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MEMORANDUM FOR RECORD

SUBJECT: 8 November 1965 PSAC Reconnaissance Panel Round-table Discussion on DORIAN

1. As previously explained to me by Dr. Flax in a KY-9 telecon, PSAC had specifically requested this round-table discussion for the purpose of ensuring a better understanding of their desires concerning the manned and unmanned modes of operation. They had reviewed the documents previously prepared by PSAC to reflect these desires, and those which had subsequently been sent to us on this subject, and felt that neither fully explained their views.

2. Those present included: Dr. Hornig (Chairman, PSAC), Dr. Land (Chairman, PSAC Reconnaissance Panel), Dr. Shea, Dr. Purcell, Dr. Garwin, Dr. Puckett, Dr. James Baker, Dr. Goldberger, Dr. Ling; also present were Dr. Steineger, Executive Secretary, Mr. Thomas, BOB, Mr. Fink and Mr. Koslov of DDR&E, Dr. Flax, General Berg, Dr. Leonard General Martin, Colonel Allen and LtCol Knolle, and Mr. Waggershauser, Mr. Simmons, Dr. Oder, Mr. Sewell, and Mr. Collinge, all of Eastman Kodak Company.

3. Prior to the round-table discussion, at Dr. Land's request, Colonel Allen and LtCol Knolle summarized briefly the general approaches being followed in the present efforts to define the unmanned aspects of the DORIAN effort.

4. Dr. Land explained that PSAC feels that the MOL Program must include both manned and unmanned capability. He stated that the option must be available to continue the program on an unmanned basis if for any reason the President should decide to forego any specific manned flights at any time. He also said that, in any case, there should be unmanned flights in the on-going program as well as manned flights, perhaps as many as four or five unmanned flights for every manned flight. Dr. Land stated that the Panel is absolutely convinced that both the manned and unmanned versions can make use of a considerable

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amount of interchangeable major components provided that the original design is carried out, from the beginning, on this basis. He further stated that the Panel is convinced that the same performance can probably be attained in an unmanned mode as can be attained in a manned mode provided the necessary attention and effort is devoted to this objective.

5. Dr. Purcell explained that the desire for inclusion of automatic features in the manned version as well as the unmanned is based on their conviction that the manned version will be better if the automatic features are provided than if they are omitted on the basis that the man could get along without them. In the Panel's concept, the use of man should be predicated on his using or adding to automatic functions which are adequate for unmanned operation, rather than replacing these functions.

6. Dr. Shea explained in detail the Panel's present concern, which appeared in the subsequent round-table discussion to be the most important single point for calling the meeting. This point was that the MOL Program must have the manned and unmanned capability designed into it from the very inception, rather than designing on the basis of manned operations, and then converting this initial design to unmanned use. He illustrated this with NASA's experience in the Apollo Project, pointing out that they had a good example of how to do it, and another example of how not to do it. The example of how to do it was the Lunar Excursion Module (LEM), in which the requirement was placed from the earliest inception of the project to fly the same basic equipment in unmanned as well as manned modes. Everyone accepted this requirement from the beginning, and the solution was relatively simple. The case of how not to do it was the Command Service Module (CSM). In this case, Shea said that everyone "barrelled along" for awhile, designing everything for a manned-only mode of operation. Later they tried to convert this to add the unmanned capability, and the result is very complex, example of just what they want us to avoid in the MOL. It was clear throughout the discussion that the entire Panel completely indorsed Dr. Shea's explanation of their intent. They want the unmanned operations designed from the very beginning in every sense.

7. The Panel made it clear, in discussions by Dr. Land, Dr. Garwin, and Dr. Hornig, in response to my questions, that there is some flexibility with which their desires can be met. There is no requirement for rapid changeover from manned to unmanned operations; this can be done within the normal 2-3 month pad cycle. The appearance of the unmanned system

does not have to be the same as the manned system; that is, it is acceptable that any observer seeing the system on the pad can easily distinguish between the two. There was agreement that the Gemini capsule may be removed for unmanned operations, and replaced with a fairing or with a multi-recovery module, as appropriate. The Panel clearly believes that the laboratory module can and should be designed so that it can be used in either the manned or unmanned operation. For unmanned flights, components not necessary would be omitted; for manned flights, some things not useful in any sense to the manned operation also would be omitted. The initial design should be for a single laboratory vehicle which accommodates both of these capabilities in the simplest and most effective way possible. We also may consider an entirely separate spacecraft for use in the unmanned mode in lieu of a joint-use laboratory module as described above, but in this case, the Panel would desire careful cost comparisons. They made it clear, that while they were willing to consider this approach, it is their present view that the joint-use laboratory module would be much less expensive; and they see no reason why it could not be developed. The Panel made it clear, that in the unmanned operation, sufficient recovery buckets must be included to make the unmanned operation effective, either within the laboratory module, or in a separate recovery vehicle module to be used in the unmanned mode. It was quite clear that the Panel desires the payload to be the same for both the manned and unmanned modes, and wants it designed for both modes from the beginning.

8. Based on the discussion concerning the above points, I got the strong impression that the Panel, as such, is interested only in cost comparisons between reasonable alternative methods of meeting their desired objective of manned/unmanned capability through joint-use of all feasible system components; they are not interested in comparisons of any of these with any alternative which does not meet their stated desires. I think that they will be quite hostile to detailed consideration of any manned-only type system; with the flexibility they have given they are convinced that their objective can be reached if we orient all program emphasis to this objective from the beginning rather than "barrelling along"on any manned-only approach. Although it was not clear that all members would agree, it seemed quite clear that the most vocal of the Panel members are really not interested in any manned-only version of the MOL; they are convinced that the unmanned version is an indispensable part of the program, and can be obtained relatively simply provided the proper attention is given to this objective from the beginning.

9. In answer to my question as to whether the Panel would accept an unmanned capability in which the expected performance might be somewhat

degraded from the expected resolution performance of the manned version, Dr. Garwin answered emphatically that it would not. He stated that under these circumstances the whole program should be slipped until this performance could be expected, or even cancelled. Dr. Hornig explained that the nine months presently specified in our guidance as the acceptable lag between the first flights of the unmanned version and the manned version was not a "magic" date; the unmanned flight should be made as soon as the expected performance warrants. Both he and Dr. Land made it clear that the unmanned capability is desired as soon in the flight program as possible, even the first MOL flight, if possible, but that the expected performance should determine the first flight date of either version, whether the first flight of any MOL system is unmanned or whether the first unmanned flight is six or nine or 11 months or so after the first manned flight. The point was made that the subject of a lag came up only because they anticipate that some additional time may be required to obtain the unmanned performance. Dr. Land repeatedly expressed the opinion that it might be more desirable to actually fly the first MOL flight unmanned.

10. Both Dr. Land and Dr. Garwin emphasized several times the importance of obtaining the design resolution performance. The Panel is convinced that the [redacted] ground resolution must be obtained to justify continuance of the program. Dr. Land emphatically pointed out that there is absolutely no point in having this expensive program come in with results not significantly better than those expected from the GAMBIT-CUBE project.

11. Dr. Garwin emphasized that there should be no separate manned/unmanned competition in the MOL program. He stated that it is the Panel's view that this type of competition would be most unhealthy and should be avoided. They want a single program with the capability of operating in either mode, with minimum changes between such modes, as outlined in the discussion.

12. Dr. Land stated that there must be continued availability of unmanned capability after the initial demonstration but that the amount of this was a programming decision outside the purview of his Panel, in which he deferred to Dr. Hornig. (Although not stated explicitly, I interpreted his reference to mean Dr. Hornig's role not only as the advisor to the President, but more specifically his role as chairman of the NRO Executive Committee, established under the 11 August 1965 NRO Agreement).

13. Dr. Land stated that the Panel wishes to review the basis on which program decisions will be made prior to these decisions actually being made. In response to a question as to the next appropriate meeting for such a review, Dr. Flax suggested early in January.

14. Dr. Shea invited us to review the LEM and CSM cases to see examples of how to proceed and how not to proceed, and then to have NASA discuss with us how they would do these same jobs now if they had it all to do over. He emphasized again the Panel's fundamental concern that the capability for operating in either mode must be built in from the beginning; rather than designing for manned operation and then converting to unmanned capability.

15. The following is a concise summary of what PSAC wants, taking the entire discussion in context:

> PSAC wants a single MOL program which is designed from the beginning to provide the option of manned or unmanned reconnaissance flights, with minimal changes in the basic configuration to convert from one mode to the other within the two to three month pad cycle. These changes may include substitution of a fairing or a multiple recovery package for the Gemini capsule when converting from the manned to the unmanned mode. PSAC believes that the payload and the laboratory module can and should be designed from the beginning to be operable in either mode of operation, with some laboratory module components unplugged and omitted or changed when configuring for one mode or the other, and appropriate multiple recovery capability added for the unmanned mode. PSAC is willing to consider a separate unmanned spacecraft which would be substituted for the laboratory module in the unmanned mode only if the cost comparison is favorable, which they do not expect. They want the maximum use of automatic features in the manned mode, with the man's functions added or superimposed, rather than substituted for such automation. They want both modes to be capable of the same resolution performance, and they believe that this can be obtained if sufficient effort is placed on this objective from the beginning. They believe that

the attainment of [redacted] ground resolution is absolutely necessary to justify continuance of the program. They want both modes of operation as soon as possible in the flight program, and they want the first flights of either mode to be determined by the expected attainment of the [redacted] ground resolution. They don't want any competition between manned and unmanned modes; they want a single program capable of operating in either mode with minimal changes, and they want it designed this way from the beginning rather than designing a manned version and then adapting or converting it for unmanned operation. They expect unmanned flights in the program on a regular basis, in addition to assuring the option of continuing the entire program on an unmanned basis if for any reason a decision should be made at any time to discontinue manned MOL flights.

SIGNED

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Brigadier General, USAF
Director