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DEPARTMENT OF THE AIR FORCE
WASHINGTON



OFFICE OF THE SECRETARY

MAR 4 1966

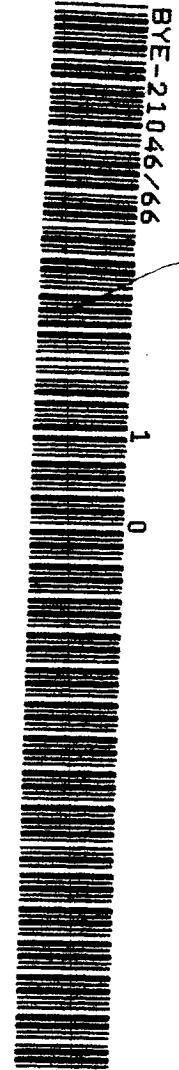
MEMORANDUM FOR THE SECRETARY OF THE AIR FORCE

SUBJECT: Manned Orbiting Laboratory Monthly Status
Report

The attached Status Report on the Manned Orbiting
Laboratory (MOL) Program covers activities through
February 28, 1966, and is submitted in accordance with
the February 23, 1966 instructions from the Office of the
Secretary.

for *Harry P. Evans*
B. A. SCHRIEVER
General, USAF
Director, MOL Program

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I. PROBLEMS

A. Eastman Kodak Facilities

Eastman Kodak has proposed, and the Director, NRO has deemed acceptable, the position that EK lease to the Government the contractor-owned property for construction of Government-financed buildings. Under this arrangement, the Government would retain for a fixed period an option to buy the land at the price paid by the contractor. A proposal that the facility be operated by EK under a CPFF contract is also acceptable to the Director, NRO, subject to the option that the Government can change operators if EK's performance is not satisfactory. It is believed that the preceding agreement will serve as a basis for future action with the contractor to arrive at a mutually satisfactory agreement and authority to proceed with the industrial facilitization is anticipated during March.

II. CHANGE PAST MONTH

A. Congressional Actions during February

(1) On February 8 General Schriever appeared before the House (Miller) Committee on Science and Astronautics on the subject of MOL. Per agreement between Secretary Brown and Chairman Miller, the closed hearing covered primarily the areas of booster, life support, tracking stations, ships, recovery areas, schedule, and rendezvous. In response to questions by the Committee, a list of answers and comments were compiled and submitted for the Committee record. A particular set of questions were posed by Congressman Gurney in a letter to Director, MOL. These questions, related to the potential of ETR rather than WTR as the launch site for MOL, were answered directly to Congressman Gurney.

(2) On February 15 at the request of Senator Holland of the Senate (Anderson) Committee on Aeronautical and Space Sciences and the Senate (Hayden) Committee on Appropriations, a briefing was given to Senator Holland and members of the "Florida delegation." The briefing was on the subject of ETR vs. WTR as the launch site for MOL. As a result of this briefing, a number of items and reports were requested by Senator Holland. These were submitted to the Senate Committee.

(3) On February 24 Dr. Foster, Dr. Flax and Dr. Seamans appeared before the Senate Committee on Aeronautical and Space Sciences. This hearing on ETR vs. WTR for MOL had been set up at the request of Senator Holland. Dr. Foster and Dr. Seamans both read prepared statements and, along with Dr. Flax, answered questions for the record.

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(4) In connection with the ETR vs. WTR problem, numerous queries have been received within the AF, DOD, and the Executive Department. These queries have apparently been generated by Floridians and Florida newspaper articles decrying the "move" of MOL from ETR to WTR in the face of the vast capabilities at ETR for space launches. The line of answer has been that MOL requires high inclination orbits, and the range safety and dog-leg penalties associated with MOL launches from ETR prevent mission accomplishment.

B. Briefing to Senator Margaret Chase Smith

On February 4, 1966 a special DORIAN briefing on the MOL Program was given by the MOL Program Office to Senator Margaret Chase Smith, member of the Aeronautical and Space Sciences Committee, the Appropriations Committee, and the Armed Services Committee. The same briefing material was used as had been used for the briefing of Senator Clinton Anderson on January 21, 1966.

C. MOL Program Review - February 5

Based on information presented during the MOL Program Review meeting held at Los Angeles on February 5, 1966, it was agreed that for planning purposes, October 1969 is now the scheduled planning date for the second manned launch (currently the fourth launch from WTR). Launches conducted prior or subsequent to that date will be at four-month intervals.

D. MOL Policy Committee and PSAC Meetings

A meeting of the MOL Policy Committee was held on February 8, 1966 to review the substance of the briefing to be given to PSAC on February 9. These briefings on February 8-9 covered the progress and status of program activities primarily associated with the response to guidance received from PSAC on mission payload considerations and requirements. The PSAC seemed pleased with the briefing and their only suggestion was that a flight be designated for the first unmanned reconnaissance mission. This is tentatively agreed as being Flight #6 (June 1970).

E. Briefing to Congressman Teague

Chairman Teague and members of his Subcommittee on Manned Space Flight, House Committee on Science and Astronautics, visited Douglas (Huntington Beach Space Center) during a West Coast trip on February 11, 1966. The visit was principally an orientation for Congressman Teague of plant facilities and an indoctrination of the technology to be utilized by MOL. Discussions during the tour at Douglas emphasized the use of previously generated technology from primarily the Gemini and Apollo Programs.

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F. Briefing to Department of the Navy

On February 23, 1966 staff officers of the MOL Program Office briefed the Department of the Navy on MOL recovery planning. Principal Naval officers in attendance were: V. Adm. Colwell, DCNO (Fleet Operations and Readiness); R. Adm. Smith, Strategic Plans Division, Op Navy; R. Adm. Fleming, ACNO (Plans and Policy); and members of their staff.

G. Release of MOL FY 1966 Deferred Funds

On February 14, 1966 DDR&E approved the release of \$40.0 million of MOL FY 1966 deferred funds to cover program requirements through June 30, 1966. In addition to the \$150 million budgeted for FY 1967, \$60.0 million of FY 1966 deferred funds remain available to apply toward meeting FY 1967 program requirements. Firm estimates on FY 1967 funding requirements, as well as total program costs, will be submitted in mid-May 1966.

H. Release of Military Construction Funds for WTR

On February 25, 1966, FY 1966 Military Construction funds for acquisition of Sudden Ranch (\$4.0 million) and funds for construction of the ILC (\$18.0 million) were apportioned by Bureau of Budget and OSD. The \$4.0 million for land acquisition and \$2.5 million for site preparation for the ILC have been transferred to the Corps of Engineers.

I. MOL Data Computation Subsystem

After careful Air Force/Aerospace review of the Douglas Subsystem Source Selection Board results on the Data Computation Subsystem, the decision was made that additional information was required before a choice could be made between the top two competitors. For this reason, IBM Corporation and Univac will conduct parallel competitive efforts in this area through May 1, 1966. Between May 1 and May 15 an evaluation of these efforts will be made by Douglas and a single contractor chosen. The additional cost of the program for this competitive effort is estimated at \$400,000. Funds have been made available to the Systems Office for this effort.

J. MOL Simulator Program

General Martin and General Berg requested and received approval for a Simulator Program to support the development of the DORIAN system. This program, consisting of an elemental engineering simulator and a stimulus generation effort, will be conducted by General Electric Company in their role as experiments integrator. The objective of the elemental engineering simulator program is to

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determine the optimum design criteria for the Acquisition and Tracking Scope (ATS), tracking control loop, control stick, cue displays and other equipments required for manned operation of the DORIAN payload. The stimulus generation program will provide stimulus material of the proper scale, field of view and resolution for use in the elemental engineering simulation and the subsequent mission development and crew training simulation programs. Estimated funds required for the initial design and development of these efforts is \$4.5 million, of which approximately \$2.0 million is required to be funded in FY 1966. Funds are available in FY 1966 to cover this requirement.

K. MOL SIGINT Study Program - Program Directive 66-1

The MOL SIGINT Study Program - Program Directive 66-1 was approved by the Director, NRO and Director, MOL during February. This Directive provides for a study of an Electromagnetic Pointing System for use with large optical sensors, [REDACTED]

[REDACTED] To implement the MOL SIGINT Study Program, the Electro-magnetic Pointing System Study RFP's were released on February 17 to Airborne Instruments Lab, Lockheed Missile and Space Company, Sylvania-EDL, TRW-Systems, and LTV-Electrosystems. Proposals are due March 14 and will be evaluated by Air Force/Aerospace. Contracts for the three-month study will be let to the successful bidders during the week of March 28. Funding in the amount of \$300,000 is available for this study effort. The Aircraft Test Program will be conducted under a black contract with LTV-Electrosystems for the payload installation, checkout, maintenance and operation. AFSC will be tasked for the aircraft and its operation and support. \$500,000 is available to fund the Aircraft Test Program.

L. Quantitative Assessment of Man's Usefulness in Space

A task force composed of members of the MOL Program Office has been formed to identify, if possible, in quantitative terms, man's contribution to space system effectiveness. Toward this objective, trips were made to the Systems Office in Los Angeles and the Manned Spacecraft Center at Houston to review the mid-program results of the GEMINI Program. During the latter trip, Dr. Charles Berry, Captain Alan Sheppard, and Mr. Donald Slayton were interviewed. The purpose of these interviews was to attempt to identify specific functions which man has accomplished under actual space flight conditions that might not have been included in open literature. Impressions and judgment were recorded as possible clues to areas requiring more detailed evaluation.

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III. CURRENT STATUS

A. Responsibilities for MOL Mission Payload System Hardware

Following discussions during Program Review meeting on February 5 and again at a meeting on February 18 with Director, NRO and Director, MOL attending, the delineation of the following contractors' roles and responsibilities were firmly established for MOL mission payload system hardware:

(1) Mission Module Structure

GE will be responsible for the design of the mission module structure. As integrating contractor, DAC will be responsible for preparation and release of fabrication drawings and verification test of the mission module structure.

(2) Structure for Tracking Mirror Drive

The tracking mirror drive will be supported by a structure separate from the main lens barrel. The structure for the tracking mirror drive will be furnished by GE and will be attached to the mission module structure.

(3) Main Lens Barrel and Ross Corrector Barrel Structure

The structure for the main lens barrel and Ross corrector barrel will be furnished by EK and will be separate from the mission module structure.

(4) Tracking Mirror Drive

GE will furnish the tracking mirror drive. This includes the gimbals, bearings and servo drive motors.

(5) Tracking Mirror Control

GE will furnish the necessary tracking mirror control hardware and software, with the exception of the airborne computer which will be furnished by DAC. With the exception of the V/h sensor which will be furnished by EK, the tracking mirror control hardware will include those instruments required for accurate positioning information such as: star tracker subsystem, drag accelerometer (if required), rate gyro package, and the instrumentation to measure angular displacement between the lens barrel and the structure for the tracking mirror drive. GE will be responsible for development and mechanization of the tracking mirror control equations.

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(6) Acquisition and Tracking Scopes (ATS)

The ATS will be furnished by GE. The same basic hardware configuration and software providing control of the tracking mirror will be used for the ATS. Any additional control hardware or airborne computer software will be furnished by GE.

(7) Dynamic Performance of the Mission Payload System

GE will be responsible for the dynamic performance of the mission payload system and will provide dynamic analysis of the system.

(8) Mounts and Locks for Main Barrel and Ross Corrector Barrel

GE will provide the mounts and locks for the main lens barrel and Ross corrector barrel including the connection between the Ross corrector barrel and the laboratory module pressure bulkhead.

(9) Thermal Control of Main Lens Barrel and Ross Corrector Barrel

EK will provide the necessary insulation, heaters and control devices to maintain the main lens barrel and Ross corrector barrel within the required temperature range.

(10) Thermal Control of Tracking Mirror

GE will provide all necessary insulation, heaters and control devices in the tracking mirror bay (defined for discussion purposes as the area between the laboratory module pressure bulkhead and the forward position of the main lens barrel) to maintain the tracking mirror within the required temperature range. Environmental doors for control of thermal flux on the tracking mirror during photographic periods will be furnished by GE. GE will also furnish the required servo controls for the environmental doors.

(11) Data Readout System

EK will provide the on-board film processor. GE will provide the editing console and scanner.

(12) Electrical Power Conditioning and Distribution

DAC will provide the raw DC electrical power and GE shall be responsible for receiving, controlling and distributing the electrical power for the mission payload segment. This will include provision of converters for DC power and inverters for AC power.

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B. Contractors' Integration and Test Functions

In association with the above delineation of contractors' responsibilities for mission system hardware, the following integration and test functions have been specified in the factory-to-pad flow:

(1) Mission Module Structure at GE

GE will install the tracking mirror drive, control devices located in the mission module, the thermal control system for the tracking mirror bay and the environmental door system. The mission payload system will be integrated during this period as much as feasible using simulation hardware for the lens barrel and Ross corrector barrel thermal control system and using a simulated system for the tracking mirror and mount. A preliminary system test will be conducted which will include thermal, vacuum and vibration tests of the integrated system. After completion and sign-off by the Air Force/Aerospace of this system test, the mission module structure and installed hardware will be shipped to EK.

(2) Mission Module Structure at EK

EK will install the main lens barrel, Ross corrector barrel, tracking mirror and mount and the thermal control system for the lens barrel and Ross corrector barrel. Thermal, vacuum, optical performance and vibration tests will be performed on the assembled system to verify optical integrity of the system. Following Air Force/Aerospace sign-off, the assembled mission module will be shipped to DAC, Huntington Beach, for integration with the laboratory module.

(3) Mission Module Structure at DAC

The mission module will be mated electrically to the laboratory module with GE integrating the mission payload systems. GE will then perform an integrated system test of the mission payload system. The results of this system test must be approved by Air Force/Aerospace prior to releasing the mission payload system to DAC for final orbiting vehicle integration and system test. A final combined Laboratory Module/Mission Payload System test will be accomplished by DAC. This system test will include thermal and vacuum tests. The results of this system test also must be approved by Air Force/Aerospace prior to release of the laboratory module/mission module for shipment to Vandenberg Air Force Base.

C. MOL Heat Shield Qualification Flight

The planning and preparation for a Gemini Heat Shield Qualification (HSQ) flight from ETR in October this year utilizing

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a Titan IIIC R&D booster is progressing satisfactorily. A group of scientific experiments have been identified and will be incorporated in the simulation laboratory structure. The flight plan for Titan III involves a second transtage burn after Gemini separation to place the simulated laboratory structure in a 160 nautical mile orbit, with a third burn to circularize the orbit.

IV. FORECAST FOR FUTURE

A. The MOL Program Office is scheduled to brief the Director, NSA on March 4, 1966 on the SIGINT study effort.

B. NASA is considering an airlock unit experiment for flight on Saturn IB Flight SA 209 during the last quarter of 1967. A low circular earth orbit will be flown. The experiment is to demonstrate an airlock unit, attached to existing LEM mounting fixtures and capable of being connected to the dome hatch of the S-IV-B stage hydrogen tank. This configuration would provide an ingress-egress capability and self-contained life support, power and environmental control systems required to pressurize and maintain the S-IV-B stage hydrogen tank so that astronauts can work inside in a shirt-sleeve environment during a 14-day or longer mission. Unofficially, NASA views this experiment with considerable favor and the chances are good that this project will be approved. The early flight date may offer a unique opportunity to design experiments, directly supporting the MOL development, to obtain information on crew activities in a large volume orbital vehicle. This is being examined, along with consideration for including a MOL flight crewman in the three-man SA-209 crew. This experiment will be a subject of the next NASA Manned Space Flight Experiments Board meeting scheduled for March 21, 1966.

C. Firm cost estimates on FY 1967 funding requirements, as well as total program costs, will be submitted during mid-May 1966. Contractors' cost proposals will be submitted on a baseline of nine launches from WTR, scheduled on four-month centers starting in October 1968. Also, as a planning and costing baseline, three of the nine scheduled launches are to be flown in the automatic mode, with Flight #6 designated as the first flight in the automatic mode.

V. DUE DATE FOR NEXT PROGRESS REPORT

Next monthly MOL Program Progress Report to be submitted April 6, 1966.

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