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MEMORANDUM FOR: Deputy Secretary of Defense
Director of Central Intelligence
Special Assistant to the President for
Science and Technology

SUBJECT: APOLLO Applications Program

As presently being conceived and planned, the NASA Apollo Applications Program appears to pose a serious threat to the security of the NRP - both from the standpoint of protecting the level of the sensor technology associated with NRP systems, and with reference to the need for continuance of an international climate which permits the conduct of U. S. overhead reconnaissance activities.

Neither repeated expressions of concern by myself and by my predecessor to various senior officials of NASA, nor correspondence between the Secretary of Defense and the Administrator of NASA, appear to have had substantial influence on NASA planning and preparations for the Apollo Applications Program. I am continuing to work with representatives of NASA and DDR&E on the Manned Spaceflight Policy Committee in our attempt to resolve the difficulties which we have encountered. However, the basic lack of agreement with NASA on fundamental premises compels me to doubt that our problems can be solved by that means. I believe it now is timely, therefore, that the NRP ExCom review this matter and determine what action should be taken.

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To provide background for an ExCom discussion, the NRO Staff has summarized and documented the situation in the attached study. The study summarizes the NASA activities and planning in the APOLLO Applications Program and NRO concerns and actions relative to the program; more detailed supporting material and references are provided in the attachments.

With your concurrence, I will schedule an ExCom meeting at an early date on this subject.

Atch a/s

Alexander H. Flax
Director
National Reconnaissance
Office

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THE APOLLO APPLICATIONS PROGRAM

AND THE

NATIONAL RECONNAISSANCE PROGRAM

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~~TOP SECRET~~

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INTRODUCTION

Over the past year, NASA has been preparing detailed plans for the Apollo Applications Program (AAP) for "remote sensing of the earth". The program plan envisages the use of those Apollo spacecraft and Saturn launch capabilities which may prove excess to the lunar program; it may also involve the procurement of additional spacecraft and boosters.

Two elements having possible impact upon the National Reconnaissance Program are reflected in the NASA plans: (1) the use of polar orbits in order to achieve maximum coverage of the earth's surface and (2) the use of a wide variety of earth sensing devices of advanced technology, the results of which will be of reconnaissance or near reconnaissance quality relative to NRP standards.

NASA planned activities in terrestrial sensing stem from such fields as geodesy, geology, oceanography, agriculture, and forestry. There can be no question that there are legitimate civilian purposes in these fields which could be served by earth sensing from satellites.

There is a conflict between NASA's planned earth sensing activities and the National Reconnaissance Program: (1) with respect to security, (2) in terms of competition for the nation's available optical sensor fabrication and photographic exploitation assets, and (3) in terms of the need for effective and economic use of national technical assets.

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Security practices under the NRP, through which the U. S. has endeavored to preserve an international environment conducive to the successful continuation of this intelligence collection activity, are designed to prevent official confirmation of the mission under other than the most considered and controlled circumstances, and to effect protection of the extent and success of the program through rigid control of both the technological state-of-art and the resultant intelligence products. Efforts by the NRO, to date, to impose a degree of similar restriction to these NASA activities, which, from the standpoint of applicable technology, parallel the NRP in many areas, have not been notably successful. In this regard, there is a question as to correct interpretation of existing national policy related to such activities.

There are available in the U. S. somewhat limited industrial and governmental assets to provide for fabrication of satellite optical equipment and exploitation of resultant satellite photographic products. Most of these assets are heavily committed in support of this intelligence mission. Any uncontrolled competitive effort among separate departments of the U. S. government, would tend to dilute the National capabilities to an unsatisfactory level.

In addition, there is currently available, under TALENT/KEYHOLE controls, considerable material which could be used to satisfy many of the requirements toward which the NASA program is

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directed. Further, when examined in terms of cost effectiveness, many of the tasks planned under AAP could probably be better accomplished by NRO systems either in being or under development.

For many of these tasks, the presence of man aboard the Apollo vehicle appears to be unnecessary, and existing or planned unmanned systems would accomplish the desired objectives at lower cost.

There would appear, therefore, to be justification for examination of both programs from a total national viewpoint to resolve areas of overlap, redundancy, and conflict.

THE NASA PROGRAM:

NASA has recently outlined in some detail its plans for satellite-borne image-forming sensors of the earth's surface in conjunction with the Apollo Program (Tab 1). The development of this program will require experiments with image forming sensors aboard earth orbiting vehicles; therefore, NASA has actively solicited proposals for imagery experiments from the scientific community, civil government agencies, and Department of Defense agencies to achieve maximum utilization of these vehicles.

The photography obtained from the Mercury and Gemini programs and experiments, involving a wide array of terrestrial sensors conducted from aircraft, have proven the potential for application of this type of material to many scientific problems and current Federal government programs such as those being conducted by the Geological Survey, Coast and Geodetic Survey, Department of

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Agriculture, and even the Census Bureau. The technical personnel and engineers responsible for the proposals made to NASA realize that much improvement can be achieved with systems designed for use in space and have, therefore, recommended sensor programs requiring high resolution and considerable geometric stability. While only a portion of the experiments require photographic quality comparable to that utilized in the NRP, all experimenters, by nature, will desire greater resolution and less distortion as their research progresses. Polar orbits are required, of course, to achieve maximum potential for covering the entire earth's surface.

The latest proposal for an Integrated Group of Photographic Experiments for Manned Earth Orbital Missions (Apollo Application Flights), dated December 1, 1965, (Tab 2) lists the types of sensors to be flown and states that photographic experiments based on scaled-down or simulated Apollo camera systems, will be flown on late Gemini or early Apollo flights. If these systems are to be flown as indicated, the following kind of schedule generally will have to be met:

Specify functional requirements	Winter 1965/66
Define mission payload specifications	Winter 1965/66
Issue an RFP to the optical industry for the development of necessary earth sensors	Spring 1966
Evaluate proposals from industry	Spring 1966
Award hardware development contracts and publicly announce the award	Spring 1966

Obtain Manned Space Flight Evaluation Board approval	Summer 1966
Conduct validation tests for photographic sensor performance	Fall 1966
Make spatial mock-up available to news media	Spring 1967
Commence final mission planning and choose orbital inclinations	Spring 1967
Complete plans for data collection, reduction, and processing	Summer 1967
Publicly announce flight objectives	Summer 1967
Release mission profile to news media	Fall 1967
Distribute public information (press) plan	Winter 1967/68
Commence astronaut training	Winter 1967/68
Deliver hardware to spacecraft contractor for integration	Spring 1968
Integrate payload	Spring 1968
Checkout spacecraft (payload) systems	Spring 1968
Define complete detailed system performance characteristics	Spring 1968

The camera systems proposed by NASA to meet the needs of the scientific community and civil government agencies are contained in Table 1, appearing on page 4, Tab 2.

A comparison of these camera characteristics with those used in the NRP shows that, in many respects, they are similar. This is to be expected in that, while the purposes of the two programs differ, the data required to solve their problems is very similar. Nor is it surprising to find that there is

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considerable overlap between the AAP and the NRP with respect to that category of personnel who serve as expert advisers, both in and out of government. It is undoubtedly true that the technology developed in the NRP is reflected in the proposed NASA systems.

THE SECURITY PROBLEM:

Security as practiced within the NRP under the general policy guidance of the DCI, has been strict and is both sound and realistic in light of the purpose for which it was intended; namely, the protection of probably the most important single U. S. intelligence source and the maintenance of an international environment conducive to continuation of this covert program. Under this system of security, the intelligence product, the fact of the activity, and that technological state-of-art, which might reveal the extent and relative success of the program, are tightly controlled.

It has its basis: (1) in a Presidential memorandum dated 26 August 1960 directing that the products of satellite reconnaissance, and information of the fact of such reconnaissance revealed by the product be afforded security protection within the TALENT/KEYHOLE Security System; (2) in NSC Action 2454 which recommended national policy related to U. S. satellite reconnaissance activities; and (3) in covert or near covert security methods which were an outgrowth of security methods used in the CIA U-2 program.

The NASA program, on the other hand, is intended for

scientific purposes, for the benefit of the world at large. It is difficult, and, in most instances, inappropriate to invoke strict security controls with respect to such activities. However, in terms of international image, as Communist nations would choose to portray the U. S., there is a refusal to acknowledge the existence of two national space programs: a "military" program, the primary preoccupation of which, to date, has been the acquisition of intelligence; and a "peaceful" U. S. space program under NASA.

The security problem exists now, because as pointed out earlier, NASA's requirements for earth sensing technology parallel those of the NRP, the limited domestic assets to provide such technology are those which have been heavily engaged in the NRP. Unless strict control is exercised, the NASA program, during its research and development phases, will gradually bring about the exposure of NRP technology and consequently the NRP. Further, the present program planning discussions, which are unclassified, and the imminent program definition activities will soon result in a very considerable disclosure of National reconnaissance capabilities.

The security problem, in terms of international reaction may grow as NASA provides to the public more and more knowledge concerning its plans under AAP.

The security problem will further increase at such time as NASA obtains photographic products under AAP. Within the present terms of reference, it is difficult to envision any form of strict security control of such materials.

At the time of the "DOD/CIA/NASA Agreement on NASA Reconnaissance Program" dated 28 August 1963 (Tab 3), the mapping and survey mission of Apollo was envisioned as being designed to provide NASA with lunar surface mapping in addition to high resolution photography of specific lunar areas, necessary to effect the Apollo lunar landing. It was anticipated that an advance earth orbital mission for system checkout purposes might also be required. A Supplemental Agreement and Security Addendum (Tab 4), specifically designed for this set of circumstances, was prepared and work proceeded toward system definition with the ultimate selection of the GAMBIT and the improved FCIC stellar index camera combination as the photographic equipment to be used for the Apollo M&S mission.

Whereas the Security Addendum to the Agreement was designed to afford continued security protection to the NRP, while at the same time rendering full assistance to the NASA, it was a negotiated agreement, with Section G of the Addendum representing something less than what would be hoped for were security the only consideration. Section G states:

- | | |
|---|-------------------------------------|
| "1. Lunar photography as initially processed | SECRET |
| 2. Sanitized lunar photography (i.e., remove fiduciaries and enlarge) | UNCLASSIFIED |
| 3. Earth photography, if any | TOP SECRET/
TALENT KEY-
HOLE" |

Under the above criteria, following a successful lunar Apollo M&S mission, from resulting cartographics and photography of the moon's surface ranging from UNCLASSIFIED to SECRET, it will in all probability be feasible to technically transpose the results in terms of an estimated earth surveillance capability. The result at that time (mid-1969) will be a presumption of an earth capability to map gross areas with resolution on the order of 90-100 ft and specific area high resolution survey capability on the order of 3-5 ft.

The agreement and the security addendum, however, are not sufficient to meet problems resulting from the expanded Apollo program concept which includes earth sensing missions, since these were apparently not contemplated at the time the agreement was arrived at. Subsequent correspondence (See Tabs 5 thru 9) and negotiations involving the Secretary of Defense and the Director, National Reconnaissance Office, with NASA resulting in establishment of technical criteria to be considered in terms of NASA photographic sensing requirements. These are:

("An image forming sensor having an angular resolution of 0.1 milliradian or finer (approximately 60.8 ft ground resolution at 100 nm from lens to photographed object) or an optical or infrared image forming system with a physical aperture (diameter) greater than 30 cm (11.8 in.) and an optical figure controlled to better than 1/4 wave length".

"Development or test of pointing, tracking, and stabilization techniques or systems to be used with satellites bearing such sensors, in which pointing accuracy is better than 20 microradians or the unstabilized rate is less than 20 microradians per second.")

A three-man ad hoc NASA committee was established with the agreement of DNRO. This group was to have been kept fully informed with respect to NRP technology for the purpose of reporting to the Associate Administrator/NASA, instances wherein NASA's requirements or plans involve technology falling within the above criteria, which could then result in a joint DNRO-Associate Administrator/NASA consideration of the matter or unilateral action by the latter to discontinue the activity. However, the committee's actions to date appear to have had little effect in restraining NASA public and contracting activities in areas affecting the NRP.

Disagreement is also reflected in the correspondence between Mr. Webb and Mr. McNamara related to this subject, however, in that Mr. Webb considered activities proposed under AAP as within the intent of NSC Action 2454, whereas Mr. McNamara had indicated concern. Furthermore, Mr. Webb did not agree to a proposal made by Mr. McNamara that NASA designate the Air Force as its agent to conduct all studies potentially involving technical requirements which could be reasonably construed to be of reconnaissance quality, to include a blanket delegation to the Air Force of responsibility for all testing in earth orbit.

The existence of and the rationale in support of such documents as the DOD/CIA/NASA Apollo M&S agreement, correspondence related thereto and NSC Action 2454 are unknown to the vast majority of those associated with the NASA program. They, by and large, observe terrestrial sensing activities planned

under AAP as being well within the confines of existing international law and in no way contradictory to U. S. international commitments (See Tab 10). The security requirement that NRP intelligence products be sanitized from the standpoint of satellite attribution prior to dissemination outside TALENT/KEYHOLE controls has no application to NASA's terrestrial sensing activities. NASA's solicitation of testimonial support from military services and civilian federal agencies has therefore been on an open and, in most instances, totally unclassified basis (See Tab 11). NASA's solicitation of requirements from military services concerned with such fields as oceanography and mapping, charting and geodesy, in this manner, was sufficiently at cross-purposes with NRP objectives as to cause the Deputy Secretary of Defense on 30 August 1965 to direct that all such requirements be cleared first with the NRO (See Tab 12).

The general tenor of NSC Action 2454 was one of proceeding with considerable caution toward obtaining international acceptance of such activity with Point 5 stating that, "NASA should study urgently the possibilities of accelerating bilateral international cooperation to develop non-military space activities involving space observation perhaps including photography." There can be no doubt that TIROS and GEMINI photography have obtained a degree of international acceptance

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for activities of this type. Activities such as those planned under AAP, might provide a further step in this direction - or they might precipitate international confrontation of such order as to prejudice the NRP. There is not available a sufficient basis in intelligence to assess the impact. It is extremely difficult to envision circumstances under which the nation would be able to continue indefinitely control of technology associated with sensing of the earth's surface from satellites, particularly when such devices of necessity represent the best potential for lunar and planetary exploration and study. On the other hand, a flaunting of such technology at a time when the U. S. can reasonably be presumed to be engaged in a major program of satellite reconnaissance, might prove provocative and might well provide the basis for considered counteraction by the Soviets.

Nor is the danger that the NASA program may compromise satellite reconnaissance technology limited to the field of optics. Undoubtedly both radar and infra-red imagery have as yet relatively unexplored potential for this mission. Whereas there is as yet no formal USIB requirement for a satellite high resolution radar system, there certainly is a requirement for such an all-weather, all-illumination sensor if one can be developed that has practical application to the mission. In fact, the DIA in presenting the MC&G requirements to COMOR have stated the need for an all-weather capability.

THE PROBLEM OF LIMITED DOMESTIC ASSETS:

The domestic industrial base which supports the NRP camera program includes the Eastman Kodak Corp, Itek Corp, FCIC, and, to a lesser extent, Perkin-Elmer Corp and Hycon Corp. Collectively, they represent virtually all of the domestic capability in this field. The impact of the MOL optical work on the heavily-taxed facilities of Eastman Kodak Corp was considered at some length at the time of that program's approval and it was deemed essential then that another satellite reconnaissance camera program at EK be curtailed and assumed by another corporation.

The photographic exploitation facilities of the U. S. Government have been forced by and large to concentrate their activities on priority military intelligence targets. Undoubtedly a great deal of material, contained in existing photography, still awaits exploitation in terms of economic intelligence contained therein.

It would appear, therefore, that unless some effort is made to coordinate the drain of these two programs upon the available domestic assets, a prejudice to one or the other, or both, programs could result..

CONSIDERATION OF ECONOMICAL UTILIZATION OF NATIONAL ASSETS.

The third area of apparent conflict is related to overall national economy. If exploited to this end, photography currently available within TALENT/KEYHOLE might satisfy to a considerable degree, those civilian requirements to which the AAP is intended to respond. Ideally, full utilization and evaluation of these materials should be accomplished prior to the development and operation of new systems.

Furthermore, the resolution and geometric characteristics of the camera systems under consideration by NASA bear a considerable similarity to NRP hardware, all of which is currently flown in unmanned satellites. This suggests that the overall effort should be examined to prevent unnecessary duplication and insure cost effectiveness.

For example, the photographic products from current NRP programs are being exploited to meet many DOD mapping, charting, and geodesy requirements. Future NRP satellite missions will provide additional materials to meet the needs of mapping, charting, and geodesy. The work done on map revision, ice flows in the polar cap regions, and new map compilation at small and medium scale prove that current NRP programs can produce the type and quality of photography for which NASA desires to develop new systems.

Furthermore, if the photography of the ocean areas is important enough to justify additional launch costs, they could be photographed in color or infra-red starting in July or August 1966 with the existing CORONA system. The total cost to cover the ocean areas with 90 per cent cloud-free photography by current NRP Systems is considerable less than the development and launch costs of new systems using Saturn boosters. The same requirement could be met with the improved follow-on search system providing still greater photographic resolution if such improved resolution is indeed needed.

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SOLUTIONS:

Methods related to security currently practiced by NASA, within its planned earth surveillance activities under AAP, are not reconcilable with security methods used under the NRP. Both appear to have basis in current national policy. The expense of program development and operation coupled with the limited domestic technical and industrial base available to support satellite imagery programs suggest that a single coordinated program should be considered.

In order to arrive at possible solutions to this problem, the rationale supporting the covert nature of the present U. S. satellite reconnaissance program needs to be examined in terms of the probable international environment related thereto in the 1969 and post 1969 periods. It has been conclusively established that a Soviet satellite reconnaissance program is in operation today. A French photographic satellite is in the foreseeable future. There is a possibility that the Japanese could also embark on such a program.

However, notwithstanding the remarks of the now deposed Mr. Khrushchev, the Soviets have so far indicated an intention to observe a practice of secrecy with respect to such activities. Sufficient information does not presently exist upon which to forecast what will be the French and Japanese policies applicable to such practices. Whereas the U. S. in the future may be able to take relief from any public disclosures these three nations may choose to make related to their activities, it would be unwise to take precipitous action at this time.

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Whereas the utility of those NRP security practices, through which NRO attempts to control satellite reconnaissance technology, needs to be realistically examined against possible prejudice to worthwhile scientific endeavors and in light of the fact that the United States no longer enjoys a monopoly with respect to such technology, there exists at the present time no compelling reason to be magnanimous. To the contrary, unnecessary compromise of U. S. satellite reconnaissance state-of-art might provide the basis for considered Soviet counteraction.

The alternative solutions suggested below, therefore, presume a continued need for a near-covert NRP and provide for a contemplated but controlled effort on the part of the U. S. to obtain international acceptance of earth observation from space. Possible alternative solutions include:

Alternative #1: Permit NASA to proceed, but initially to be restricted to near equatorial orbits (no overflights of the Soviet Union). Require a careful screening of NASA's sensing equipments against the .1 milliradian criterion and establish national policy with respect to public release of that of NASA's photography covering areas to be defined as sensitive.

Alternative #2: A contemplated program to permit NASA to proceed with satellite earth imagery but at a constant rate behind NRP technology; i.e., KH-4 for flight by 1968, KH-7 by 1969-70, etc., with actual hardware to be released at as late

a time as will permit program schedules to be met. NASA, in coordination with the Department of Defense, to negotiate with individual foreign governments, to obtain their agreement to undertake such activities in response to their needs as well as those of the U. S. scientific community. KH-4 and KH-7 and TKH mapping and charting materials could be screened for their application to scientific requirements and, where appropriate, be released in such manner as to be attributable to NASA activities.

Alternative #3: Screen KH-4 and KH-7 and TKH mapping and charting materials against the scientific requirements. Where appropriate from a cost effectiveness standpoint, task the NRP against other scientific requirements. Initially such work would be limited to TKH controls or disseminated in accordance with sanitization procedures designed to protect satellite attribution. If this approach were used in conjunction with either Alternative #1 or #2, in time, many of these materials could subsequently be released under cover of the NASA program.

ALTERNATIVE APPROACHES TO SOLUTIONS:

All of the suggested solutions would necessitate redirection to either or both programs of such nature as to require the intervention of a higher authority to which both are responsive. The following are suggested as possible approaches:

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1. Joint DCI/Secretary of Defense negotiation with NASA.

(This would, in effect, be a further extension of earlier CIA/DOD/NASA Agreement).

2. Space Council consideration and recommendation to the President.

3. USIB consideration and recommendation to the National Security Council.

4. FIAB consideration and recommendation to the President.

(Both alternatives #3 and #4 are appropriate to the possible threat to a major U. S. intelligence source brought about by the current situation and are certain to appropriately assess the impact upon the U. S. intelligence mission).

5. Recommendation to National Security Council by ad hoc committee presently constituted under NSAM 156.

(This would represent an appropriate reconsideration of NSC 2454 policy which was originated by this group pursuant to NSAM 156).

6. Bureau of Budget recommendation to President for formation of ad hoc committee to consider and make recommendations.

(The aspect of coordinating overall national expenditure suggests this as an appropriate approach. This would represent a further step to action taken by BOB in directing the Secretary of Defense to study the ability of DOD mapping and charting facilities and programs - which are, in large measure, based upon TKH sources - to meet the requirements of



January 31, 1968

Paul:

My problem with this is that the commonality with our re-entry vehicle,^(S) plus the whole sense-to-film-to-recovery, alignment concept, will most certainly result in a commonality with our command and control procedures - a situation which, ^{according to} the DCI's response to NSAM-156 Recommendation # 7, ~~should~~ should be guarded against.

If we approve this, then we have certainly gone a long way from our security concepts at the time of the initiation of program 439 AP (the photo missile inspection system) where we insisted upon rigid because - like Coma - the system employed a film cutter, spool wind-up etc.

Each day that I struggle with this problem, I become more and more convinced, that there has ^{just} got to be something between BYEMAN and UNCLASSIFIED - probably a 5200.13 which blankets both DOD and NASA.

Law

the civilian agencies. (See Tab 13)).