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~~(S)~~ NATIONAL RECONNAISSANCE OFFICE  
WASHINGTON, D.C.

OFFICE OF THE DIRECTOR

MEMORANDUM FOR THE NRO EXECUTIVE COMMITTEE

SUBJECT: Astronomical Observations from Space

The question of NASA's development and use of optical telescopes to conduct astronomical experiments from space was posed to the Executive Committee by Dr. Hornig in a memorandum dated October 11, 1966. Because of the press of other matters of higher priority, this subject has not been discussed at the ExCom meetings since that time. However, activity in this general area has continued, and extensive discussions have taken place between the MOL office and NASA regarding the capability of the MOL to conduct experiments in astronomy.

The purpose of this memorandum is to summarize the present status of these discussions between the MOL office and NASA, and to point out the general security problems that would attend a NASA program of astronomy from space.

The interchange between the MOL office and NASA regarding the use of the DORIAN optics for experiments in astronomy was the outgrowth of a briefing on MOL to NASA in late June 1966, and subsequent discussions between General Evans, Vice Director, MOL and Dr. Newell of NASA. As a result, an appropriately cleared NASA/MOL group was formed to examine the scientific merit and technical feasibility of using MOL to obtain astronomic measurements.

*DRAFT prepared by  
Col Carter on 17 March*

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By February 1967, the analysis by this group had progressed to the point that NASA was able to summarize its conclusions in terms of four alternatives as follows:

a. Use existing MOL/DORIAN equipment without modification. NASA recommended that the baseline MOL system be used to acquire random observations of the nearer planets on a non-interference basis. They noted that no specific requirements existed for such observations, but that NASA would use such data to support planning for planetary missions.

b. Addition of specialized auxiliary equipment within the laboratory module (i.e., spectrometers, photometers, etc.) NASA recommended against the addition of such auxiliary equipment since the associated requirement for precise guidance would demand extensive modifications to the MOL attitude control and stabilization systems.

c. Modify the DORIAN optics in later generation vehicles to provide for specialized astronomical observations. NASA recommended against modification of the DORIAN optics. They noted that such modifications would be costly and would probably conflict directly with the primary requirements for the DORIAN optics.

d. The application of MOL technology to the development of NASA's cognate instrumentation. NASA indicated that significant benefit could be realized by adapting MOL technology to NASA programs. A continuation of cooperative efforts in this area was recommended.

These conclusions were discussed in some detail at the meeting of the DOD/NASA Manned Space Flight Policy Committee on February 9, 1967, and it was agreed that when the MOL Program begins planning for specific flights, a cooperative effort could be arranged between NASA and DOD to acquire planetary observations.

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While it is clear from these meetings and discussions that the MOL Program could make a positive scientific contribution to the astronomical community, it is equally clear that the development and use by NASA of optical telescopes to conduct astronomy from space poses severe questions of security as related to the National Reconnaissance Program. These potential problems were recognized by Dr. Hornig and Mr. Schultz in their memorandum to Mr. Rusk of April 4, 1966, which requested the NSAM 156 Committee to consider the relationship of peaceful earth sensing programs to the National Reconnaissance Program. With respect to MOL, that memorandum asked:

"In view of the MOL capability for making high quality astronomical measurements, can MOL be used to meet NASA requirements for orbital astronomical experiments? If so, how and at what level of security classification?"

The report of the NSAM 156 Committee did not deal explicitly with the security implications of astronomy from space and the use of MOL hardware for this purpose. However, the policy which was established by this report provides a base from which to consider this security question. Unfortunately, no one has yet been able to devise a credible scheme for providing astronomical photography taken with the DORIAN optics to the scientific community without exposing the reconnaissance mission and capability of MOL. In his memorandum to the ExCom on October 11, 1966, Dr. Hornig pointed out that the astronomers have traditionally pioneered in the field of high precision optical instruments. They would be certain to recognize the MOL astronomical data as having come from a very long focal length, high quality optical system. In view of these factors, I have substantial reservations as to the prudence of any attempt to accomplish scientific astronomy with MOL.

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A Study Panel was established in response to Recommendation #7 of the NSAM 156 Report to determine the security restrictions which must be applied to equipment from the National Reconnaissance Program which could be made available for use by NASA in non-military satellite earth sensing. This Panel reaffirmed the need to protect the National Reconnaissance Office as a primary source of intelligence.

If the National Reconnaissance Office were to be tasked to procure an astronomical telescope for NASA, based on present or projected programs, an agreement similar to that for UPWARD would be required. In general, under the UPWARD agreement, the fact that NASA will do lunar sensing, and that DOD is participating, is treated as unclassified. The sensor equipment and technology is protected under BYEMAN security controls but the photography of the moon is classified SECRET, and when properly sanitized, is considered to be unclassified. All photography of the earth (which may be required for test or engineering) is protected under TALENT KEYHOLE security system. The UPWARD Program has shown this to be a difficult but workable arrangement. X

On the other hand, if the NASA were to develop its own telescope, interfacing with the National Reconnaissance Office where required by technological considerations or contractor commitment, I am of the opinion that a satisfactory security agreement and procedure could be established which could furnish suitable safeguards to the National Reconnaissance Program. Under these procedures, applicable technology and components (for example, mirrors) would be furnished to NASA on a carefully controlled basis and would not give us a problem once they had been incorporated into the NASA astronomical configuration.

There is, of course, a problem of international politics associated with a public and widely announced NASA flight. Essentially, the answer to this problem lies in developing international reassurance that NASA's satellites are actually looking

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toward space and not toward the earth. I am reasonably optimistic that there are several means for developing such reassurance, the most promising of which appears to be bringing representatives of the international astronomical community into the NASA Program at its onset.

I recommend this general topic for our consideration and discussion at the next meeting of the Executive Committee.

Alexander H. Flax

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