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(S) NATIONAL RECONNAISSANCE OFFICE

WASHINGTON, D.C.

THE NRO STAFF

28 May 1976

MEMORANDUM FOR GENERAL KULPA, PROGRAM A  
MR. DIRKS, PROGRAM B  
CAPTAIN DARCY, PROGRAM C

SUBJECT: Background Information on FY 77 Congressional  
Hearing

Attached for your information and retention is a copy of the NRP statement before the Congress in support of our FY 77 Budget Request. Also available for your review in SS-5 is a copy of the House Appropriations Committee transcript which contains a verbatim account of our FY 77 testimony before the Congress. The statement and transcript provide an insight into our commitments and the interests and concerns of the Congress.

Please note that the comments and commitments in this statement and the transcript do not constitute program direction or the authority to initiate any effort other than those approved through normal channels. I will be pleased to answer any questions you may have on the attached statement.

*W. L. Shields*

WILLIAM L. SHIELDS, JR.  
Brigadier General, USAF  
Director

1 Attachment  
NRP Statement

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NATIONAL RECONNAISSANCE OFFICE

PRESENTATION TO THE COMMITTEE ON APPROPRIATIONS  
HOUSE OF REPRESENTATIVES

SUBJECT: Fiscal Year 1977 National Reconnaissance Program

STATEMENT OF: HONORABLE JAMES W. PLUMMER  
Director, National Reconnaissance Office



March 1976

[ ] EARPOP/GAMBIT/HEXAGON/KENNEN [ ]

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INTRODUCTION

Mr. Chairman and Members of the Committee.

It is a pleasure to appear before you in support of the FY 77 National Reconnaissance Program. With me today are two key members of the National Reconnaissance Program,

my Comptroller, and Colonel Robert A.

Rosenberg, who is my Deputy Director for Programs. As I know you are generally familiar with the National Reconnaissance Program, and as we have presented to the Congress for the first time a detailed, comprehensive Justification Book on our program, I will limit my remarks to a brief summary of what the NRP is, who is responsible for the program, followed by a description of each of our major efforts. I will be pleased to answer any questions the committee may have, either at the end or as we go along. With your indulgence, Mr. Chairman, I will use some viewgraphs to explain the functions of our office and the specifics of our program.

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THE FY 77 NRP REQUEST

Last week, Mr. Bush, the Director of Central Intelligence, presented the National Foreign Intelligence Program to this distinguished committee (Viewgraph 1). The National Reconnaissance Program is within the National Foreign Intelligence request of [redacted]

[redacted] for National Reconnaissance Activities. National Reconnaissance Activities (Viewgraph 2), in turn, consist of our programs, [redacted]

[redacted]

appropriation level. Our FY 77 request is in line with the historical funding profile of the NRP, which has been funded at a relatively even annual level in the FY 67-77 time frame.

Before I get into our organization and specifics on our programs, I would like to put in context where the National Reconnaissance Program fits within the Intelligence Community followed by some special security aspects of our program.

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CONTROL SYSTEMS JOINTLYTHE NRP ORGANIZATIONAL ENVIRONMENT

The President's Omnibus Executive Order on Intelligence, issued on 18 February 1976, has changed the organizational environment of the intelligence community (Viewgraph 3). The Executive Order is the culmination of over a year of intensive study and review of the intelligence community. Since you have received specifics on the Executive Order from Mr. Bush and Mr. Ellsworth, I will address the Executive Order only as it applies to the National Reconnaissance Program. First, let me state that the NRP operates in full compliance with this order, and the reorganization of the intelligence community should have minimal effect on our program. As written in the Executive Order, I, as the Director of the NRO, will now receive my budget and program guidance from the newly formed Committee on Foreign Intelligence, chaired by Mr. Bush, the Director of Central Intelligence (DCI). We will continue to receive our long-range and day-to-day requirements guidance from whatever mechanism replaces the United States Intelligence Board (USIB). The USIB is currently being retained on a temporary basis. The DCI will, as in the past, provide security guidance for our program. As the intelligence community reorganizes, our objective is to keep vital NRP systems operating effectively and to remain responsive to user requirements. I am confident that we will achieve this objective.

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Security Policy (Viewgraph 4)

The National Reconnaissance Program, most frequently referred to as the NRP, consists of satellites that have a unique capability to obtain intelligence from "denied areas" under Sino-Soviet control. The total National Reconnaissance Program--the development, procurement and operation of reconnaissance satellites--is conducted under extremely sensitive, tight security policies and procedures. For example, the names of the systems that I will use throughout the briefing are known only to those people with special access to knowledge about the NRP. I have personally been associated with the satellite reconnaissance business from the very start, and I can assure you that the NRP security blanket is warranted for several reasons. First, the more our adversaries know of the high quality, the capabilities, and successes of our spy satellites, the more they may be inclined to take action to limit or deny this capability. Second, satellites, by their nature, are relatively vulnerable and subject to countermeasures. The Soviets do have the capability to either destroy or degrade a satellite's effectiveness. This denial capability, while of concern, is not considered a great threat as long as knowledge of our capabilities remains secure. Third, if the U.S. Government were to admit officially and openly our satellite reconnaissance program, it could

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render the program open to official protest by either friendly or adversary foreign governments.

The NRP (Viewgraph 5)

The National Reconnaissance Program was established as a national effort to satisfy those foreign intelligence needs of the Government which can best be met by overhead reconnaissance. Our mission is to develop, procure and operate reconnaissance satellites which obtain photographic and signal intelligence data from denied areas of the world and to provide this data to the intelligence community. Since its inception, the program has produced most of our Government's intelligence on the deployment, and most of the technical capability of Soviet missiles, and has provided a great deal of highly valuable information on other subjects of vital national concern. Information obtained by satellites is used in fulfilling national, political, economic, strategic and tactical military, and scientific and technological intelligence needs. Photo and signal intelligence information obtained by NRP satellites directly supports national objectives and requirements, such as SALT monitoring, Mutual Balanced Force Reduction negotiations, indications and warning, crisis monitoring, and operation and command support. More specifically, NRP satellites provide information which is used to answer intelligence questions on issues of extreme importance and concern to United States policy makers. Our

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satellites collect information that can be analyzed to assess the capability and to help in projecting the intent of the USSR and the People's Republic of China. Let me give you just a few specific examples of the vital information obtained by NRP satellites and how this information is used. Over 70 percent of the information contained in a recent DIA briefing, titled "Soviet Military Trends and Capabilities", was obtained by NRP satellites. This briefing, which has been made available to members of the Congress, reflects the agreed judgement of the national intelligence community. The briefing identifies the current capabilities, and the trend, momentum and scope of the Soviet military. For example, the DIA briefing identifies, through information obtained primarily from our satellites, the new family of Soviet ICBM's with a considerably improved accuracy and throw weight. Photo satellites, through coverage of missile sites, provide knowledge of silo modifications and conversions, and tell us when and where this new family of missiles is being deployed. Information of this nature is vital in Strategic Arms Limitation monitoring and in weighing United States strategic requirements. Our satellites are also a primary source in obtaining data on Soviet Ballistic Missile Submarine production and deployment. The data we obtain on the technical characteristics and the production base of Soviet strategic and tactical aircraft is extremely important in assessing the threat our forces will encounter. Our

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satellites can identify the location of deployed Soviet strategic surface-to-air missiles, and this information directly influences the penetration routes of our strategic bomber force. NRP satellites have also been providing considerable information regarding Soviet wheat growth potential during the past two years. Information of this nature is vital to both the United States and our allies.

Emerging collection capabilities over the past few years have significantly increased the potential of providing near-real-time intelligence information to tactical commanders. In FY 77 we will continue to conduct studies and exercises to address the feasibility, applicability, and operational usefulness of providing an increasing quantity of intelligence information to tactical commanders. NRP systems such as

[redacted] and the low orbiting SIGINT satellites can provide significant tactical information and indications and warning, especially during crisis situations.

Based on USIB approved collection tasking for Strategic Air Command's (SAC) SIOP-5 planning, the [redacted] HEXAGON, and P-989 reconnaissance satellites have been heavily tasked to survey and report air defense activities in key Soviet areas. Near-real-time data from SIGINT satellites is used for timely update of photo intelligence on missile and fixed Soviet Air Defense positions, and SAC penetration routes are confirmed or modified based on this information. DIA, NSA, SAC and the

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NRO are currently working on a study titled "Strategic Force Planning Study", which involves analysis of [ ] P-989 and [ ] abilities against the mobile SAM threat. The NRP systems have supported military exercises BRAVE CREW, GALLANT SHIELD, BOLD EAGLE, and OCEAN SAFARI in order to develop expertise in Army, Navy and Air Force units for the development of doctrine for the employment of NRP systems in support of tactical forces. The overhead systems also continually respond to USIB approved operational ELINT requirements such as the Mayaguez incident, Korea, Vietnam, the Mid-East, and in support of routine and special land and ocean surveillance requirements. The reaction to these exercises and operations by the military commanders has been very favorable. The result is a growing pressure for the expanded use of the national systems in support of tactical operations. While our overhead systems have far reaching, unique capabilities, there are limitations with regard to tactical applications. Satellite systems may be more or less survivable than the conventional alternatives, depending on scenario, but are vulnerable to a technically sophisticated enemy. Another problem is the cost of satellite systems. In the current era of tight fiscal constraints, I doubt that any single command, service or agency can procure its own system. However, the diverse user community represented on the United States Intelligence Board is becoming more responsive to operational requirements and considerable

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effort is being expended in achieving a balance between competing requirements. We foresee satellites supplementing as opposed to replacing organic military intelligence assets.

The NRO

The National Reconnaissance Office (Viewgraph 6), the NRO, was established as a result of a Presidential decision to create an intelligence collection program operating on a low profile basis and using minimum management overhead. The NRO is a separate agency of the Department of Defense organized to provide a central, streamlined management agency for the National Reconnaissance Program. As you know, the use of space for reconnaissance-gathering purposes is of a relatively recent origin. Rather than go into a detailed chronological history, as is contained in our Justification Book, I will just touch on a few main points. First, satellite reconnaissance, from the initial development efforts in 1956, has received intensive high level oversight. Shortly after the May 1960 U-2 incident, when Gary Powers was shot down, President Eisenhower directed that a study of reconnaissance satellite potential be undertaken by the National Security Council. The study endorsed the feasibility of the concept, and shortly thereafter, our first successful photo satellite reconnaissance mission, under the cover title of "DISCOVERER," returned photographs of Russian mainland military installations. Subsequently, President Eisenhower decided that a new reconnaissance satellite development effort should be conducted under

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a special management structure within the Air Force, similar to that employed with the DISCOVERER satellite. The DISCOVERER and SAMOS satellites evolved into the early CORONA and GAMBIT systems of the National Reconnaissance Program.

The Secretary of Defense is the executive agent for the NRP, and I am, in addition to my normal duties as the Under Secretary of the Air Force, the Director of the NRO and am responsible for accomplishing the NRP mission. Assisting me is Dr. Cook, who is the Deputy Under Secretary of the Air Force for Space Systems. [ ] and Colonel Rosenberg, who I have previously introduced, head a very small and select headquarters staff of professional personnel. The NRO goes under the open title of Office of Space Systems, Office of the Secretary of the Air Force. In addition to the headquarters staff, the NRO has three program offices: Program A, an Air Force element located at Los Angeles, California; Program B, a CIA element located in Washington, D.C. and Program C, within the Navy, also in Washington, D.C. These program offices have the responsibility to design, develop and operate the reconnaissance satellite systems. They conduct research and development efforts that are unique to satellite reconnaissance projects. The Program Directors manage their programs and report directly to me without being subjected to a normal chain of intervening command reviews.

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The National Reconnaissance Program has generally been credited by observers as having an efficient and effective management approach for the design, acquisition, and operation of satellite systems. The overall effectiveness of the NRP, from both an engineering and procurement standpoint, is due largely to some basic organizational concepts. These stress organizational cohesiveness; a short vertical management chain, and authority commensurate with responsibilities which are delegated to the lowest possible level. The organization is relatively small. The staffing policy provides for a minimum number of exceptionally well-qualified people. The tenure within the organization is normally a year or so longer than normal service tours. For a program of the magnitude of the NRP, we have a relatively small total number of people. There are approximately 2400 military and government civilian employees that support the program both directly and indirectly. Of this total, approximately 600 are involved in the technology, development and acquisition of the satellite systems. Additionally, there are about 1800 government employees involved in the operation and indirect support of our systems. While these military and civilian personnel costs are not funded within the National Reconnaissance Program, if they were, it would add less than 10 percent to the total program costs. By way of comparison,

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we examined one NRP program and one typical DOD program of similar size and technical complexity. We found that while we have approximately 46 people assigned to this particular program, the DOD requires approximately 230 people, or roughly five times the number. This isn't to say that the rest of DOD could operate at a manning level comparable to the NRO, as our mission is unique in many ways.

The management approach used within the NRO supports two very unique aspects of the NRP. First and foremost is the NRO's responsibility for the total life cycle of our satellite systems including design through fabrication, test, launch and on-orbit operations. Second is the highly sophisticated technical state of our programs which are of a continuing and evolving nature due to dynamic requirements. Traditionally, the NRP has consisted of about five to seven major programs that exist in a dynamic mission environment. Due to the evolving nature of the requirements for which the systems are built, production quantities are usually small and sophisticated developments force long intervals between initial acquisition and production delivery. Another important aspect is that each field program manager has been accorded all of the authority necessary to achieve the mission responsibilities assigned. This delegation of authority is the cornerstone of our organizational flexibility and probably the single most important factor in the success of

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the program. Voluminous staff reviews, numerous requests for reports and inquiries for information from outside sources are avoided. Budget and program approvals are processed through minimum management channels. By these means, it has been possible to concentrate all the resources of the NRP on one purpose-- accomplishing the mission objective.

An absolutely essential element of the management approach used by the NRP is the normal authority to incrementally fund our development and the unique authorization to incrementally fund the acquisition and operational phase of our programs. In addition to the obvious advantage of permitting us to request a relatively constant level of funding from the Congress, thereby precluding large peaks in the year of acquisition, there are a number of very significant management advantages. Perhaps one of the most significant is that it provides the Program Manager with a means of negotiating a contract covering the life cycle of a program including the development, acquisition, and operation of the system. This permits the establishment of performance objectives and the payment of fee based on the system's ability to accomplish the end objective; however, it is not necessary to commit the government to the total cost of the program at its inception, which could run into several hundreds of millions of dollars. The Program Manager's authority to incrementally fund, generally on a quarterly basis, limits the government's liability to approximately one-fourth of the

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annual cost of the program, pending the accomplishment of the objectives during that short period of time. The Program Manager is able to maintain positive and direct control of the effort being expended on the program, and has the ability to redirect resources in the face of technical problems or requirements changes. Additionally, the Program Manager is able to procure selectively certain components and sub-systems which are not subject to change in larger quantities, thereby capitalizing on the savings that result from the larger procurement. This also ensures maximum standardization from vehicle to vehicle. I should reemphasize that the two unique features of the NRP provide the significant advantages to be derived from incremental funding. First, each satellite system is procured in relatively small quantities, involving evolutionary changes from system to system to meet the dynamic requirements we face. Second, the total life cycle responsibility, from development through operation, rests within the small organization of the NRO. The combination of these two features are unique within the Defense Department to the types of systems procured by the NRO.

Requirements Satisfaction (Viewgraph 8)

The NRP responds to requirements levied by the intelligence community. Our responsibility is to develop satellites capable of obtaining the quality and quantity of data required to meet

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foreign intelligence needs, and then to procure and operate the satellites that obtain the data. Once our satellites obtain the photo and signals intelligence data required, this data is turned over to the intelligence community for exploitation and dissemination. For photo satellites, film is processed by the NRO and turned over to the intelligence community. In the case of signal intelligence satellites, mission ground stations are jointly operated with the National Security Agency, where processing of the signals data begins immediately upon receipt of the data at the ground station. The National Security Agency, the prime processor of signals intelligence data, works closely with the NRO in the design of signal intelligence satellites to insure compatibility with the basic processing system. We continuously seek and receive feedback from product users as an aid to improving our responsiveness, the product, and the cost effectiveness of our program.

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The NRP has two types of satellites (Viewgraph 9), those that return film or images, and those that return signal data. Signal intelligence satellites, referred to as SIGINT satellites, perform several different missions--Electronics Intelligence, Communications Intelligence, and Telemetry Collection. Our SIGINT satellites also  perform ocean surveillance, and conduct other special missions.

Currently, we operate two imaging film-return photographic satellites--HEXAGON, which provides broad area search, surveillance, mapping and target positioning capabilities, and GAMBIT, which provides high resolution imagery of point targets for technical intelligence and target surveillance purposes.

This year we will launch and operate a revolutionary new imaging system, the KENNEN, which will, for the first time, provide us with a continuous near-real-time imaging capability. HEXAGON and GAMBIT provide a highly successful complementary mix of HEXAGON's medium resolution for search and surveillance and GAMBIT's high resolution for technical intelligence. However, both of these film return systems lack the timeliness of imagery return required for effective support of indications and warning, crisis reconnaissance and tactical applications. Our new "electro-optical" KENNEN, a long-life imaging satellite system, will provide continuous, near-real-time returns of electro-optical image data to the

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There are large asymmetries in United States and Soviet space capabilities (Viewgraph 10). The necessity for the United States to acquire scientific and technical intelligence from denied areas of the world has driven the requirement for space oriented photo and electronic intelligence collection. This requirement is reflected in the degree of sophistication and superior performance of our systems vis-a-vis the Soviets. Their use of space appears to have current and long-term operational motives, principally directed to military purposes. For example, the Soviets have developed a Fractional Orbital Bombardment System and also have an Anti-Satellite System. The Soviet Anti-Satellite system was recently tested in February of this year. This capability was initially demonstrated in 1967 and the recent test was the first since 1971. We consider this capability a potential threat to low-orbit satellites however, the Soviets have not demonstrated an ASAT capability against high-orbit satellites. The U.S. is currently pursuing technology which could provide an ASAT capability if warranted. Our efforts in this area have been low key, since, as I stated earlier, there exists an agreement with the Soviets of non-interference with each others' national means of verification and internationally we support a "peaceful use of space" policy. The Soviets also have an orbiting radar satellite which is

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capable of performing near-real-time ocean reconnaissance missions. This satellite can detect medium-sized and some small ships, such as cruisers and destroyers, under favorable sea conditions and probably can detect large ships, such as aircraft carriers, under adverse sea conditions.

In 1975, the total Soviet space launches reached an all-time high of 92; 70 percent of the launches were in support of military and intelligence applications. This compares to total space launches for the United States of 31 in 1975, of which less than 30 percent were for military and intelligence applications. Of the 31 launches, six were in support of the NRP. Comparing our reconnaissance systems further, the United States has types of signal intelligence systems which the Soviets don't have. Specifically, we have satellites which perform communications and telemetry intelligence missions. Both the United States and the Soviet Union have satellites that perform photo and electronics intelligence collection; however, their systems are inferior technically to those of the United States. Their best photo resolution is estimated to be three to seven feet, depending on the type of mission.

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This compares to [ ] to 2 feet for our satellites. Their systems also return much less film than ours, an estimated 130,000 feet in FY 75 as compared to 510,000 feet for the United States. The Soviets launched 34 photo satellites in 1975 as compared to four for the NRP and nine Signal Intelligence satellites as compared to two for us. As in the photo area, our SIGINT satellites are far superior to those of the Soviets. For example, [ ]

[ ] whereas the Soviets' best geoposition capability is believed to be five nautical miles. So where we strive for highly capable, long-life systems, the Soviets launch significantly larger numbers of shorter life reconnaissance satellites and receive far less quality information.

The Imaging Reconnaissance Satellite Mix (Viewgraph 11)

The future imaging reconnaissance satellite mix of HEXAGON, GAMBIT and KENNEN has received considerable attention over the past two-and-one-half years. The decision on the type and quantity of imaging satellites required to meet intelligence requirements can only be made after a realistic on-orbit evaluation of KENNEN. However, based on performance predictions of KENNEN, a phased reduction in HEXAGON and GAMBIT missions has been programmed.

We anticipate that the quality of KENNEN imagery will be equivalent to all but the very best GAMBIT. If our predictions

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are realized, GAMBIT will be phased out or cancelled. It is unlikely, however, [REDACTED]

[REDACTED]

I recommended to the ExCom last year, and the Congress subsequently directed, that the KENNEN program be rephased to provide for an on-orbit evaluation prior to the decision to go to a [REDACTED]. Our decision on the termination of GAMBIT must also await KENNEN performance results. Consequently, to assure retention of our ability to fulfill GAMBIT intelligence requirements, we must retain the option to continue the GAMBIT system. The current imagery program is structured to retain this flexibility. However, once a determination has been made that a [REDACTED] is capable of replacing GAMBIT, an accelerated launch of the [REDACTED] and the simultaneous cancellation of GAMBIT is essential if we are to achieve desired cost savings. We anticipate making this decision in November of next year, and therefore solicit your concurrence at this time to proceed with an accelerated [REDACTED] and simultaneous cancellation of GAMBIT, contingent on achieving KENNEN performance expectations. Recognizing that if KENNEN expectations are not realized, we will come back to the Committee with a revised plan.

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HEXAGON. HEXAGON (Viewgraph 12) is unique in its ability to image vast areas of the earth in a single mission with imagery of sufficient quality for detailed photo-interpretation. It is ideal for periodically searching for new activities of intelligence interest that are not located at known installations, as well as for periodic surveillance of large numbers of known installations. HEXAGON's broad coverage capability makes it uniquely applicable to monitoring agreements such as the Strategic Arms Limitation Accords. It is the only system capable of performing an inventory of ICBM silos in the USSR and the People's Republic of China on a periodic basis and is the principal source of obtaining geodetic information which is used in targeting our strategic missile force. HEXAGON also provides visual evidence of industrial and agricultural developments, and is a principal source of gathering intelligence data from other areas of interest.

HEXAGON is our largest satellite. The vehicle has five film recovery capsules; four for the primary mission of search and surveillance, and one for mapping photography. The system has two panoramic stereoscopic cameras and carries 45 miles of film. HEXAGON is launched on a Titan IIID booster from Vandenberg AFB, California, and is controlled by the Air Force satellite tracking network. After each film recovery capsule is filled, it is ejected for aerial recovery near Hawaii.

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Our FY 77 request (Viewgraph 13) for HEXAGON is \$138.8 million, down \$15.9 million from FY 76. In anticipation of KENNEN's launch at the beginning of FY 77, we have started the phase down in the frequency of HEXAGON launches so that by FY 78, we will be launching one HEXAGON per year. As the chart indicates, we have our eleventh HEXAGON system on-orbit at the present time. The total invested in the program through the transition quarter is \$1.865 billion. Each HEXAGON mission cost the government in excess of a hundred million dollars. We continue to strive for maximum intelligence return for the lowest possible cost on all of our systems. We have, we believe, been extremely successful in meeting this objective by gradually and steadily increasing the capability of on-orbit lifetime of our systems, enabling a decrease in the number of systems that must be flown per year. The HEXAGON is a good example of this. In the late 1960s, when we were developing the HEXAGON system, we anticipated a mission length of 30 days and were planning to fly five systems per year which would yield approximately 150 days of on-orbit performance. We have demonstrated the capability of flying in excess of 120 days per mission with imminent plans to go to 150 days, and ultimately to 180 days. This increased on-orbit life will yield a higher number of mission days with one launch per year than we had originally planned with five launches per

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year. While increasing the system lifetime has been a very cost effective approach, it is not achieved without its difficulties. Decreasing the production rate from five per year to one per year has inherent complicating factors, which tend to drive up the unit cost and require extremely close management to maintain the high reliability that is essential. While it is impossible to visualize the complexity of the HEXAGON spacecraft without actually seeing it, it helps to point out that it is some 60 feet long, 10 feet in diameter, and weighs approximately 26,000 pounds. The system approximates the size of a railroad engine yet operates with the precision of a sophisticated computer. In order to pull the system together, eight major aerospace contractors work as partners with some 45 major subcontractors under them, with an excess of 1,000 suppliers and vendors from across the country. It takes in excess of four-and-one-half years from the time we order the glass from which the lens is made, until the vehicle is ready to launch. After all of the major contractors have delivered their subsystems to the integrating contractor and the vehicle is fully assembled, the vehicle spends slightly in excess of one full year in all-up system tests to insure reliability and performance. The uniqueness and complexity of the HEXAGON system requires that we maintain a minimum work force in excess of 2,000 highly trained

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specialists and engineers dedicated full time to the program. These specialists are spread principally throughout four of the major associate contractors. The camera subsystem makes up the most sensitive and complex system within the HEXAGON spacecraft. This camera system costs approximately \$32 million and takes approximately 33 months from the time we start to build the system until its delivery to the system integrating contractor. An additional 18 months of integration is spent in testing. To assure the high performance required and reliability of this camera system requires the retention of approximately 1,000 dedicated engineers and technicians. It should also be pointed out that these 1,000 dedicated specialists, with a relatively small increase in manufacturing resources, could support an annual launch rate two to three times our current rate. Therefore, as we have reduced the annual launch rate, the principal savings realized are from items like the launch vehicle, which costs about \$15 million per launch, and the basic spacecraft hardware, which costs about \$26 million. The savings that can be achieved in these areas, which we refer to as variable costs, are large enough to more than offset the increase in unit costs as the production rate decreases. A graphical display of the improvements we have achieved over the years is reflected on the next chart (Viewgraph 14). The red line in the left upper corner is

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a comparison of the number of Soviet search and surveillance satellite missions. HEXAGON mission days on-orbit have increased significantly while the number of launches has decreased over the years. Our best resolution is below two feet.

GAMBIT. GAMBIT (Viewgraph 15), the NRP's high resolution photographic system, is unique in its ability to return photography adequate for technical intelligence purposes. GAMBIT's high resolution imagery is our means of gathering detailed intelligence on different types of weapon systems, both operational and under development; of monitoring compliance with SALT and MBFR agreements; and of discovering camouflage and concealed items of interest. GAMBIT aids in making development decisions related to United States weapon systems by providing technical intelligence on foreign systems.

GAMBIT is similar to HEXAGON in that both systems use film recovery capsules. The GAMBIT satellite is 50 feet by 5 feet in diameter, and has two recovery capsules. The stereo camera is pointed at targets by rotating the entire forward section. To begin a mission, GAMBIT is launched into an orbit which places it over the area of interest in daylight with a minimum altitude of about 70 nautical miles. The launch vehicle is a Titan IIIB booster. Launches are from Vandenberg AFB. On-orbit operations, film recovery, and post-mission events are identical to those for the HEXAGON program.

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The FY 77 (Viewgraph 16) request for GAMBIT is \$132.3 million. As you see, this is down \$6.9 million from FY 76. This reduction, as was true in HEXAGON, is attributed to the programmed decrease in launch rate following the anticipated KENNEN launch in late 1976. Since the inception of the improved GAMBIT system in 1967, we have had 45 launches to date with a total investment in the program of slightly in excess of \$1.7 billion. In the late 1960s, when the system first became operational, we were flying eight systems per year, each of which had a mission life of about ten days. This provided about 80 days of on-orbit mission life per year. In 1970, as the on-orbit lifetime was increased, the number of launches was reduced to five per year. GAMBIT launches have decreased gradually since that time to where we now plan to fly two missions in FY 77, with an on-orbit life of 45 days--yielding 90 days of on-orbit performance. Our current program protects the option to continue flying GAMBITS at the reduced rate of one per year with lifetimes up to 60 days, pending KENNEN's demonstrated ability to replace the GAMBIT program. Since we have flown far more missions of the current version of GAMBIT than any other active program, it is probably the best program to illustrate the combined effects of inflation and decreasing production rates on unit cost. In the

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1968-69 time frame, when we were producing the vehicles to support a launch rate of eight per year, the unit cost was slightly below \$25 million. As you see on the chart, the system that we are currently flying today, procured for a launch rate of four per year, costs slightly over \$49 million. The cost of the systems we are building today to be launched in the FY 77 and subsequent time period, to be launched principally at a rate of one per year, increases to slightly over \$77 million per mission. However, once again I would like to point out that in fiscal year 67 we expended \$150 million to obtain 80 days of on-orbit GAMBIT performance, while in FY 77 we will be expending about \$132 million to achieve in excess of 90 days of on-orbit performance. In summary, considering our current operational HEXAGON and GAMBIT systems, the NRO in FY 77 will provide more and higher quality intelligence for a lower actual dollar expenditure than in any time in our 15 year history. The next chart (Viewgraph 17), as with HEXAGON, reflects Russian launches, the significant increase we have realized in mission days on-orbit, and continued improvements in resolution--down to a best of

KENNEN. KENNEN (Viewgraph 18) will fill the requirement for a long life imaging system with continuous near-real-time imaging data return. The need for a near-real-time imaging capability has been recognized for several years. Technical

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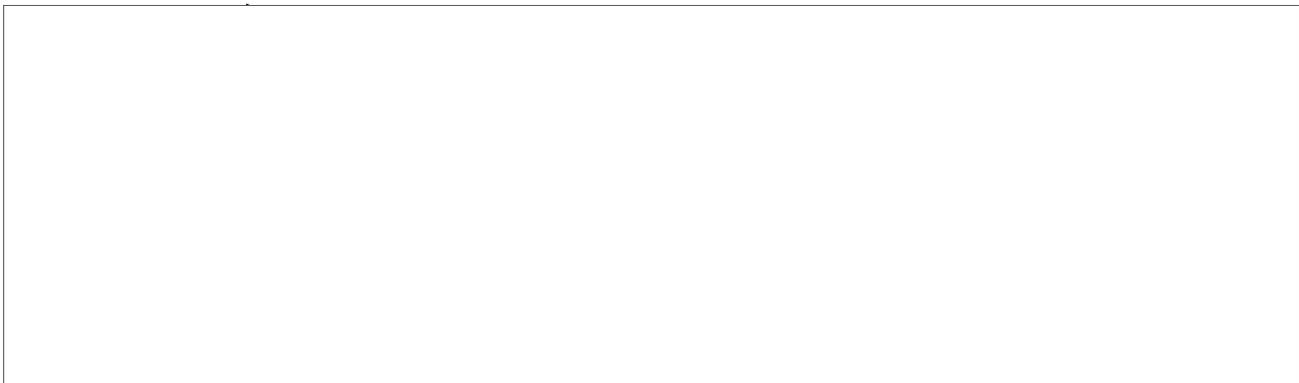
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research in the late 1960s and early 1970s resulted in continued advancement in the development of solid state electro-optical imaging devices. Congressional and Presidential approval to develop the KENNEN system occurred in 1971 and led to a challenging five year development, production, and test schedule, which will culminate in the launch of the first imaging satellite in October 1976.

The KENNEN system operates predominantly as a surveillance system with the unique attribute of near-real-time return and exploitation of the image data. KENNEN will be the only imaging system with the capability of near-real-time crisis reconnaissance. The timely collection of imagery of key targets will provide United States policymakers with indications and warnings of foreign actions. For example, KENNEN will be able to provide imagery of areas and subjects of vital national interest for same day intelligence exploitation. This capability will be of significant value during situations such as the Middle East crisis and the recent Angola situation.

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Our FY 77 (Viewgraph 19) request for KENNEN is

[REDACTED] from FY 76.

This decrease is normal for a program in this phase having moved from a highly concentrated development and qualification phase into the production phase for the first four vehicles. The KENNEN program is by far the most technically complex system that the NRO has ever undertaken and the progress to date, as we approach the first launch in the latter part of this year, has been, in our opinion, truly outstanding. We believe it is exemplary of the proper way to develop and manage a highly complex system of this type. Looking back four-and-one-half years to the fall of 1971 when the program was approved with a planned first launch in October 1976, the projected cost through FY 77 at that time was [REDACTED]. Comparing that to where we are today, excluding the transition quarter, we are still planning to launch the first satellite on 15 October 1976 at a cumulative cost of about [REDACTED]. This represents a cost growth of less than 2½ percent since the initial program was approved. Additionally, in mid-1971, we had no way of anticipating the abnormal inflation that we have seen over the last couple of years, which in itself, more than accounts for the cost growth. The Executive Committee has approved some design modifications to the ground processing part of KENNEN in FY 76 and FY 77 to enhance its ability of

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accomplishing the HEXAGON and GAMBIT missions, thereby achieving the programmed launch rate reductions in those programs. As indicated by the unit cost on this chart, the KENNEN imaging satellites will be the most expensive satellite the NRO has ever built; however, we feel that the unit cost is justified when considering the planned performance and on-orbit capability of the system.

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CONTROL SYSTEMS JOINTLYSignal Intelligence Satellites

The programs for collecting signals intelligence by satellite were established to provide information not available to, or collectable by, conventional reconnaissance resources. SIGINT satellites are designed and tasked primarily for unique collection of Telemetry, Electronics, and Communications Intelligence, [REDACTED]

[REDACTED] SIGINT systems constitute a vital element of the total collection capability of the United States. We currently have five SIGINT systems: [REDACTED] Program 989, and POPPY [REDACTED]. We have, over the years, significantly improved the capability, reliability and mission life of our SIGINT systems. As you can see by the next viewgraph (Viewgraph 20), our launch rate is just about half of what it was in 1970, yet our coverage has doubled in some cases. Spacecraft life has gone from a few days to more than two years for some of our systems. These demonstrated improvements are extremely important in terms of dollars spent, the product received, and in maintaining our efforts within fiscal constraints.

[REDACTED]

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POPPY [redacted] The POPPY [redacted] systems con-



satellites with a primary mission of ocean surveillance and search. POPPY is our current system, [redacted]



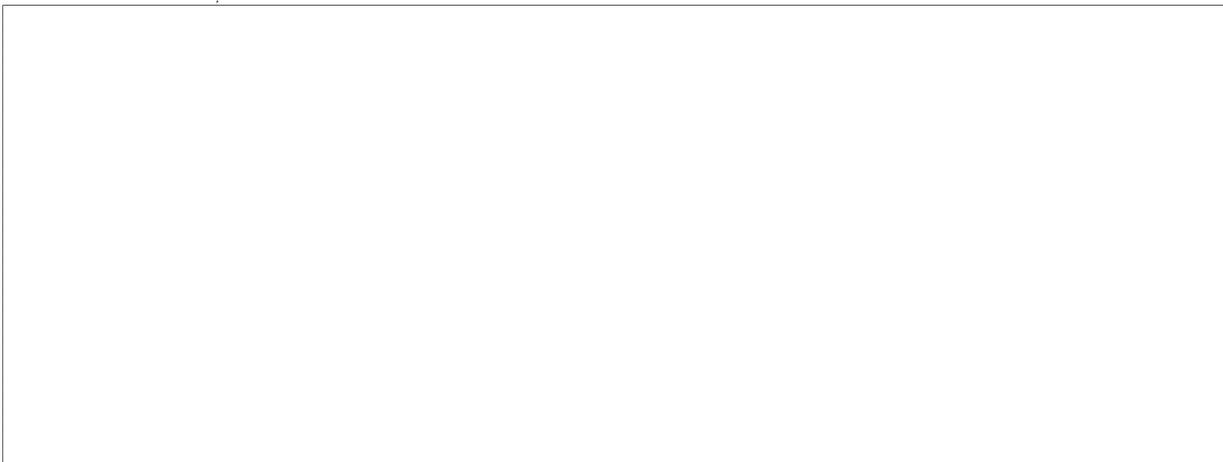
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Program 989. The last major Signal Intelligence Program is Program 989--frequently referred to as P-11 (Viewgraph 30). The P-989 program consists of a series of independently operating low-orbiting satellites each of which is capable of providing worldwide general search, operational electronic intelligence, and technical electronic collection or a combination thereof. The P-989s are the primary contributors to electronic order of battle data

P-989s offer unique capabilities that are not present in other overhead electronics intelligence systems. These satellites complement rather than compete with the high orbiters by performing technical measurements or electronic order of battle and surveillance that is difficult for, or outside the frequency ranges of, the high altitude satellites. The four P-989s currently in operation provide significant information in the areas of locating communications links and determining their signal

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characteristics, in locating special interest radar systems and in obtaining technical intelligence data on the Soviet ABM and other radar systems. Though all overhead systems have mechanisms to redirect tasking within a short period, only the P-989 satellites have the unique capability to apply coverage to any area of the world.

P-989 vehicles are launched from a HEXAGON satellite. For this reason, they are often referred to as passenger payloads. After separating from HEXAGON, the satellite is placed in a 275 nautical mile circular polar orbit using on-board rocket motors. The mission ground station tasks the satellite and receives the collected data through the Air Force satellite tracking network.

The FY 77 funds of \$15.2 million (Viewgraph 31) support fabrication of the spacecraft currently underway and operation of on-orbit systems. Current plans also provide for a P-989 launch in October 1977. Funds also provide for operation of the mission ground station.

#### SIGINT Experiment

A special effort in the signal intelligence arena, termed SIGINT experiment, deals with two experiments proposed as passenger payloads on future HEXAGON missions. Each experiment would be of value in determining the extent of development of new and unusual Soviet and PRC emitters and their impact on

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intelligence collection efforts. The FY 76 effort is oriented toward the study and analysis of the mission, concepts and operating parameters of each experiment, which will aid in determining which experiment should be procured as a payload in FY 77. FY 77 funding to start development is \$2.1 million. The total experiment will cost about \$6 million over the next three years.

#### NRP R&D Program

The NRP mission is constantly evolving in response to changing threat requirements. This, combined with efforts to make NRP systems more cost effective, provides direction to our R&D program. The continued success of the NRP depends upon an on-going program to bring emerging technologies to application at an early date. The R&D program comprises a number of individual projects, typically in the \$100-\$300K range. Projects are typically new technology, of high technical risk, but with high potential payoff. In scope, the R&D program covers the entire range of unique technologies required by the NRP. To get more mileage from our R&D funds, we take maximum advantage of the technical capabilities outside of the NRO and perform only that work which is necessary for satellite reconnaissance.

A good example of our R&D effort is a program called

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### Space Shuttle

The Space Shuttle is an approved national program. The NRO is studying requirements to transition NRP satellites to the Space Shuttle. Our effort is closely coordinated to the timing of the NASA development plan for the Space Transportation System and construction of the Shuttle launch and support facilities.

The total out year costs associated with transitioning NRP satellites to the Space Shuttle are large and provide only essential modifications to transition to the Shuttle. While these transition costs are high, there will be long range advantages once the Space Shuttle has demonstrated its reliability and capabilities. Spacecraft should be able to capitalize on the increased weight and volume capabilities of the Space Shuttle. NRO transition study efforts for FY 77 will cost \$6.4 million and are included in our R&D request.

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CONTROL SYSTEMS JOINTLYFY 77 FUNDING SUMMARY

Summing up all of our efforts, the total NRP request of  represents a 5.5 percent decrease from FY 76 appropriation level, as reflected on the next viewgraph (Viewgraph 32). While we have maintained a relatively even annual funding level in the FY 67-77 time frame, our budget, when considered in terms of buying power, has declined dramatically, as reflected on the next viewgraph (Viewgraph 33). For example, if we tried to buy in FY 77 what we procured in FY 67, it would cost us almost double. Only by continually improving our systems' capabilities and reliability have we been able to maintain an adequate level of performance and introduce such improvements as KENNEN. We are extremely proud of the fact that we have been able to continue to improve the quantity and quality of intelligence data derived from our imaging satellites while continuing to decrease the actual dollar expenditure for the collected data over the past 10 to 15 years. The technology advancements and improvements that we have made to our systems have enabled us to offset the abnormally high inflation experienced over the time period and the corresponding decrease in actual buying power. We have been able to actually increase the quantity and quality of the intelligence derived per dollar spent. The next viewgraph (Viewgraph 34) depicts the major NRP segments and recognizes the gradual reduction and phaseout of aircraft related capabilities and activities from the NRP.

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Mr. Chairman, this concludes my statement. I will be pleased to respond to any questions you may have.

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