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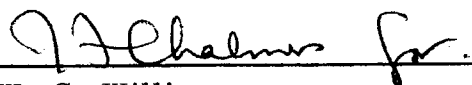
MOL MONTHLY PROGRESS REPORT

FOR

1 DECEMBER THRU 31 DECEMBER



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1.0 GENERAL

The combination of vacation and sick leave due to epidemic influenza combined to affect operations during the month of December. During one week approximately 50 % of our MTS strength was absent and the total MTS charges for the month were reduced to an equivalent of 236 Man Months.

Work continued in all segments in support of Air Force contract negotiations on the Supplemental Agreement and progress was made in a variety of technical areas.

2.0 LOADS

Basic Load Cycle 4 effort has been completed with the resolution of the thrust termination condition discrepancies between Aerospace and MMC. A meeting will be held at Aerospace on 7 January 1969 to establish the requirements for the conditions for thrust termination. Data resulting from the meeting will be prepared by MMC and transmitted to the contractors by 7 February 1969. They will then be utilized by the contractors for structural evaluation, not design.

Additionally, follow-on effort for a revised relative displacement transform, Subsystem 'C' loads transform and Subsystem 'B' loads transform, were discussed and scheduled for receipt of data from MMC. This was subsequently agreed upon. A meeting is scheduled for 29-30 January at MMC to discuss all loads cycle 4 activities. All contractors will attend.

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3.0 CONTAMINATION

3.1 Plume Contamination

Testing of the 1 lb. thruster at AEDC was completed during this report period. A preliminary 30-day report is being generated along with the verification of all the data accumulated during the tests. Interim results identified the need for full scale pulse tests. A program funded by MDAC-WD is now in process at Marquardt. Hardware is being fabricated and the first thruster firing will be conducted in late January 1969. After a series of baseline firings, a nozzle shroud (similar in design to the one tested at AEDC) will be tested with the full scale 22 lb. thruster.

4.0 ALIGNMENT

General Electric and Aerospace have been making error analyses to determine which geometrics of the new flight alignment links discussed last month meet the present error allocations. Although there are differences in several areas of the analyses, both GE and Aerospace agree that the new link should monitor between the star tracker base and the tracking mirror. General Electric is expected to recommend this solution in late January.

5.0 IVS

Preliminary test results on the GE IVS tester indicate that, for the Hycon device, specification compliance is satisfactory except for cross-coupling. System requirements, mainly settling time, will be analyzed by GE and Aerospace in addition to GE investigation by closed-loop testing.

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5.0 IVS - Continued

The Goodyear device now shows good improvement from the breadboard tests, but engineering unit testing is not complete enough to forecast specification compliance.

The near term IVS schedule calls for a GE selection of a single IVS vendor in mid-February and a "go-ahead" to the selected vendor by 1 March 1969.

6.0 FLIGHTS 6 AND 7

Conducted a Contractor meeting to resolve schedule problems involving ATP for the Automatic Configuration. Several alternate schedules, with their attendant impact on the Automatic Program, were presented to Maj. Gen. Bleymaier. As a result of this meeting, the Contractors were directed to protect the schedule as required to maintain the present launch dates.

Contractor CEI's for the RS, DRV and Nose Fairing were reviewed and comments were forwarded to the appropriate OPR's.

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7.0 ADVANCED DATA SYSTEM (ADS)

Reconfiguration of the SCF Data Handling and Computation System is a major problem to the MOL Program. Work continued in December to define the problems to be solved and to identify specific approaches. Of major significance are (1) the proposed change to 6600 computers and the undefined operating software system; (2) hardening of the STC baseline for ADS based on the November 17 definition; (3) cancellation of Lockheed efforts on ADS for the remote stations; (4) initiation of Mellonics' study of RTS processing based on minimum change to that for other programs; and (5) pending change of orbit determination program.

Individual specialized task teams are being organized. The change affects all MOL software baseline requirements and interfaces and has a major cost, schedule and risk impact.

8.0 TRACKING MIRROR DRIVE STABILITY

A meeting on Tracking Mirror Drive Stability was held 16 December 1968 at General Electric. The Drive A design criteria were carefully listed and agreed to by GE and Aerospace as were math models for the principal noise (sounds) in the system. Both GE and Aerospace have since proceeded to determine rate error performance and roll loop minimum frequency for phase stabilizing the critical fourth mode as functions of roll bandwidth. It was necessary to readjust the noise model for the torquers to reflect brassboard measurements of performance. Results of the refined analysis will be reported by GE mid-January. Aerospace study results

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8.0 TRACKING MIRROR DRIVE STABILITY - Continued

should be available prior to the General Electric data. Tentative conclusions from the meeting confirm that the tracking mirror flexures must be stiffened.

9.0 MOL SYSTEM SAFETY

During this period the Safety Office continued its support to the Segment Offices, reviewing design changes and supporting in-house technical reviews. In addition to the normal functions, the Safety Office supported a formal review of the MDAC-ED Dual-Gas System Test. This review culminated in several design and procedural changes to the test program to enhance the safety of operation. The recommendations have been accepted and are being implemented.

The first meeting of the On-Orbit Crew Safety Working Group was held with the major associate contractors in attendance. Working arrangements and roles and responsibilities were established for performing an integrated review of hazards for this mission phase. Particular emphasis was placed on nonmetallic materials and atmospheric contaminants control and flammability test programs. This type of Working Group will be held approximately every three months.

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10.0 ELECTRICAL POWER SYSTEM (EPS)

10.1 DAC MOL Matrix Fuel Cell Presentation

The new DAC MOL fuel cell baseline was presented to Aerospace and the MOL SO on 17 December 1968. The DAC change to the Allis-Chalmers matrix fuel cell will benefit the MOL Program by decreasing the LM weight by approximately 150 lbs. and the reduction in fuel cell parasitic power has a potential reactant weight savings of 50 lbs. DAC stated that this change will cause minimum impact on the LM design and that the change can be accomplished without affecting the MOL Program schedule.

10.2 MOL Matrix Fuel Cell NASA Coordination

Representatives from NASA-MSFC fuel cell technology group and the AAP Program Office were briefed on the Allis-Chalmers matrix fuel cell for MOL by Aerospace, MOL SO, and DAC on 17 December 1968. Agreement was reached for NASA and Aerospace to review each other's Allis-Chalmers fuel cell program requirements. NASA provided Aerospace and DAC their Allis-Chalmers "Statement of Work" for the AAP Qualification Test Program and the MOL SO transmitted a copy of the DAC Allis-Chalmers Technical Requirement Specification (TRS) for the MOL. Arrangements for a meeting between NASA and Aerospace/MOL SO will be made during the week of 13 January 1969 to discuss commonality areas of the MOL and AAP fuel cell programs and where minor changes to program requirements could achieve mutual benefits and cost savings.

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10.3 DAC Preliminary Matrix Fuel Cell ECP

Meetings are planned with DAC on 3 January 1969 to discuss and reach agreement on the LMCEI and TRS documentation changes caused by the change to the matrix fuel cell. The deletion of the KOH water conductivity sensor and the addition of the silver ion generator to the fuel cell, and its impact on both the DAC Electrical Power Subsystem and Water Management Subsystem will be discussed in detail during these meetings.

11.0 ATS DRIVE STABILITY

Since the ATS system is, in effect, a miniature of the Tracking Mirror drive system, it is not surprising that similar problems have been surfaced. The Contractors (DAC and GE) identified an ATS drive problem due to a lack of servo stability at the critical structural resonance of the Lab Module shell. This problem is very similar to the Tracking Mirror drive problem (8.0). The Contractors proposed stiffening the LM shell at a penalty of 60 pounds. This change was rejected by Aerospace and a series of tradeoff analyses initiated at DAC and GE.

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12.0 [REDACTED]

Although, so far as Aerospace is aware, no official change to the Program Objectives has been made, it is our understanding that preliminary authority to proceed [REDACTED] was received during the reporting period. In-house effort was expended to finalize the Statement of Work and Preliminary Part I Specification which will be the basis of the Contractor Proposal. Effort was also expended to support the GE negotiation process by developing a statement of work for proposed GE effort [REDACTED]

13.0 ADVANCED PLANS

13.1 Block II EDMOL Studies

MDAC-WD submitted a proposal on December 23, 1968 to study the EDMOL vehicle system. The study is to define a preferred configuration, crew safety, costs, and production schedule for the EDMOL Vehicle. The study is to be initiated early in January 1969, and scheduled for completion in five months.

Potential vehicle weight reduction items that may be considered on Block II vehicle planning are currently being investigated by Aerospace. Initial discussions with the Gemini B Program Office indicated some reductions might be possible in the heat shield, ballast, and guidance system areas. This activity is concerned generally with the feasibility of weight

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13.1 Block II EDMOL Studies - Continued

saving potential and the attendant economic impact on the program for its acquisition.

13.2 Optical System Improvement Studies

The final briefing of the Eastman Kodak (EKC) Payload study was presented on 3 December 1968 in the MOL SO (Washington, D.C.).

On 4 December 1968, plans for follow-on payload studies were discussed with J. T. Stewart. Direction was prepared to instruct EKC on the appropriate items to be considered in their proposal for follow-on studies.

This direction was given to EKC on 11 December. At the request of the contractor, the due date for the study report and proposal was slipped to mid-January 1969 from 31 December 1968.

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