THE SECRETARY OF DEFENSE
WASHINGTON

October 24, 1960

Dear Mr. President:

A summary of progress on the Military Space Projects during June, July, and August 1960 is attached.

A brief review of some events of interest that have occurred subsequently is included in this letter.

DISCOVERER XV was launched from Vandenberg Air Force Base and successfully placed into orbit on 13 September 1960. On the 17th pass, the capsule was separated but, because of an abnormally fast consumption of control gas, the capsule landed in the water some 900 miles south of the intended impact point. Recovery was prevented by a storm. Launch of DISCOVERER XVI is planned during the last week in October 1960.

The launch of the first SAMOS reconnaissance vehicle on 11 October 1960 was unsuccessful as orbit was not achieved. ATLAS booster performance was normal, but, as a result of loss of control gas pressure during launch, the second-stage AGENA vehicle performed abnormally. The next launch of a SAMOS vehicle is scheduled during November 1960.

[redacted]

With great respect, I am

Faithfully yours,

(Signed) Thomas S. Gates

Attachment

The President

The White House

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II. SAMOS PROJECT

(RECONNAISSANCE SATELLITES)

A. Project Objective

SAMOS to provide both Visual (Photographic) and Ferret (Electromagnetic) data on enemy strength.

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.

B. Project Description

Goal is timeliness of intelligence information.

1. The SAMOS Project, employing orbiting satellites composed of AGENA vehicles and reconnaissance payloads, will provide surveillance of the entire Soviet Complex, providing a variety of Sino-Soviet Bloc intelligence data. Timeliness of receipt of the intelligence information with daily reconnaissance coverage of high resolution is the ideal. The SAMOS concept utilizes satellite vehicles, modified ATLAS boosters, launch facilities, tracking facilities and a complex communications and data processing network with related facilities. The recovery system will include a re-entry capsule and a recovery force.

Acquisition of data by (1) capsule recovery and (2) electronic data readout system.

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

Dual payload scheduled for first 3 flights.

3. A combined visual/ferret payload will be tested on the first 3 flights. The successive ferret payloads (F-1 and F-2) will include progressively more complete installations of receivers and antennas to provide increasingly greater electronic measurement capability.

C. Progress Review - June, July, August 1960

1. Technical Status

a. Second Stage Vehicles

The AGENA "A" vehicle for the first SAMOS flight successfully completed systems testing on 17 August. On-stand date was rescheduled from 19 August to 2 September. Launch is now scheduled for 11 October.

(1) The second stage vehicle for the first SAMOS flight has completed system testing at Vandenberg Air Force Base. The tests were successfully concluded on 17 August following a simulated launch. Late delivery of airborne communications equipment and the requirement for a full-scale radio frequency interference check (because of the DISCOVERER XII horizon scanner problem) resulted in rescheduling the on-stand date from 19 August to 2 September. This revised date is compatible with the requirement of not installing the AGENA until after completion of the ATLAS booster Flight Readiness Firing. The ATLAS flight readiness firing was successfully completed on 23 August. Launch of the first SAMOS flight is scheduled for 11 October. This date will permit the telemetry ship Pvt. Joe E. Mann to return on station, following its support of the DISCOVERER recovery operation.

The two remaining SAMOS AGENA "A" vehicles are approximately six to eight weeks behind schedule. Schedule recovery appears unlikely.

(2) The two remaining SAMOS AGENA "A" dual payload satellites are proceeding through modification and checkout in the systems test area. These vehicles are approximately six to eight weeks behind schedule. This slip resulted from late delivery of communications equipment, the 30-day strike at Lockheed and the need for engineering changes in the systems test area. These changes will decrease the time required for the missile assembly building phase of prelaunch operations. No airborne communications equipment delinquencies exist at this time, but previous delays have made schedule recovery unlikely.

Because of the attitude control problem experienced on the second [redacted] flight, the orbital program for the first three SAMOS satellites will be changed. The

(3) Because of the attitude control problem experienced on the [redacted] flight, the first three SAMOS satellites will maintain a horizontal, nose forward position throughout most of the first orbit. Re-orientation to the nose-down position will be initiated by stored commands as the satellite comes within range of the tracking station at Kodiak, Alaska, on its first orbital pass. This change assures completion of tank pressurization venting prior to shutting off the flight

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change assures completion of tank pressurization venting prior to shutting off the flight control system pneumatics.

control system pneumatics. The forces created by the continuation of venting after switching from the flight control to the attitude damping system were believed to have been a major factor in the loss of attitude control. The AGENA "B" vehicles will incorporate a full-time attitude control system and will not require the modifications being made on the AGENA "A" vehicles.

The first AGENA "B" vehicle has entered the final assembly phase of manufacture.

(4) The stacking of major components for the first AGENA "B" (single payload) vehicle was completed on 23 August. The vehicle has now entered the final assembly phase of manufacture. The XLR-81 Ba-9 engine (45:1 area nozzle ratio) was received in mid-August. Delivery has also been made of the guidance and control system inertial reference package and its associated electronic items.

b. Visual Reconnaissance Systems

(1) Visual Reconnaissance Systems payloads are being developed in a minimum number of configurations to attain readout and recovery mission objectives. The design and purpose of each configuration is as follows:

Readout:

E-1 - Component Test Payloads

E-2 - Steerable Reconnaissance Payload (with 20-foot ground resolution)

Recovery:

E-5 - High Resolution, Steerable Recoverable Payload (with 5-foot ground resolution)

E-6 - Medium Resolution, General Area Coverage, Recoverable Payload (with a ground resolution of 10 feet or more).

Checkout of the E-1 is on schedule.

(2) Checkout and testing of the E-1 payload continues to proceed on schedule at Vandenberg Air Force Base.

E-2 thermal mockup environmental tests were successful.

(3) Environmental tests of the E-2 thermal mockup conducted in July indicate that successful control of critical components can be achieved under both hot and cold orbital conditions.

E-2 payload final assembly completed in August. Delivery to be made in late September.

(4) Final assembly of the E-2 payload for the fourth SAMOS flight was completed during August. Subsequent functional testing of the completed payload has resulted in modifications to the processor web feed system. Eastman Kodak is expending maximum effort to incorporate these improvements with a minimum delivery schedule slippage. Delivery of the payload is expected in mid-September.

E-5 thermal model completed in August. First E-5 flight payload scheduled for mid-February 1961 delivery.

(5) Design releases for the full-scale test models of the E-5 recovery capsule were completed in August and fabrication of the initial test articles is progressing satisfactorily. A thermal model of the E-5 payload, for testing in the high altitude temperature simulator, was completed during August. Delivery of this thermal model is programmed for early September. A mid-February 1961 date has been established for delivery of the first E-5 flight payload.

Wind tunnel tests of the E-5 recovery capsule are essentially complete.

(6) Wind tunnel tests for the purpose of confirming the E-5 recovery capsule basic aerodynamic configurations are essentially complete. The force oscillation tests at Langley Field, to determine dynamic stability characteristics in the 2.3 - 5 Mach range, were completed on 10 August. Tests in the transonic range are scheduled to begin in early September.

Two tests to determine the E-5 capsule drag and oscillation characteristics during retrieval have been conducted. Neither test was completed.

(7) Two Recovery Equipment Test Unit tests have been conducted at Edwards Air Force Base. These tests determined the E-5 capsule drag and oscillation characteristics during retrieval into the recovery aircraft. Because the Recovery Equipment Test Unit was lost during the deployment phase, neither test was completed. Some data were obtained and are currently being evaluated.

Test results of descent characteristics of a single main parachute vs a clustered main chute configuration are still being evaluated.

(8) Test results of the stability and rate of descent characteristics of a single main parachute versus a clustered main chute configuration are still being evaluated. Based on visual observation of tests completed to date at El Centro, California, the single chute system appears more desirable from the stability standpoint. Structural integrity tests of the E-5 stabilization chute were initiated late in August.

c. Ferret Reconnaissance System

(1) Ferret Reconnaissance System payloads are being developed in a minimum number of configurations. The designation and purpose of each configuration is as follows:

F-1 - Component Test Payloads

F-2 - Digital General Coverage Payloads

[redacted]

(2) Checkout and testing of the F-1 payload is proceeding on schedule at Vandenberg Air Force Base.

Assembly of initial F-2 payloads continues on schedule.

(3) The testing and assembly of components for the initial F-2 payloads continues on schedule.

d. Ground Support Equipment

The vacuum test chamber was delivered to Vandenberg Air Force Base in June.

(1) Functional tests of the electronics portion of the vacuum test chamber (used for leak testing E-1 and E-2 payloads) were completed by the contractor and the chamber was delivered to Vandenberg Air Force Base in June. This completed the delivery of major items of E-1 payload ground support equipment for the Vandenberg Air Force Base missile assembly building.

The 144-inch collimator was delivered in July.

(2) The 144-inch collimator, to be used for the E-2 payload alignment and checkout, was completed in June and delivered in July.

Installation of UHF equipment at Vandenberg Air Force Base is complete and systems integration has started.

(3) Installation of the E-1 operating console, the second set of visual reconnaissance ground reconstruction electronics equipment, and two primary record cameras in the Vandenberg Air Force Base data acquisition and processing building was completed in July. Installation of the ultra high frequency equipment required for initial SAMOS operations at the Vandenberg Air Force Base tracking and acquisition station is complete, and

the equipment is undergoing systems integration. Also completed during July was the installation of the Model 1604 computer.

Delivery of PICE to Vandenberg Air Force Base scheduled for September.

(4) Assembly and checkout of the Programmable Integrated Control Equipment (PICE) to be available for the third and subsequent SAMOS flights, are progressing at the contractor's facility. Functional checkout and compatibility tests of set No. 1 are now in progress. Delivery to the Vandenberg Air Force Base tracking and acquisition station is scheduled for September. Set No. 2, scheduled for delivery to the satellite test center 60 days after completion of set No. 1, is in final assembly.

F-2 checkout console completed in June.

(5) The first F-2 checkout console was completed in June and compatibility tests, using a service test model F-2 payload, are in progress.

Telemetry data monitoring equipment delivered in June.

(6) A major portion of the telemetry data monitoring equipment was delivered to Airborne Instruments Laboratory on 15 June. This equipment will be incorporated into the F-2 evaluation and command complex for the Vandenberg Air Force Base and New Boston tracking and acquisition stations.

F-1 console delivered.

(7) The F-1 operating console was delivered to Vandenberg Air Force Base in July.

2. Facilities

Modification designed for the New Boston data acquisition and processing building.

a. A change in concepts of computer type and configuration has necessitated the design of a modification to the New Boston data acquisition and processing building. This modification is scheduled for completion in time to support the first SAMOS launch.

Offutt Air Force Base interim data processing facility construction cancelled.

b. The construction contract for the interim data processing facility at Offutt Air Force Base was ordered cancelled by the Office of the Secretary of Defense in June. Pending redirection of the program, no further action will be taken on either the interim or final facility.

Construction is complete on all facilities required for the first SAMOS flight.

c. Construction of all facilities required for the first SAMOS flight is complete, and installation and checkout of equipment are progressing at a rate compatible with the scheduled launch date. Systems testing of the Pad 1 complex at Point Arguello was completed late in July.

SAMOS laboratory building accepted on 18 July.

d. The SAMOS laboratory building at Vandenberg Air Force Base was completed and accepted on 18 July, with minor deficiencies remaining to be corrected. Design of the Vandenberg Air Force Base helium unloading and storage facility has been initiated with final design review scheduled for 9 September.

Construction contract awarded for Point Arguello diesel generator building.

e. Bid openings for the Point Arguello diesel generator building were held on 26 July. A total of twelve bids ranging from $184,000 to $249,000 were received. The construction contract was awarded on 29 August.

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VII. STATUS OF FUNDS BY PROJECTS

(In Millions of Dollars)

31 August 1960

Project	Funding FY 1960 and Prior Years	Amounts Programmed FY 1961	Cumulative Obligations	Cumulative Expenditures
DISCOVERER 1/ (R&D Satellites)	$ [redacted]	$ [redacted]	$ [redacted]	$ [redacted]
SAMOS 1/ Reconnaissance Satellites)	269.4	284.6	301.4	243.2
[redacted]				

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

SUMMARY

June, July, August 1960

DISCOVERER PROJECT (Research and Development Satellites)

DISCOVERER XIII and XIV were launched into polar orbits on the 10th and 18th of August, respectively. After orbiting the earth for over 26 hours both capsules were recovered. DISCOVERER XIII was recovered from the sea and DISCOVERER XIV was snatched from the air by an Air Force C-119. These events marked the first time in history man-made objects which had been in orbit around the earth were returned and recovered.

Extensive recovery system component system drop tests were conducted at Holloman Air Force Base, New Mexico. The capsules containing diagnostic payloads were carried by balloons to 100,000 feet altitude and released. They then went through a normal ejection sequence while the payload transmitted valuable data to the ground station. A full-scale mockup of a biomedical capsule designed to maintain a chimpanzee in orbit for two days was completed in June.

Van type telemetry readout and recording equipment has been installed on Christmas Island to monitor all orbital passes within range of the station and record all telemetry data during re-entry.

SAMOS PROJECT (Reconnaissance Satellites)

The AGENA "A" vehicle for the first SAMOS flight completed system tests at Vandenberg Air Force Base on 17 August. The ATLAS booster flight readiness firing was successfully completed on 23 August. The launch of this vehicle is scheduled for 11 October. The two remaining AGENA "A" vehicles are in the modification and checkout phases in the systems test area. The premating of major components for the first AGENA "B" vehicle was completed on 23 August. Delivery of the XLR-81Ba-9 engine was made in mid-August.

Checkout and testing of the visual (photographic) and ferret (electromagnetic) first flight payloads is proceeding on schedule at Vandenberg Air Force Base. Final assembly of the visual (photographic) with steerable reconnaissance payload for the fourth SAMOS flight was completed during August. A thermal model of the visual (photographic) high resolution, steerable, recoverable (E-5) payload was completed during August, with delivery programmed for early September. A mid-February 1961 date has been established for delivery of the first E-5 flight payload.

Installation of the visual reconnaissance system operating console, the second set of visual reconnaissance ground construction electronics equipment and two primary record cameras in the Vandenberg Air Force Base data acquisition and processing building was completed in July. Installation of the UHF (ultra high frequency) equipment and the Model 1604 computer at this station was also completed.

Construction of all launch facilities for the first SAMOS flight is complete, and support equipment checkout is proceeding at a rate compatible with the 11 October scheduled launch date.

[redacted]