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DEPARTMENT OF THE AIR FORCE  
WASHINGTON

OFFICE OF THE UNDER SECRETARY

September 30, 1965

MEMORANDUM FOR THE SECRETARY OF DEFENSE

SUBJECT: Comments on NRO and NRP

This memorandum presents a brief report upon my retiring as Director, National Reconnaissance Office. The first section lists a number of events, and changes, that have taken place since February 1963 that appear to me to be significant. Several personal judgments are interpolated. Subsequent sections refer to the present status of the NRO and NRP. They concentrate on the problems as I see them.

Events and changes since February 1963

1. There has been a sharp increase in the pace of satellite reconnaissance activity. This is demonstrated by Chart I which lists all satellite launches, successful or not, for reconnaissance purposes or in support of reconnaissance, since February 1963.

2. There has been an even sharper increase in the rate of production of useable satellite photography. The qualifying word here is "useable" meaning "of useable quality." This results from an increase in satellite activity, an increase in the amount of film carried per launch, some improvement in reliability, some increase in the lifetime of our missions, and an improvement in our ability to forecast weather and to avoid useless photography of clouds. Chart 2 presents some statistics to indicate the general increase in productivity during the period. The modifier "useable" is to be distinguished from "useful," the latter referring to direct contributions of intelligence. Item (4) below suggests a specific reason for believing that there has also been an increase in the usefulness of some of our photography during this period.

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3. There has been a measurable improvement in the reliability of the CORONA system, and specifically, of the AGENA vehicle. For example, the success ratio: CORONA film buckets successfully returned vs. film buckets launched, was 9/13 for March 1963 through February 1964, and 23/28 for March 1964 through February 1965. There appears also to have been a steady improvement in the quality of the CORONA pictures. If this latter improvement is real, it must be the cumulative result of many small factors.

4. GAMBIT became an operational system. Satellite photography at resolutions as good as three feet became a reality; this constituted, I believe, a real gain in the potential usefulness of satellite photography for intelligence purposes. The resolution of GAMBIT photography, and the productivity of GAMBIT missions as measured by the count of useable photographs of required targets, showed regular improvement through May 1965. Reliability of the spacecraft was a problem in 1964. Five successive successes in 1965 improved the record greatly, but three successive failures (one a booster failure) since May have been a discouragement. The failures have been diagnosed and corrective measures instituted. The prospect now is good for further reliable operation.

5. The A-12 (OXCART) airplane went through its flight test program and is approaching operational status. It has met the speed (Mach 3.2) and altitude (90,000 feet) objectives originally set for it. Its range performance has so far been demonstrated at about 85% of that originally proposed. Its offspring, the YF-12, has publicly established nine world's records for speed and altitude.

6. The SR-71, also derivative of the A-12, reached flight test status on schedule, and is performing well. Both the SR-71 program and the 417 weather satellite program have been removed from under the mantle of special security.

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7. Management systems were introduced into the National Reconnaissance Program that bring the programming and budgeting of that Program into the five-year force structure pattern followed by other DoD programs.

8. Development of a satellite system, G3, expected to acquire photography at a resolution of [REDACTED] was undertaken. The development is going well and continues toward a scheduled first launch in the summer of 1966. G3 will make the first operational use of TITAN III.

9. Studies and breadboard hardware have demonstrated that a satellite system capable of searching the whole Sino-Soviet land mass in one mission, at a resolution of three to five feet, is feasible using a TITAN III booster. Full development has not been initiated.

10. The MOL program was established. The mission plan and the specific optical concept for a system to acquire photography from orbit at a resolution of [REDACTED] or better were developed during two years of study, funded and directed by the NRO.

11. There has been a great increase in effort directed toward study and analysis, largely in the domain of satellite photographic reconnaissance. Operational analyses of cost and effectiveness, using realistic models of the target system and of the effects of weather, defined the general system parameters for the new general search system mentioned in (9) above. Similar analyses have identified improvements to GAMBIT and CORONA, and have assisted in defining the parameters for G3. Extensive mission analyses went into the study of the MOL.

12. The NRO supported, throughout this period, a program of technical studies and design studies by optical contractors. Excluding pursuit of specific designs for new general search systems, over [REDACTED] was spent during the period on work of this kind. Results of this effort are visible in the optical designs for G3, for the new general search system, and for the MOL.

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A review in detail of these studies as they evolved will, I believe, support the judgment that the technology of large optics and, specifically, of very high resolution photography has progressed in a striking manner in the last two years.

### The NRO Agreement

My tenure as DNRO began with the Gilpatric-McCone agreement of 13 March 1963, defining the structure, authorities, and responsibilities of the NRO. Within a few weeks, the Director of Central Intelligence had challenged the terms of this agreement; by July of 1963 he had openly repudiated portions of it. At no time after that was there a satisfactory agreement as to the authorities or responsibilities of the DNRO, or as to the structure of the NRO; there were many disagreements on substance and no satisfactory or agreed upon means to settle them. I cannot record, in a manner that would appear objective, the history of the many difficulties that developed out of this situation, and will not try. The record is an interesting one, and is fairly complete.

The "Agreement for the Reorganization of the National Reconnaissance Program," signed on 11 August 1965 by Mr. Vance and Adm. Raborn replaces the document of 13 March 1963. It goes less far in defining the structure of the NRO than did the earlier agreement. It is also less definitive about the authorities of the DNRO, and circumscribes those which it does define. It is evidently intended to palliate some of the frictions which were charged to the prior agreement. In the process, it has weakened considerably the structure provided by that prior agreement, and has, I believe, introduced a number of potential further sources of friction.

Three specific weaknesses of the present agreement strike me. First, it is quite ambiguous, in fact, about the authorities of the Executive Committee. While the opening paragraphs charge the Secretary of Defense with the "ultimate responsibility for the management and operation of the NRO and the NRP," the paragraphs defining the duties of the Executive Committee do not

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consistently reflect this. Of the six functions assigned to the Executive Committee, only one, ("Recommend to the Secretary of Defense an appropriate level of effort for the NRP...") refers to the final authority of the Secretary of Defense. The other five functions are defined by the unqualified verbs "approve or modify," "approve," "approve," "assign," and "review."

Second, the document almost completely omits reference to responsibilities of the DNRO in connection with reconnaissance operations. These responsibilities will have to be defined somehow, either de facto by extension of present practices, or by fiat of the DNRO, of the Executive Committee, or of the Secretary of Defense.

Third, the document imposes no obligation upon the CIA, or upon anyone other than the Secretary of Defense for that matter, to provide any focus of responsibilities for actions undertaken under the NRP.

In general, the document has a crucial character. It scarcely touches on the substance of the NRP, but rather sets up procedures for negotiating the kinds of dispute that have marked the recent past. Its emphasis on the procedural and on the dichotomy between CIA and DoD, its inordinate emphasis specifically on procedures for allocating responsibilities for research and development, and its failure to provide any basis for an operating organization leave the way fully open for extensive further negotiations on all of the important substantive problems now facing the NRO.

Indeed, the agreement can easily have the effect of putting even the day to day management of the NRP directly into the hands of the Secretary and Deputy Secretary of Defense.

Fortunately, the gaps in the agreement, and many of its weaknesses, can be remedied if the Secretary of Defense exercises his authority and issues a set of firm implementing instructions. It is my recommendation that this be done. Drafts of possible instructions have been provided to Dr. Flax.

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### The job of the DNRO

During the period of my tenure, the job of the DNRO has been a full-time endeavor. Indeed, I did not give to two parts of the NRP, the OXCART development and the satellite SIGINT program, the full attention they needed for good management. Time was consumed because much of it was spent negotiating or defending, rather than managing. Whenever a CIA interest was involved, even the most straight forward management decisions incurred delays and required endless discussion. On such matters, no delegation of the DNRO's authority was possible, and even the required basic information was difficult to get and validate. Unless a basis for management by the DNRO is provided and accepted that is firmer than suggested by the words of the current agreement, this situation appears likely to continue. If it does, Dr. Flax will find it very difficult to be an effective DNRO and accomplish his other duties as well. In a less troubled atmosphere, the DNRO could operate, and have adequate time to devote to the important elements of his job, without expending all of his available time.

More than just the time of the DNRO is at issue here. It is my conviction that the NRP needs vigorous and imaginative technical leadership, and that this must come from the DNRO and his immediate staff. Some reasons for this conclusion will be cited later. If the kind of people who can provide technical leadership are to be recruited and retained, working conditions are required within which their leadership is possible. Defined authorities, reasonable procedures for review and approval, and clear evidence of support from higher authority are all required if these working conditions are to be created.

### "Requirements"

In the spring of 1965, for the first time, the USIB provided the NRO with a comprehensive statement of current photographic collection requirements. This document specified surveillance targets, areas for search, and the required frequency of coverage

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for each. This has been a valuable document. Not only has it provided a basis for an orderly scheduling and programming of future launches, but it has provided a validated target model against which to analyse operational plans and potential new systems. With its help, we were able to determine an optimum film load and booster selection for the proposed new general search system, and to identify operational improvements to GAMBIT and CORONA.

Requirements in the other areas of the NRP are in a far less satisfactory state. Even in the photographic field, it is not clear to me that a good analysis has been made of all of the value that can be derived from the intelligence sources that are now open to us. There seems to be no interest in the economic and agricultural activity that could be determined from satellite photography. Although a great deal of interest is professed within the Defense Department in geophysical and oceanographic data that can be collected by satellite photography, requirements for such photography have not reached the NRO. Meanwhile, these same interests have motivated NASA to consider expensive manned APOLLO missions to collect similar data.

In the field of signals intelligence, a comprehensive statement of collection requirements exists. It is, however, very broad and indiscriminating, and provides little guidance except for the grossest planning decisions. This is a field in which there appears to be very little analysis relating the specific intelligence to be collected to specific military needs, actions, or decisions. The NRO, at least, sees little distinction made between radar order of battle (ROB) - which may affect targeting and flight planning in a direct and immediate way - and the general search for new and unknown signals. Even within the special field of ROB, no distinction of priority is evident between [redacted] radars - which are so common and of such general function that little specific military action is taken to counter them - and weapon system radars which represent specific local threats and call for specific counter actions. No rational basis is available for selecting technical approaches to SIGINT problems because no priorities are stated for the determination of signal parameters.

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In effect, most requirements are given the NRO in the form of a request to fly a specific payload on a requested schedule. The requirement is often stated by the designer of the payload in question.

No good basis exists, in the form of statements of collection requirements, for long range planning of new payload developments, beyond the comprehensive statement of current photographic requirements already cited. Such long range guidance as the NRO has been given is in the form of hardware requirements. There is no basis for comparing disparate alternatives against a common statement of need, since no statements of need are made. Three examples will illustrate the problem.

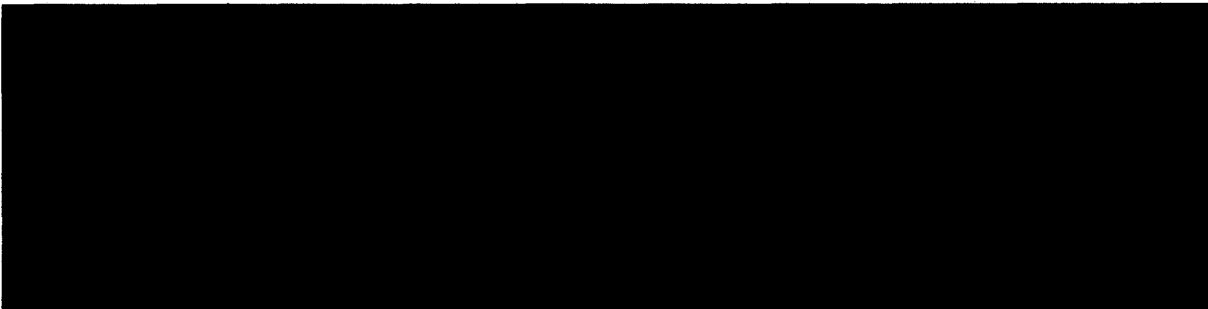
The only statement by USIB that exists which addresses the need for developing a new general search system, beyond CORONA, dates from July, 1964. It asserts that there is a need for a satellite system having the resolution of GAMBIT and the swath width of CORONA. This is not a statement of collection requirements. It is a system specification, albeit a crude one. It leaves little room for, and provides no basis for, trade off analyses among swath width, resolution, orbit altitude, orbit life time, and other important mission parameters, and offers no criteria for optimizing performance within constraints of cost or physical feasibility. Fortunately, in this case, later definitive statements from USIB of current collection requirements have provided a target model against which to make performance analyses. The applicability of this model to the period beyond 1967, when a new search system could be available, is probably not seriously to be questioned, but has not been validated by USIB.

A "requirement" has been stated for a [REDACTED]

[REDACTED] This requirement cites a prior USIB requirement for [REDACTED]



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Similarly, a "requirement" has been stated for a high altitude hypersonic manned boost-glide vehicle, ISINGLASS, to carry a reconnaissance camera. In a separate memorandum for record I have commented in detail on this scheme. I note here only that it is expected to result in a [redacted] program, and that no statement of intelligence collection requirements has been provided which ISINGLASS specifically satisfies. Again, therefore, there is no clear basis for comparing the performance of this system with possible alternative means of collection.

The technology of intelligence collection from overhead vehicles is rich in opportunities. The most basic task of the NRO is to exploit this technology in a way that most effectively meets the country's further important needs. It is for this reason that I believe that the DNRO must be, as an individual, capable of making the critical technical judgments involved, and must have the authority, and the support, to make these judgments effective. It is the lack of intellectual rigor evident in the three examples of long-range "requirements" just listed, and evident also in many other instances, not cited here, that convinces me that the DNRO himself must exercise intellectual leadership for the NRP. Neither valid nor responsible leadership is available elsewhere.

Current problems

1. The OXCART program has been, and continues to be, complex technically and managerially. As DNRO, I controlled by gross, and often somewhat arbitrary, control of funds. Detailed control

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was exercised through CIA channels and was never really delegated by the CIA to their elements of the NRO. Therefore, even to get information about the program was a slow and difficult process. I see no immediate prospect of a change in this situation.

I consider this a continuing problem. I cannot be sharply critical of CIA management; indeed I am sure that it has improved greatly in the past two years. Nevertheless, OXCART costs [REDACTED] annually, is not yet a productive system, and remains therefore a troublesome item in the NRO budget. I feel that if it were subjected to the same rigorous management that is now imposed upon the satellite programs, some [REDACTED] annually could be saved. This is, however, a gross judgment. It could not be put to test without a determined effort by the DNRO to establish effective control.

2. It is one year and eleven months since I first proposed to the DCI improvements to the management of the CORONA system which I then considered, and still do, to be necessary. The management of CORONA is now in somewhat worse condition than it was at the time of that proposal. Specifically:

There is still no recognized program director short of the DNRO himself.

There is no contract or authority for over-all systems engineering and technical direction that is recognized by all contracts on the program.

The contractual structure is still essentially the complex one described in my memorandum to the Secretary of Defense of January 28, 1964.

There exists no valid contract for systems integration of the camera and re-entry vehicle into the spacecraft. This work is being done by a contractor without a signed contract, because the CIA has directed him not to sign the instrument. The present DCI reiterated this demand on June 17, 1965.

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Funding information on CIA CORONA contracts is denied the NRO West Coast office where CORONA programming is done. All information on CIA contracts used by that office must be forwarded by the NRO Comptroller.

Release by CIA of information on the payload to operating elements of the NRO during orbital operations is sharply curtailed in comparison to the free exchange that was in practice prior to August 1964.

I am concerned about these departures from good management practice, not only as a matter of principle, but also because they subtly threaten the health of the CORONA system. For reasons noted below, CORONA is likely to remain the backbone of our search operations for at least two more years.

3. After the expenditure, during the past year, of some [REDACTED] on specific design efforts toward a new general search system, to replace CORONA, we are still over two years from a launch thereof. Last February, it would have been possible to initiate a completely safe and fully viable program oriented toward a launch in March or April of 1967. That option was in fact retained until quite recently. The earliest possible launch date is now late in 1967, and is advancing one day per day, until an effective decision is made to proceed.

Loss of time, and expenditure of effort, while a decision is arrived at are two of my concerns. A third is the impact of the current NRO agreement on the conduct of the program. It will certainly be very difficult to establish a management structure that can discipline the conduct of the payload development by the CIA, as the agreement provides. Yet I am convinced that firm control and discipline by the DNRO will be necessary. So far in this program, the management by the CIA of their efforts to establish a competing design has been lacking in judgment and intellectual rigor. The camera concept originally selected was

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rejected by one contractor a priori, and was rejected by a second contractor after he had worked on it for nine months. An outside panel of experts were critical of it on two occasions, and a third contractor later rejected it, in effect, by changing it drastically before electing to undertake further design effort. Despite this evidence that the camera concept was open to serious question, the CIA spent about three times as much money on ancillary items such as spacecraft and re-entry vehicles as on direct pursuit of the fundamental technical problems of the camera.

Many details of the system concept adopted by the CIA are also, in my judgment, open to question. The fundamental fact, however, that they were unable to recognize or accept the basic problems of their camera design is what causes me most concern. It seems to me that there is therefore little assurance that they are capable of correct or courageous action with respect to the technical problems that will inevitably arise during any camera development they undertake, whatever the source of the design. I believe it will be necessary for the DNRO to review their technical efforts in detail and on a continuing basis to protect the integrity of any camera development by them. Whether such monitoring or review will be possible is doubtful in my mind. I, at least, was aggressively prevented from getting any detailed information about the CIA work on general search systems, despite that about [REDACTED] of NRO funds were spent on this work.

Final thoughts

While this memorandum places considerable weight on the problems currently afflicting the NRO, I want to close with the acknowledgment that the program has been enormously productive in spite of these problems. Our interagency difficulties with the CIA have been concentrated at the top management levels; at the working level there have been many examples of a cooperative attitude. The NRP will be even more productive once it is given the opportunity and the mandate to develop an

DORIAN  
CORONA  
12 GAMBIT  
OXCART

ISINGLASS  
[REDACTED]

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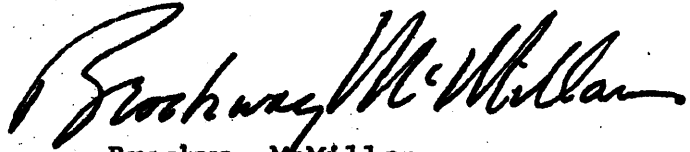
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orderly, disciplined management environment. As my predecessor indicated in his final report to you, the concept of an NRO is sound but it must be designed as an operating agency, not a coordinating body. Achieving this most desirable goal will call for your personal intervention in asserting the position and authority of the DNRO on all matters associated with the management and accomplishment of the program.

  
Brockway McMillan

Attachments  
Chart 1  
Chart 2

DORIAN CORONA ISINGLASS  
[REDACTED] GAMBIT [REDACTED] OXCART

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### SATELLITE LAUNCHES FOR RECONNAISSANCE PURPOSES (OR IN SUPPORT OF RECONNAISSANCE)

	1963												1964												1965											
	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S				
CORONA	1*		1		2*	1	1*	1		2*	1*		1*	1	1		2	1	1	1	2*	2*	1*	1*	1*	1*	1*	1*	1*	1*	1*					
ARGON			1				1		1								1*			1*																
LANYARD		1		1*		1*																														
QUILL										1																										
GAMBIT						1		1	1		1		1	1	1	1		1	1	1	2		1	1		1	1	1	1	1	1					
POPPY					1*							1*														1										
417	1		1					1				2					2							1		1		1			1					
TOTAL	2*	1	3	1*	4*	3*	2*	3	3	2*	4*	3*	3*	2*	2	1	5*	4*	3*	2	6*	3*	2*	3*	1*	5*	2*	3*	3*	3*	2*					

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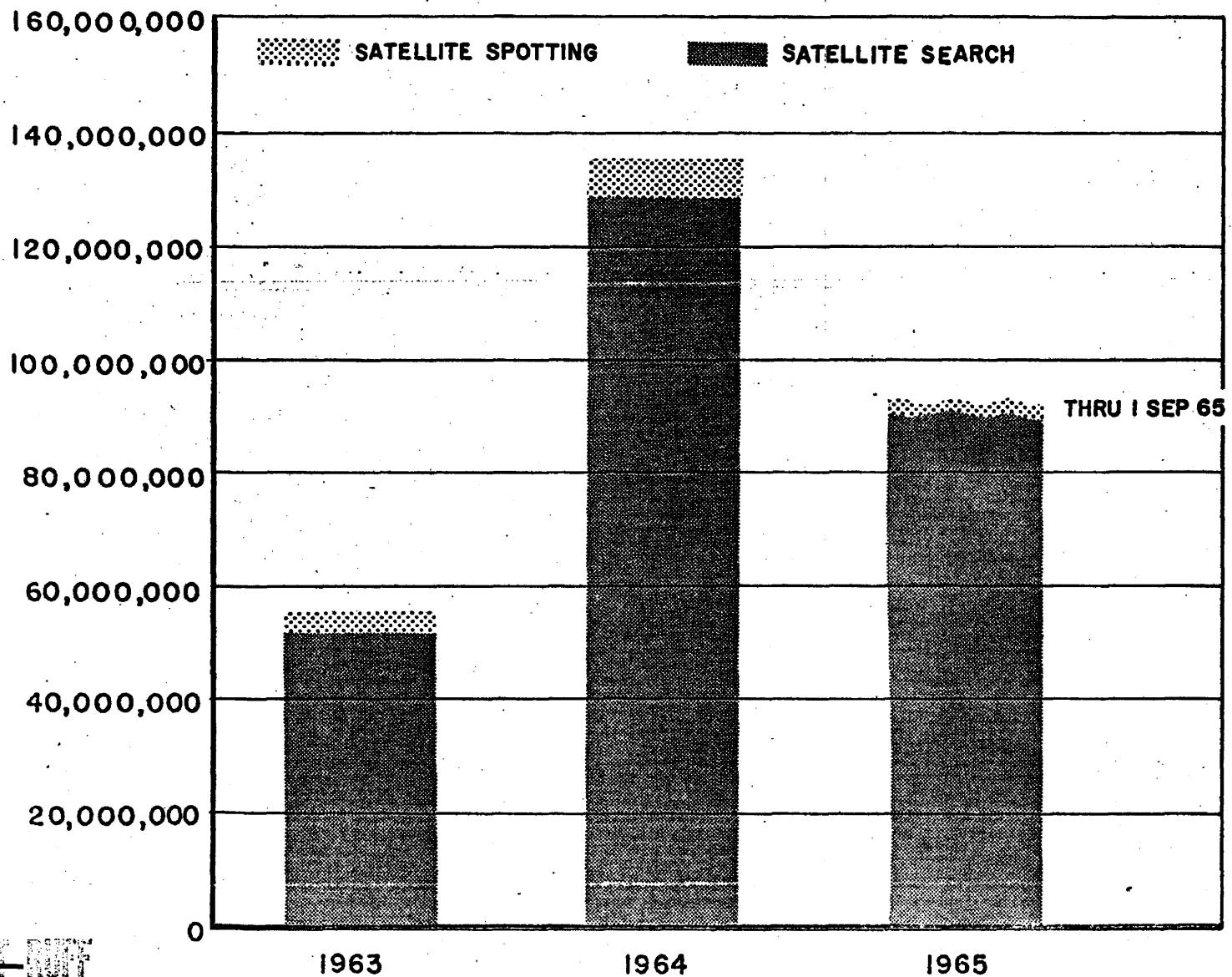
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### SQUARE MILE COVERAGE FROM SATELLITE PHOTO RECONNAISSANCE



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## KH-7 COVERAGE OF COMOR HIGHEST PRIORITY OBJECTIVES

- IN 1964, AVERAGE MISSION PROVIDED COVERAGE OF:  
124 TARGETS PER MISSION (49 PER PHOTO DATE)
- IN 1965, AVERAGE COVERAGE HAS INCREASED TO:  
499 TARGETS PER MISSION (115 PER PHOTO DATE)

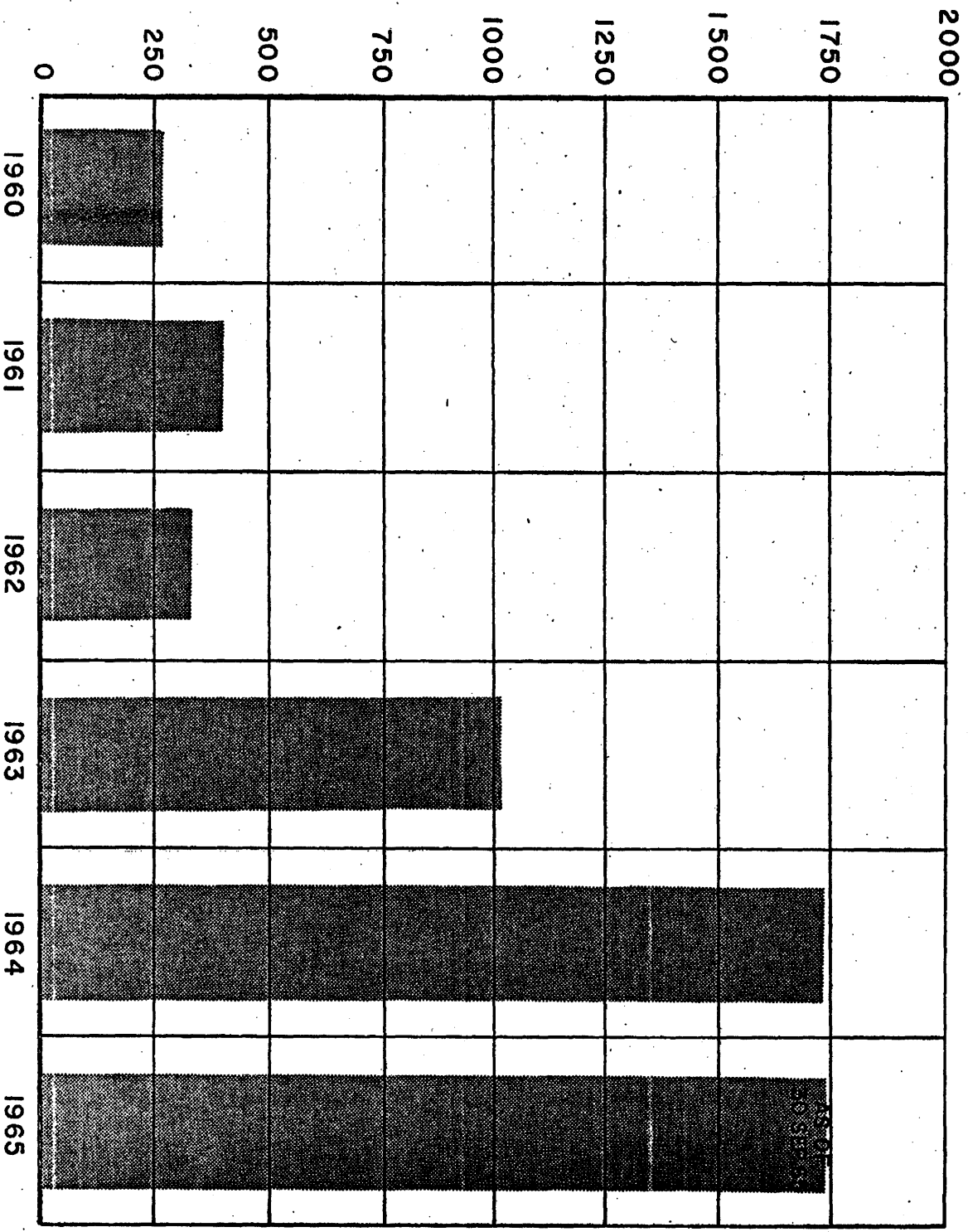
	MISSION	PHOTO DATES	TOTAL TARGETS	
	4006	12-14 MAR 64	143	} 1964/746 TARGETS ON 6 MISSIONS WITH 15 PHOTO DATES
1	4007	24-27 APR 64	209	
9	4008	20 MAY 64	52	
6	4010	15-16 AUG 64	66	
4	4011	24-27 SEP 64	120	
	4014	5 DEC 64	37	
<hr/>				
1	4015	24-27 JAN 65	359	} 1965/2116 TARGETS ON 4 MISSIONS WITH 18 PHOTO DATES
9	4016	13-16 MAR 65	584	
6	4017	21 APR-3 MAY 65	554	
5	4018	28 MAY-1 JUN 65	619	

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