USAF in brackets [ ]
NRO in red underline

Document No. [redacted]

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MILITARY SPACE PROJECTS

REPORT OF PROGRESS
FOR
QUARTER ENDED 31 DECEMBER 1959

SECRET

Secret Cont. No. [redacted]

COPY NO. [redacted]

THE SECRETARY OF DEFENSE
WASHINGTON

January 26, 1960

Dear Mr. President:

I am forwarding herewith the Military Space Projects Report for the quarter ended December 31, 1959.

The DISCOVERER VII was launched successfully into orbit from the Pacific Missile Range on November 7, 1959. Due to a power failure, the vehicle tumbled, thus making it impossible to eject the recovery capsule. DISCOVERER VIII, launched on November 20, 1959, also achieved orbit. Because the orbital period was greater than planned, the recovery capsule was ejected on the fifteenth pass. Aircraft and a surface ship tracked the capsule beam after ejection, but the signal was lost after a short time and no contact was made. The next DISCOVERER launch is scheduled for January 29, 1960, following extensive modifications aimed at correcting earlier problems.

[redacted]

With great respect, I am

Faithfully yours,

/s/ James H. Douglas
Deputy

1 Inclosure:
Military Space Projects Report

The President

The White House

ADVANCED RESEARCH PROJECTS AGENCY
WASHINGTON 25, D. C.

25 January 1960

MEMORANDUM FOR THE SECRETARY OF DEFENSE

SUBJECT: Progress Report on Military Space Projects for Quarter Ended December 31, 1959

This transmits the Military Space Projects Report for the quarter ended December 31, 1959.

During the past quarter, decisions were made to transfer a number of military space projects from the management cognizance of the Advanced Research Projects Agency. As a result of these transfers, it has been determined that future quarterly reports on military space projects will be prepared by the Office of the Director of Defense Research and Engineering. ARPA and the military services will furnish necessary data to ODDR&E on space projects under their cognizance.

Highlights of major events occurring during the quarter are covered briefly in the attached draft of your letter which will transmit the report to the President.

A. W. Betts

1 Inclosure:
Quarterly Report on
Military Space Projects

A. W. Betts
Brig. General, USA
Director

MILITARY SPACE PROJECTS

QUARTER ENDED 31 DECEMBER 1959

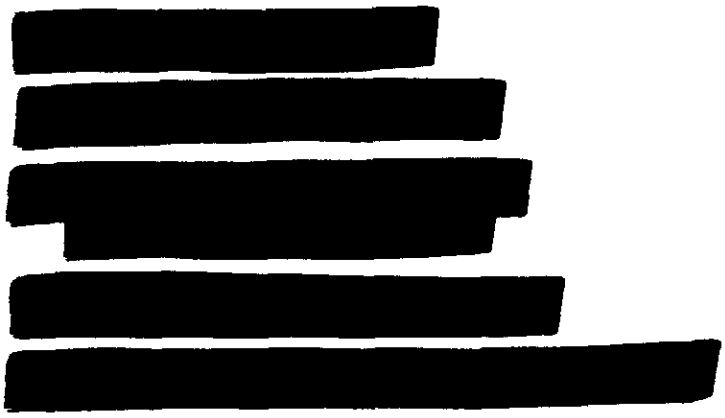
Department of Defense

Washington 25, D.C.

~~SECRET~~

CONTENTS

ILLUSTRATIONS



PROGRESS HIGHLIGHTS

During the Quarter Ended December 31, 1959

On November 7, 1959, DISCOVERER VII was successfully launched into orbit from the Pacific Missile Range. Due to a cycle power failure, the stabilization system became inoperative and the vehicle tumbled. It was impossible, therefore, to initiate the sequence to eject the recovery capsule. DISCOVERER VIII, launched on November 20, also achieved orbit. The orbital period, however, was greater than planned and the recovery capsule was ejected on the fifteenth pass. Nine aircraft and a surface ship tracked the capsule beacon after ejection, but the signal was lost after a short time and no further contact was made.

In the SAMOS (reconnaissance satellite) Project, modification and checkout of the AGENA second stage has been completed. This vehicle will be used, together with an ATLAS booster, for the first SAMOS launch, now scheduled for June 1960.

[redacted]

During the quarter, decisions were made to transfer military space projects from the management control of the Advanced Research Projects Agency. Projects DISCOVERER, [redacted] and SAMOS have been transferred to the Department of the Air Force. [redacted]

DISCOVERER PROJECT

(COMPONENT TESTING SATELLITE)

INTRODUCTION

Project Objectives - Development and testing of components for Military Space Technology Program.

The objective of the DISCOVERER Satellite Program are to conduct research and developme on components, equipment, instrumentation, prc pulsion, data processing, communications and operating techniques all dealing with military space technology.

The DISCOVERER project is characterized by an open-end series of space flights to be utilized testing classified equipments within the space environment. All of the earlier flights planned for this project will utilize the THOR-IRBM Booster and the AGENA second stage.

DISCOVERER FLIGHTS

DISCOVERERS VII and VIII

DISCOVERERS VII and VIII launched into orbit successfully.

During the quarter DISCOVERERS VII and VIII were launched and placed into orbit. DISCOVERI VII was launched on November 7 (see Figure 1) and DISCOVERER VIII was launched on Novembe both from the Pacific Missile Range. Lift off anc first stage trajectory were normal and accurate i both flights and orbital status was achieved, although the DISCOVERER VIII apogee was much higher than planned. These flights represent the fifth and sixth AGENA vehicles to be successfully injected into orbit since February 1959.

Payload recovery efforts unsuccessful.

Although both flights attained orbit successfully, neither of the payload recovery attempts was achieved. Initial telemetry received on the first pass of DISCOVERER VII indicated that a 400 cycle power failure had occurred. As a result, the stabilization system was inoperative and the vehicle was tumbling. Also it was impossible to

initiate the ejection sequence. Subsequent investigations indicate that the power failure was probably caused by the load limiter. Because of the greater than planned orbital period, the DISCOVERER VIII capsule was ejected on the fifteenth pass. Nine C-119 aircraft and a surface ship tracked the capsule beacon after ejection, but the signal was lost after a short time and no further contact was made. Subsequent analysis indicated that the vehicle guidance system "hunting" for a stable attitude at the greater than planned apogee resulted in premature exhaustion of control gas. The vehicle, therefore, was improperly oriented at the time of capsule ejection.

DISCOVERER IX

Launch of DISCOVERER IX set for late January.

Launch of DISCOVERER IX is scheduled tentatively in late January. The exact flight date depends upon completion of various planned modifications and delivery of the payload to Vandenberg AFB.

STATUS OF AGENA VEHICLE

Final AGENA "A" vehicle in modification.

The last three AGENA "A" vehicles for the initial DISCOVERER flight design program underwent hot firing at Santa Cruz Test Base (SCTB). Two of these were accepted by the Air Force on November 17 and are now at Vandenberg AFB.

First AGENA "B" vehicle ready for checkout.

The first AGENA "B" vehicle in the follow-on program was essentially ready for modification and checkout at the close of this reporting period. This vehicle has an engine restart capability and includes integral propellant tanks of double the AGENA "A" capacity to permit extended engine burning time.

BIOMEDICAL PROGRAM

Biomedical capsule thermal tests conducted.

Thermal testing of a special biomedical capsule, instrumented to determine thermal resistances throughout the capsule system, was completed on November 25, 1959, in the High Altitude Temperature Simulator. The tests were conducted to determine thermal profile extremes for the biomedical capsule (primate passenger) under anticipated orbital conditions. Initial results indicate that simplification of the system may be feasible. However, it appears that additional water evaporator capacity may be required to satisfy extreme heat flux conditions.

Live specimen testing to be resumed in January.

Biomedical testing with a live primate is expecte to be resumed in January, following capsule modifications now being made. Modifications include correction of an air conditioning deficiency which caused the abort of the last test with a live specimen.

FACILITIES

First increment of Test Center completed.

Increment one of the Satellite Test Center (formerly Development Control Center) Sunnyvale, California, was completed and accepted from the construction agency during December. Increment two is scheduled for completion in June 1960.

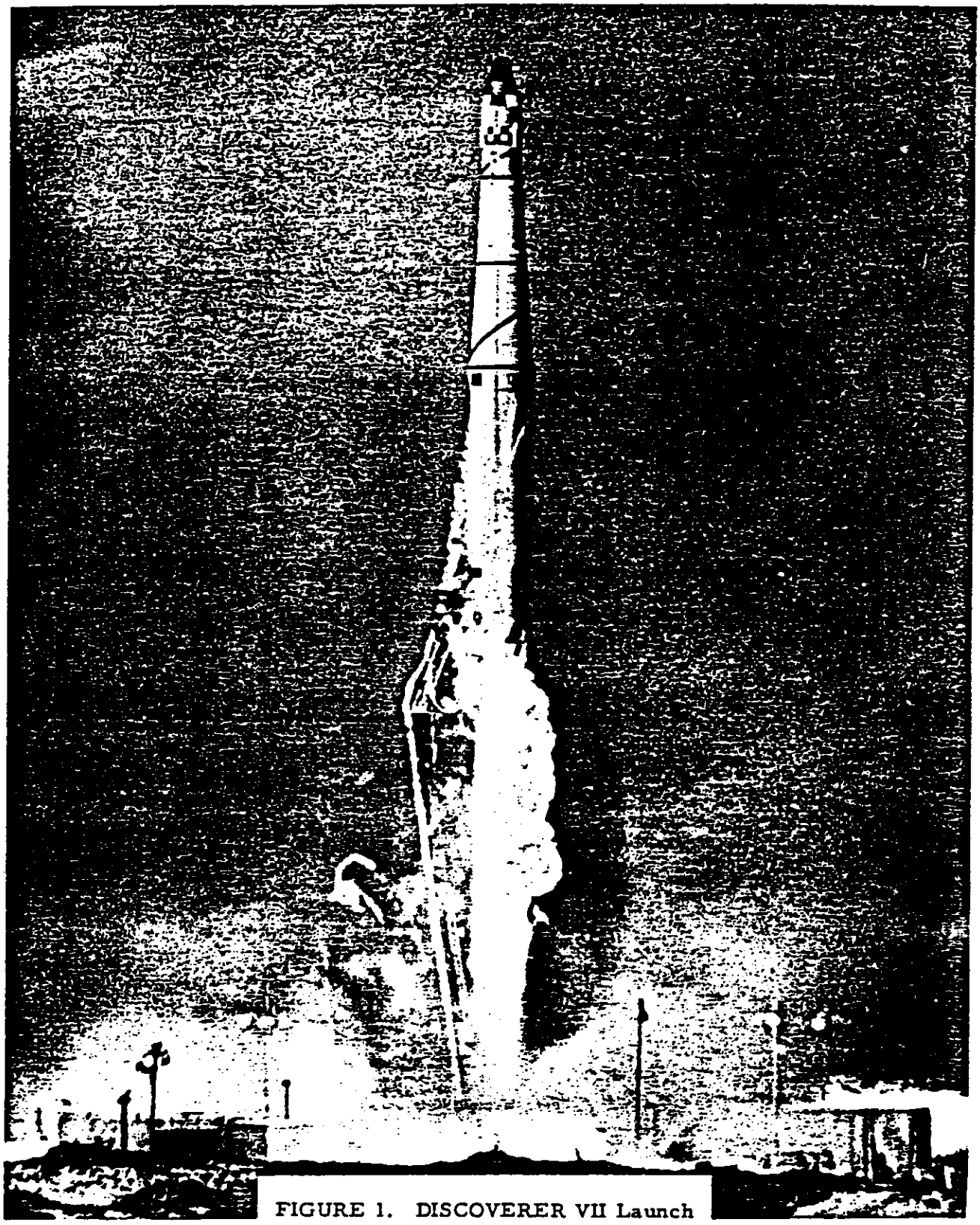


FIGURE 1. DISCOVERER VII Launch

SAMOS PROJECT

(RECONNAISSANCE SATELLITE)

INTRODUCTION

SAMOS to provide both Visual (Photographic) and Ferret (Electromagnetic) Data.

The objective of the SAMOS project is the development of a reconnaissance system utilizing polar orbiting satellites to collect and process visual (photographic) data and ferret (electromagnetic) data. The SAMOS system is expected to acquire a great amount of technical intelligence regarding enemy military and industrial strength.

Acquisition of data by capsule recovery.

Two approaches are being developed for acquiring intelligence data; (1) the recovery system - for visual data - in which a capsule is ejected from the satellite and recovered, and (2) the electronic data readout system - for both visual and ferret - in which data is transmitted to ground stations.

GENERAL

AGENA vehicle for first SAMOS flight nears completion.

Stacking of the major components of the AGENA second stage for the first SAMOS flight vehicle, shown in Figure 2, was completed on November 6, 1959. Completion of modification and checkout is scheduled for January 1, 1960. Subassembly of the second AGENA vehicle is progressing on schedule. The first SAMOS launch is now scheduled for June 1960.

VISUAL RECONNAISSANCE SYSTEMS

First payload (E-1) operated successfully under orbit conditions.

Following comprehensive testing, the first flyable (E-1) payload was operated successfully for 72 hours under simulated orbital conditions. During subsequent vacuum tests, however, improper installation of a clamping ring assembly resulted in the payload pressure shell being damaged beyond repair. The payload has been diverted for type test use only. Work on the second deliverabl E-1 payload has been accelerated for use as the fi flight article. Delivery is scheduled for January 1960, to Lockheed.

E-1 payload support equipment installation complete.

All E-1 payload support equipment has been installed in the Sunnyvale checkout area. Personn are being trained in operation and maintenance of the equipment in advance of the January delivery of the first flyable E-1 payload.

E-2 payload progress on schedule.

Component fabrication and subassembly of the two flyable E-2 payloads with more sophisticated design are proceeding on schedule. Design studies are being made to reduce weight and improve performance of subsequent payloads.

Extensive deliveries of support equipment made at Vandenberg AFB.

Two primary record film processors and auxiliary equipment have been delivered to Vandenberg AFB. Installation will be made in the Missile Assembly Building (for payload checko beginning January 5, 1960; and at the tracking and data acquisition station (for orbital test operations) beginning January 12. Other items delivered to Vandenberg AFB include payload handling equipment, payload test support equipment, oscillograph record camera, and 35mm quality evaluation viewer.

Recoverable system parameters being established.

Final design parameters are being established for the E-5 (recoverable photographic reconnaissance system). As presently planned, the E-5 payload will use a mirror system to permit mounting of the panoramic camera lens horizontally while in orbit. The system will use capsule recovery of both the film and camera. Recovery will be initiated no later than thirty days after launch, and the system will include the capability for command recovery any day prior to the thirty day lifetime limit. Recovery will be effected in the Hawaii area on a north-to-south pass. Launch will be from the Pacific Missile Range.

FERRET RECONNAISSANCE SYSTEMS

F-1 payloads in modification and checkout area.

The first two F-1 payloads were delivered to Lockheed on October 23, 1959. These units are in the modification and checkout center undergoing functional testing and preparations for installation

in the vehicle. The third F-1 payload is undergoing systems testing and is scheduled for delivery to the Lockheed Missile and Space Divisic on January 29, 1960.

Training courses completed.

Training courses on the characteristics and operation of the F-1 payload and ground support equipment were completed for modification and checkout personnel and for personnel who will be assigned to Vandenberg AFB.

FACILITIES

Launch stands near completion.

Beneficial occupancy date for Launch Stand No. 1, Point Arguello, California, except for the propellant loading system, is January 1960. Final completion of Stand No. 1 is scheduled for March and Stand No. 2 for April.

Plans and specifications for the Technical Support Building at Vandenberg AFB have been completed. Preliminary concept studies for a Technical Support Building at Point Arguello were completed on December 14, 1959.

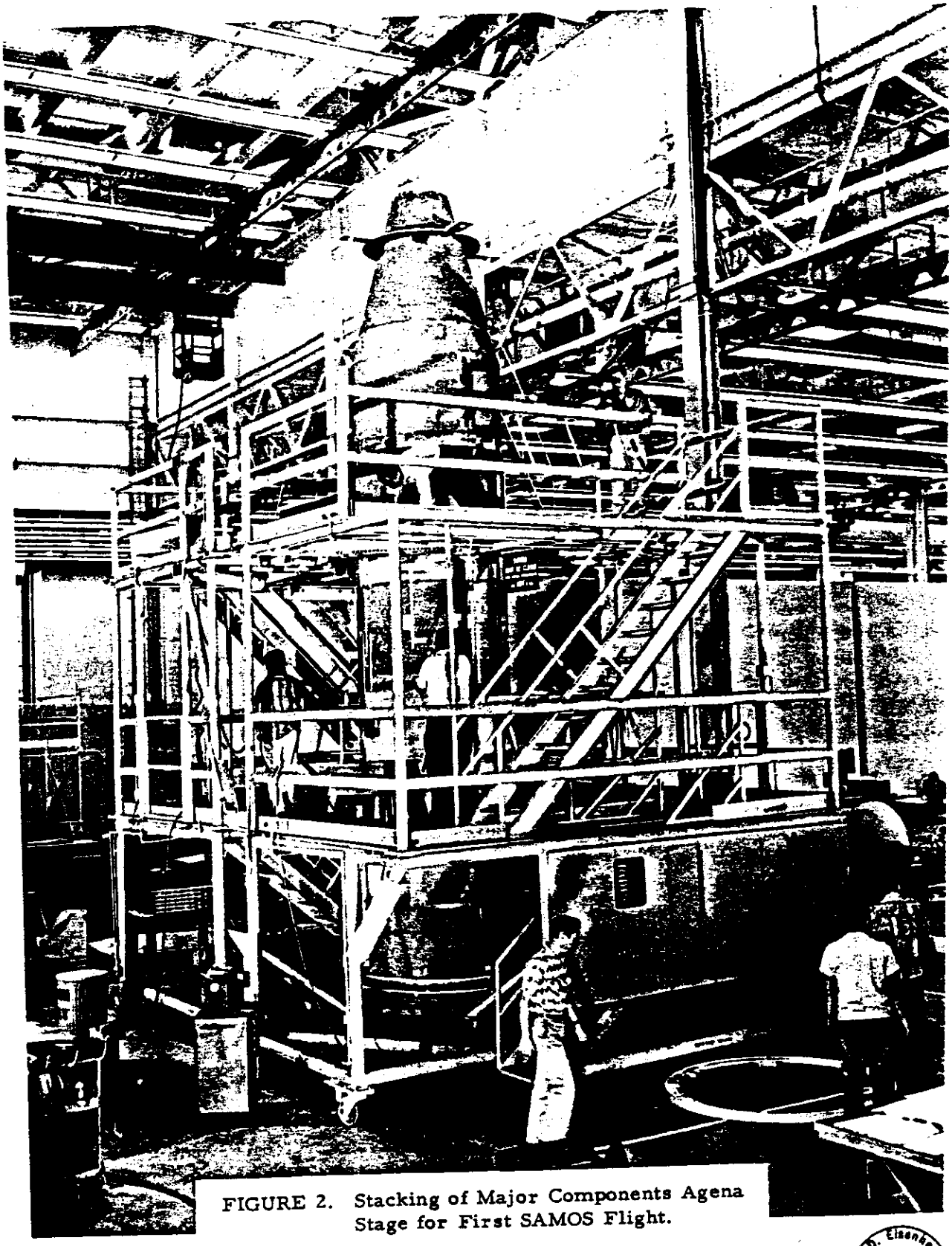


FIGURE 2. Stacking of Major Components Agena Stage for First SAMOS Flight.

NOTICE OF REMOVED PAGES

Pages 9 through 26 and Figures 3 through 7 are not provided because their full text does not contain CORONA, ARGON, LANYARD programmatic information.

STATUS OF FUNDS

(In Millions)
December 31, 1959

Project	Funded (ARPA Orders Issued) FY 1959 & Prior Years	Amounts Programmed FY 1960	Cumulative Obligations	Cumulative Expenditur
DISCOVERER 1/	[redacted]			
SAMOS 1/	105.6	159.5	168.7	115.3
[redacted]				
TOTAL	[redacted]			

1/ Excludes [redacted] programmed during Fiscal Year 1958 and prior years for WS 117L Program. DISCOVERER, SAMOS and [redacted] projects are outgrowths of WS 117L.

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DOD SATELLITE LAUNCH SCHEDULE

Program	Vehicle	Launch Site	FY 1961 1960 Quarters 1 2 3 4	FY 1962 1961 Quarters 1 2 3 4	FY 1963 1962 Quarters 1 2 3 4
1. DISCOVERER	Thor-Agena	PMR	6 6 6 2		
2. Reconnaissance (SAMOS)	Atlas-Agena	PMR	1 2 2	2 1 3 3	3 1
3. [redacted]					
4. [redacted]					
5. [redacted]					
6. [redacted]					

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FLIGHT DATA ON

SATELLITES ACHIEVING ORBIT

DISCOVERER FLIGHTS

DISCOVERER VII (206-1051)

Date Launched: November 7, 1959
Booster: THOR #206, IRBM
Gross Weight: 117,200 lbs.
Payload Weight: 300 lbs.
Perigee: 103 Statute Miles
Apogee: 505 Statute Miles
Eccentricity: .05
Period: 94.42 minutes
Payload: Mark II biomedical recovery capsule

Subsystems: Airframe, Propulsion, Auxiliary Power, Guidance and Bio-medical
Second Stage: DISCOVERER Vehicle
On-Orbit Weight: 1,753 lbs.
Propulsion: XLR81-Be-5 Engine
Fuel: Unsymmetrical Di-Methyl Hydrazine/Inhibited Red Fuming Nitric Acid
Flight Characteristics: Ballistic trajectory to orbit.

DISCOVERER VIII (212-1050)

Date Launched: November 20, 1959
Booster: THOR #212, IRBM
Gross Weight: 117,200 lbs.
Payload Weight: 300 lbs.
Perigee: 120 Statute Miles
Apogee: 1026 Statute Miles
Eccentricity: .10
Period: 103.67 Minutes
Payload: Mark II biomedical recovery capsule

Subsystems: Airframe, Propulsion, Auxiliary Power, Guidance and Bio-medical
Second Stage: DISCOVERER Vehicle
On-Orbit Weight: 1,750 lbs.
Propulsion: XLR81-Be-5 Engine
Fuel: Unsymmetrical Di-Methyl Hydrazine/Inhibited Red Fuming Nitric Acid
Flight Characteristics: Ballistic trajectory to orbit.