DEPARTMENT OF THE AIR FORCE
OFFICE OF THE SECRETARY

MEMORANDUM

For Mr. McGough

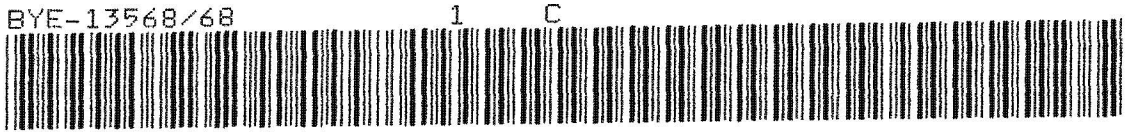
Really, here are some NRO suggestions for your transition paper. Call if you need "more, different," etc.

Dave

22 Nov

~~TOP SECRET~~ Bye-13568-68

HANDLE VIA BYEMAN CONTROL SYSTEM



The National Reconnaissance Program (NRP) is a single national program, under the executive management of the DOD, to meet the intelligence needs of the United States Government for the development, management, control and operation of all projects for the collection of intelligence and mapping and geodetic information obtained through overflight of denied foreign territory. The NRP commits its resources solely and directly in response to requirements and priorities established by the United States Intelligence Board. The plans and schedules for both satellite and aircraft reconnaissance overflights are submitted directly to the 303 Committee of the National Security Council for approval. The President's Foreign Intelligence Advisory Board regularly reviews and provides guidance on NRP plans and activities.

The NRP resources consist of aircraft and satellites covertly performing the following missions:

A. Broad coverage photographic reconnaissance.

B. High resolution photographic reconnaissance.

C. Electronic signal intelligence collection.

1. Technical intelligence collection
2. General electronic search
3. Directed electronic search

4. Electronics order-of-battle determination

5. Communications intelligence collection.

A typical broad coverage satellite mission provides 80% cloud-free photography of an area of 6 million square nautical miles at a ground resolution of five to eight feet. A typical high resolution satellite mission provides 55% cloud-free photography of 3,500 priority targets at a ground resolution of one to three feet. The satellite electronic signal intelligence collection vehicles provide repetitive coverage, and assure constant surveillance, of electronic transmissions emanating from within the Sino-Soviet bloc.

FUTURE PROGRAMS (RDT&E)

There are a number of potential problem areas within the satellite photographic collection program which tend to determine the course of future RDT&E efforts. It is not now anticipated that there will be extensive effort in the NRP for improved aircraft photo systems due to the increasing concern over the survivability of aerodynamic systems over denied areas.

The photographic satellite systems of the 1970's compared with those of the 1960's, are characterized by much higher quality of imagery, much longer on-orbit duration, and therefore, quantity of coverage, more efficient on-orbit operation and greater cost and complexity. One result of these characteristics is that collection requirements can be met with much lower launch rates. One penalty is that the responsiveness of the system is much less and the ability to provide timely data during periods of tension is less. Emphasis will be placed on developments leading to improved capabilities for quick response systems, perhaps with features of survivability. The techniques used may be near real time electronic return of imagery from a satellite with a lifetime of [redacted] Although such techniques are not practical now, there are promising approaches which may yield future capability.

Other problem areas include survivability in the event of Soviet harrassment of overflight activities, imaging capability in very low light levels or bad weather, and the utility of multi-spectral observations.

PHOTOGRAPHIC INTELLIGENCE RDT&E (NRP)

Introduction

Within the NRP there are several types of RDT&E activities. There is an area of Exploratory Development and Advanced Development of components. This area has expended at about $20M annually or about [redacted] of the NRP and will be discussed further in this paper. There is a much larger area of RDT&E funding for the development of approved systems for operational uses; this area will not be discussed further.

Objectives

The exploratory efforts of the NRP are executed by SAFSP and by CIA (OSP) elements of the NRO. The efforts are addressed to both photographic and electronic collection, but the majority of past efforts have been for photographic purposes. Individual tasks are applicable to either satellite or aerodynamic vehicle collection platform, but within recent years, the majority of the effort has been addressed to techniques applicable to satellite collection. There is no attempt to conduct a complete exploratory effort, but rather the activity is restricted to those which are unique to the NRO, and therefore, the majority of the effort is covert. The NRO relies heavily on the much broader RDT&E activities of the DoD for technological progress in areas such as launch vehicles, spacecraft technology, ground support equipment. In addition, the NRO conducts almost no fundamental research but supports only activities leading in an identifiable way to improved capability in mission areas endorsed by USIB.

Discussion

To illustrate the nature of exploratory activities within the NRP, it is useful to consider a specific area which is unique to the NRO and where the NRO attempts to establish the

base of national competence. Such an area is the technology of large, reflective optical systems for satellite photography. Ground based optical instruments are limited by atmospheric seeing conditions and large telescopestherefore are limited to a few arc seconds of resolving power. Satellite observation platforms are not so limited and have been designed to operate to about 0.1 arc seconds. Such telescopes must be fabricated with extreme precision and new materials and techniques have been required. Thermal distortions are very damaging and the NRO has conducted an extensive program to develop materials for optical materials which are very insensitive to temperature gradients. Two such materials have been developed successfully together with manufacturing techniques for fabricating very light weight mirrors in sizes of 72 inches diameter or greater. New techniques of polishing and testing large mirrors have been developed to permit unprecendented quality of components. Although atmospheric turbulence is less important for downlooking systems than for ground based systems, the effects can still limit performance at resolutions of [redacted], and careful experiments have been conducted with balloon-borne telescopes to measure the effect in a practical manner relating to intelligenge systems. These and related efforts were conducted over several years and integrated with conceptual design studies which led to current system developments for very high resolution systems.

Another area of current emphasis relates to techniques for electronically transmitting imagery to ground stations. Such techniques are now seriously limited by the performance of the sensor but several possible approaches to a useful solution are being explored.

Other activities relate to development of fuel cells for electric power supplies, improved navigation and pointing techniques and methods for attitude control.