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29 November 1965

MEMORANDUM FOR GENERAL EVANS

SUBJECT: Manned/Unmanned MOL Mission Assignments



Problem

Define a reasonable flight schedule and mission assignments for the manned and unmanned configurations of the MOL system.

Assumptions

1. The primary MOL objective is to obtain at the earliest date high ground resolution [redacted] satellite photography. However, the present plan to accomplish a manned flight near the end of 1968 should be maintained.

2. The previously approved schedule for MOL flights is as shown in TAB A.

3. Flight model primary optics will be available for an April 1969 launch and every two months thereafter.

4. Manned and unmanned configurations will use the same booster, optics, and mission module. Gemini will be used only on the manned mission. The unmanned mission will use a modified laboratory module including aerodynamic nose fairing and additional (or larger) R/Vs.

5. The overall system effectiveness for the configurations is:

Manned - 0.89
Unmanned - 0.50

6. The WTR minimum launch cycle is three months.

Discussion

One of the main considerations of early schedule definition is primary optics availability. Neither the manned nor unmanned configuration can be completely tested without the flight model high resolution camera system. This sets a major schedule milestone of first "all-up" mission flight at April 1969.

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Useful testing has been planned and still can take place prior to obtaining the "all-up" mission module. This testing would consist primarily of qualifying T-III-M, Gemini B, and the man-vehicle interfaces. In addition, components and subsystems of the final orbital vehicle available for these early flights would be used or simulated. This would allow common equipments of the manned and unmanned configurations to be tested simultaneously as well as individual tests of unique equipments. Since flight tests of the unmanned configuration prior to an "all-up" system would not normally be contemplated, these tests, primarily for the manned version, would give the unmanned configuration a good start toward flight qualification. In addition, man would be available on at least one flight for possible equipment malfunction detection, analysis, and correction.

It is therefore considered advisable to continue the first three WTR flights on the MOL schedule with objectives as follows:

Flight 1 - short life orbital flight without man primarily for T-III-M qualification and MOL structure test.

Flight 2 - short life ballistic (or orbital) flight without man primarily for Gemini B and recovery qualification.

Flight 3 - moderate life orbital flight with man to verify manned configuration and unmanned configuration equipments with primary optics simulated.

The schedule time of these flights does not appear critical and involves a tradeoff of early detection and correction of design deficiencies against equipment availability for inclusion in the tests. However, Flight 3 could be scheduled to maintain the announced late 1968 manned flight date.

Flight number four should be an "all-up" manned configuration. The presence of man on this mission will enhance early acquisition of useful high resolution photography and permit further developmental on-orbit testing of automatic equipments to be used in the unmanned configuration. This launch date is presently set for April 1969 because of flight model camera availability.

Parallel developments of the two configurations will allow either to be launched as Flight 5 and succeeding flights. The availability of flight model camera systems is not expected to affect this approach. To comply with the desire for early test of the unmanned

configuration, this version should be scheduled for Flight 5. Depending on the success of Flight 4, it may be desirable to again fly the manned configuration to take advantage of its higher system effectiveness.

The frequency of flights succeeding Flight 4 is determined primarily by the launch facility cycle time of approximately three months. The number of planned development flights of each configuration will be a function of their respective expected mission effectiveness. Using the present estimates, three manned configuration flights should provide roughly better than 99% confidence of successful mission demonstration. The equivalent cumulative confidence of the unmanned configuration for varying numbers of flights is:

| Number | Cumulative Confidence |
|---|---|
| 3 | .875 |
| 4 | .937 |
| 5 | .969 |
| 6 | .984 |

These figures however do not account for the earlier testing of the many components and subsystems expected to be common to both configurations. Hence the confidence of the unmanned configuration successfully demonstrating mission capability should be higher than that reflected by the table above. It is concluded that approximately four unmanned flights during the development phase should be programmed.

The sequencing of the manned/unmanned flights after the 5th flight should provide sufficient time between like flights to apply to the second the experience gained on the first. This implys alternating manned and unmanned configuration tests. Conversely, scheduling of two successive flights of one configuration to provide a backup flight in case of catostrophic failure is also desirable. The application of these two conflicting rules are reflected in alternate schedules as shown in TABS B and C.

Conclusions

1. The schedules shown in TAB B and TAB C for the manned/unmanned program appear reasonable from the preceding considerations and based on the stated assumptions. They both depict an additional requirement of three flights for the combined program.

2. Parallel developments of the manned and unmanned configuration for flights succeeding Flight 4 should be implemented.

LEWIS S. NORMAN, JR.
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3 Attachments
TAB A
TAB B
TAB C

I concur:

M. I. YARYMOVYCH
Technical Director
MOL Program Office

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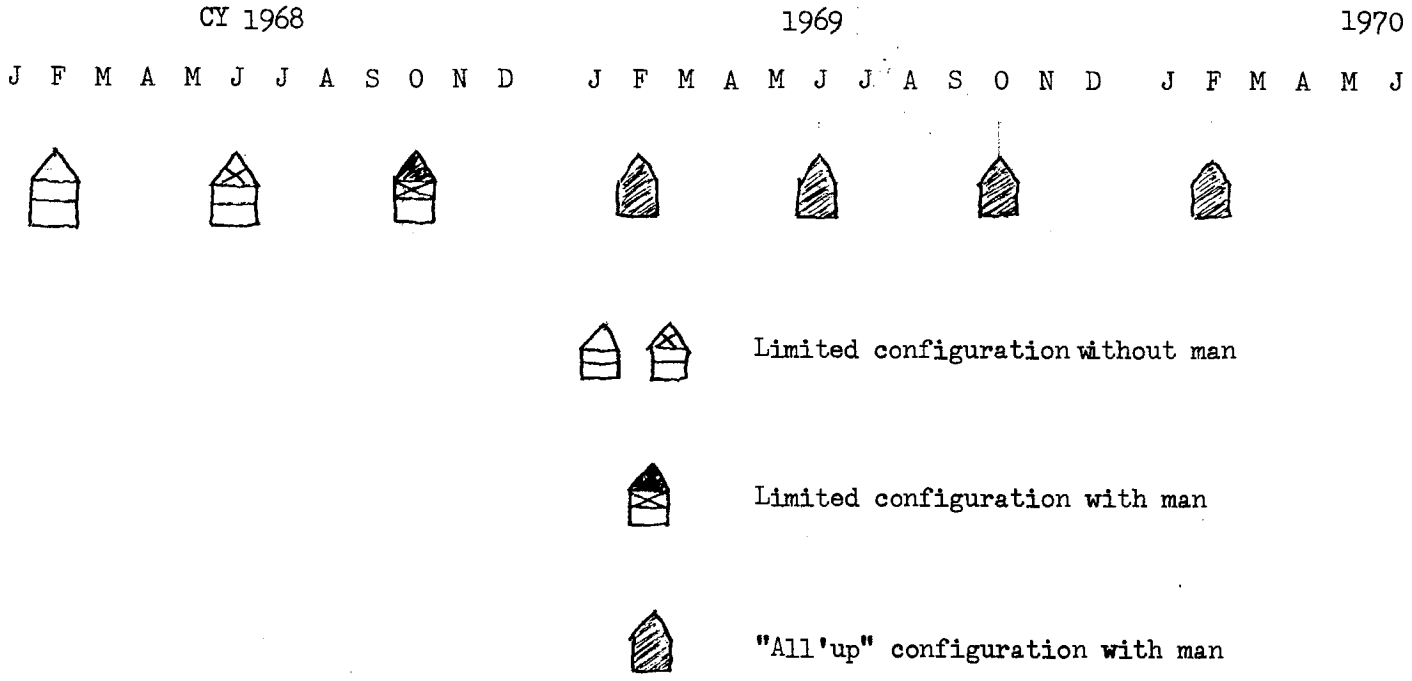
4.

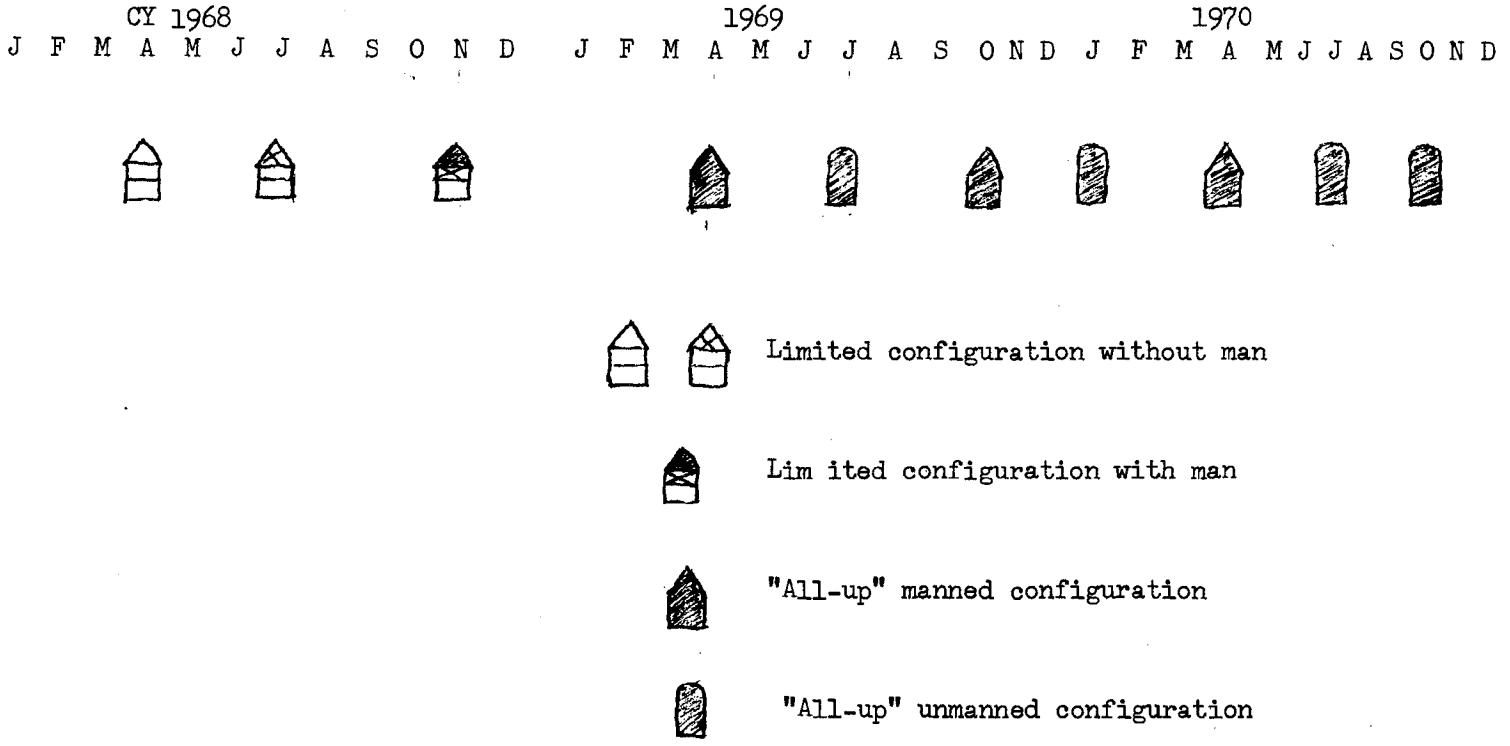
TAB A

## PRESENT MANNED MOL SCHEDULE



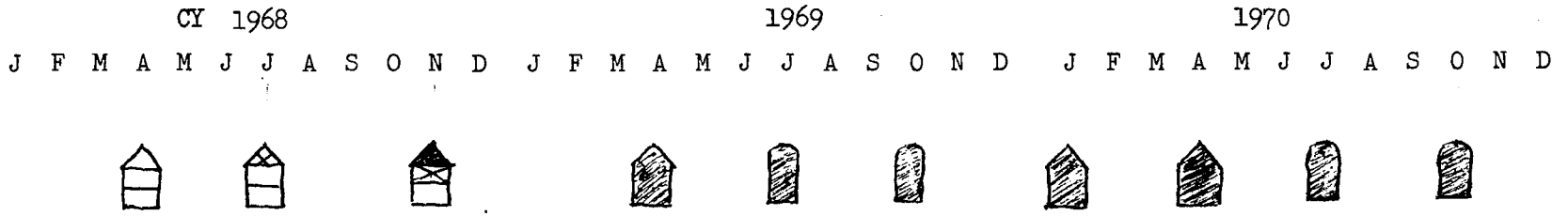
TAB B

PROPOSED MANNED/UNAMNNED MOL SCHEDULE, ALTERNATE 1



TAB C

## PROPOSED MANNED/UNMANNED MOL SCHEDULE, ALTERNATE 2




Limited configuration without man

Limited configuration with man

"All-up" manned configuration

"All-up" unmanned configuration



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