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DEPARTMENT OF THE AIR FORCE
WASHINGTON

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OFFICE OF THE SECRETARY

APR 8 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
March 31, 1966, and is submitted in accordance with
the March 19, 1966 instructions from the Office of the
Secretary.

for SIGNED *by Gen Evans*
B. A. SCHRIEVER
General, USAF
Director, MOL Program

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a/s

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I. PROBLEMS

A. Eastman Kodak Facilities

(This subject reflects progress as of April 5, 1966.)

On April 4, 1966 the Assistant Secretary of the Air Force (R&D) requested and received the approval of DDR&E to build a special purpose industrial facility on EKC-owned land in support of the DORIAN effort. An approval message was dispatched to SAFSP this same date.

Air Force and contractor personnel met at Hq USAF on April 4 and drafted the terms and conditions of the facility contract which received the tentative approval of both the Government and the contractor. Under the terms of the contract, the Government has the option upon termination or completion of the DORIAN contract to take title of the building and land at contractor's acquisition costs, not otherwise reimbursed by the Government. Formal contract coverage is expected within the next three to ten days.

Due to the urgent need and tight schedule for acquiring this facility, EKC plans to commence grading and other site preparations on April 5.

B. Weight Control

For the past six weeks, the MOL System Office weight reduction "Tiger Teams" have been working with contractors in a concerted effort to reduce the design weight of the Gemini B and the laboratory module. The teams have evaluated proposed weight reduction actions with respect to such factors as cost, technical risk, mission effects, etc. A similar activity was started with the mission module and payload contractor two weeks ago. A number of weight saving design changes have been adopted and others are still under study. As a result of aggressive action by the "Tiger Teams," estimated weight of the orbiting vehicle is now forecast to be 32,570 pounds, including 20 per cent contingency of the dry weight of new hardware. This is within the presently postulated capability of the updated 7-segment Titan III, which is expected to place 32,600 pounds in an 80°-80/155

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N.M. orbit. The weight status of each segment not including contingency allowances is as follows:

(1) Gemini B. With the proposed changes, the design weight on which the contractor will make his proposal is 5,579 pounds. This is less than the specification target weight of 5,660 pounds.

(2) Laboratory Vehicle (including mission module structure). The specification target weight is 13,555 pounds. Prior to initiation of the weight reduction effort, the contractor's weight estimate had grown to 15,456 pounds. This has been reduced to 14,502 pounds, the configuration on which the contractor will submit his cost proposal. However, the contractor will also provide delta cost estimates for an additional 13 items which can further reduce the weight by 1,015 pounds. These items will be evaluated along with the contractor's basic proposal.

(3) Mission Payload. The specification target weight for this segment is 6,200 pounds. The current contractor estimate is 9,178 pounds, an excess of almost 3,000 pounds. The weight reduction team will concentrate heavily on this area during the month of April in an effort to achieve reductions comparable to those obtained in the other system segments.

C. Material Priority for Support of MOL

During recent months, delivery lead time requirements quoted by vendors of extrusions, forgings, electronic components, bearings, gears, high-temperature alloys, and other items required for MOL Phase II development, have increased markedly. The MOL Systems Office, in conjunction with participating MOL contractors, is in the process of evaluating the impact of these lead time stretch-outs on MOL schedules and projected funding. One preliminary, but increasingly clear, result of this assessment is the conclusion that it will be necessary to have a DX priority to assure that critical development items of the program are not compromised because of material delivery problems. Collection of quantitative schedule impact data is in process and will be provided to Dr. Flax to supplement the request we have submitted for favorable consideration of a DX priority for MOL.

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D. HSQ Launch Schedule

The recent rescheduling of the next Titan III (#11) launch with a Defense Communication Satellite Program (DCSP) payload, followed by a second DCSP launch seven weeks later, has resulted in a reschedule of the MOL HSQ launch from October 6 to October 27. Although the DCSP payloads and HSQ are scheduled on separate launch pads, the level of effort negotiated with the Martin Company and associate contractors preclude any significant concurrency in launch preparations which would maintain the HSQ schedule. In the event that all fifteen DCSP satellites do not activate properly on orbit, a third back-up launch (Titan III #13) must be made available immediately to provide full communication capability, necessitating another reschedule of the HSQ launch until near the end of 1966 or probably in early 1967.

Since the last NASA Gemini launch is scheduled for December or earlier, a significant delay in launching the HSQ beyond the October 27 date will require the Air Force to negotiate for the launch support presently available from NASA, as well as an extension of the launch support contracted for by the Air Force with McDonnell.

II. CHANGE PAST MONTH

A. MOL Launch Site - WTR vs ETR

In the "Report to the Congress from the President of the United States - United States Aeronautical and Space Activities 1965", it was stated that the manned launches of MOL will be flown out of the Western Test Range. This announcement precipitated a flurry of Florida newspaper editorials and articles berating the "transfer of the MOL from ETR to WTR." This caused considerable interest in the MOL program by Florida Congressmen and civic leaders. This culminated in Dr. Foster (DDR&E) appearing before the Committee on Aeronautical and Space Sciences, U.S. Senate on February 24 "to give a full and complete explanation of the launch facilities required for MOL and particularly an explanation of why a new Titan IIC launch complex is required at WTR."

Subsequently, a group of 27 questions regarding the launch site for MOL was received from the Senate Appropriations Committee. Also the Chairman, Committee on Armed Services,

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House of Representatives asked to be informed on the factors concerning the determination of the launch site for MOL. Replies have been made to all Congressional inquiries on ETR vs WTR MOL launch sites.

A contract has been awarded and work has started on preparation of a site on Sudden Ranch for construction of the Titan III/MOL launch complex.

B. MOL Funds Status

An Obligation Authority of an additional \$7.015 million was sent to SAF-SP on March 31 to fund identified requirements associated with the EKC DORIAN effort. With the \$7.015 million, SAF-SP (General Martin) has now been funded a total of \$22.431 million and SAFSL-1 (General Berg) a total of \$57.1 million for a combined total of \$79.531 million since Phase 1 program approval in late August 1965.

C. MOL Experiments for Saturn Flight SA-209

NASA plans to fly an airlock unit experiment on Saturn flight SA-209 during the last quarter of 1967 were reported last month. In this experiment, the S-IV-B stage hydrogen tank is to be pressurized so that astronauts can work inside in a shirt-sleeve environment during a 14 day or longer mission. The early flight offers a unique opportunity to design experiments directly supporting the MOL development to obtain information on crew activities in a large volume orbital vehicle. At the March 21 meeting of the Manned Space Flight Experiments Board (MSFEB), the Vice Director, MOL Program expressed interest in the possibility of conducting MOL-oriented experiments in this program. Dr. Mueller welcomed this interest and offered whatever cooperation is required to enable the Air Force to develop experiments. An Ad Hoc group, headed by Dr. Yarymovych, SAF-SL, has been established to define a proposed package of MOL supporting experiments. This group includes representatives of the MOL Systems Office, the SSD Houston Field Office (which managed the DOD Gemini experiments), the Research and Technology Division and the Hq AFSC Office of the Deputy Commander for Space. An initial meeting will be held in Washington on April 13, 1966. The recommendations are to be presented to the Director, MOL Program prior to the next MSFEB meeting near the end of May.

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D. MOL Recovery Support - Henderson Island

Methods for flight crew and spacecraft retrieval in the event of an abort during powered flight are being investigated. The method of using C-130 aircraft and CH-3C helicopters staging from a base at Henderson Island (Pitcairn Group, U.K.) appears worthy of further investigation. Since very little information is available on this uninhabited island, a site survey is required to determine the feasibility and cost estimates to construct the necessary facilities on Henderson Island. A request for United Kingdom approval of a site survey to be conducted May or June 1966 has been transmitted to the American Embassy, London. A reply was received March 28, 1966 acknowledging receipt of the request and the forwarding of this request to U.K. Foreign Office. Composition of site survey team, transportation to Henderson Island and facilities required are presently being established. At the suggestion of the A.F. General Counsel's Office and the Air Staff (AFXPD), a SAF-SL project officer is prepared to go to London to explain the MOL requirement if U.K. approves. Initial estimate of cost of facilities, excluding aircraft and helicopters, required at Henderson Island was \$7-10 million. This estimate will be refined after the site survey. Methods of retrieval other than a base on Henderson Island are being investigated.

E. MOL - THIC Utilization for Apollo Applications Program

Anticipating a request from NASA generated by Bureau of the Budget questioning the cost of the Apollo Applications Program, the DDR&E directed that studies be conducted of possible application of the MOL configuration for potential NASA experiments. A selection of several production rates for the MOL orbiting vehicle and Titan IIC 5-segment and 7-segment boosters is being costed. Also, the feasibility of launch of the Apollo vehicle by a Titan IIC is being investigated. Reply will be provided to DDR&E by April 22.

F. MOL Program Cost Review

General Schriever has directed that, in addition to the MOL Systems Office review and submission of Phase II program costs, a supplemental cost review effort be conducted by a Cost Review Team and a Senior Cost Review Board. The purpose of these additional reviews is to have manager and specialist personnel not

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directly involved in the day-to-day implementation of the MOL Program provide their experience to assist in establishing a realistic MOL program cost for Phase II. This supplemental effort is divided into two task forces. Task Force I comprises a Cost Review Team of six officers and two civilians chaired by Colonel R. J. Walling of the MOL Program Office. They will report to General Berg on April 18 and recommend to him any program cost changes resulting from their review. A Senior Cost Review Board chaired by General Schriever will convene on approximately April 26 to review Phase II program costs presented by the MOL Systems Office.

Task Force II comprises a Cost Review Team chaired by [REDACTED] and will review the costs of the DORIAN payload and the mission module and make their recommendations to General Martin and General Berg. A Senior DORIAN Cost Review Board chaired by Dr. Flax will review the findings and recommendations of the Cost Review Board about May 11. A presentation to the MOL Policy Committee of the total MOL Program cost estimate is planned for May 20.

G. Technical Management Control Center (TMCC)

The proposed TMCC at Vandenberg AFB is intended to fulfill three functions:

(1) It will provide office space for elements of the 6595th Aerospace Test Wing and key contractor personnel.

(2) The Test Wing Launch Operations Control Center (LOCC) will be relocated from its present location in the Wing Headquarters building. The LOCC is the location where senior Wing and mission personnel are located during the conduct of launch operations.

(3) It will provide a centralized telemetry facility for prelaunch checkout that is presently decentralized in duplicative equipments in the assembly buildings and at the blockhouses. In addition to the telemetry stations, this facility would centralize computers for real time data processing and display, for simulating AGE and providing the checkout program for the vehicle command system.

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The third function could have an effect on the MOL Program; consequently, a study contract has been awarded to Lockheed to determine the feasibility and cost effectiveness of this function of the TMCC on the MOL Program and other space programs being conducted from VAFB. This study is scheduled to be completed by May 31, 1966.

H. Public Release of MOL Information

The Douglas Company released the names of the MOL subcontractors on March 31. The release was approved by DOD and carried primarily by the trade journals with little variation. The Deputy Secretary of Defense has directed that the HSQ launch be an "open" launch. An annex to the MOL information plan will be prepared by SAF-SL to cover this. Also, informal indications from the Office of the Assistant Secretary of Defense, Public Affairs are that the announcement of the next increment of MOL pilots will be handled the same as the introduction of the initial group -- at a press conference at SSD.

III. CURRENT STATUS

A. Transfer of NASA Gemini Equipment to MOL

Preliminary negotiations for the transfer of certain Gemini equipments to MOL have been completed at the Manned Spacecraft Center. Excess spares and materiel to the NASA Gemini program, along with production overages and equipments at vendors, will be transferred to Air Force accountability. Mockups, flown spacecraft and certain trainers will be made available; however, the Dynamic Crew Procedures simulator and the Translation and Docking simulator located at the Manned Spacecraft Center is being retained by NASA for use in the Apollo program. Some Gemini recovery equipment will be transferred to the Air Force and a sharing arrangement with Apollo for the remainder is being worked out with NASA. Twenty-three of thirty-one long lead time AGE items required by McDonnell for the Gemini B will be released. The remainder will be retained by NASA in support of the Apollo at CKSC. All NASA Gemini equipments identified for transfer to the Air Force will be released by January 1967 or earlier when Gemini requirements are satisfied.

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B. Ocean Surveillance Requirement

Due to some changes in the conceptual system, the Navy has stated that it will not be ready to come forward with a well documented request for Contract Definition funds until July of this year. The MOL funds presently on hand within the Navy are sufficient to complete the work necessary to be ready to enter Contract Definition. FY 1967 fund requirements are estimated at \$3.8 million. It appears now that a hardware system delivery date would be early Calendar Year 1970.

C. MOL Instrumentation Ship

An instrumentation ship is required approximately 700 N.M. down range for each MOL launch. The three T-2 type AGM-19 class ships presently being modified for the NASA Apollo Program will have the instrumentation required for the initial MOL flights with the exception of telemetry ground station capacity. The additional telemetry capacity can be provided for approximately \$0.5 million per ship.

A joint committee was formed by NRD to investigate the joint NASA/MOL use of the three T-2 ships. The committee membership included representatives from Headquarters NRD (Chairman), Headquarters NASA, MOL Program Office, Instrumentation Ship Program Office, and NASA Manned Spacecraft Center.

The NRD presented results of the joint committee and NRD recommended possible solutions to the MOL Program Management Review Meeting April 2, 1966.

The MOL Program Director approved the following recommendations to support the MOL Program:

- (1) Modify two T-2 ships for added PCM telemetry capability required for MOL.
- (2) Plan for a T-2 ship support for first four MOL flights.
- (3) Minimum modifications to an existing instrumentation ship for remaining MOL flights. The estimated cost of these mods is \$3.0 million.

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Reference item 2 above. Ship scheduling conflicts must be resolved with NASA as they occur for the first four MOL flights. T-2 type ship support is required for the first four MOL flights for flight proof testing of the MOL Autonomous Guidance System. When this system is flight proven, an instrumentation ship with less capability than the T-2 type will be sufficient for the remaining flights.

Reference item 3 above. Action will be initiated to determine the ship instrumentation required for the later MOL flights. The ship most likely to be modified to this configuration is the "Range Tracker" (existing in the NRD Fleet) or the AGM-6 "Watertown," (a NASA Apollo re-entry ship that may be released by NASA).

D. Quantitative Assessment of Man's Usefulness of Space

The task force of MOL Program Office personnel continued its efforts to locate credible data sources and assess information previously obtained concerning man's contribution and worth in space applications which bear on MOL. The approach of the group has been to visit government, industry and non-profit organizations and conduct discussions on relevant subject matter. During this reporting period the task force visited General Electric Company, McDonnell Aircraft Company, Strategic Air Command, the Aerospace Medical Research Laboratory at Wright-Patterson Air Force Base, Eastman Kodak Company, Douglas Aircraft Company and Aerospace and Air Force offices of the MOL System Office in Los Angeles. The interviews are nearly complete and available documentation is being assembled for further review and detailed study.

IV. FORECAST FOR FUTURE

A. Initial estimates of MOL Phase II program costs are substantially higher than anticipated and action is now being taken with the contractors to find ways to reduce program costs. A recently determined increase in the time required for development, production and integration of the optical-photo system for MOL will be a delaying factor in the presently approved MOL schedule. It will be necessary to examine the overall MOL schedule in the immediate future and establish a new program schedule. This

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could have a major impact on the time phasing requirements for the program funding. It is planned that a presentation of realistic program costs will be made to the MOL Policy Committee about May 20.

B. A MOL Program Review was held at the MOL Systems Office on April 2. A detailed report of the items covered at this meeting will be contained in the next monthly status report.

V. DUE DATE FOR NEXT PROGRESS REPORT

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

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