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MEMORANDUM OF MEETING 66-1
AIR FORCE MOL POLICY COMMITTEE

Tuesday, February 8, 1966

Room 4E871, Pentagon

Attendance:

Committee:

- Hon. Harold Brown, Secretary of the Air Force, Chairman
- Hon. Alexander H. Flax, Asst. Secretary of the Air Force (R&D)
- Hon. Leonard Marks, Jr., Asst. Secretary of the Air Force (FM)
- General John P. McConnell, Chief of Staff, USAF
- General B. A. Schriever, Commander, AFSC
- Lt General James Ferguson, DCS/R&D

Secretariat:

Colonel Richard L. Dennen, SAFSL, Asst to Executive Secretary

Proceedings:

1. The stated purpose of this meeting was to briefly summarize material to be presented to the Reconnaissance Panel of the PSAC on 9 February 1966. General Berg introduced the meeting with a chart outlining the agenda for PSAC's presentation.

Introduction	Dr. Flax
Subject Overview	General Berg
Manned and Unmanned Systems	
Sensor and Operational Considerations	Dr. Tennant
MOL System Impact	Dr. Leonard
Optical Sensor Summary	Dr. Oder
Program Summary	General Berg

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2. Dr. Leonard discussed the briefing for PSAC as follows:

a. Manned/Unmanned Systems in terms of man's functions and the pros and cons of automating them. Those basic functions relating to the sensor which, as a minimum, require automation in the unmanned mode include alignment and focus, target acquisition and pointing, image motion compensation and film handling and recovery. Dr. Leonard expressed high confidence in our ability to design automatic equipment which can focus, acquire targets and recover film. He also assured the Committee that, of the three contractors attempting to automate a sensor to compensate for V/h image motion, one or more was certain to achieve [redacted] or better. He said that Aerospace Corporation agreed with Eastman Kodak that for across the format IMC, most of the smear can be reduced by the development of techniques for moving the film during exposure in the direction of flight motion. It now appears that the ground resolution obtainable with the unmanned system is the same as that of the manned, provided the unmanned system is operated with a perigee of 70 N.M. The unmanned system could also perform for 41 days at this lower altitude with 1400 lbs of added fuel for orbital sustenance.

b. The philosophy behind the choices made in substituting computer functions for those of man. Dr. Leonard stated that for PSAC he would show each major subsystem and how it was changed. For operation of the payload, timed computer commands would be employed. As a substitute for man's ability to monitor system performance and provide remedial action when required, the computer places in a holding operation and commands the telemetry recorder. For man's ability to perform maintenance, redundancy is designed into the unmanned system. Overall, for unmanned operations, 186 commands were added to the orbiting vehicle computer and 478 commands to the ground computer.

c. A new baseline MOL. Dr. Leonard identified a new baseline MOL which includes, for manned operations, a V/h sensor, automatic alignment, star tracker and rate gyro package. For unmanned, it includes film transport, V/h sensor and recovery capsules. The baseline vehicle has a design weight of 26,425 pounds to which 720 pounds must be added for manned operation and from which 392 pounds can be subtracted for the unmanned operation. Thus the vehicle in the manned mode will weigh about 1100 pounds more than in the unmanned configuration. Reliability for the manned vehicle will approximate .9 and for the unmanned, .7 to .8.

d. Conclusions. The conclusion that Dr. Leonard intended to convey to PSAC were that a manned/unmanned configuration is feasible; MOL is being designed from inception towards that objective; early

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demonstration of the unmanned mode would involve a weight penalty of about 720 pounds; and that the decision as to whether a particular vehicle should be manned or unmanned can be made as late as 4 - 6 months prior to launch.

e. A summary chart revealed a comparison between manned and unmanned vehicles in terms of critical functions:

<u>Function</u>	<u>Manned</u>	<u>Unmanned</u>
Resolution	High	Comparable, or slightly lower
Visual Observation	High	None
Photography	2 or more film types	1 film type
Data Recovery	Rapid processing and readout of selected data	Physical recovery of exposed film, weekly



Discretionary Payload	None	Space available
Growth Considerations	Next level through rendezvous	Difficult to automate

3. At the conclusion of Dr. Leonard's presentation, General Schriever expressed concern that theoretical studies on automatic functions may foster a false optimism for unmanned operations. Dr. Brown stated that the briefing to PSAC, insofar as possible, should show the advantages of manned operations in terms of credible numbers reflecting the increased cost for development of unmanned systems and related to these costs, the decrease in reliability of unmanned systems.

4. Dr. Leonard expressed optimism that PSAC would welcome the presentation planned for them since it reflected their interest in having equal consideration given to the manned and unmanned systems in the early design stage. Dr. Brown cautioned against false optimism expressing the point the PSAC's concern with MOL is basically political in nature, having to do with the political acceptability of man overflying the Sino-Soviet Bloc for the purpose of reconnaissance. Dr. Brown also

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emphasized that man's role was essential to possible future rendezvous and resupply of consumable items of equipment as well as maintenance. General Berg stated that studies had been underway since December on these conditions. General Schriever noted that the need for rendezvous might be even greater for unmanned vehicles which require more fuel to sustain their orbits at lower perigee.

5. Following the manned/unmanned summarization, Dr. Leonard stated that the Eastman Kodak briefing to be given to PSAC by Dr. Oder would cover optical, thermal alignment and dynamic considerations of the DORIAN optical subsystem. The thermal problem is associated with the flat which absorbs energy from the earth during the times the movable doors are open for telescope operations. The energy absorbed can possibly cause distortion of the flat mirror and the optical light path. One solution being considered is the use of slats or moving doors which, instead of being fully opened during telescope operation, are opened only to the extent required for the target under observation. Still another solution proposed is to heat the back plate of the flat mirror with about 150 watts of electricity. In any event, Dr. Leonard stated that Eastman's summary was intended to convince the PSAC that they have established satisfactory solutions to the critical problems, and the unmanned system would be able to do the job.

6. General Berg next summarized the briefing by stating that the contractors have been notified that the Contract Definition Phase has been extended to April 30, 1966, and effort has been redirected towards definition of the manned/unmanned design. In addition, he stated the tentative program budget estimates would be available by 16 April 1966 and firm figures by 15 May. The launch schedule was given as follows:

Oct 1968	-	Unmanned	-	Booster qualification
Feb 1969	-	Unmanned	-	Gemini qualification
Jun 1969	-	Manned	-	Orbiting Vehicle, less large optics
Oct 1969	-	Manned	-	1st Flight, all systems including optics
Feb 1970	-	Manned or unmanned	-	all systems
Jun 1970	-	"	"	"
Oct 1970	-	"	"	"
Feb 1971	-	"	"	"
Jun 1971	-	"	"	"

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General Berg stated that to achieve this schedule, the present program is being planned on the basis of a total of \$237 million obligating authority in FY67, with a decision being required in October or November 1966 if the level must be held to the \$150 million in the President's FY67 budget. Dr. Brown stated that we have a verbal commitment from DOD that the additional \$87 million will be made available, if required. General Berg also stated that the above schedule assumes the purchase of 3 kits to convert the MOL from the manned to the unmanned configuration in any of the seven manned/unmanned tests. Thus, a maximum of three unmanned launches is presently being planned to meet this schedule. A decision four months prior to launch is required to install the kit for unmanned operation.

7. After the presentation, General Schriever mentioned that a comprehensive study on the factory-to-pad flow which impacted on the interface between Douglas, General Electric and Eastman Kodak had been briefed at the MOL Program Review on 5 February 1966. Dr. Brown requested that he be kept informed of all agreements satisfactorily concluded with respect to the interfaces among these contractors. General Schriever said that he thought Dr. Flax planned to review this subject at AFSSD on 18 February 1966.

ACTION: Advise Dr. Brown of any interface agreements concluded between Douglas, General Electric and Eastman Kodak subsequent to the 18 February 1966 review by Dr. Flax and General Schriever.

The meeting adjourned at 1530 hours.

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APPENDIX

MOL POLICY COMMITTEE

8 February 1966

Other Attendees:

B/General R. Berg, Deputy Director, MOL Program
Dr. Peter Leonard, Aerospace Corporation
Dr. Michael I. Yarymovych, MOL Program Office
Colonel Henry C. Howard, Office of Space Systems
Major Donald Floyd, MOL Program Office

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