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MAR 13 1967

MEMORANDUM FOR DIRECTOR, NATIONAL RECONNAISSANCE OFFICE

SUBJECT: Recommendations on Readout in the MOL Program

Cancellation of the GAMBIT 3 readout development has caused a re-evaluation within the MOL baseline, which has included an adaptation of the GAMBIT 3 readout components and the use of the ground station. Resulting from the review, this memorandum recommends that the data recovery capsule now planned in the manned configuration be eliminated and that the program proceed with the integration of the CBS readout system as previously intended. The reasons, in summary, for this recommendation are:

1. The safety and engineering problems associated with handling the rocket-propelled capsule inside the laboratory module are serious enough to be worth avoiding if possible.
2. In any event, the readout system is superior to the recovery capsule for use during the MOL orbital development period.
3. MOL provides a unique opportunity for an orbital evaluation of the performance of the CBS readout system.
4. MOL can perform an effective evaluation of the readout mission, including the ground environment, as it applies to intelligence collection objectives.
5. The readout system will be a valuable tool for providing a wealth of feedback data during orbital testing so that a thoroughgoing evaluation can be made of just what abilities of the man on orbit are most useful and how they may be applied most effectively.
6. A readout system has specialized applications to the MOL mission.
7. An orbital readout system has many projected intelligence applications.

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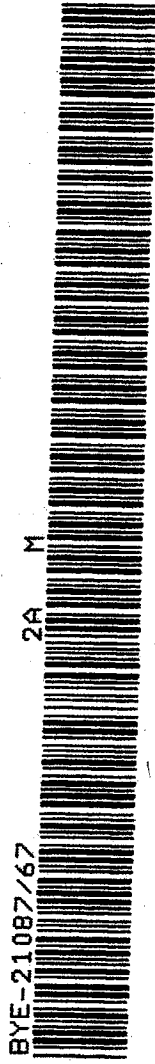
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In the process of arriving at the recommendation, four obvious alternatives, discussed in Tab A, were considered:

1. Continue with the baseline configuration which provides both a recovery capsule and readout.
2. Eliminate both.
3. Provide only a recovery capsule.
4. Provide readout only. (Recommended).

The following discussion presents the reasoning to support the recommended decision:

1. Adoption will eliminate safety and engineering problems with the capsule.

The baseline configuration contains the recovery capsule in the pressurized section of the laboratory. Its presence unavoidably presents several difficulties, some of which were not previously considered quite so serious when there was less experience with oxygen-rich atmospheres. The capsule is handled on the ground with procedures which apply to low-order explosives. Pyrotechnics are used in several parts, the largest being the rocket igniter. One faces here the dilemma either of carrying the capsule "loaded" (with igniter installed and shorted out) or of having the astronaut perform the installation, an operation conducted behind sandbags on the ground.

The capsule is a heavy mass which must be maneuvered to the launching tube (with no previous practice) or, alternatively, originally installed in the tube and fed by a probably impractical, devious film path. The former is the current solution.

Certain emergency situations call for an overboard escape hatch. The capsule launching tube can serve this need with the exception that during the time it is occupied by the capsule it is not usable. If the capsule should fail to eject normally, a dangerous condition would exist which probably would forbid any astronaut attempts to dislodge it. In such a case, this escape route could not be used. The capsule has never been qualified for storage in an oxygen-rich atmosphere.

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2. For the MOL orbital development period the readout system is superior to the capsule.

The capsule is a one-shot system having the sole advantage of returning the primary record from the primary platen. Any examination that needs to be made by ground-based technicians subsequent to the single recovery must await the end of the 30-day mission. Readout, on the other hand, provides a quick-reaction check continuously through the mission. The differences between the transmitted photography and the primary record will be small, as well as identifiable in advance. A weekly readout from a primary record sample also can be made.

3. MOL provides a unique orbital test of the CBS system.

Quite unlike the proposed GAMBIT 3 program, MOL can carry the readout as a secondary payload without detriment to any other objective. It would be regrettable to miss the opportunity to perform such a thorough orbital test of the system at so low a cost. The manned attendance during the developmental period is a unique advantage. Aside from the identification of possible future uses, the testing of such a system will provide valuable information for future planning.

4. MOL can perform an effective evaluation of the readout mission.

The place to be occupied by readout techniques in future intelligence collection efforts is far from being defined as yet. At least a significant part of the controversy can be resolved by an orbital shake-down of the mission itself, which can be accomplished comprehensively by MOL in the three 30-day tests on which the equipment would be scheduled. The experience to be gained in the actual operation, including the processing and distribution of the data from the ground station, is certain to shed new light upon the whole problem. The economy, coming from astronaut readout selectivity, in the quantity of material that must be handled will be important during this exploratory phase.

5. The readout system is ideally suited as a tool for evaluating the manned functions of the mission.

In spite of the best laid plans, the manned missions are sure to be dominated by continual revisions, trades and adjustments in functions, priorities and targeting objectives as the operations actually are experienced. It will be important to know whether the "active-indicator" search can be performed as planned, whether the "false-target" rate is high and whether the resolving power of the

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telescopes is adequate to permit target inspections. Target verification needs to be checked in both manned and automatic modes and the same is true for the weather selectivity function. Only a small part of this information can be determined at all by the astronauts and reported verbally. With no recovery capsule or readout, these evaluations will be predominantly post-mission. With only a total of three missions scheduled, there may not be enough time to make all the cut-and-try adjustments that could, if given enough feed-back, solve all the major problems. A single capsule returned early in the mission has some value, but it would contain only a small percentage of the data. By contrast the readout system gives a daily clearly verified check of all these functions, operating as a continuous feed-back in the experiment. The information transmitted can be carefully selected and specific to the function being tested. The readout system can more than pay for itself in this mode of operation alone.

6. The readout system has specialized applications to the MOL mission.

It follows from 5., above, that, once the operational modes are developed, they can employ readout for checking and updating future missions. In addition, the MOL mission has inherent quick-response elements in those cases, for instance, where high-value intelligence of a perishable nature has just been obtained or where the whole system is employed at a higher altitude in a crisis situation.

7. A readout system does indeed have important future applications.

Much of the current apathy in attitude toward readout can be attributed to characteristic conservatism in the governmental intelligence machine, in spite of which there is reason to believe in a future, not clearly defined, importance for readout.

The prospect of return of intelligence information with short time lag has been viewed favorably in some degree or other by most users. The requirements usually are expressed in rather general terms. Several sources have recognized the crisis management applications, but have not considered this alone to sufficient justification for large expenditure. It is recognized, however, that readout also can provide timely validation of data received from other sources, can work especially well in combination with SIGINT and can have importance in connection with impending or occurring events of special interest. In a large percentage of cases, the first clues received about such events come from intercepted message traffic or radiated emissions

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from the site of the activity. Frequently it is not possible to determine whether the activity is in fact occurring. The ability to photograph the site upon demand would be a powerful addition to the collection system. Quick response is essential, since information on these events is perishable.

The military requirements for a satellite reconnaissance system with quick-response return of information are stated in JCSM 937-63, dated 29 November 1963. The system proposed for testing in MOL would not meet all of the parameters listed, but it would be an important step forward in providing such intelligence return at a future time.

Proposed Actions

The weight and cost factors associated with the recommended action are minor and are within the present program scope and funding. Tab A contains the current estimates. If you approve, the necessary instructions will be transmitted to cause the deletion of the capsule recovery from the manned configuration and to direct the SPO to proceed with contractual action for the CBS readout system. The SPO will be instructed to study and propose a suitable approach to provide a data link and ground system.

HARRY L. EVANS
Major General, USAF
Vice Director, MOL Program

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a/s

Colonel Battle/55674/13Mar67/ams

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TAB A

SUPPORTING INFORMATION

Factual and Status Information

1. Status

CBS is continuing at a low level of activity in order to maintain continuity until a decision can be made. To adapt to MOL, they would need to come up with a final design and to define the AGE. BTL appears unwilling to do any more on their part. Another contractor could take over, however, without BTL objection, and some arrangement to employ the ground station would need to be worked out.

Provisions have been made in the baseline design to permit installation of both systems. These actions are proceeding slowly, however, pending a decision on which option is to be selected.

2. Weights

a. The capsule installation weight of 400 lbs. has been included in the baseline weight statement.

b. The readout system installation weight is 431 lbs., of which 163 lbs. is in the baseline weight statement.

c. 375 lbs. of the capsule system can be removed. If the readout system is substituted for it, the baseline weight will show a net decrease of 107 lbs.

3. Cost

a. The cost of the capsule system has been included in the current budget. If deleted, the cost would be reduced by about \$5.0 million.

b. The readout system cost is estimated to be \$25.0 million. \$15.5 million is now programmed for readout. Approval of the readout system would require, therefore, an extra \$9.5 million. Elimination of the capsule system would save \$5.0 million, so that the net cost increase of the recommended option would be \$4.5 million.

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Discussion of Four Options

1. Continue with baseline, providing both recovery and readout.

Heaviest in weight and highest in cost, this option also provides the most in advantages. The capsule installation and operation will not interfere with the readout system. Orbital checkout of the capsule recovery system would put it in a ready status for future use if needed. Considering the developmental nature of the MOL program, this option probably would be preferred were it not for the safety and engineering problems which at the present appear very troublesome. The worth of the capsule system, which has functions that largely are redundant to those of the readout system, does not appear great enough to justify incurring the associated complications.

2. Delete both systems from the baseline.

Simplicity, low weight and low cost would be the principal reasons for selecting this option. Mission data feedback would be accomplished through the voice link, something like performing photo interpretation by question-and-answer sessions on the telephone. Significant pieces of information out of the manned-mode operation can be passed by voice, but only a small fraction of the analytical information needed to conduct testing and operations can be sent down by voice. With only three manned R&D tests programmed, elimination of any data return, particularly the readout system, would appear to be a false economy.

3. Provide only a recovery capsule.

The utility of the data capsule stands alone only in one respect: it returns the primary record. It is possible that some defect in the primary platen (trouble with across-format IMC, for instance) could be detected and corrected for the latter part of the mission. Other than in this particular failure-analysis application, the readout system is superior in all respects. Since in the readout case, the primary record also will be returned, at the end of 30 days, the small advantage of the capsule in this particular respect is not a strong justification. The complications presented by the capsule already have been discussed.

4. Provide readout only.

The case for Option 4 has been stated.

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