATIONS WILL BE BASED UPON THE
EQUENCE OF ACTUAL FIRINGS REPORTED BY THE PRESS. THESE FIRINGS WILL,
ASED UPON PAST PRESS REPORTING EXPERIENCE, NORMALLY FALL WITHIN THE
IMITS FOR "OPEN" LAUNCHINGS, OF FAILURE AT LIFT-OFF AND COMPLETE SUC-
ESS. THEREFORE, AN INTERRUPTION ON COUNTDOWN AND POSTPONEMENT OF A
AUNCH, EVEN FOR REPLACEMENT OR MODIFICATION OF VEHICLE COMPONENTS, WILL
OT RPT NOT CHANGE THE PUBLIC INFORMATION NUMERICAL DESIGNATION. IN
ENERAL, NO RPT NO ATTEMPT WILL BE MADE TO CONCEAL UNCLASSIFIED RE-
LACEMENTS OR MODIFICATIONS AND PRE-LAUNCH PRESS BRIEFINGS WILL PRO-
IDE ACCEPTABLE OFF-THE-RECORD INFORMATION ON SUCH CHANGES, WHILE RE-
AINING THE NUMERICAL DESIGNATION OF THE LAUNCH IN ACCORDANCE WITH THE
RITERIA STATED ABOVE. THIS WILL APPLY TO THE 25 FEBRUARY LAUNCH IN
ARTICULAR.

4. TO MAINTAIN THE ANONIMITY OF VEHICLES IN OFFICIAL REPORTS WHILE ACCOMMODATING THE PUBLIC INFORMATION PROBLEM, A CURRENT MASTER LIST OF PROGRAM FLIGHTS TOGETHER WITH ASSOCIATED BOOSTER SERIAL /INSOFAR AS AVAILABLE/ AND VEHICLE NUMBERS WILL BE PROVIDED TO ARPA AND AGENCIES

[redacted]TIAL

AND OFFICES OF PRIMARY CONCERN, FOR EXAMPLE, FLIGHT NUMBER I-THOR 160-VEHICLE 1019, FLIGHT NUMBER II-THOR 163-VEHICLE 1022, ETC. THESE MASTER LISTS WILL BE KEPT CURRENT AT ALL TIMES AND BOOSTER SERIALS ADDED AS THEY BECOME KNOWN. ALL REPORTING TRANSMISSIONS PERTAINING TO THE 28 FEB FLIGHT WILL BE DESIGNATED DISCOVERER I-163-1022. THIS, USED IN CONJUNCTION WITH THE MASTER LIST, WILL INDICATE TO THE RECIPIENT THAT THIS WAS THE SCHEDULED SECOND LAUNCHING VEHICLE. IF THE SECOND LAUNCH ATTEMPT RESULTS IN COMPONENT REVISION WITHOUT A FIRING REPORTED BY THE PRESS DISCOVERER I WILL BE USED AGAIN IN CONJUNCTION WITH THE MASTER LIST AND VEHICLE NUMBERS DESIGNATED, AS APPROPRIATE, FOR THE THIRD FLIGHT. THIS PROCEDURE WILL APPLY TO AL SUBSEQUENT LAUNCHINGS.
IF THESE PROCEDURES OUTLINED POSE UNACCEPTABLE PROBLEMS TO OFFICIAL REPORTING CHANNELS, COMMENTS AND SUGGESTIONS SHOULD BE FORWARDED TO THE DIRECTOR, ARPA, BY 1200 EST, 24 FEBRUARY 1959. UNLESS SUCH COMMENTS RESULT IN A FOLLOW-UP ARPA DIRECTIVE TO BE ISSUED BY 1800 EST, 24 FEBRUARY THIS DIRECTIVE WILL BE PROMPTLY DISSEMINATED TO APPROPRIATE PROJECT AND PUBLIC INFORMATION OFFICES FOR INFORMATION AND STRICT COMPLIANCE.
BT
THIS IS CAT AC MSG
20/0435Z FEB RJWZNF

[redacted]

[redacted]

WDSW

FEB 16 1959

MEMORANDUM FOR COLONEL CURTIS

SUBJECT: Report of Investigation of Missile Test Mishap DISCOVERER Vehicle 1019

1. I have reviewed the subject report and concur in the conclusions and recommendations arrived at therein.

2. I have, by separate action, copy attached, requested Mr. L. Eugene Root, LMSD, to initiate certain of the indicated remedial action.

3. You are directed to implement recommendation No. 6 of paragraph E, page 29 of the report in that you are to establish a qualified Air Force Survey Team to investigate the drawing practices and procedures at LMSD for acceptable conformance with Air Force standards. In this regard you are authorized to make use, on a temporary basis, of highly qualified personnel from within all portions of AFBMD after coordination with the concerned Deputy Commander.

SIGNED

1 Incl.
Cy Ltr to
Mr. Root, LMSD

B. A. SCHRIEVER
Major General, USAF
Commander

WDSW 13 Feb 59 dl
Col Oder 1822

[redacted]

[redacted] CONFIDENTIAL

16 FEB 1959

Mr. L. Eugene Root
Vice President & General Manager
Lockheed Aircraft Corporation
Missiles and Space Division
3251 Hanover Street
Palo Alto, California

Dear Mr. Root:

This letter is written in confirmation of certain of the items discussed at our meeting in my office on 16 February 1959.

I have inclosed the conclusions and recommendations of the Missile Test Mishap Investigating Committee established to investigate the mishap associated with the attempted launch of DISCOVERER Vehicle 1019 on 21 January 1959.

During their investigation the Committee reviewed the report of the WS-117L Management Survey Team which convened at LMSD, Palo Alto, California, on 25 August 1958, in light of the circumstances surrounding the missile mishap. Pertinent points on which action appears to be incomplete or ineffective at this time are outlined in the following quotations from the 23 September 1958 report to the Commander, AFBMD, by the Survey Team.

a. (paragraph 22h, Survey Team Report) "Perhaps the outstanding deficiency noted by the team is the general lack of established procedures and controls designed to coordinate the efforts of a large and expanding organization and to insure timely recognition of potential trouble spots in order that remedial action may be taken. Far too many procedures are unwritten and decisions of great importance are being made at low levels with little, if any, management review."

see inclosed file for reply by [illegible]

[redacted] CONFIDENTIAL

[redacted]

b. (paragraphs 21b(2) and 21b(5), Survey Team Report) "Strong management attention must be devoted to the establishment of policies and procedures, which will achieve better scheduling and control, and sharpen the sensitivity at all management levels to progress and potential trouble spots. This should include the following areas:

. . . . .

"(2) Change control of vehicle and GSE.

. . . . .

"(5) Internal Audit program, to test existing systems and procedures and to determine the need for new or revised systems and procedures."

It is requested that your organization initiate without delay the following remedial action in the interest of the effective accomplishment of the DEMOWIRER Program.

a. Effect those steps necessary to the accomplishment of recommendations 1 through 5 of Inclosure 2. With reference to Item 6 of Inclosure 2, I will, by separate action, establish a qualified Air Force Survey Team to investigate the drawing practices and procedures at LMSD for acceptable conformance with Air Force standards.

b. Continue your efforts to meet the needs indicated in the Management Survey Report of 23 September 1958, particularly those portions cited above.

ORIGINAL SIGNED:
B. A. SCHRIEVER

2 Encls.
1. Conclusions
2. Recommendations

B. A. SCHRIEVER
Major General, USAF
Commander

WDZW dl(13 Feb [redacted]
Col Oder 1822

[redacted]

[redacted]

1. The incident on RECOVERER Vehicle 1019 occurred when ground power was applied (at T-60 during the countdown) to start the hydraulic pump for engine gimballing. As a result of a hard-wire connection between the ullage rocket and hydraulic pump circuits, the ullage rocket circuitry was activated and the rockets fired. The heat from the ullage rockets fused wires in a J-box and started the "D" timer. The "D" timer, then, as designed for flight, fired the pin-pullers, retro rockets, explosive separation bolts, and the horizon scanner ejection mechanism.

2. The wiring that caused the premature firing of the ullage rockets on Vehicle 1019 was designed into the vehicle and was not affected by any change made after the vehicle left manufacturing.

3. The test procedure in the countdown that led to the premature firing of the ullage rockets was included in the first draft of the countdown manual and also in all following revisions.

4. Before the attempted launch of Vehicle 1019 on 21 January, there was no formal review within the Development Division of ISED for approval of WS 117L test procedures from a standpoint of adequacy or system compatibility.

5. There was a ground safety circuit in the blockhouse-to-pad wiring that was designed to automatically stop the "D" timer in 0.35 seconds in the event of premature activation. However, incorrect wiring in this circuit prevented its operation and the "D" timer ran for approximately 26 seconds, at which time all power to the vehicle was turned off. This circuitry error permitted firing of the balance of the vehicle pyrotechnics listed in paragraph 1 above.

6. During the installation and checkout of the blockhouse wiring, a series of changes was made in the circuit discussed in paragraph 5 above. After these changes were completed, there was no functional test run on the circuit.

7. There was no assignment of responsibility for the analysis and verification, from a systems standpoint, of the circuit design which fired the ullage rockets.

8. At no time during tests performed in Modification and Checkout, at Santa Cruz Test Base, or at Vandenberg Air Force Base, was the series of operations during countdown simulated in a manner adequate to reveal the design defect.

9. The installation of monitors on the connections for the pyrotechnics at Vandenberg Air Force Base would have revealed the wiring defects during the dress rehearsal.

[redacted]

10. From the schematics examined by the Committee, there appeared to be a lack of uniform drafting practices involving standard nomenclature and cases of cross-reference. Individuals who were questioned by the Committee had difficulty in finding the proper drawings and correlating them. This confusion could have contributed to the failure to identify the wiring defect from examination of the drawings.

Encl 1.

[redacted]

[redacted]

[redacted]

It is recommended:

1. That LMSD institute a standard design practice of isolating pyrotechnic circuits from unrelated circuits.

2. That the responsibility be positively and clearly levied against a specific group within the Development Division for the detailed evaluation of all test procedures, to insure system adequacy and compatibility.

3. That as a matter of standard procedure whenever either a GSE or missile circuit is altered, specific tests be accomplished to re-verify the system.

4. That within LMSD there be established one centralized organization to plan and conduct comprehensive systems engineering and analysis to assure compatible WS 117L vehicle and launch equipment design.

5. That monitors be placed in the pyrotechnic circuits during all tests, to remain an integral part of the checkout until such time as adequate verification of the circuits has been demonstrated.

6. That a qualified Air Force Survey Team investigate the drawing practices and procedures at LMSD for acceptable conformance with Air Force standards.

Incl 2.

[redacted]

[redacted]TIAL

Director of [redacted] 117L
ATTN: [redacted]

FEB 16 1959

SUBJECT: Report of Investigation of Missile Test Mishap
DISCOVERER Vehicle 1019

TO: Commander
Air Research and Development Command
Andrews Air Force Base
Washington 25, D. C.

1. As I have previously informed you, our first attempt to launch a DISCOVERER Satellite was unsuccessful. To this end I constituted a Missile Test Mishap Investigating Committee to investigate the circumstances associated with the attempted launch of DISCOVERER Vehicle 1019 on 21 January 1959. A copy of their report to me is inclosed.

2. I have accepted the conclusions and recommendations of the Committee and have implemented remedial action as follows:

a. I have discussed the specific mishap itself as well as the management implications thereto with senior key Lockheed personnel and have gone over with them very carefully the management steps which I feel are required to remedy this situation.

b. I have sent the inclosed letter to the Vice President and General Manager of Lockheed Missiles and Space Division, Mr. L. Eugene Root, to specify action which I feel is mandatory in the satisfaction of this problem.

3. Particular attention will be given by [redacted] to insure that the necessary remedial action is taken. If additional formal action of a remedial nature is required with LMSD I will advise you at the time it is initiated.

SIGNED

B. A. SCHRIEVER
Major General, USAF
Commander

2 Incl
1. Report of Missile Test Mishap Investigating Committee
2. Ltr to Mr. Root

WDZW dl(13 Feb 59)
Col Oder 1822

[redacted]TIAL

SECRET SECRET

CONFIDENTIAL

PRIORITY
PRIORITY X AF

COMDR, AFBMD, INGLEWOOD, CALIFORNIA

ASST COS, GUIDED MISSILES
HQ USAF
WASHINGTON, DC

ASST COS ADV TECH
HQ USAF
WASHINGTON, DC

COMDR, HQ ARDC
ANDREWS AFB, MD

INFO: CHIEF, AFBMD FIELD OFFICE
PALO ALTO, CALIF.

CHIEF, AFBMD FIELD OFFICE
VANDENBERG AFB, CALIF.

DOWNGRADED AT 3 YEAR INTERVALS;
DECLASSIFIED AFTER 12 YEARS.
DOD DIR 5200.10

COMAAC
ELMENDORF AFB, ALASKA

COMPACAF
HICKAM AFB, T.H.

SECRET-FROM WDZWF 1-25-E. REFERENCE DEF 953003, ACTION FOR AFGOM. PLEASE PASS TO MR. ROY JOHNSON AT ARPA; FOR GEN MC CORKEL, AFGOM; GEN BOUSHEY, AFDAT; COL SIKES, AFGOM-A; COL WORTHMAN, ARDC. WE ARE AT T-2 DAYS IN THE COUNT FOR THE FIRST LAUNCH OF DISCOVERER AND HOLDING. WE WILL INFORM YOU WHEN COUNT IS RESUMED.

13 JAN 59

WDZWF

QUENTEN A. RIEPE
Lt. Col., USAF

L/Col Quenten A. Riepe ss
2781 1 1

HARRY L. EVANS
Colonel, USAF
Director for WS 117L

SECRET SECRET

WDZW 59-66
Cy 4 of 7

CONFIDENTIAL

WDZW

JOINT MESSAGEFORM

SECURITY CLASSIFICATION [redacted]

~~SECRET~~

SPACE BELOW RESERVED FOR COMMUNICATION CENTER

OC 187

JAN 10 20 57 '59

PRECEDENCE		TYPE MSG (Check) BOOK	MULTI	SINGLE	ACCOUNTING SYMBOL	ORIG. OR REFERS TO	CLASSIFICATION OF REFERENCE
ACTION	OPS IMMEDIATE		X		AF	DEF 953003	
INFO							

FROM:
COMDR AFBMD (ARDC) INGLEWOOD, CALIF

SPECIAL INSTRUCTIONS

TO: ASST CHS, GUIDED MISSILES
HQ, USAF
WASHINGTON DC

ASST CHS ADV TECH
HQ, USAF
WASHINGTON, DC

COMDR, HQ ARDC
ANDREWS AFB, MD.

INFO: CHIEF, AFBMD FIELD OFFICE
PALO ALTO, CALIF

CHIEF, AFBMD FIELD OFFICE
VANDENBERG AFB, CALIF

COMDR, AAC
ELMENDORF AFB, ALASKA

COMDR, PAC. A.F.
HICKAM AFB, T.H.

DOWNGRADED AT 3 YEAR INTERVALS;
DECLASSIFIED AFTER 12 YEARS.
DOD DIR 5200.10

SECRET FROM WDZWF -1-20-E. REFERENCE DEF 953003, ACTION FOR AFCGM. PLEASE PASS TO MR. ROY JOHNSON AT ARPA; FOR GENERAL MC CORKLE, AFCGM; GEN. BOUSHEY, AFDAT; LT COL HIRAK, AFCGM-A; COL WORTHMAN, ARDC. MESSAGE IN THREE PARTS: PART ONE: CONTINUED DIFFICULTY

(WDGW-59- 25)

DATE	TIME
10	
MONTH	YEAR
JAN	1959

WRITER

SYMBOL: WDZWF

TYPED NAME AND TITLE (Signature, if required): LT COL HINCE

PHONE: | PAGE NR. 1 | NR. OF PAGES 2

[redacted]

RELEASER

SIGNATURE:

TYPED (or stamped) NAME AND TITLE:

HARRY L. EVANS
Colonel, USAF
Director for WS-117L

[redacted]

DD FORM 1 MAY 55 173 REPLACES DD FORM 173, 1 OCT 49, WHICH WILL BE USED UNTIL EXHAUSTED

Copy 2 of 7 copies.

JOINT MESSAGEFORM - CONTINUATION SHEET

SECURITY CLASSIFICATION [redacted]

CO[redacted]DENTIAL

FROM:

[illegible] [illegible], ([illegible]), [illegible], CALIF

BEING EXPERIENCED IN DUAL PROPELLANT LOADING EXERCISE. HYDROGEN STORAGE TANK WAS DISCHARGED AND ALL ELEMENT CLEANED ON 9 JAN. ON RECHARGE AND SAMPLING IT WAS FOUND THE SYSTEM WAS STILL CONTAMINATED. SPARE COMPRESSOR SYSTEM BEING INSTALLED AS ELEMENT CAUSING CONTAMINATION. FULL AUTOMATIC PROPELLANT TANK LOADING HAS NOT BEEN COMPLETED AS YET. THE MISSILE HAS BEEN LOWERED FROM THE VERTICAL POSITION AND MINOR DISCREPANCIES NOTED DURING THE [illegible] [illegible] CORRECTED. BIADE TWO DISCREPANCIES STILL [illegible] [illegible] [illegible] ARE THE [illegible] [illegible] ANTENNA AND FUEL LOADING [illegible] ON THE THE BOOSTER.

PART II: CONTINGENT ON THE SUCCESS OF THE DUAL PROPELLANT LOADING EXERCISE TODAY, 10 JAN THE SYSTEM CHECK-OUT WILL BE AT LEAST 2 DAYS WITH COUNTDOWN ON 12 JAN. THIS WILL PLACE T MINUS ZERO TIME AT TEN O'CLOCK, PST, 13 JAN AS THE EARLIEST POSSIBLE LAUNCH TIME AND DATE. PART III: COMMUNICATIONS AND TRACKING SYSTEMS CHECKS HAVE BEEN COMPLETED BUT ARE BEING PERIODICALLY RE-CHECKED TO VERIFY CONTINUOUS READINESS.

[redacted]L

(RDCW-59-18)

SYMBOL	PAGE NR	NR OF PAGES	SECURITY CLASSIFICATION	INITIALS
WDSWP	2	2	[redacted]	QAR

DD FORM 1 MAY 55 173-1

[redacted] [redacted] ~~CONFIDENTIAL~~

ARS MISSIONS

1956 ~~SECRET~~

- To provide physiographic pioneer & surveillance coverage of the USSR and satellites.
- To provide and maintain continuous and comprehensive surveillance of the electronic activities of the USSR.
- Each mission carries a firm requirement for suitable data handling & processing capability both in the vehicle and on the ground.
- The test prog. will involve firing instrumented test vehicles. One such satellite test vehicle will be a "Research Lab. Model" able to obtain & transmit to earth scientific data on the space environment.

~~SECRET~~ [redacted] ~~CONFIDENTIAL~~

53RD2-10663

[redacted] [redacted]

PHYSIOGRAPHIC PIONEER & SURVEILLANCE RECONNAISSANCE

~~CONFIDENTIAL~~

~~SECRET~~

- RECONNAISSANCE POSSIBILITIES
  - ROUTINE TARGET.
  - MAPPING.
  - PIONEER TERRAIN.
  - WEATHER.
  - BOMB DAMAGE ASSESSMENT.
- OBJECTIVES
  - RESOLVABLE SURFACE DIMENSIONS SHOULD BE 100 FOOT OR SMALLER.
  - RESOLVABLE DIMENSIONS OF 20 FT. OR LESS ARE REQUIRED TO IDENTIFY WEAPON LAUNCHING SITE.
  - ULTIMATE MAPPING GOAL SHOULD BE 1/10 MILE ACCURACY.
  - NECCESSARY SYSTEM COMPROMISES WILL BE MADE IN FAVOR OF THE RECONNAISSANCE CAPABILITY WHERE POSSIBLE.

[redacted]

~~SECRET~~ ~~CONFIDENTIAL~~

SER 2-10662

~~CONFIDENTIAL~~ ~~SECRET~~ [redacted] [redacted]

Technical Development Program

TO BE COMPLETED BY JULY 1956

TASK NO	CONTRACTOR	TITLE
41256	RCA	TV Techniques for ARS
44147	NAA	Attitude Sensing and control for ARS
50558	MIT	Orbital Attitude Sensing and Control ARS
70843	Harshaw Chemical	Solar Auxiliary Power Plant
30291	None	Auxiliary Power Plant
41700	Not Selected	Effects of Nuclear radiation on Electronic Components
15000	None	Intelligence Parameters Study
15001	None	Intelligence Processing Methods
41262		Electronic Reconnaissance
		Ground to Air Communication
21010		System Design Studies

~~CONFIDENTIAL~~ [redacted] ~~SECRET~~

~~CONFIDENTIAL~~ ~~SECRET~~ [redacted] [redacted]

Project 1115

REFERENCES

HQ ARDC PDD-1115 14 SEP 1954
SR-5 29 NOV 1954

Responsibility:
Implementation and execution assigned to W.A.D.C.

Completion Date:
1 July 1956

Objective: To conduct System Design Study
To perform further research and technical development in the critical areas of operation of a satellite reconnaissance system – to further demonstrate the feasibility of obtaining detailed intelligence of those areas of the world where access is denied.

Approach: to accomplish the objective by the establishment of tasks in the critical technical areas of development and operation.

~~CONFIDENTIAL~~ [redacted] ~~SECRET~~

56RD2-10659

ELECTRONIC (FERRET) RECONNAISSANCE

- TARGETS

Communications Systems
Radars
Navigation Systems
Missile Guidance Systems
Experimental Systems

- TYPES OF INTELLIGENCE

Order of Battle
Capabilities
Intentions
locations
Activity Schedules
Frequency Spectrum Utilization

~~CONFIDENTIAL~~ ~~SECRET~~ [redacted]

DESIGN STUDY OBJECTIVE

To determine whether a military intelligence system aimed at satisfying the national intelligence requirements of the future can be forseen at this time with sufficient definitude to indicate full development, and to establish the direction and magnitude of the technical programs needed to realize development.

~~CONFIDENTIAL~~ [redacted] ~~SECRET~~

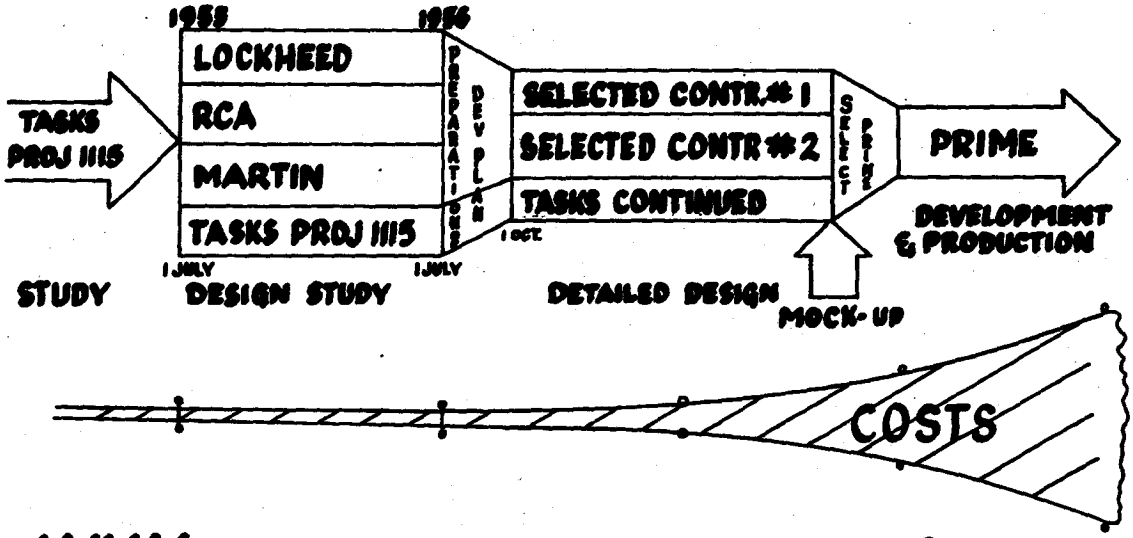
58 RD2-10651

~~CONFIDENTIAL~~

~~SECRET~~

[redacted]

PROGRAM IMPLEMENTATION



WHY THREE DESIGN STUDY CONTRACTORS?

1. RELATIVE SMALL COST OF DESIGN STUDY TO DEVELOP COSTS
2. SUFFICIENTLY DIFFERENT APPROACHES TO PROBLEM INDICATED IN PROPOSALS
3. ENHANCES COMPETITIVE NATURE OF STUDY & DEVELOPMENT

[redacted]

~~CONFIDENTIAL~~ ~~SECRET~~

[redacted]

56RD2-10650

~~CONFIDENTIAL~~

~~SECRET~~

SATELLITE PROGRAM

GLENN L. MARTIN COMPANY

RAND CORPORATION

AEC

PROJ. 1115

SYSTEM 117 L

~~SECRET~~ [redacted] ~~CONFIDENTIAL~~

~~CONFIDENTIAL~~
~~SECRET~~

[redacted]

THE SYSTEM DESIGN STUDY PROGRAM

REFERENCE:

HQ. ARDC SYSTEM REQ'MT NO. 5 DTD. 29 NOV. '54
HQ. USAF GOR NO. SA-2c DATED 11 MAR. '55

DIRECTED ACTION RESPONSIBILITY	Conduct design studies for ARS Initiation & Management - WADC
PARTICIPATING CENTERS	RADC, AFCRC & Air Proving Ground Cmd.
COORDINATING	ADC, SAC
TARGET DATES	Completion of design studies 1 Jul. '56 Preparation of devel'pmt plan 1 Oct. '56

~~CONFIDENTIAL~~ [redacted] ~~SECRET~~

~~CONFIDENTIAL~~

~~SECRET~~

[redacted]

DESIGN STUDY

ADVANCED RECONNAISSANCE SYSTEM MX 2226

TASK 21010

CONTRACTORS: GLENN L. MARTIN, LOCKHEED AIRCRAFT AND RADIO CORP. OF AMERICA.

ENGINEER : LT. COL. W. G. KING, JR.

OBJECTIVE : To determine whether a military intelligence system aimed at satisfying the national intelligence requirements of the future can be forseen at this time with sufficient definitude to indicate full development; and to establish the direction and magnitude of the technical programs needed to realize development.

~~CONFIDENTIAL~~ [redacted] ~~SECRET~~

~~CONFIDENTIAL~~
~~SECRET~~

[redacted]

DESIGN STUDY DIRECTIVE

- ARCD SYSTEM REQUIREMENT No. 5 — 29 NOV. 1954
- DIRECTED ACTION: SUPPORT INDUSTRY IN THE CONDUCT OF DESIGN STUDIES OF THE ADVANCED RECONNAISSANCE SYSTEM.
- RESPONSIBLE AGENCY: THE DIRECTORATE OF AIR WEAPON SYSTEMS OPERATIONS WADC, WILL BE THE FOCAL POINT WITHIN ARDC FOR INITIATION AND ADMINISTRATION OF STUDY CONTRACTS.
- PARTICIPATING CENTERS-
  - ROME AIR DEV. CENTER - INFORMATION PARAMETERS DATA PROCESSING, GROUND-AIR COMM., INCLUDING ACQUISITION TRACKING, AND COMMAND OF THE FLIGHT VEHICLE.
  - A.F. CAMBRIDGE RES. CENTER. ENVIRONMENTAL DESIGN DATA, AND UTILIZATION OF TEST VEHICLES FOR GEOPHYSICAL PURPOSES.
- TARGET DATES: COMPLETION OF DESIGN STUDIES - 1 JULY 1956
  COMPLETION OF SYSTEM DEVELOPMENT PLAN - 1 OCT 1956
- DIRECTIVE IMPLEMENTED BY TASK* 1115 - 21010

[redacted] ~~SECRET~~

~~CONFIDENTIAL~~ [redacted]

55 WCS-13118

~~CONFIDENTIAL~~

~~SECRET~~ [redacted]

LOCKHEED AIRCRAFT CORP.

MISSILE SYSTEM DIVISION

ENGINEERING APPROACH – DUE TO THE CLOSE CONSONANCE OF VEHICLE REQUIREMENTS BETWEEN THE ARS & ICBM MOD. VERSIONS OF THE ICBM AIRFRAME COULD BE MADE SUITABLE FOR THE ARS-THIS APPROACH WILL ALSO RESULT IN SAVINGS IN TIME & TOTAL COST

PRIME & SUB CONT'R AREAS- LOCKHEED-LAUNCHING-GRD HANDLING-VEHICLE PROPULSION-GUIDANCE-ACQUISITION-TRACKING-AUX POWER-ATTITUDE SENSING & CONTROL

COLUMBIA BROADCASTING SYSTEM-COMMAND CONTROL-DATA RECORDING (TAPE) DATA-RECIEVING-AIRBORN RECORDING-PLAYBACK-XMITTER-SOLAR APU FERRET SYSTEM-TV SYSTEM

EASTMAN KODAK CO.-FILM DATA RECORDING-DATA PROCESSING & DISTRIBUTION-FILM CAMERA SYSTEM FOR RECOVERY PACKAGE

STRONG POINTS-LOCKHEED PROPOSAL WAS BY FAR THE MOST COMPLETE AND INDICATED A VERY THOROUGH & DETAILED UNDERSTANDING OF THE COMPLEX SYSTEM INTEGRATION PROBLEM

WEAK POINTS-THE TEAM LOCKHEED-CBS-EKC COLLECTIVELY REPRESENT VERY LITTLE EXPERIENCE IN THE FERRET RECCE FIELD

[redacted]

55 WES-13092

~~CONFIDENTIAL~~ [redacted] ~~SECRET~~

~~SECRET~~
~~CONFIDENTIAL~~

[redacted] [redacted]

GLENN L. MARTIN CO.

ENGINEERING APPROACH: FROM A STATEMENT OF THE INTELLIGENCE REQUIREMENTS AS A FUNCTION OF TIME - DEFINE THE USEFUL SYSTEM IN THE TERMS OF THE STATE OF ART

PRIME & SUB-CONTRACTOR AREAS: MARTIN CO. FERRET RECCE SYSTEM (AIR & GROUND) - PAYLOAD SYSTEM INTEGRATION - AUX. POWER PLANTS (SOLAR NUCLEAR) VEHICLE - AIRFRAME - PROPULSION - CONTROLS - GUIDANCE
PHILCO CORP. THE TV SYSTEM - STORAGE - PLAYBACK - XMITTERS - REC. - ANTENNAS
INT. BUS. MACH. DATA HANDLING - STORAGE - PROCESSING INDEXING - PRESENTATION - ROUTING - COMPUTERS

STRONG POINTS: GLENN L. MARTIN CO. INCLUDED THE MOST COMPREHENSIVE COVERAGE OF THE FERRET RECONN. SYSTEM

WEAK POINTS: G L M DID NOT INCLUDE ADEQUATE COVERAGE OF THE GLM TECHNICAL PERSONNEL TO BE UTILIZED ON THE STUDY NOR THE SUB-CONTRACTOR PERSONNEL. THE PROPOSAL DID NOT ADEQUATELY COVER THE PLANNED APPROACH TO THE AIRFRAME, VISUAL RECCE, DATA HANDLING, RELIABILITY PROBLEMS TO PERMIT DETAIL EVAL

55 WCS-13091

~~SECRET~~ [redacted] ~~CONFIDENTIAL~~

RADIO CORPORATION OF AMERICA

[redacted]

ENGINEERING APPROACH - METHOD OF SUCCESSIVE APPROXIMATIONS.
I.E., BASED ON TENTETIVE REQUIREMENTS A TENTETIVE SYSTEM IS DEVELOPED AND FROM EXPERIENCED WITH THE SYSTEM A NEW SET OF REQUIREMENTS ARE GENERATED AND A REFINED SYSTEM IS INVENTED.

PRIME & SUB-CONTRACTOR AREAS: R.C.A. - RECONNAISSANCE SYSTEMS - I.E. T.V. - FERRET - COMMUNICATIONS - RECORDING - DATA REDUCTION - SOLAR APU - ETC

BELL AIRCRAFT CORP. - VEHICLE AND EQUIPMENT - IE. AIRFRAME - PROPULSION GUIDANCE & CONTL - GROUND HANDLING - LAUNCHING - ATTITUDE SENSING & CONTL. -

NORTH AMERICAN AVN - NUCLEAR AUX. POWER UNIT.

STRONG POINTS: THE RCA PROPOSAL REPRESENTED BY FAR THE BEST UNDERSTANDING AND CAPABILITY IN THE T.V. RECCE. AREA.

WEAK POINTS: RCA's ORIGINAL PROPOSAL WAS NOT PREPARED IN ACCORDANCE WITH THE GROUND RULES OUTLINED IN THE REQUEST FOR PROPOSAL.

~~SECRET~~ ~~CONFIDENTIAL~~ [redacted] [redacted] [redacted]

HIGH LIGHTS

GENERAL

1. ALL PROPOSALS RECOGNIZE USABILITY OF ICBM COMPONENTS
2. ALL PURPOSE USE OF NAA ENGINE DATA
3. WORK DONE SINCE 1946 BY RAND & CONTINUATION & EXPANSION OF THIS WORK BY WADC IS RECOGNIZED & INTEGRATED INTO ALL PROPOSALS

PROBLEMS

1. SECURITY
2. PROPOSED GUIDANCE & CONTROL SUB-CONTRACTORS ARE "LESS THAN" SATISFACTORY - DO NOT REPRESENT RECOGNIZED LEADERS IN INERTIAL FIELD
3. INTERCHANGE OF INFORMATION WITH ICBM PROGRAM
4. INTELLIGENCE PARAMETERS MUST BE ASSEMBLED & PRESENTED TO CONTRACTORS AT EARLIEST DATE TO PREVENT CONTRACTORS FROM MAKING INDEPENDENT SOLICITATIONS OF DATA

~~SECRET~~ ~~CONFIDENTIAL~~ [redacted] UNCLASSIFIED

EVALUATION CONDUCT

PARTICIPANTS – WADC (DOL.DOR.WCS) RADC. AFRC

REFERENCE - WADC REG 80-6 ARDC REG 70-9 (DRAFT)
PR # 175626 ARS 80-4 DOCUMENTATION

TO BE CONSIDERED

1. PROCURMENT OF TWO OR MORE DESIGN STUDIES
2. TECH. EVALUATION OF PROPOSALS WERE TO BE BASED ON FOLLOW.:
   a. COMPLIANCE WITH STATEMENT OF WORK.
   b. UNDERSTANDING OF PROBLEM.
   c. APPROACH TO PROBLEM - DESIGN PHILOSOPHY. SUB SYS. CONCEPT. INTEG. GROWTH POT.
3. MANAGEMENT ASPECTS
   a. FACILITIES AVAILABLE-RESEARCH, DEVELOPMENT, PRODUCTION
   b. PERSONNEL-TYPE, QUAL. &QUAN., EXPERIENCE, PREVIOUS PERF. & DEL. SCHEDULE

PROCEDURE

1 DEGREE OF EXCELLANCY TO BE RATED-EXCELLENT, GOOD ACCEPT, POOR, OR UNACC.
2. SUMMARY RATINGS & COMMENT TO BE FURNISHED
3. EACH CENTER & LAB TO RATE PROPOSALS IN THEIR AREA OF TECH. PROF.

TEAM FOR FINAL EVALUATION - TEAM FROM WADC, RADC, & AFCRC
TO PREPARE EVALUATION RULES & MAKE SUMMARY EVALUATION.

1515

DESIGN STUDY PROGRAM SCHEDULE

- COORDINATION OF SOURCES TO BE SOLICITED FOR DESIGN
  RCA - LOCKHEED - GLM - BELL TEL. LABS. 6 FEB '55
- REQUESTS FOR PROPOSAL MAILED TO FOUR SOURCES 15 FEB '55
- CONTRACTOR QUERY MEETING HELD AT WADC 4 MAR '55
- TECHNICAL STATE OF THE ART SYMPOSIA
  WADC - WITH RADC PARTICIPATING 16-17 MAR.
  AFCRC - ON GEOPHYSICS 22-23 MAR.
- NOTICE OF INTENT TO PROPOSE DUE FROM SOURCES 25 MAR '53
- PROPOSALS RECEIVED AT WADC FROM RCA LOCKHEED GLM 18 APR
- PROPOSAL EVALUATION COMPLETED 11 MAY '55
- TARGET DATE FOR SIGNING CONTRACTS 15 JUNE '55

The joint Air Research Development Command/Western Development Division/Wright Air Development Command/Air Materiel Command contractor evaluation board, after having met 12-20 March 1956, selected Lockheed Aircraft Corporation as best qualified contractor for the WS 117L system and recommended award of prime contract to that corporation for the research and development of the WS ~~LLB~~ 117L. Lockheed had prepared its Volume II design study in twelve volumes, one for each subsystem.

Although Lockheed Aircraft Corporation became the contractor for the research and development of the Advanced Reconnaissance System, ~~However,~~ the Air Force Ballistic Missile Division did not expect the contractor to perform research and development, "design, manufacture and test of the many components of the system." The Air Force Ballistic Missile Division ~~expected~~ indicated that "Component parts to include entire subsystems of WS 117L, should be procured through the medium of subcontractors or vendors who have the capability, including personnel, facilities and experience to develop and manufacture the class of equipment to be procured."x

---

x Ltr, AFBMD (WDTR) to Lockheed Aircraft Corporation, 23 Sep 57, subj: AFBMD Policy Review of LAC/MSD Report 35804 "General Test Plan and Related Facilities and Equipment."

The 15 September 1958 Development Plan which was essentially the same as the plan of 2 April 1957 except that the latest plan did not specify an ~~A~~ Intercontinental Ballistic Missile as the booster, described the five subsystems as follows:

V- Top of Cabin

a. Subsystem "A" - Airframe

(1) The airframe subsystem will consist of the propellant and pressurization tankage, aerodynamic fairings, structural supports, brackets, and fittings for the satellite; all mechanical and electrical installations in the satellite not specifically included in the definition of other subsystems, and all contractor-furnished modification items for the SM-65 booster. It will include equipment for over-all environmental control within the satellite. It will also include all items of ground equipment required for testing and launching of the vehicle.

(a) Airframe design must meet the following requirements:

1. Provide for the effects of environmental factors, such as drag and gust loading, meteorite bombardment, and thermal and nuclear radiation.

2. Accommodate the different payloads as new items of equipment are developed.

3. Accommodate boosters for first-stage propulsion and furnish additional thrust and guidance to achieve the orbit.

4. Provide for proper mating and separation of booster and vehicle stages.

5. Accommodate several different auxiliary power units.

6. Optimize equipment packaging to minimize attitude control power requirements.

(2) The Airframe presently being designed and fabricated is based on the maximum weight capability as defined by the SM-65 total impulse and the impulse available in the WS 117L vehicle as built for the SM-75 boosted program. This weight is considered to be 11,600 lbs.

(3) The Airframe will consist of a 60 inch diameter cylinder adapter, (which will be attached to the booster and remain with it after separation), and the orbiting vehicle. The vehicle will be a 60 inch diameter load carrying cylinder about 14 ft. long containing or supporting all other subsystems. This cylinder will be inclosed for about half its length in the adapter. The payload and structure on the front of the vehicle will be protected from aerodynamic effects by a conical nose section. The engine and pressurized gas storage will be carried at the rear of the vehicle making an over-all length of about 18 feet. Maximum utilization of structural material will assure the highest possible ratio of payload weight to gross weight.

b. Subsystem "B" - Propulsion

(1) The propulsion subsystem will consist of the rocket engines (main liquid rocket engine and two ullage solid propellant rockets), the propellant expulsion and feed systems (other than structural, loadcarrying fluid and gas tanks), engine gimbals (but not gimbal actuators) and the equipment required to start and stop the rocket engines in response to an electrical signal from the ground or from the guidance subsystem. In addition, the propulsion subsystem will include all ground-based items used for testing, calibrating, checkout and servicing of the propulsion subsystem.

(2) The Project Hustler XLR81, 15,150 pound thrust, pump fed engine will be used for the main satellite rocket power plant. The YLR81-Be-3, using IRFNA (Inhibited red fuming nitric acid) and JP-4 propellants, having a 263 sec vacuum specific impulse, will be used in the first four Thor boosted flights. This engine modified to use IRFNA and UDMH (unsymmetrical dimethyl hydrazine) as propellants with a 277 sec vacuum specific impulse will be used on subsequent flights. Forces required to provide proper fuel orientation prior to firing the main rocket engine at the completion of the coast phase will be provided by small 20 sec-120 pound thrust solid propellant rockets (ullage rockets).

c. Subsystem "C" - Auxiliary Power

(1) The auxiliary power subsystem furnishes all electrical power required within the WS 117L vehicle from a time just prior to launch until the end of the vehicle's reconnaissance lifetime. The complete subsystem includes ground equipment necessary to utilize available ground power during warm-up, testing, and checkout on the launch stand, and for switching from external to internal power at the appropriate time before launch. It also include service, test, and handling equipment, which may be elaborate where nuclear supplies are used.

(2) The APU must furnish 28 volts DC, both regulated and unregulated, and alternating current at 400 cps and 2000 cps. Drain on the primary energy source will vary from 3 kilowatt hours per day upwards depending upon the nature of the source, vehicle mission, and power conversion efficiencies.

(3) A battery energized power supply has been selected to meet the requirements of early vehicles, for which operating duration is more likely to be limited by system reliability than by the energy capacity of the power supply, and for which proof testing and redesign data are the primary objectives. Beyond that stage, however, very long duration power supplies will become increasingly desirable. Systems requiring simultaneous functioning of multiple satellites dictate lifetimes of one year or more. Solar and nuclear power supplies are therefore being developed. Advanced electro-chemical sources to back up battery systems are also being considered in the event that solar and nuclear developments are not completely successful or are prolonged.

(4) The battery supply will employ silver-zinc modules providing 75 watt-hours per pound. Individual modules weighing 110 pounds may be on or off loaded for payload flexibility during development. A lifetime of 23 days is expected for early operational vehicles with 10 modules nominally allocated. Increased payload capability realized with the UDMH engine may permit loading of 16 modules, and a corresponding lifetime of 36 days, again for the earliest reconnaissance systems.

(5) Solar power units will adapt silicon photovoltaic converters into a complete subsystem meeting WS 117L requirements. Environmental degradation of silicon cells and secondary battery cycle life are important questions in evaluating the performance of conceptual solar designs. Orbital tests planned for Atlas boosted flights will be necessary before designs can be completed. Large collector-converter panels mounted on the vehicle skin, or mounted for heliotropic action, will require some redesign of the present vehicle.

(6) Two nuclear secondary power units for WS 117L are under development by the AEC in a program known as SNAP (Subsystems for Nuclear Auxiliary Power). Requirements and vehicle integration problems are worked out through a Joint AFBMD-AEC SNAP Committee. SNAP I is a radioisotope fueled, 500 electrical watt, 60 day supply with inherent capability to provide 250 watts for 230 days. SNAP II will utilize a 45 kilowatt reactor heat source and produce 3 kilowatts electrical output with a one year operating lifetime.

d. Subsystem "D" - Guidance and Control

SECRET

(1) The guidance and control subsystem for the Thor boosted WS 117L vehicles will be comprised of all those items of equipment required to perform the following functions:

(a) Provide a programmed trajectory during the Thor boost phase and a signal for separation of the orbiting vehicle from the booster and the end of the boost phase.

(b) Provide programmed pitch of the satellite vehicle during the coast period to establish and maintain the required orientation of the vehicle for orbital boost.

(c) Provide attitude and stabilization control during coast.

(d) Determine trajectory during coast and calculate the necessary information for proper initiation and termination of orbital boost.

SECRET

SECRET

(e) Provide a signal to initiate orbital boost.

(f) Position the thrust vector of the orbiting vehicle propulsion system so as to give the proper direction for the orbit boost.

(g) Provide attitude control and stabilization during orbital boost.

(h) Provide a signal for final termination of thrust.

(i) Provide self contained means for initially aligning and maintaining the desired vehicle attitude during orbital operation.

(j) Provide an indication of attitude and/or rate of change of attitude to other subsystems in the vehicle as necessary.

(2) The guidance and control subsystem for the Atlas boosted WS 117L vehicles will be comprised of all those items of equipment required to perform the following functions:

(a) Determine the position, velocity, and/or acceleration and attitude of the orbiting vehicle/booster as necessary from launch to final termination of thrust.

(b) Compare these values with those required to attain a preselected orbit.

(c) During operation of the sustainer engine of the booster, provide proper steering signals to the booster autopilot and thrust termination signals for sustainer and vernier engine cut-off.

(d) During coast phase, if any, provide attitude and stabilizing control.

(e) Provide a signal for separation of the orbiting vehicle from the booster, and for starting the orbiting vehicle engine.

(f) Position the thrust vector of the orbiting vehicle propulsion system so as to give the proper direction for the orbit boost.

(g) Provide attitude control and stabilization during orbital boost.

(h) Provide a signal for final termination of thrust.

(i) Provide self contained means for initially aligning and maintaining the desired vehicle attitude during orbital operation.

(j) Provide an indication of attitude and/or rate of change of attitude to other subsystems in the vehicle as necessary.

(3) Specifically, the guidance and control subsystem will include the following:

(a) The actuating mechanisms and power supply used to control the direction of the orbital thrust rocket engine.

(b) Any thrust producing devices (gas jets) and associated plumbing used for attitude and roll control including the electro-mechanical valves used to start, stop or regulate thrust of these devices.

(4) The guidance and control subsystem also includes those items of equipment required to service test and calibrate the elements of the subsystem defined above.

8. Subsystem "H" - Ground-Space Communication

(1) The ground-space communication subsystem is comprised of all those items of equipment required to perform the following functions:

(a) Determine the position of a satellite vehicle relative to the earth as a function of time by process of observation and prediction.

(b) Command and program the functioning of the vehicle payload and auxiliary devices on a time sequence basis or in real time.

(c) Provide means for communicating with the vehicle from ground stations and for receiving, monitoring and encoding environmental, vehicle functional and all reconnaissance data from other vehicle subsystems.

(2) The "end product" of the ground space communications subsystem will be a magnetic tape recording and a "hot-line" wherein all of the properly indexed reconnaissance data will be available.

(3) In addition to a. through c. above, the ground-space subsystem will be responsible for the generation and proper indexing on the reconnaissance data signal the following:

(a) Unique date-time signals which relate vehicle time to real ground time and, in addition provide a time "zero" for the reconnaissance data.

(b) Vehicle position data.

(4) Within the satellite vehicle, the ground-space communications subsystem will be responsible for the following indexing signals:

(a) To accept from the attitude stabilization equipment a signal which will be encoded into the proper form and provided to the particular sensing subsystem(s) concerned for their recording on reconnaissance data.

(b) To generate and provide the vehicle sensing subsystem(s) with time signals.

(5) The ground-space communication subsystem shall also include all those equipments required to service, test, monitor and calibrate the elements of the subsystem defined above.

(6) The ground-space communications ground equipment will provide for acquisition and tracking, reception of data, and transmission of Specific commands to a satellite vehicle moving on an orbit at approximately 300 miles altitude. This capability will be provided to accommodate a maximum radio range from the ground stations. The ground equipment will provide for:

(a) Interstation ground communications, including transmission of reconnaissance data.

(b) Computation necessary for acquisition, programming and for geographic registration of the vehicle position.

(c) Telemetry reception and recording.

(d) A synchronized timing system.

(7) The vehicle electronics to be contained in the vehicle and which are to be developed under this subsystem will provide the means for:

(a) Transmission of the reconnaissance data to the ground receivers.

(b) Control and programming of the vehicle payload functions.

(c) Telemeter encoding and transmitting.

(d) Vehicle function timing.

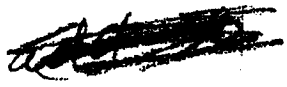
(8) The system of ground stations will be strategically located to provide efficient control and intercept of the satellite and its reconnaissance data. When the vehicle is within radio range from a station, an acquisition and tracking system will determine the position of the vehicle and transmit the position data to the orbit computer. Orbit position will determine the discrete program commands which are to be transmitted to the satellite. The high-gain telemetry and reconnaissance data receiving antennas will be slaved to the tracking system. The video output from the data link receivers will be available for monitoring. The directional data link antenna on the vehicle will be scanned so that the ground receiver can detect errors in its direction. Antenna orientation in the vehicle will be corrected over the command link.

(9) The station locations are to be determined on the basis of maximizing the readout cycle and reducing the storage time in the vehicle. Other considerations affecting choice of location are the need to preserve security and reduce the complexity of logistic support. Interstation communications systems to be used will rely on wire and radio nets.

Subsystem A

LMSD was responsible for the development and production of the Subsystem A that included providing propellant and pressurization tankage; aerodynamic fairings; structural supposts, brackets and fittings; mechanical and electrical fittings not included in other systems; environmental controls; and ground equipment required for transporting, servicing, erecting and launching.

~~Early in the planning in the preliminary development plan dated Circa 14 January 1956,~~



Subsystem B (Propulsion)

The WS 117L Preliminary Development Plan which presented the planning for that portion of the overall ARS necessary to demonstrate an orbital capability within the IGY (1 July 1957 - 31 December 1958), proposed the power plant or propulsion subsystem would probably be the Hustler XLR-81-BA-1 engine. However the first WS 117L Development Plan, 2 April 1956, provided for the Project Vanguard engine for the propulsion subsystem.

[redacted]

In By March 1957, Lockheed Aircraft Corporation with the concurrence of the Air Force, selected Bell Aircraft's LR-81 engine as the basic propulsion unit for the WS 117L second stage,[x] and on

x Special Projects Weekly Diary, 28 Mar 57; (Not available)

[redacted]-15 March BrigGen Ritland, Vice Commander, AFBMD, requested funds in the amount $1.5 for ten each Bell Hustler Engines.[x]

x Msg, [redacted] WDTR 3-2-E, 15 Mar 57.

In May 1957, Headquarters USAF terminated the B-58 MA-1 Bomb Pod portion of the B-58 Bomber program. The partial contract termination took place under contract AF 33(038)-21250 between Convair and the Air Force. The contract included a subcontract between Convair and Bell Aircraft Corporation to design and fabricate certain engines, designated XLR-81. As a result of the partial subcontract termination, items of fabricated engines, special tooling, ground support equipment, special test equipment, and spare parts were made surplus to the needs of the government. In october 1957, the termination inventory useable in the WS 117L program was made available to Lockheed Aircraft Corporation

under Amendment Number 6 to Letter Contract AF 04(647)-97, the contract between the Air Force and Lockheed Aircraft Corporation for ~~the research~~ design and development of the WS 117L. [x]

x ASD History of the Development of the B-58 Bomber, Vol III p 21; Ltr, MCPTA, Eugene S. Silberman, Memorandum for the File, subj: Letter Contract AF 04(647)-97 - Lockheed Aircraft Corporation - Amendment #6, 11 Oct 57; DF, MCPTA LtCol James S. Seay to MCPT (BMC), subj: Weekly Diary - 4-10 Oct 57

Following ~~acceleration~~ the defense secretary's decision to accelerate the program by using Thor as a booster, Lockheed Aircraft Corporation proposed a short-term improvement to the propulsion subsystem that would decrease the ~~fuel~~ amount of fuel and thereby increase the ~~payload~~ payload weight. Lockheed's proposal was to improve the Bell Hustler engine so that Unsymmetrical Di-Methyl Hydrazine (UDMH) and could be used as the fuel instead of inhibited red fuming nitric acid (IRFNA) and JP4 ~~propellant~~ (Jet fuel) propellant originally planned for use in the ~~Prototype Test versions~~ XLR-81-BA-3 engine.

x Msg, LMSD/56167, 3 Apr 58; Advanced Reconnaissance System Development Plan (New Horizon Program) ~~1 July 1958~~ 15 Mar 58 with ~~amendment~~ change 1 Jul 58.

~~ARDMD accepted the proposal and on 21 April 1958 revised the Fiscal Year Financial Plan by reducing the amount of funds required in the 15 March 1958 Development Plan~~

AFBMD accepted the proposal and on 21 April 1958 notified Assistant Chief of Staff for Guided Missiles of a reduced Fiscal Year 1959 financial plan for WS 117L.[x]

---

x Ltr, WDTSR to Asst CofS for Guided Missiles, Hq USAF, subj: Reduced FY 59 Program for WS 117L, 21 Apr 58. (~~In Vol ---- Supporting documents --- (Vol I-1)~~ (Supporting Documents, Vol I-1)

Two full-duration firings of the prototype unsymmetrical di-methyl hydrazine engine during September 1958 gave evidence that engine performance was within specifications. As a result, assembly operations were completed on the first UDMH flight engine and the engine was delivered to the Lockheed Missile Systems Division at Sunnyvale, California.[x]

---

xWS 117L Program Status Report, Qtr ending 30 Sep 58. (SAMSO Space Historical/Files)

XLR81-Ba-5,

The ~~engine was designated as~~ [illegible], 15,150-lb thrust engine was pump-fed with 277 lb sec/lb vacuum specific impulse that used unsymmetrical di-methyl hydrazine (UDMH); inhibited red fuming nitric acid (IRFNA) fuel. (SEE MR. PIPER ABOUT THIS DESCRIPTION) The ~~prototype~~ [illegible]

~~thrust engine was pump-fed, 277-lb sec/lb vacuum specific~~ [illegible]

[illegible]

test equipment, and spare parts were made surplus to the needs of the government. In October 1957 the termination inventory was useable under WS 117L program was made available to Lockheed Aircraft Corporation under Amendment Number 6 to Letter Contract AF 04(647)-97, the contract between the Air Force and Lockheed Aircraft Corporation, ~~the supplies-as-items-were-furnished-the-Lockheed-for-use-in-the-WS-117L-program.~~ x in the

ASD History of the Development of the B-58 Bomber, Vol III, p 21; Ltr, 11 Oct 57, MCPTA, Eugene S. Silberman, Memorandum for the File, subj: Letter Contract AF 04(647)-97 - Lockheed Aircraft Corporation - Amendment #6; DF, MCPTA LtCol James S. Seay to MCPT (BMC), subj: Weekly Diary - 4-10 Oct 57.

I believe this came later - 1st manned burn 2-18-61 maiden flight

x About the time the air Force selected the Bell Hustler rocket engine for the propulsion subsystem, a young Lockheed engineer conceived the "dual burn" satellite vehicle ascent technique. In contrast to the single burn where a satellite would separate from the booster and coast to apogee before its engine would fire, in dual burn, the satellite stage would ignite right after separation and burn just long enough to provide a begin-coast speed sufficient for the long, shallow climb required for high efficiency. At apogee the satellite stage rocket would restart to provide orbit injection. The greater begin-coast speed ~~would afford that would~~ afforded by dual burn would reduce the ~~tee~~ total

AMOUNT OF PROPELLANTS REQUIRED IN THE SATELLITE STAGE and making it possible to increase the payload. On 3 April 1958, Lockheed proposed the development of a short-term improvement of the propulsion subsystem by using unsymetrical dimethylhrdrazine fuel-and-IR--(UDMH) and inhibited fuming nitric acid (IRFNA).[x]

x Msgx 204-1 From Lockheed-Missile-& LMSD, Palo Alto CA to Comdr AFBMD 3 Apr 58.

The second of the first two rocket engines XLR81-BA-3, 15,150 pound thrust, pump-fed engines, using IRFNA (inhibited red fuming nitric acid) and JP-4 (jet fuel) propellants, having a 263-pound-second/pound vacuum specific impulse, was accepted by the Air Force and shipped to the launch site on 26 November 1958. The Air Force had decided to convert to the 15,150 pound thrust, pump-fed rocket engine XLR-rocket-engine-model-XLR81-BA-5, 15,150/modified to use INFRNA and UDMH propellants with a 277-pound-second/pound vacuum specific impulse beginning with the third Sentry (Discoverer) launch.[x] Conversion to UDMH/IRFNA fuel allowed an increase in the gross weight of the Sentry/Atlas vehicle from 9,300 pounds to 11,600 pounds. Increase in the gross weight of the vehicle permitted an increase of the on-orbit weight from approximately 3,500 pounds to approximately 5,000 pounds. By September Atlas boosters were being strengthened so as to accommodate the higher-lea heavier loads.[x] The-Model-Designation-for-the-WS-117L-engine-was-approved-on-19-December-1958.[x] modified-engine-was-XLR81-BA-5- The new designation for the modified engine was XLR81-BA-5 which was approved on 19 December 1958.

x Sentry Program Status Reports for months ending 31 Oct 58 and 30 Nov 58. (Samso Historical Space Files)

x WS 117L Program Status Report for quarter ending 30 Sep 58, pp 3 & 6.

x Ltr, WADC (WCLPRM) to Hq ARDC, subj: Model Designation for WS-117L Engine, 9 Jan 59.

x (next above)

Next page after following

Under study since early 1958 was a modification to the Bell-Hustler stage that would allow dual burning capability. The WS 117L program had having been transferred to ARPA and renamed SENTRY, (and later to SAMOS) had been reoriented in the fall of 1958 so that by ARPA Orders , MIDAS and Discoverer were separated from the system as a whole. SENTRY remained under ARPA Order No. 9-58; By ARPA Order No. 38-59, 5 November 1958, ARPA directed that Midas study and development begun as Subsystem G be continued as an independent project designated MIDAS.

By ARPA Order No. 48-59, 16 December 1958, ARPA directed that the THOR phase of the SENTRY Program be continued as an independent project identified as Discoverer-Thor Project.

ARPA issued ARPA Order No. 17-58, 4 September 1958 that affected the SENTRY program but it was not until ARPA issued Sheet Amendment No. 4 on 10 April 1959 that any portion of the SENTRY program should be identified by the writer. Task No. 3 contained in the Amendment is as follows:

> Modify the Bell-Hustler stage to obtain dual burning capability, simplify guidance and control system, structural simplification such that payloads of arbitrary shapes may be carried, and increased propellant carrying capacity. Estimated cost, $5,150,000.

Task No. 6 was as follows:

> Provide for the delivery and launching at PMR of two THOR-Hustler (Modified) vehicles suitable for the injection of the 215-pound Transit 2 payload into 400 N. Mi. high circular orbit. Estimated cost, $7,660,000.

In June 1959, ARPA issued the following message:[x]

> The upper stage or orbital vehicle stage in the current Discoverer program has been referred to as the Discoverer Vehicle or the Bell Hustler, neither of which is appropriate. Discoverer is a long range program which may utilize a variety of boosters and upper stages. Henceforth the Lockheed developed orbital stages built around the Bell engine will be designated AGENA, repeat, AGENA. Agena comprises the basic vehicle configuration and the Bell engine in its single or dual brim versions.

x Weekly Diary - 11 thru 18 June 1959, AMC (BMC) LBJ to LBG, 18 Jun 59. (Extract in Agena documents)

On 1 July 1959 ARPA issued ARPA Order No. 96-60 that directed the work formerly authorized under Task 3 in Amendment No. 4 to ARPA Order No. 17 be continued as follows:

> Mo Modify the Agena stage to obtain dual burning capability, simplify guidance and control system, structural simplification such that payloads of arbitrary shapes may be carried and increased propellant carrying capacity. Estimated cost - $5,150,000. redesignated (changed from XLR81-BA-5 on 15 April 1959) The modified version of the XLR81-BA-5/engine was designated as the XLR-81-BA-7,(Bell Aircraft Model 8081),[x] on 23 November 1959.

x Ltr report, WDPCR to Director ARPA, subj: Modification of AGENA Vehicle, 30 September 1959, dtd 1 Oct 59; Ltr AFFTC (FTRDL to AFBMD, subj: Engine Model Designations, 18 Dec 59. (Both in Agena Documents)

A feasibility of restart testing program was in progress at Arnold Engineering Development Center which greatly expedited the implementation of the development of the Rocket engine XLR-81-BA-7.[x] Approval Authorization

x Ltr, WDPCR to Director ARPA, 8 Sep 59, subj: Modification og AGENA Vehicle, 31 Aug 59.

By June 1959 after

ARPA authorized the ~~conversion program~~ in April 1959, the engine mockup review and approval was completed. The propellant capacity selected for developmennt had twice the volume of the

, ~~-Modification-of-the-Bell-Hustler-engine~~

AF
The/Model XLR-81-BA-7 (Bell Aircraft Company Model 8081) engine

was scheduled for use on the first four ~~NASA~~ Agena "B" flights, the first of which was launched on 26 October 1960 as Discoverer # XVI.

for Dean Burn. See Staff meeting Minutes 3 June 5' Agena name

Task No. 6, Amendment No. 4 to ARPA Order No. 17-58 was transferred to ARPA Order No. 97-60 on 1 July 1959 ~~and~~ subsequently amended on 5 October 1959 to provide ~~for Able-Star--(AJ-10-104~~ Able-Star engines instead of the ~~Bell-Hu-~~ ~~Me~~ modified Bell-Hustler

Under study since early 1958 was a modification to the Bell-Hustler stage that would allow dual burning capability.[x] In contrast to

x ~~Msg, Lockheed MSD Palo Alto Calif, 4-2-2 April 1958~~
TWX 204-1, Lockheed MSD Palo Alto Calif 2 Apr 58.

single burn where ~~the satellite separates from the booster) and~~ coast to ~~apogee before~~ its engine is fired, dual burn would allow the engine ~~satellite~~ ~~stage~~ to ignite right after satellite separation and burn just long enough to provide a begin-coast speed sufficient to place any given payload into a higher orbit ~~for the long, shallow climb required for high efficiency~~. At apogee the rocket engine is restarted to provide orbit injection. The greater begin-coast speed afforded by dual burn reduced the total amount of propellants required in the satellite stage that would in turn ~~allowe~~ allow increased payload.[*]

* R. Cargill Hall, Lockheed Missiles & Space Company, ~~Lockheed Aircraft~~-- in a rough draft of a brief history of The Agena Satellite wrote that a young Lockheed engineer conceived the "dual burn" technique concurrent with the selection of the Bell-Hustler rocket engine for the WS 117L program.

XRM-81

Agena Programs

Engine models: XLR-81 Ba-5 — Agena A

XLR-81 Ba-7 — Agena B

XLR-81 Ba-9 — do

Programs	Agena Type	Booster Type
Advent (Phase One) -	Agena B (Ba-9)	(Advent Phases Two & Three uses Centaur satellite vehicles)
Discoverer (1 - 15)-	Agena A	Atlas D (all phases) Thor DM-18
do (16- 19)-	Agena B (Ba-7)	Thor DM-21
do (20----)-	do (Ba-9)	do
Midas (I and II) -	Agena A	Atlas D
Midas (III---) -	Agena B (Ba-9)	do
NASA Agena B -	Agena B (Ba-9)	Atlas D & Thor DM-21
Saint -	Agena B (Ba-9)	Atlas D
Snapshot -	Agena B (Ba-9)	do
Vela Hotel -	Agena B (Ba-9)	do

XBAC 8048 = USAF YLR81-BA-5

" 8081 " XLR81-BA-7

" 8096 YLR81-BA-9

"Bell Aerosystems Co

File Hist 2

~~CONFIDENTIAL~~

HEADQUARTERS
AIR RESEARCH AND DEVELOPMENT COMMAND
UNITED STATES AIR FORCE
Andrews Air Force Base
Washington 25, D.C.

1697

REPLY TO ATTN OF: RDRBS

NOV 16 1960

SUBJECT: Operational Order for Satellite and Missile Observation System (SAMOS) Serial No. 60-1

TO:

23 NOV 60

1. You are directed to take immediate action to implement the subject Operations Order (copy attached).

B. A. SCHRIEVER
Lieutenant General, USAF
Commander

1 Atch
Operations Order

IF INCLOSURES ARE WITHDRAWN (OR NOT ATTACHED) THE CLASSIFICATION OF THIS CORRESPONDENCE WILL BE CANCELLED IN ACCORDANCE WITH PAR 25E, AFR 205-1.

~~CONFIDENTIAL~~

CO-92240

~~CONFIDENTIAL~~

HEADQUARTERS
AIR RESEARCH AND DEVELOPMENT COMMAND
WASHINGTON 23, DC

OPERATIONS ORDER FOR SATELLITE AND MISSILE OBSERVATION SYSTEM (SAMOS)
SERIAL NO. 60-1

TABLE OF CONTENTS

THIS OPERATIONS ORDER IS CLASSIFIED IN ACCORDANCE WITH THE REQUIREMENTS OF PARAGRAPH 23 OF AFR 205-1

HEADQUARTERS
AIR RESEARCH AND DEVELOPMENT COMMAND
WASHINGTON 25, DC

OPERATIONS ORDER NO.

TASK ORGANIZATION:

The Satellite and Missile Observation System (SAMOS) Project Office, a field extension of the Office of the Secretary of the Air Force, has been established at 2400 East El Segundo Blvd, El Segundo, California, per SAF Order No. 115.1, 31 August 60. (See Annex A) Brigadier General Robert E. Greer has been designated Director of the SAMOS Project Office, with additional duty as Vice Commander for Satellite Systems, AFBMD, ARDC. As Director of the SAMOS Project, General Greer is responsible to, and will report directly to the Secretary of the Air Force. In his dual capacity as Director of the SAMOS project and Vice Commander, AFBMD, he will exercise authority and control of the field management of the SAMOS program. Manpower and all necessary resources will be made available by AFBMD to support this office on the highest national priority. The resources and assistance of all ARDC Divisions and Centers will be made available as required.

1. GENERAL SITUATION:

The Deputy Secretary of Defense has directed the Secretary of the Air Force to assume direct responsibility for the reconnaissance satellite program (SAMOS), and to report for review and approval of the program directly to the Deputy Secretary of Defense. To assist in discharging his responsibilities for direction, supervision, and control of the SAMOS Project, the Secretary of the Air Force has established the SAMOS Project Office at AFBMD and the Office of Missile and Satellite Systems in the Office of the Secretary of the Air Force. He will appoint, as appropriate, a Satellite Reconnaissance Technical Advisory Group and has appointed a Satellite Reconnaissance Advisory Council. The SAMOS Program has been accorded the highest national priority, with the objective to obtain an operational capability for the United States at the earliest possible date.

2. MISSION:

Headquarters ARDC will, within existing capabilities, support to the maximum extent possible the development of the SAMOS Program. This support will include all functions normally considered operational and performed by other Commands and activities.

3. TASKS:

A. Headquarters ARDC will in accordance with appropriate directives provide the necessary support to the SAMOS development program. An office, Assistant for Satellite Systems (RDRB-1) has been established for this purpose. The functions of this office will include the following responsibilities:

(1) Informs the Commander on all aspects of SAMOS development program.

(2) Monitors the program to insure consistency between its assigned priority and the resources applied against the program.

(3) Maintains cognizance of the activities of ARDC Divisions and Centers to include effecting coordination as requested by the Commander, AFBMD.

(4) Maintains a knowledge of the activities of the staff, Hq ARDC, to assist in accomplishing staff actions expeditiously.

B. Hq AFBMD will support the SAMOS development program to the extent possible from within existing resources. Such resources will not be at the expense of programs having equal national priority. Hq ARDC will be advised of any requirements beyond existing capability to provide. Maximum use will be made of the technical resources of the Aerospace Corporation and Associate Contractors. Subordinate units will be augmented wherever necessary by the employment of competent civilian scientific and technical talent. The programming and status reporting facilities of the AFBMD will be augmented as necessary to support this program.

C. Each ARDC Division and Center having an assigned responsibility in connection with the SAMOS development program will establish a single point of contact office, reporting directly to the Division/Center Commander, and will support the program in accordance with its national priority. The Assistant for Satellite Systems, Directorate of Ballistic Missiles & Space Systems (RDRB-1) is designated as the SAMOS point of contact within Hq ARDC and will report directly to the Commander, ARDC, on SAMOS matters.

D. Headquarters USAF has directed that the Air Force provide the necessary resources and assistance to assure the timely attainment of the SAMOS objectives.

E. The urgency of this program will require lowest safe security classification to permit expeditious accomplishment. Extreme care will be exercised by all concerned, however, to ensure the strictest "need to know" in order to protect the sensitive political nature of this program.

F. Specific supporting requirements are outlined in the attached Annexes.

B. A. SCHRIEVER
Lieutenant General, USAF
Commander

ANNEXES:
A - Implementing Directives
B - Comptroller
C - Facilities
D - Logistics
E - Not used
F - Communications-Electronics
G - Personnel, Manpower & Organization
H - Aircraft Support
I - Security & Inspection Services
J - Legal
K - Information & Historical Services
L - Administrative Services

ANNEXES: (Continued)

M - Medical Services

DISTRIBUTION:

Office of the Secretary of the Air Force:
3 copies - SAFSM

Headquarters USAF:

1 - DCS/D
1 - DCS/M
1 - DCS/O
1 - DCS/P
1 - DCS/C

Headquarters ARDC:

1 - RDG
1 - RDGV
1 - RDGE
1 - RDA
1 - RDE
1 - RDI
1 - RDJ
1 - RDC
2 - RDY
3 - RDM
2 - RDP
1 - RDL
3 - RDR
5 - RDRB

ARDC Commands:

5 - Each ARDC Division
3 - Each ARDC Center

ANNEX "A"
TO
OPERATIONS ORDER
SERIAL NO.
IMPLEMENTING DIRECTIVES

HEADQUARTERS
AIR RESEARCH AND DEVELOPMENT COMMAND
WASHINGTON 25, DC

COPY

THE SECRETARY OF DEFENSE
WASHINGTON

Sep 15, 1960

MEMORANDUM FOR THE SECRETARY OF THE AIR FORCE

SUBJECT: Reconnaissance Satellite Program

The Secretary of the Air Force will assume direct responsibility for the reconnaissance satellite program and will report for review and approval on the program directly to the Deputy Secretary of Defense. A project management structure will be established within the Department of the Air Force which will ensure that the USAF director of the program will report directly to the Secretary of the Air Force.

The principal staff agency to assist the Deputy Secretary of Defense on the program is the Office of the Director of Defense Research and Engineering (ODDR&E). The USAF project management office will keep the ODD&E fully informed, on a timely basis, concerning all matters pertaining to the program.

/signed/
JAMES H. DOUGLAS
ACTING

COPY

NO: 115.1

DATE: August 31, 1960

SECRETARY OF THE AIR FORCE

ORDER

SUBJECT: Organization and Functions of the Office of Missile and Satellite Systems

1. There is hereby established the Office of Missile and Satellite Systems in the Office of the Secretary of the Air Force.

2. The Director of the Office of Missile and Satellite Systems is primarily responsible for assisting the Secretary in discharging his responsibility for the direction, supervision and control of the SAMOS Project. He is responsible for maintaining liaison with the Office, Secretary of Defense, and other interested Governmental agencies on matters relative to his assigned responsibilities. He may be assigned additional duties as deemed appropriate by the Secretary of the Air Force.

3. The Director will provide the Secretariat for the Air Force Ballistic Missile Committee.

DUDLEY C. SHARP
Secretary of the Air Force

COPY

NO: 116.1

DATE: August 31, 1960

SECRETARY OF THE AIR FORCE

ORDER

SUBJECT: The Director of the SAMOS Project

1. Effective this date, Brigadier General Robert E. Greer, Assistant Chief of Staff for Guided Missiles, is designated as Director of the SAMOS Project, with additional duty as Vice Commander for Satellite Systems, AFBMD, ARDC, with duty station at 2400 East El Segundo Boulevard, El Segundo, California.

2. The Director will organize an office to manage the SAMOS Project. Manpower to staff the office will be drawn from manpower available to him as Vice Commander for Satellite Systems. The SAMOS Project Office will be a field extension of the Office of the Secretary of the Air Force.

3. The Director is responsible to and will report directly to the Secretary of the Air Force.

4. Additional duties may be assigned to the Director as deemed appropriate by the Secretary of the Air Force.

DUDLEY C. SHARP
Secretary of the Air Force

HQ ARDC
OPERATIONS ORDER NO. 60-1

COPY

31 Aug 60

OFFICE OF THE SECRETARY

MEMORANDUM FOR THE CHIEF OF STAFF

1. In implementation of SAFO 115.1, it is requested that orders be issued assigning Brigadier General Richard D. Curtin as Director of the Office of Missile and Satellite Systems. Personnel listed in the attachment should be assigned coincident with General Curtin's assignment.

2. Necessary adjustment to the authorized manning of OSAF will be made to accommodate the transfer of the personnel indicated.

3. Physical office space should be in the area presently occupied by the Assistant Chief of Staff for Guided Missiles, if feasible.

1 Incl
Attach

/signed/
DUDLEY C. SHARP

COPY

12 Sep 60

ORGANIZATION AND FUNCTIONS OF THE

OFFICE OF MISSILE AND SATELLITE SYSTEMS

1. Secretary of the Air Force Order No. 116.1, dated 31 August 1960, designated Brigadier General Robert E. Greer as Director of the SAMOS Project, with additional duty as Vice Commander for Satellite Systems, AFBM, ARDC, with duty station at AFBMD. It directs him to organize a SAMOS Project Office at AFBMD as a field edtension of the Office of the Secretary of the Air Force. It specifies that Director of the SAMOS Project is responsible to and will report directly to the Secretary of the Air Force.

2. Secretary of the Air Force Order No. 115.1, dated 31 August 1960, established the Office of Missile and Satellite Systems in the Office of the Secretary of the Air Force. It provides that the Director of the Office of Missile and Satellite Systems is primarily responsible for assisting the Secretary in discharging his responsibility for the direction, supervision and control of the SAMOS Project. He is responsible for maintaining liaison with the Office, Secretary of Defense and other interested governmental agencies on matters relative to his assigned responsibilities. He may be assigned additional duties as deemed appropriate by the Secretary of the Air Force, and he will provide the Secretariat for the Air Force Ballistic Missile Committee.

3. The general management structure for the SAMOS Project is outlined in figure 1, attached. The Satellite Reconnaissance Technical Advisory Group will be appointed by the Secretary of the Air Force and will provide the means of obtaining the services of recognized experts from the scientific and applied engineering fields in the furtherance of the technical program. The Satellite Reconnaissance Advisory Council will be appointed by the Secretary of the Air Force to provide advice and counsel to him in the discharge of his overall responsibilities.

4. The internal organization and personnel assignment of the Office of Missile and Satellite Systems is outlined in Figure 2, attached. Following is a brief description of the principal duties of SAFMS officers:

OFFICE OF THE DIRECTOR

DIRECTOR	Responsible for conducting all actions of SAFMS in accordance with policy of and delegated authority from the Secretary of the Air Force.
DEPUTY DIRECTOR	Principal assistant to the Director, acts with full authority of the Director on all affairs of SAFMS. Responsible for overall direction, guidance, supervision, and coordination of the activities of the office.
EXECUTIVE OFFICE	Executive Officer, and Chief of the Executive

Executive Asst Executive	Office responsible for the general administration of SAFMS, including mail, security, records, inspections, personnel, travel, and overall office management.

EXECUTIVE SECRETARIAT OF AFBMC

Secretary Asst Secretary	Executive Secretariat of the Air Force Ballistic Missile Commitee for Missile and Space Systems. Handles all matters related to Committee Actions.

SATELLITE RECONNAISSANCE

Asst for Programs	Responsible for SAFMS duties concerning programming, funding, and schedules. Monitors, briefs and reports on all SAMOS launches. Maintains an active, working SAMOS control room for daily use. Responsible for actions incident to revising, processing, and maintaining the SAMOS development plan. Responsible for general briefings on the entire overall SAMOS Project, and for the preparation and maintenance of complete briefing material, aids and information on the overall project.
Asst for Electronics	Responsible for SAFMC duties concerning electronic payloads, ELINT, and related matters; weather aspects of the SAMOS Project; technical compatibility of electronic aspects of subsystem I, Space-Ground Communications. Responsible for NSA liaison and coordination. Responsible for maintaining current knowledge of booster and vehicle capabilities. Alternate to the Assistant for Instrumentation.
Asst for Photography	Responsible for SAFMS duties concerning photographic equipment and payloads and related coordination with other services and agencies. Responsible for photographic compatibility aspects of Subsystem I. Alternate to Assistant for System Engineering.
Asst for Instrumentation	Responsible for SAFMS duties concerning Subsystem I, its overall development, schedules, locations, tests, and overall technical design, overall data processing and handling of all SAMOS outputs. Also responsible for SAMOS recovery program, SAMOS command and control aspects, including centers and stations. Also responsible for MIDAS and DISCOVERER coordination. Alternate to Assistant for Electronics.

Asst for System Engineering

Responsible for overall system engineering aspects including interchangeability of payloads, system performance capabilities, mission variations, system growth possibilities, and relative priorities within the project. Responsible for necessary coordination with related and supporting R&D programs. Also responsible for special projects as assigned by the Director. Alternate to the Assistant for Photography.

BEST COPY

COPY

SATELLITE RECONNAISSANCE TECHNICAL ADVISORY GROUP

1. The services of recognized experts from the scientific and applied engineering communities shall be solicited as appropriate in the furtherance of the SAMOS technical program. Such services shall be rendered through the functioning of the Satellite Reconnaissance Technical Advisory Group.

2. The Satellite Reconnaissance Technical Advisory Group shall be composed of:

a. A permanent Standing Committee of four, which shall include recognized experts in the fields of electronics, photography, and data handling. The membership of the Standing Committee will be appointed by the Secretary of the Air Force.

b. Assemblies of technical experts representing pertinent scientific and engineering fields convened as occasions arise necessitating competent technical evaluation and advice in the prosecution of the Satellite Reconnaissance Program. Participation of such individuals in assemblies of the Satellite Reconnaissance Technical Advisory Group shall be by invitation from the Secretary of the Air Force. The Standing Committee shall preside at assemblies of the Technical Advisory Group.

3. Each assembly of the Satellite Reconnaissance Technical Advisory Group shall be chartered to consider specifically designated matters. Individuals invited to participate in Technical Advisory Group assemblies may vary for each assembly according to the nature of the matters under consideration.

4. Reports and findings of the Satellite Reconnaissance Technical Advisory Group shall be prepared for and submitted to the Secretary of the Air Force by the Standing Committee.

5. The Secretary of the Air Force shall, upon request from other government agencies in matters of national interest involving resolution of technical differences, direct the permanent Standing Committee to convene a special assembly of competent persons as determined by the Standing Committee, to consider the matter under request and to recommend appropriate resolution.

COPY

SATELLITE RECONNAISSANCE ADVISORY COUNCIL

1. Recent changes in the SAMOS management structure have resulted in the establishment of a Director of the SAMOS Project at AFBMD as a field extension of the Office of the Secretary of the Air Force, and an Office of Missile and Satellite Systems within the Secretary's staff to assist him in the discharge of his responsibilities. The SAMOS Project will be managed within this structure, with no intermediate review or approval channels between the SAMOS Project Director and the Secretary of the Air Force.

2. In order to assist the Secretary in the discharge of his responsibilities, there is a need for an advisory agency to provide assistance, advice and recommendations as required. This agency will be the Satellite Reconnaissance Advisory Council.

THE SATELLITE RECONNAISSANCE ADVISORY COUNCIL:

Under Secretary of the Air Force, Chairman
Assistant Secretary (Research and Development)
Assistant Secretary (Financial Management)
Assistant Secretary (Materiel)
Vice Chief of Staff
Deputy Chief of Staff, Development
Assistant Chief of Staff, Intelligence
Director, Office of Missile and Satellite Systems

3. The Office of Missile and Satellite Systems will provide the Secretariat for the Council.

4. No alternates will be designated. Attendance will be limited to the members of the Council and such other individuals as may be invited to attend by the Chairman.

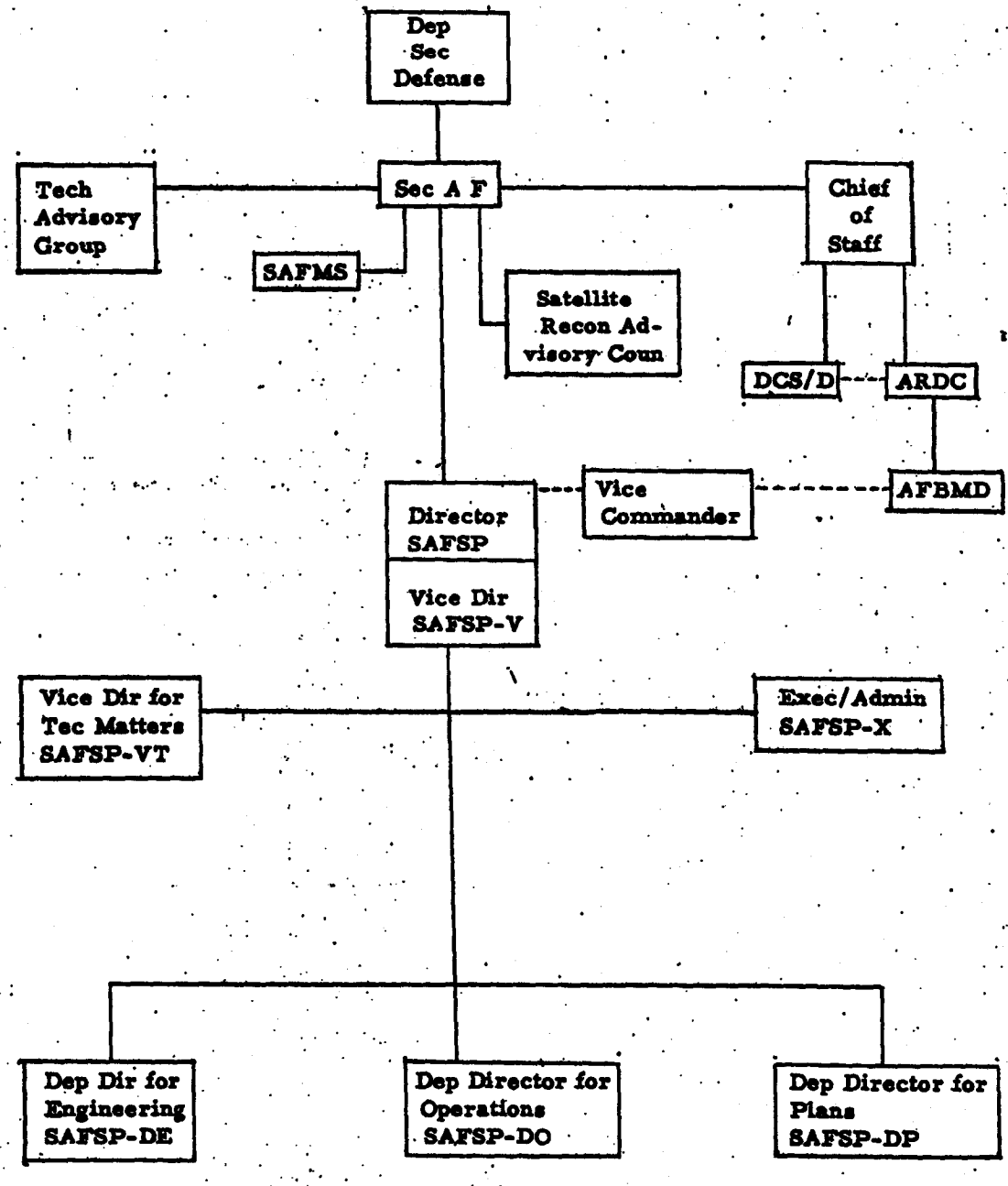

Dep Sec Defense
Tech Advisory Group
Sec A F
Chief of Staff
SAFMS
Satellite Recon Advisory Coun
DCS/D
ARDC
Director SAFSP
Vice Commander
AFBMD
Vice Dir SAFSP-V
Vice Dir for Tec Matters SAFSP-VT
Exec/Admin SAFSP-X
Dep Dir for Engineering SAFSP-DE
Dep Director for Operations SAFSP-DO
Dep Director for Plans SAFSP-DP

Figure 1

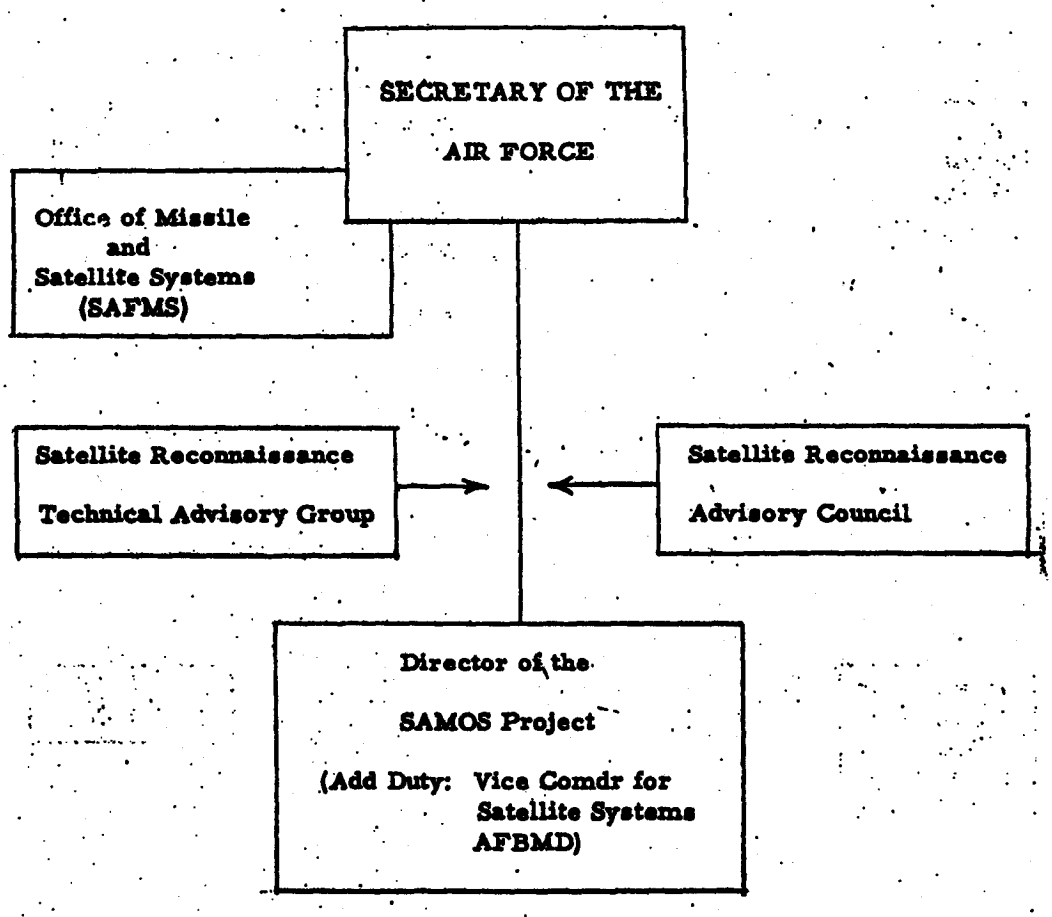

SECRETARY OF THE AIR FORCE
Office of Missile and Satellite Systems (SAFMS)
Satellite Reconnaissance Technical Advisory Group
Satellite Reconnaissance Advisory Council
Director of the SAMOS Project
(Add Duty: Vice Comdr for Satellite Systems AFBMD)

Figure 2

COPY

DEPARTMENT OF THE AIR FORCE
Office of the Secretary of the Air Force
12 September 1960

OFFICE OF
MISSILE AND SATELLITE SYSTEMS

Brig Gen Richard D. Curtin, Director
Miss Margaret Enright, Secretary

Col John L. Martin, Jr., Dep Director
Mrs Eugenia L. Luckman, Secretary

EXECUTIVE OFFICE

Maj R. A. Van Mater, Executive
CWO Wm De Haro, Asst Executive
T/Sgt Walter B McArthur, Jr, NCOIC
A/1C Albert Roach, Corr Ctl Clerk

EXECUTIVE SECRETARIAT
AFBMC (Missiles and Space)

Col Theodore H. Runyon, Secretary
Col Herman Dorfman, Assistant
Miss Cecelia Principe
A/1C J. D. Kirkpatrick

S A T E L L I T E R E C O N N A I S S A N C E

ASSISTANT FOR
PROGRAMS

Lt Col Thos J. Herron
Mrs Marylou Graham
S/Sgt J L Hester

ASSISTANT FOR
ELECTRONICS

Lt Col Edwin J Istvan

ASSISTANT FOR
INSTRUMENTATION

Major Jack Sides

Miss Carol Watson

ASSISTANT FOR
PHOTOGRAPHY

Major Clifton E James

Miss Helen St Ledger

ASSISTANT FOR
SYSTEM ENGINEERING

Major Henry C Howard

Figure 3

HQ ARDC
OPERATIONS ORDER NO. 60-1

COPY

1 October 1960

Special Order A-1790, dated 27 September 1960:

1. The verbal orders of the Secretary of the Air Force on 6 September 1960 as follows are confirmed:

"Brigadier General Robert E. Greer, 1672A, is relieved from Hq AFBMD (ARDC) Los Angeles, California, from duty as Vice Commander for Satellite Systems, AFBMD: Assigned OSAF, Hq USAF, Washington, D. C., with duty station 2400 East El Segundo Boulevard, El Segundo, California for duty as Director of the Satellite and Missile Observation System Project with additional duty as Vice Commander for Satellite Systems, AFBMD (ARDC). EDCSA 1 October. No travel involved."

COPY FOR OFFICIAL USE ONLY COPY

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON 25, DC

AFCSS

Missile and Satellite Systems 14 October 1960

AAC	CAIRC	USAFE	ADC	HqC	AFAFC
ARDC	PACAF	AU	CONAC	ATC	TAC
USAFSS	MATS	USAFA	AMC	SAC	

1. The Secretary of the Air Force has established:

a. An Office of Missile and Satellite Systems (SAFMC) in the Office of the Secretary of the Air Force to assist him in discharging his responsibility for the direct supervision and control of the SAMOS Project. The Director will provide the Executive Secretariat for the Air Force Ballistic Missile Committee. The Director, SAFMS, is responsible for maintaining liaison with the Office of the Secretary of Defense and other interested government agencies on matters relative to his assigned responsibilities. He may be assigned additional duties as deemed appropriate by the Secretary of the Air Force. Brigadier General Richard D. Curtin has been designated as Director of this office.

b. A Directorate of the SAMOS Project (SAFSP) at AFBMD as a field extension of the Office of the Secretary of the Air Force responsible to and reporting directly to the Secretary for management of the SAMOS Project. Brigadier General Robert E. Greer has been designated as Director with additional duty as Vice Commander for Satellite Systems, AFBMD, ARDC, with duty station at 2400 East El Segundo Blvd., El Segundo, California.

c. A Satellite Reconnaissance Technical Advisory Group and a Satellite Reconnaissance Advisory Council.

2. Effective immediately, the satellite reconnaissance program will be managed within the above structure. Further:

a. There will be no review or approval channels between the Director of the SAMOS Project and the Secretary of the Air Force. However, in order to maintain general project knowledge within those command or staff offices where such knowledge is necessary for program support or coordination of related matters, need-to-know briefings will be given on a periodic basis. Briefings will be given by SAFMS without request and not as a part of project management actions. Requests for briefings will be directed to the Secretary of the Air Force and will be approved on a strict need-to-know basis.

FOR OFFICIAL USE ONLY

b. Visits to the SAMOS Project Office, El Segundo, California, will be for official business only. Requests for visits by other than specifically accredited contractors and agencies of the government whose business requires regular and frequent visits will be directed to the Secretary of the Air Force for approval.

c. The Director of the SAMOS Project is authorized direct contact with major commands to request support.

d. The Director, Office of Missile and Satellite Systems, is authorized direct contact with the Air Staff and other staffs and agencies to request support as required.

3. The Executive Secretariat of the Air Force Ballistic Missile Committee will be the responsibility of the Director of Missile and Satellite Systems. Pending resolution and clarification of Air Staff participation in the direction of Ballistic Missile and Space Programs, the Secretariat will continue to provide the Air Force Ballistic Missile Committee with a direct channel to the Inglewood Complex, Air Materiel Command, and the Air Staff. This will include the necessary arrangements for meetings and follow-on implementing actions. The Air Staff will keep this office fully advised on missile and space matters so as to insure maximum effectiveness for the Secretary of the Air Force and the Air Force Ballistic Missile Commitee. Until more detailed operating instructions are issued, the Air Staff will continue to assist the Office of Missile and Satellite Systems in every way possible.

4. The high national importance accorded the SAMOS Project requires complete support and immediate response from all elements of the Air Force. All individuals and organizations of the Air Force are urged to provide the necessary resources and assistance to these offices to assure the timely attainment of missile and satellite objectives.

/signed/
ROBERT R. ROWLAND
Colonel, USAF
Secretary of the Air Staff

FOR OFFICIAL USE ONLY

ANNEX "B"
TO
OPERATIONS ORDER
SERIAL NO.
COMPTROLLER

HEADQUARTERS
AIR RESEARCH AND DEVELOPMENT COMMAND
WASHINGTON 25, DC

1. BUDGET:

a. The Budget Annex of the Development Plan will provide the basis for justifying the program fund requirements through all levels of review. It will include prior year funding, current year fund requirements, and one future year estimated fund requirements unless otherwise directed by the Secretary of the Air Force. The Development Plan will not contain support-type fund requirements. These will be included in normal Budget Estimates and Financial Plans submitted by supporting Centers, Divisions, and Commands.

b. After appropriation of funds by the Congress, the Financial Plan as approved by the Secretary of the Air Force will constitute the authority for all funding actions by Hq USAF. Funds allocated to the Commander, ARDC, will be sub-allocated to appropriate Division and Center Commanders. Military Construction funds will be allocated by Hq USAF directly to the Air Force Construction Agent, as designated by the Secretary of the Air Force.

c. Each Division/Center having a responsibility in this program will state support fund requirements to Hq ARDC. This will normally be accomplished in the Division/Center Budget Estimates and Financial Plans and revisions thereto. Fund requirements stated by each Division/Center in support of this program will be separately identified. In the event unprogrammed items requiring funding arise, and the Division/Center cannot absorb the funding within existing resources, the Division/Center involved will advise Hq ARDC of the additional fund requirement.

d. The AFBMD Budget Directorate will provide Budget Services to the Director, SAMOS Project, as required.

2. ACCOUNTING AND FINANCE:

a. The AFBMD Accounting and Finance Directorate will perform accounting operations for this program as prescribed in current directives.

b. The AFBMD Accounting and Finance Directorate will provide the same finance service to this program and assigned personnel as provided other programs and personnel assigned to AFBMD.

c. Each Division/Center will perform accounting operations as prescribed in current directives for funds received in support of this program.

3. STATISTICAL SERVICES:

a. Each Division/Center will provide normal statistical services in support of this program.

4. MANAGEMENT ANALYSIS:

a. The AFBMD Financial Analysis Directorate will provide the Commander AFBMD and the Director, SAMOS Project financial analysis services as required.

b. Each Division/Center Commander will insure that appropriate analysis is performed to provide him data to insure smooth implementation and accomplishment of his portion of the program.

ANNEX "C"
TO
OPERATIONS ORDER
SERIAL NO.
FACILITIES

HEADQUARTERS
AIR RESEARCH AND DEVELOPMENT COMMAND
WASHINGTON 25, DC

1. POLICY: The Air Research and Development Command, through the Air Force Ballistic Missile Division, Los Angeles 45, California, will provide facility support for the SAMOS Program worldwide and for the SAMOS Project Office, El Segundo, California.

II. SAMOS PROGRAM SUPPORT: The Deputy Commander for Facilities, Air Force Ballistic Missile Division, will provide the Civil Engineering support required for implementation of the SAMOS PROGRAM including, but not limited to:

a. Development of worldwide facility requirements.

b. Programming of requirements.

c. Design of all facilities. Design responsibility includes architect-engineer selection, supervision, review and approval of design concepts, preliminary and final design; design interpretation during construction and review and approval of design change orders during construction.

d. Construction surveillance.

e. Fiscal management of design and construction.

f. Acceptance of completed facilities.

III. SAMOS PROJECT OFFICE SUPPORT: The Civil Engineering Division of the 6592nd Support Group, AFBMD, will support the SAMOS Project Office, El Segundo, California, as follows:

a. Provide for the maintenance, operation and accountability of all Air Force Real Property utilized in support of the SAMOS PROGRAM.

b. In conjunction with Aerospace Corporation, provide necessary office space, fixed facilities and parking space.

c. Analyze, review and process requests for modification and alterations of facility requirements submitted in accordance with AFBMD Regulation 85-1, "Work Order Request".

ANNEX "D"
TO
OPERATIONS ORDER
SERIAL NO.
LOGISTICS

HEADQUARTERS
AIR RESEARCH AND DEVELOPMENT COMMAND
WASHINGTON 25, DC

1. GENERAL:

a. A priority and precedence rating of 1-1 and a DOD rating of Brickbat .01 is assigned to the SAMOS Program.

b. AFBMD is responsible for insuring that timely Logistics Support is available to meet the requirements of the SAMOS Project Office. This includes both support of Military Organizations and Contractors engaged in Research and Development of the SAMOS system in both the Los Angeles area and at operational sites.

2. SUPPORT SOURCES:

a. Support will be provided from three major sources - AF host commands (host Air Force bases), other DOD agencies and/or AFBMD. Support agreements with host agencies will be negotiated by AFBMD.

b. In the event site location makes it impossible to provide support from Air Force or interservice sources, AFBMD will take the necessary action to contract for the required support.

3. TRANSPORTATION:

a. Transportation for equipment and supplies for the SAMOS Program will be arranged for by AFBMD (WDMT) in accordance with applicable directives and agreements between the AMC (LSM).

b. Vehicles in support of the SAMOS Program will be arranged for by AFBMD. SAMOS organizations are responsible for proper use of vehicles in accordance with AFBMDR 77-1.

4. MAINTENANCE:

a. AFBMD will process modifications for aircraft used to support the SAMOS Program in accordance with AFR 57-4 and will arrange for accomplishment of modifications.

b. Calibration, chemical laboratories, liquid oxygen cleaning and other highly specialized technical facilities will be arranged for by AFBMD making maximum use of existing facilities.

c. Technical Order Libraries will be provided by AFBMD.

d. AFBMD will prepare and consolidate budget estimates and financial plans for contract maintenance and equipment modification in support of the SAMOS Program.

5. SUPPLY:

a. General. AFBMD will render supply assistance to the SAMOS Program on an as required basis, and insure that required items are procured and delivered by established need dates.

b. Equipment Authorizations. AFBMD will be responsible for equipment review and authorization functions as prescribed by Air Force Directives.

c. Budget. AFBMD will prepare and consolidate financial plans and budget estimates for GFE equipment and supplies required by the SAMOS Program.

d. Propellants. Liquid propellants, fuels and chemicals required for the SAMOS Program will be programmed and/or budgeted for by AFBMD in accordance with USAF procedures.

ANNEX "F"
TO
OPERATIONS ORDER
SERIAL NO.
COMMUNICATIONS-ELECTRONICS

HEADQUARTERS
AIR RESEARCH AND DEVELOPMENT COMMAND
WASHINGTON 25, DC

1. GENERAL

a. AFBMD is responsible for providing suitable and timely Communications-Electronics support of the SAMOS Program Office.

b. Communications-Electronic support includes that of military organizations, prime and sub-contractors, and commercial carriers in both the Los Angeles area and at operational bases.

2. PROCUREMENT AND INSTALLATION

a. The intra-station and inter-station ground-support communications requirements will be procured and installed through lease from commercial carriers whenever possible. Government owned ground-support communications systems will be procured and installed through a communications contractor.

b. Prime and sub-contractors will be responsible for providing the ground-space communication requirements and the necessary interface equipments with the ground-support communications system. Ground-space communications systems will be government owned whenever possible.

3. MAINTENANCE

a. Lease ground-support communications systems will be maintained by the commercial carrier. Government owned ground-support communications will be maintained by either a commercial contractor or military personnel.

b. Ground-space communications systems will be maintained by a communications contractor or military personnel.

NOTE: Complete details such as Wire Plan, Frequencies, etc will be included in this Annex as quickly as possible.

ANNEX "G"
TO
OPERATIONS ORDER
SERIAL NO.
PERSONNEL, MANPOWER & ORGANIZATION

HEADQUARTERS
AIR RESEARCH AND DEVELOPMENT COMMAND
WASHINGTON 25, DC

1. MILITARY PERSONNEL:

The AFBMD will provide all normal personnel support services to the Director, SAMOS Project, within its capabilities in accordance with current policies and procedures. Such support will include:

a. Personnel Accounting.

b. Military Pay.

c. Personnel Classification Action.

d. Manning of all authorized positions. Assistance in manning key positions will be provided by the Secretary of the Air Force.

2. CIVILIAN PERSONNEL:

The AFBMD will provide all Civilian Personnel support within its capability to the Director, SAMOS Project. Such support will include:

a. Direction and administration of the civilian personnel program.

b. Classification and pay administration.

c. Recruitment, employment, placement, and separation of civilian employees.

d. Employee-management relations and necessary employee services.

e. Training and development of civilian employees.

3. MANPOWER AND ORGANIZATION:

a. AFBMD has provided 39 officer and 15 civilian manpower spaces for the SAMOS Project Office. In addition, 10 officer and 10 civilian spaces have been provided by the Office of the Secretary of the Air Force, specifically for the SAMOS program. Any additional spaces required will be provided by Hq USAF. Additional requirements will be submitted to Hq AFBMD (WDPO) who will assist in the preparation of substantiating data for transmittal on an expedited basis to Hq USAF through ARDC.

b. Directorate of SAMOS Project Office is a field extension of the Office of the Secretary of the Air Force, by authority of SAF Order 116.1, dated 31 August 1960. The Director is responsible to, and will report directly to, the Secretary of the Air Force. As an additional duty, he will act as Vice Commander for Satellite Systems to the Commander of AFBMD in which capacity he may command such additional support as AFBMD has the capability to provide. Organizational structure of the Directorate of SAMOS Project will be consistent with proper Air Force management procedures and will be functionally aligned to fulfill its mission. Organization changes desired by the Director of SAMOS project will be submitted to Hq AFBMD (WDPO) for transmittal to USAF through ARDC.

ANNEX "H"
TO
OPERATIONS ORDER
SERIAL NO.
AIRCRAFT SUPPORT

HEADQUARTERS
AIR RESEARCH AND DEVELOPMENT COMMAND
WASHINGTON 25, DC

I. POLICY:

The Air Research and Development Command through the Air Force Ballistic Missile Division, Los Angeles 45, California, will provide all aircraft requirements (assigned or bailed) in direct support of the SAMOS Program.

II. PROCEDURE:

The Support Operations Division (WDQO) of the 6592d Support Group, AFBMD, will support the SAMOS Program as follows:

a. Bailment requests will be processed in accordance with AFBMDIR 70-7 and ARDC Regulation 55-3.

b. Requests for assignment of aircraft will be processed through WDQO in accordance with ARDC Regulation 55-3.

c. WDQO will assist in validating aircraft requirements when required.

ANNEX "I"
TO
OPERATIONS ORDER
SERIAL NO.
SECURITY AND INSPECTION SERVICES

HEADQUARTERS
AIR RESEARCH AND DEVELOPMENT COMMAND
WASHINGTON 25, DC

1. SECURITY:

The AFBMD will provide those security services normal to a host/tenant relationship. Services provided will include:

a. Guard services to meet physical security requirements within the AFBMD Complex.

b. Personnel Security Clearance actions as required.

c. Visitor Control Services.

d. Classification guidance and assistance as required.

e. Such other requested services as are within the capability of the AFBMD.

2. INSPECTION SERVICES:

The Inspector General, AFBMD, will provide:

a. Inspection Services required by AFR 123-1.

b. Quarterly Security Inspection Check Lists in compliance with AFR 205-1.

c. Such other requested services and assistance as are within the capability of the AFBMD.

ANNEX "J"
TO
OPERATIONS ORDER
SERIAL NO.
LEGAL

HEADQUARTERS
AIR RESEARCH AND DEVELOPMENT COMMAND
WASHINGTON 25, DC

1. The Staff Judge Advocate, Headquarters, ARDC, will provide assistance to and will exercise surveillance over all legal activities of the Ballistic Missile Division in support of the SAMOS Project, Office of the Secretary of the Air Force.

2. The Staff Judge Advocate, Headquarters AFBMD, as required, will:

a. Act as advisor to the Director of the SAMOS Project and his staff on legal problems pertaining to the SAMOS Project.

b. Provide legal review of all contracts written in support of the SAMOS Project.

c. Render advice, assistance and act on all patent, copyright and royalty and other proprietary right matters including infringement claims arising out of or incident to SAMOS project activities.

d. Monitor and coordinate all actions dealing with the Reports Clause of all contracts written for the SAMOS project including evaluations and clearances for payment.

e. Direct the administration and processing of claims in favor of and against the United States Government.

f. Provide legal assistance for all eligible personnel assigned or attached to the SAMOS Directorate.

g. Provide advice and assistance to the Director on disciplinary problems.

ANNEX "K"
TO
OPERATIONS ORDER
SERIAL NO.
INFORMATION AND HISTORICAL SERVICES

HEADQUARTERS
AIR RESEARCH AND DEVELOPMENT COMMAND
WASHINGTON 25, DC

1. INFORMATION SERVICES:

a. Within the procedures prescribed by the Public Affairs Plan for SAMOS SATELLITE PROJECT (PA 13/1), dated 22 September 1960, AFBMD is responsible for developing detailed information plans and initiating programs for all information aspects of the SAMOS program in direct support to the SAMOS Project Director, Office of the Secretary of the Air Force.

b. AFBMD will establish procedures and channels for the control of SAMOS Program information, including that information generated by participating ARDC Divisions and Centers, Major Air Commands, and Air Force contractors, subcontractors, and suppliers; to provide a central coordinating agency for the review and processing of material intended for public dissemination. SAMOS Program progress will be closely monitored by AFBMD so that technical secrets are protected while general progressive information can be recommended for publication in order to serve public interest.

c. AFBMD will initiate and supervise actions affecting local and national acceptance of the SAMOS Program. This will include preparation and coordination of press plans for significant events in the SAMOS Program including making available to news media, pre-launch, launch, and post-launch information; routine handling of press queries regarding SAMOS, inputs to speeches by key SAMOS Program officials, photographic support, both still and motion, and the normal internal (Air Force wide) information activities. Other ARDC Divisions and Centers will cooperate and participate in this program as required.

d. AFBMD will submit through established information channels to the Office of Security Review, OASD(PA), all handout material, statements, fact sheets, etc for release to news media, for coordination and final approval not less than ten days in advance of the planned date of launch.

e. Hq ARDC Office of Information will be continually advised of all public information aspects of the SAMOS Program.

2. HISTORICAL SERVICES:

a. Upon request, the AFBMD Historian will provide guidance to the staff of the SAMOS Project Director, Office of the Secretary of the Air Force, in the preparation of any historical reports required under AFR 210-3, 12 August 1960.

ANNEX "L"
TO
OPERATIONS ORDER
SERIAL NO.
ADMINISTRATIVE SERVICES

HEADQUARTERS
AIR RESEARCH AND DEVELOPMENT COMMAND
WASHINGTON 25, DC

1. GENERAL:

The Director, SAMOS Project, will receive administrative support from Hq AFBMD in the same manner and extent as is received by other organizations located on the AFBMD Installation. Details of support requirements will be arranged and changed as necessary by mutual agreement between the Director of Administrative Service, Hq AFBMD (WDA), and the Executive Officer, SAMOS Project Office (SAFSP-X).

2. MAIL, MESSAGE, & COURIER SERVICE:

The Director of Administrative Services (WDA), Hq AFBMD, will provide normal message center, mail room, and courier services to the SAMOS Project Office. Maintenance of internal accountability records for classified material is the responsibility of the SAMOS Project Office.

3. ADMINISTRATIVE ORDERS:

Travel performed by the Director, SAMOS Project, in his capacity as a representative of the Secretary of the Air Force and in support of the SAMOS Project, will be covered by blanket orders from the Office of the Secretary of the Air Force. All other travel by the Director, SAMOS Project, and all travel by members of his staff will be performed under orders issued by Hq AFBMD upon request of designated officials assigned to duty in the SAMOS Project Office. As qualified above, Hq AFBMD will provide complete orders-issuing service to include travel, leave, personnel actions, board appointments and any other action requiring issuance of a special order. Hq AFBMD Regulations shall apply.

4. PRINTING, DUPLICATING, & ART SERVICES:

Printing, duplicating, and art services will be provided by Hq AFBMD. Hq AFBMD Regulations shall apply.

5. PUBLICATIONS AND FORMS:

Hq AFBMD will furnish departmental, ARDC, and AFBMD publications and forms necessary to operate the SAMOS Project Office. AFBMD Regulations governing issuance of publications and forms shall apply. Directives issued by the Secretary of the Air Force will be received directly

in the SAMOS Project Office in accordance with procedures to be established by the SAMOS Project Office.

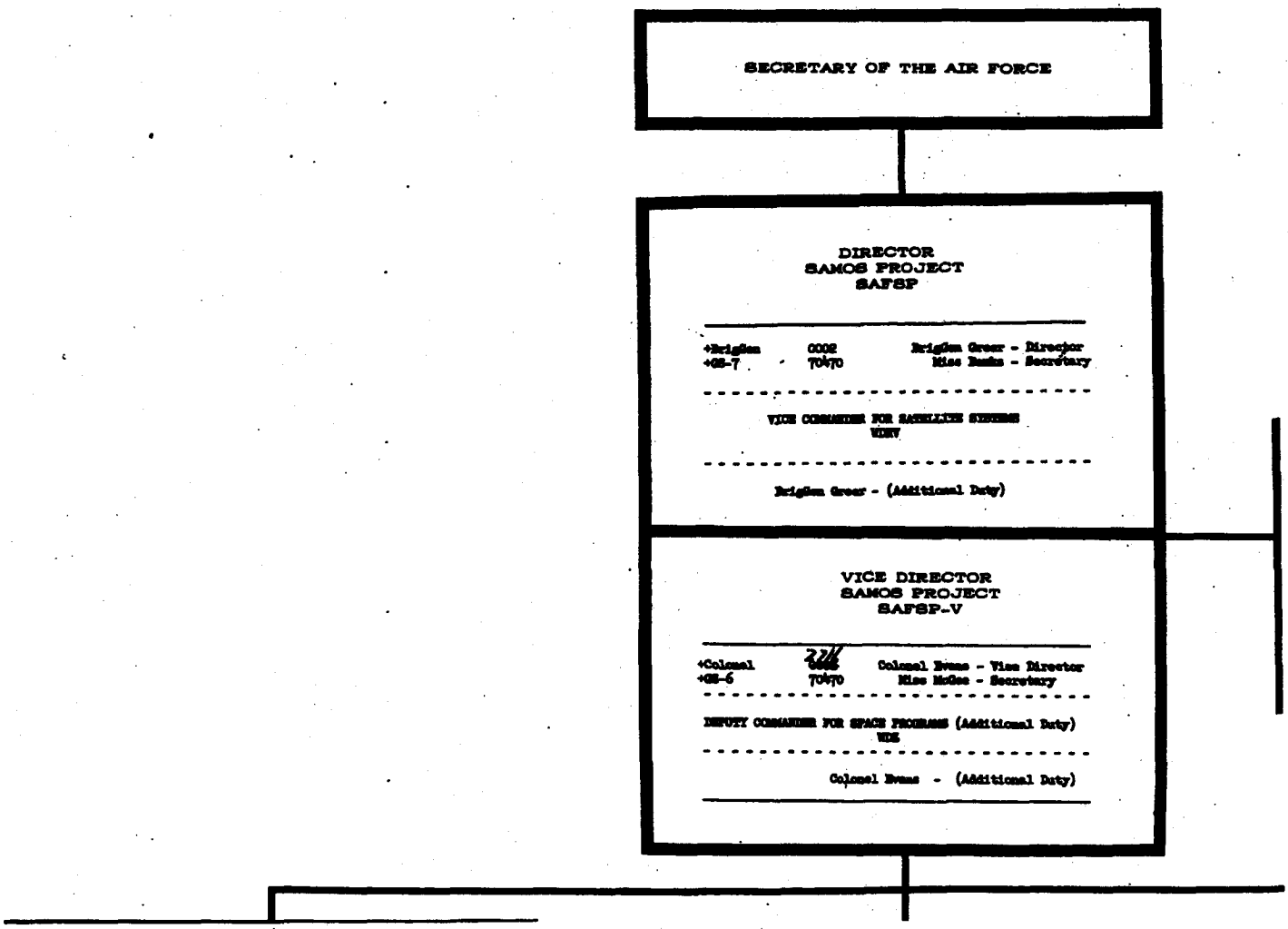
6. RECORDS MANAGEMENT:

Files of current records will be maintained in accordance with AFM 181-4. Assistance in preparing Records Control Schedules will be furnished by the Records Management Officer, Hq AFBMD.

ANNEX "M"
TO
OPERATIONS ORDER
SERIAL NO.
MEDICAL SERVICES

HEADQUARTERS
AIR RESEARCH AND DEVELOPMENT COMMAND
WASHINGTON 25, DC

The Air Force Ballistic Missile Division will provide all medical support within its capabilities to personnel of the SAMOS Project Directorate, in accordance with ARDC directives and existing procedures. Such support will include professional medical services and appropriate medical services as required.


SECRETARY OF THE AIR FORCE
DIRECTOR
SAMOS PROJECT
SAFSP
+Brigdn 0002 Brigdn Greer - Director
+GS-7 70/70 Miss Banks - Secretary
VICE COMMANDER FOR SATELLITE SYSTEMS
WDRV
Brigdn Greer - (Additional Duty)
VICE DIRECTOR
SAMOS PROJECT
SAFSP-V
+Colonel 0002 Colonel Evans - Vice Director
+GS-6 70/70 Miss McGee - Secretary
DEPUTY COMMANDER FOR SPACE PROGRAMS (Additional Duty)
WDE
Colonel Evans - (Additional Duty)

VICE DIRECTOR FOR TECHNICAL MATTERS SAFSP-VT

+Colonel	2726	Colonel King	- Vice Director for Technical Matters
+GS-5	70450	Miss Leatherman	- Secretary

DEPUTY DIRECTOR PROGRAM I SAFSP-L

		Col King	- (Additional Duty)
+LtCol	2726	LtCol Tendt	- Asst Deputy Director
GS-5	70450	Mrs Doshow	- Secretary
		SYSTEMS INTEGRATION DIVISION	
LtCol	2726	LtCol Fishburne	- Project Officer Operations
Major	2726	Major Quinn	- Project Officer Engineering
GS-4	70450	Mrs Holstein	- Secretary
		SATELLITE DEVELOPMENT DIVISION	
LtCol	2726	Major Copley	- Project Officer
Major	2726	Major Burnett	- Asst Project Officer
GS-4	70250	Mrs Holt	- Clerk Typist
		LAUNCH AND RECOVERY DIVISION	
Major	2726	Major Knolle	- Project Officer
Major	8044	Capt Burger	- Asst Project Officer
Capt	2734	Lt Flory	- Asst Project Officer
GS-4	70450	Mrs Baker	- Secretary
		GROUND BASED SATELLITE CONTROL DIVISION	
Major	2726	Capt Prentiss	- Project Officer
Major	2726	Capt Thomas	- Asst Project Officer
Capt	2734	Capt Redwine	- Asst Project Officer
GS-4	70250	Mrs Gosaudy	- Clerk Typist

DEPUTY DIRECTOR PROGRAM II SAFSP-E

+Colonel	2726	Col Moran	- Deputy Director
Colonel	2726	Col Hedrick	- Asst Deputy Director
GS-5	70450	Miss Cunagin	- Secretary
		OPERATIONS/PAYLOAD DIVISION	
LtCol	2726	LtCol Atwood	- Chief
LtCol	2726	Major Conway	- Project Officer Payload
Capt	2734	Capt Swanson	- Asst Project Officer Payload
Major	2726	Major Manley	- Project Officer Reliability & Spec
Major	2726	Major Spradley	- Project Officer Operations
Capt	2734	Capt Burton	- Asst Project Officer Operations
Major	2726	Major Smith	- Project Officer Plans
GS-5	70450	Miss Lovan	- Secretary
GS-5	70450	Mrs Boyer	- Secretary
		SUPPORTING ENGINEERING DIVISION	
LtCol	2726	LtCol Botsong	- Chief
Major	2726	Major Schmitt	- Project Officer Boosters
Major	2726	Capt Quinn	- Asst Project Officer Boosters
Major	2726	Major Rehbein	- Project Officer C & C
Major	2726	Major Edmonds	- Project Officer Re-Entry Vehicle
GS-5	70450	Mrs Thrift	- Secretary
GS-4	70250	Mrs Anyong	- Clerk Typist

LtCol
+LtCol
Major
Capt
+GS-5

+ SAF Manning

i
ayload
ility & Spec
ions
perations

rs
oosters

ry Vehicle

EXECUTIVE/ADMINISTRATIVE
SAFSP-X

LtCol	7016	LtCol	Phelps	- Executive
Major	7024	Capt	Banks	- Asst Executive
Capt	7024	CWO	Rutledge	- Administrative Officer
MSgt	70270	MSgt	Grimes	- Administrative Supervisor
+GS-5	29150B	Mr	Iannone	- Teletypist
+GS-4	70450	Miss	Merrell	- Administrative Asst
+GS-4	70450	Mrs	Dupuis	- Mail & Records
+GS-4	70450	Miss	Ryan	- Secretary
GS-4	70450			

DEPUTY DIRECTOR FOR OPERATIONS
SAFSP-O

		Col	Ruebel	- Deputy Director (Additional Duty)
LtCol	2726	LtCol	Gomez	- Asst Deputy Director
+LtCol	2726	LtCol	Ohlmeyer	- Asst Deputy Director Processing
Major	2734	Capt	Reuner	- Asst for Production Development
Capt	2734	Capt	Woodall	- Asst for Mission Programming
+GS-5	70450	Mrs	Willis	- Secretary

DEPUTY DIRECTOR FOR PLANS & PROGRAMMING
SAFSP-P

+Colonel	2716	Col	Curtis	- Deputy Director
+LtCol	2726	LtCol	Jochim	- Asst Deputy Director
+GS-5	70450	Mrs	Komo	- Secretary
GS-4	70450	Mrs	Speaks	- Secretary
		PLANS DIVISION		
LtCol	0076	LtCol	Hurley	- Chief Plans Division
Major	2734	Major	Campbell	- Advanced Plans Off
Major	7016	Major	Guy	- Development Plans Off
Capt	7024	Capt	Dvorchak	- Schedules & Status Off
GS-4	70450	Miss	Mouradian	- Secretary
		PROGRAMMING DIVISION		
+LtCol	6896			
Major	6736	Major	Lane	- Financial Mgmt Off
Major	2734	Major	Auerbach	- Coordination & Compliance Off
Capt	2734	Capt	Mc Elhaney	- Coordination & Compliance Off
Capt	2734	Capt	Krahn	- Coordination & Compliance Off
Civ	6736	Vassart		- Budget & Financial Analyst
GS-4	70450	Mrs	Garrett	- Secretary