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NATIONAL RECONNAISSANCE OFFICE

PRESENTATION TO THE COMMITTEE ON APPROPRIATIONS
SUBCOMMITTEE ON INTELLIGENCE OPERATIONS
UNITED STATES SENATE

SUBJECT: Fiscal Year 1978 National Reconnaissance Program

STATEMENT OF: DR. CHARLES W. COOK
Deputy Director, National Reconnaissance Office

March 1977

EARPOP GAMBIT HEXAGON KENNEN

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Mr. Chairman and members of the committee.

It is a pleasure to appear before you today in support of the National Reconnaissance Program. First, I would like to introduce two key members of the National Reconnaissance Program who will assist me in today's presentation, Brigadier General William L. Shields, Jr., the Director of the National Reconnaissance Office Staff, and

Our presentation will consist of a brief summary of what the National Reconnaissance Program is and where we fit in the Intelligence Community, followed by a description of each of our major efforts. We will be pleased to answer any questions you may have, either at the end or as we go along. With your indulgence, Mr. Chairman, I will use some viewgraphs as aids to explain the functions of our office and the specifics of our program.

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PROGRAM BUDGET REQUEST

The National Reconnaissance Program FY 78 request of [REDACTED] [REDACTED] is part of the National Foreign Intelligence Program request of [REDACTED] (viewgraph 1). Our FY 78 request is in line with the historical funding profile of the National Reconnaissance Program, which has been funded at a relatively even level in the FY 68-78 time frame. The [REDACTED] requested for FY 78 is [REDACTED] above our FY 77 total program. This increase is due largely to the initiation of procurements deferred from prior years (FY 75 and 76) as a result of cost effective mission life extensions. The FY 78 increase is also related to the development of some new programs to support out year acquisition decisions, and an account transfer which incorporates the cost of those efforts previously funded by the Navy into the National Reconnaissance Program effective in FY 78.

Mr. Chairman, before I get into our organization and specifics on our programs, I would like to address where the National Reconnaissance Program fits within the Intelligence Community, followed by some of the unique security requirements of our program.

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our satellite reconnaissance program, it could render the program open to official protest by either friendly or adversary foreign governments. Without official recognition, foreign governments do not have a diplomatic basis for protest.

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The NRP is a single program, national in character, designed to meet those foreign intelligence needs of the United States Government which can be met by satellite reconnaissance. The NRP is operated under strong, national leadership and has the mission to develop, manage, control, and operate all projects, both current and long-range, for the collection of foreign intelligence and of mapping and geodetic information obtained through satellite overflight of denied areas of the world. Information obtained by satellites is used in fulfilling national, political, economic, military, and scientific and technological intelligence needs. Photo and signals intelligence information obtained by NRP satellites directly supports national objectives and requirements, such as Strategic Arms Limitation (SAL) monitoring, Mutual Balanced Force Reduction (MBFR) 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. While intelligence analysis is not a function of the NRP, our satellites collect information that can be analyzed to assess the capability and to help in projecting the intent of the Union of Soviet Socialist Republics (USSR) and the Peoples Republic of China

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(PRC). For example, through information obtained primarily from our satellites, the Intelligence Community has identified a 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 SAL 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 satellites can also 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.

The NRP was established to meet the unique intelligence needs of the National Security Council (NSC) in areas where conventional reconnaissance is not possible in peacetime.

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Since the establishment of the NRP, numerous government intelligence consumers have recognized the necessity of the NRP product to the accomplishment of their mission. The program is an essential contributor to a broad base of consumers ranging from, among others, the White House, the Department of State, the Department of Interior, the Central Intelligence Agency (CIA), and the Department of Defense (DOD). The nature of the data collected and the cost of acquiring the data require that the management of the NRP provide for a nonduplicative, cost-effective, secure program. For example, interception of telemetry from a Soviet test range assists the CIA and DOD in determining whether or not new weapons systems are being developed or old systems are being upgraded. This information is used in the production of National Intelligence Estimates (NIE). The State Department also requires this information for SAL verification.

Emerging collection capabilities over the past few years have significantly increased the potential for providing near-real-time intelligence information to operational commanders. In FY 78 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 operational commanders. NRP systems such as the new near-real-time KENNEN,

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URSALA, RAQUEL, and PARCAE satellites are capable of providing significant information during crisis situations. The NRP systems have supported military exercises BRAVE CREW, GALLANT SHIELD, BOLD EAGLE, OCEAN SAFARI, and COLD FIRE in order to develop expertise in Army, Navy, and Air Force units for the development of doctrine for the employment of NRP satellite systems in support of tactical forces. The overhead systems also continually respond to National Foreign Intelligence Board (NFIB) approved operational ELINT requirements, such as the Mayaguez incident, Korea, Vietnam, the Mid-East, and in support of the routine and special land and ocean surveillance requirements. The assessment of these exercises and operations by military commanders has been very favorable. The result is a fuller understanding of the potential 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 the scenario, but are vulnerable to a technically sophisticated enemy. Another limitation 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 NFIB is

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becoming more responsive to operational requirements and
considerable effort is being expended in achieving a balance
between competing requirements.

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The National Reconnaissance Office (NRO) is a separate agency of the DOD organized to provide a central, streamlined management agency for the NRP. The Director of the NRO, who is normally the Under Secretary of the Air Force, is appointed by the Secretary of Defense who is the Executive Agent for the NRP. The office was established in 1961 as a result of a Presidential decision to create an intelligence collection program operating on a low profile basis and using minimum management overhead. As a separate agency of the DOD, the NRO organizational structure provides centralized, streamlined management for the NRP.

The current Director of the NRO (DNRO) is Mr. Thomas C. Reed, the Secretary of the Air Force, who is serving pending the appointment of an Under Secretary of the Air Force (viewgraph 2). As the Deputy to the DNRO, I operate under the overt title of Deputy Under Secretary of the Air Force (Space Systems). The DNRO has a full-time NRO staff under the direction of Brigadier General Shields. This staff is known openly as the Office of Space Systems, Office of the Secretary of the Air Force (SAFSS). The staff office is jointly manned, however, by Air Force, Army, Navy, CIA and National Security Agency (NSA) personnel on selected assignment. The DNRO also has a dedicated

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Comptroller, is responsible for the management of the budget and the allocation of funds within the NRP account, known overtly as Special Activities, Air Force.

The NRP currently includes three program offices, reporting directly to the DNRO under the streamlined management concept. Two of these program offices are outgrowths of the original organization involved in reconnaissance--the AF office, Program A, headed by Major General John Kulpa, is known overtly as the Office of Special Projects, Office of the Secretary of the Air Force (SAFSP); and the CIA office, Program B, is under the purview of the Deputy Director of Science and Technology of the CIA, Mr. L. C. Dirks. The third program office, Program C, is within the Naval Materiel Command and dates back to 1962. Captain R. T. Darcy is in charge of Program C. These program offices have the responsibility to design, develop, and operate NRP 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 the DNRO without being subject to intervening levels of review.

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CONTROL SYSTEMS JOINTLYTHE ORGANIZATIONAL ENVIRONMENT

The organizational environment within which the NRP operates is depicted on the next viewgraph (viewgraph 3). As I mentioned earlier, the Secretary of Defense is the Executive Agent for the NRP. The NRP is directly responsible to the intelligence collection requirements and priorities established by the National Foreign Intelligence Board (NFIB). The newly established Policy Review Committee is now responsible for resource allocation. Operational plans and programs of the NRO are reviewed by the President's Foreign Intelligence Advisory Board. That element of the Policy Review Committee overseeing the NRP is chaired by the DCI with the Deputy Secretary of Defense, the Deputy Assistant to the President for National Security Affairs, and the Under Secretary of State for Political Affairs as the three principal members. The DCI provides security policy guidance to the NRO. The NRO maintains a close working relationship with the NSA, which is responsible for the processing, analysis, and distribution of SIGINT data. This organizational relationship is currently under review by the NSC and the Secretary of Defense.

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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 NSC. 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 directed that a new reconnaissance satellite development effort be conducted under 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 NRP. The Air Force and CIA offices which had been developing reconnaissance satellites up until that time were incorporated into the initial organizational structure.

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The NRP has generally been credited by witting national observers as having an efficient and effective management approach for the end-to-end 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 which include a short vertical management chain and authority commensurate with responsibilities delegated to the lowest level of the organization. This has allowed the NRO to be relatively small resulting from a conscious effort to have the organization no larger than is absolutely necessary for the fulfillment of the mission. Our staffing policy provides for a minimum number of exceptionally well-qualified personnel who are devoted full time to direct support of the NRO. No manning is provided for expanded staff involvement associated with other organizations. The tenure within the organization is longer than usual. The turnover of civilians has been very low and military tours are at least four years and often five years in duration.

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The mission objective of the NRP has two unique aspects which support the management approaches used within the NRO. First and foremost is the NRP's responsibility for the total life cycle of systems, including design, fabrication, test, launch and on-orbit operation. Second is the highly sophisticated technical nature of the programs which are of a continuing and evolving nature. Traditionally, the NRP has consisted of not more than five to seven large programs that exist in a dynamic mission environment. Due to the evolving nature of the requirements for which the systems are built, a policy of minimum inventory is followed. Production quantities are usually small and involve long intervals between deliveries. Procurement schedules are adjusted as required to meet planned availability dates. An essential element of this flexibility is the authority to fund incrementally all appropriations, including procurement. Incremental funding provides the program manager positive and direct control of the effort expended on the program on a continuing basis and permits adjustments to planned procurements with minimum fiscal perturbation.

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The NRO, in meeting with responsibility for the acquisition of photographic and signals intelligence of denied areas, receives its collection requirements from the DCI through the NFIB structure. Our responsibility is to develop, procure, and operate satellites capable of obtaining the quality and quantity of data required to meet foreign intelligence needs. Once our satellites obtain the intelligence data required, the data is turned over to the Intelligence Community for exploitation and dissemination. For film-carrying photo satellites the film is processed by the NRO and turned over to the Intelligence Community. In the case of signals intelligence satellites,

The NSA, the prime processor of signals intelligence data, works closely with the NRO in the design of signals intelligence satellites and related ground systems to insure compatibility with the processing system. We continuously seek and receive feedback from product users as an aid to improving the product, the cost effectiveness and the responsiveness of the program.

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CONTROL SYSTEMS JOINTLYTYPES OF NRP SATELLITES

The NRP currently has two types of satellites: those that return film or images, and those that return signal data. We are conducting technology development and system analyses on

Signals intelligence satellites, referred to as SIGINT satellites, perform several different missions--Electronics Intelligence (ELINT), Communications Intelligence (COMINT), and Telemetry Intelligence (TELINT) collection. Our SIGINT satellites also collect perform ocean surveillance, and conduct other special missions. Until recently we have operated two imaging satellites of the photography film-return variety--HEXAGON, which provides broad area search, surveillance, mapping and targeting positioning, and GAMBIT, which provides high resolution photographic imagery of point targets for technical intelligence and target surveillance purposes. Late last calendar year we launched and started operations with a revolutionary new imaging system, the KENNEN, which, for the first time, provides a near-real-time imaging capability. HEXAGON and GAMBIT have provided a highly successful complementary mix of HEXAGON's medium resolution for search and surveillance and GAMBIT's

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progressed toward full operational status, the HEXAGON and GAMBIT programs have been stretched to preclude commitment to follow-on procurements prior to KENNEN evaluation. These actions have minimized the cost of delaying a planned follow-on HEXAGON procurement for two years and resulted in deferring plans for a follow-on GAMBIT procurement at this time.

The first KENNEN imaging satellite was launched in December 1976 and was declared operational on 20 January 1977 after a period of engineering checkout. A comprehensive study of the KENNEN system is ongoing, and this evaluation will continue for several months. Because of the complexity of the KENNEN system, including the fact that it provides a new type of imagery, and the many factors involved in determining its ability to replace GAMBIT and HEXAGON, the study cannot be completed sooner. The 1978 budget should protect both GAMBIT and HEXAGON at the requested minimum level until a rational, well-thought decision can be made. This decision can only be based on the results of the ongoing study. We anticipate making this decision before the end of this year.

HEXAGON

HEXAGON (viewgraph 4) is unique in its ability to image vast areas of the earth with a single mission providing imagery of sufficient quality for detailed photo interpretation. It is

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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 SAL Accords. It is the only current system capable of performing an inventory of ICBM silos in the USSR and the PRC on a periodic basis, and is the principal source of obtaining geodetic information used in mapping for tactical and strategic targeting. HEXAGON also provides visual evidence of industrial and agricultural developments, and is a source of gathering intelligence data from areas of interest other than the USSR and PRC.

There are many examples of each system's unique contributions contained in our FY 78 Congressional Justification Book. Let me just mention a few of these which are attributable to HEXAGON's broad area coverage. HEXAGON has enabled the United States Government to monitor the SALT limitation of 2400 aggregate Soviet missiles and the 1320 Multiple Independent Reentry Vehicle limitation and confirm the absence of new deployments (the appearance of which will be in violation of the SAL agreements); to monitor the extent of Soviet and ICBM/IRBM deployment, modification, and dismantling; to monitor Soviet and Chinese air defense sites and radar installations;

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and to develop significant data on the order-of-battle for the Ground, Naval, and Air Force of Communist, Middle East and other key countries (for denied areas, this information provides a large proportion of what the United States knows about order-of-battle); to initially detect the newly emplaced Soviet ABM radar in the Kamchatka missile impact area (HEXAGON is the system most likely to detect the emplacement of these radars at other locations if that occurs); to obtain initial evidence of the Soviet naval base in Somalia (the existence of which was publicly denied by the Soviets); to discover the Soviet's Probable Beam Weapon Development Facility at Golovino; to monitor recent earthquake damage to Tangsham, China; to provide significant evidence on the planting, growth, and harvest of Soviet grain crops which, together with evidence from other sources, permitted the Intelligence Community to estimate Soviet grain production and balances with high confidence; and to provide the evidence that recent sensings by United States warning satellites originated from fires resulting from fractures to natural gas pipelines in the USSR and not from laser beams. Additional examples of significant intelligence obtained as a result of HEXAGON's excellent area search resolution capability are the first photographic indications of Soviet mobile ICBM development, which was later confirmed by the higher resolution GAMBIT system, and the only photography of the

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RAM-H, the new delta wing aircraft being developed by the Soviets at Ramenskoye Flight Test Center.

HEXAGON is our largest imaging satellite. The vehicle has five 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 on-orbit through the Air Force Satellite Control Facility (AFSCF) network. After each film recovery capsule is filled on-orbit, it is ejected for aerial recovery near Hawaii.

Our FY 78 request (viewgraph 5) for HEXAGON is \$150.8 million, up \$17.7 million from FY 77. With the successful KENNEN initial operational capability, declared in January 1977, we are in the process of confirming the wisdom of the phase down in the frequency of HEXAGON launches to one per year. Our request includes \$27.3 million for initiation of a late FY 78 procurement of two additional HEXAGON vehicles which will provide a HEXAGON capability in the 1983 and 1984 time frame at a minimum cost, and will provide us with sufficient time to

[Redacted]

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Should the current evaluation of KENNEN demonstrate a greater than expected capability of supplementing the HEXAGON mission, and if

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[REDACTED] this HEXAGON vehicle procurement may be slipped into FY 79. This would allow the HEXAGON long-lead funds to be applied to an improved KENNEN acquisition; thereby accelerating the phaseout of HEXAGON. The thirteenth HEXAGON system is scheduled for launch this spring. The total invested in the program through FY 77 would be \$1.996 billion.

We continue to strive for maximum intelligence return for the lowest possible cost on all of our systems. We have, I believe, been extremely successful in meeting this objective by gradually but steadily increasing the on-orbit lifetime of our systems, thereby 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 1960's when we were developing the HEXAGON system we anticipated a mission duration of 30 days and were planning to fly five systems per year, yielding approximately 150 days per year of on-orbit performance. We have demonstrated the capability of flying in excess of 150 days per mission with the current vehicles with plans to go to 180 days, and further increases to 220 days per mission. 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 year. While increasing the system lifetime has been a very cost effective approach, it

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has not been achieved without 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 probably not possible 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 put the system together, eight major aerospace contractors work as partners with some 45 major subcontractors under them, supported by in excess of 1,000 suppliers and vendors from across the country. It takes at least four-and-one-half years from the time we order the glass from which the optics are 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 over one year in system tests to insure reliability and performance. The uniqueness and complexity of the HEXAGON system requires that we maintain a work force of slightly over 2,000 highly trained specialists and engineers dedicated to the program. These specialists are spread principally throughout four of the major associate contractors. The camera subsystem

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constitutes 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 is spent in testing and integration. To assure the high performance and reliability of the camera system, it requires the retention of approximately 1,000 engineers and technicians. It should also be pointed out that these 1,000 specialists, with a relatively small increase in manufacturing resources, could support an annual launch rate of two to three times our current rate. While we have reduced the annual launch rate, the principal savings realized are from items like the launch vehicle, which costs about \$20 million per vehicle, and the basic spacecraft piece parts which cost about \$26 million. The savings that can be achieved in these areas, which we refer to as variable costs, are large enough, so far, to 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 6). The red line in the left upper corner is 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.

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CONTROL SYSTEMS JOINTLYGAMBIT

GAMBIT (viewgraph 7), the NRP 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 foreign weapon systems, both operational and under development; of monitoring compliance with SAL 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 imagery has made principal and unique contributions to estimates of new or modified Soviet and Chinese ICBM force capabilities, to include estimates of detailed system performance characteristics. Specific examples of recent contributions include details of Soviet silo modernization and conversion programs, allowing assessment of the specific mix of deployed systems and monitoring of SALT conformance; details of Soviet silo characteristics allowing assessment of silo vulnerability to nuclear attack; detailed mensuration of ballistic missile stages, allowing a more precise analysis of ICBM range/payload capabilities; and significant source data on Chinese missile characteristics.

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GAMBIT provides technical parameters information which allows a high confidence analysis of Sino-Soviet aerodynamic systems. GAMBIT's photography has allowed the US to perform detailed engineering analyses of all the recent Soviet aircraft development programs from their initial flight test phase through operational deployment. Specific examples include refined analysis of the Soviet BACKFIRE bomber which determined that the aircraft has a range/payload capability which has made it a major issue in current SAL negotiations; details of the newly developed Soviet AS-X-9 air-to-surface missile associated with the FENCER A aircraft; and proper identification of a new Soviet AA-7 air-to-air missile, which was earlier misidentified due to the lack of high resolution photography.

GAMBIT imagery has also made major contributions to other significant fields. These include the technical analysis of Soviet ABM and air defense radars; detecting methods of concealment and deception such as dummy submarines, missile sites and tanks, and camouflaged vehicles, some of which are not detectable with lower resolution satellite imagery; and order-of-battle identification of tanks, self-propelled guns, and armored personnel carriers.

GAMBIT is similar to HEXAGON in that both systems use film recovery capsules. The GAMBIT satellite is 50 feet long and 5 feet in diameter, and has two recovery capsules. The stereo

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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 AGENA booster launched from Vandenberg AFB. On-orbit operations, film recovery, and postmission events are very similar to those for the HEXAGON program.

The FY 78 (viewgraph 8) request for GAMBIT is \$85.4 million. As you see, this is down \$30.4 million from FY 77. This reduction is related to a programmed decrease in launch rate based on the successful KENNEN launch in December 1976.

Since the inception of the improved GAMBIT system in 1967, we have had 47 launches to date with a total investment in the program of slightly in excess of \$1.8 billion. In the late 1960's, when the improved 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 one mission in FY 78 with an anticipated on-orbit life of 60 days. Our current program plan is to continue flying GAMBITs through FY 82 at the rate of one per year with a planned lifetime of up to 90

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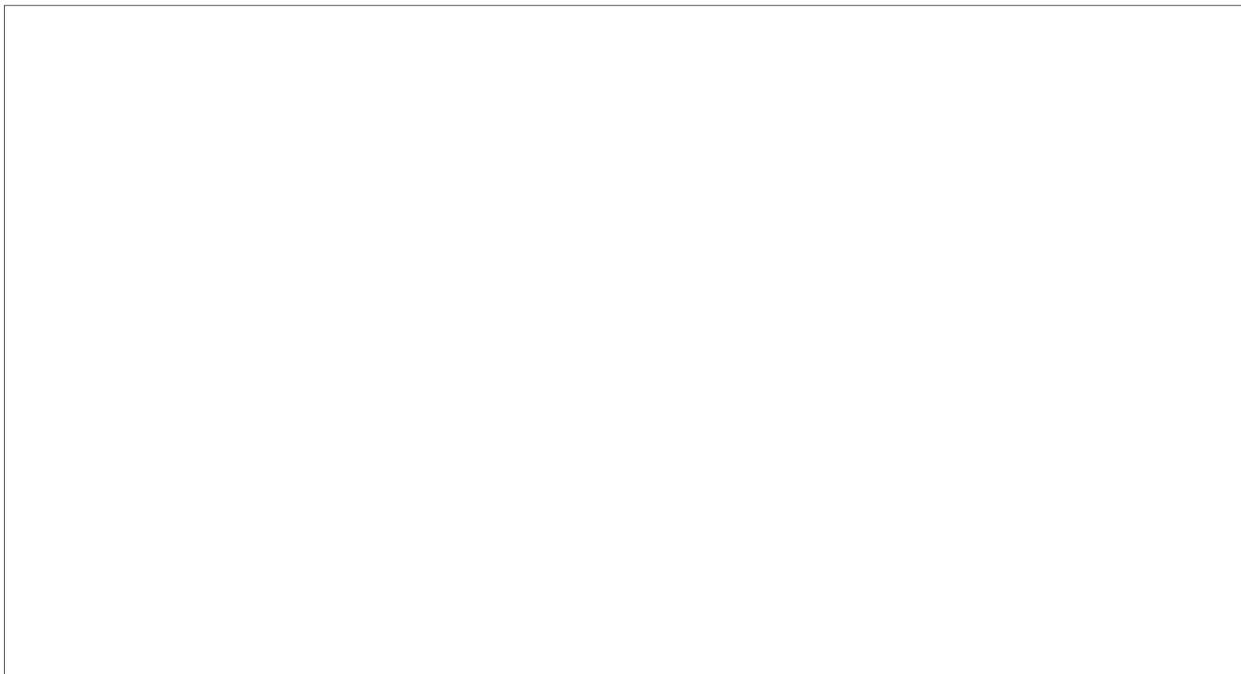
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HEXAGON and GAMBIT systems, the NRO in FY 78 will provide more intelligence in quantity and quality for a lower actual dollar expenditure than at any time in our 16 year history. The next viewgraph (viewgraph 10) compares United States with Russian launches and shows the significant increase we have realized in mission days on-orbit, and shows improvements in resolution--down to a best of that we have realized.



production and test schedule culminated in the launch of the relay satellites in June 1976 and August 1976, followed by the first imaging satellite launch on 19 December 1976. The KENNEN initial operational capability was declared on 20 January 1977.

Within the limits of early 1970s technology, the KENNEN system

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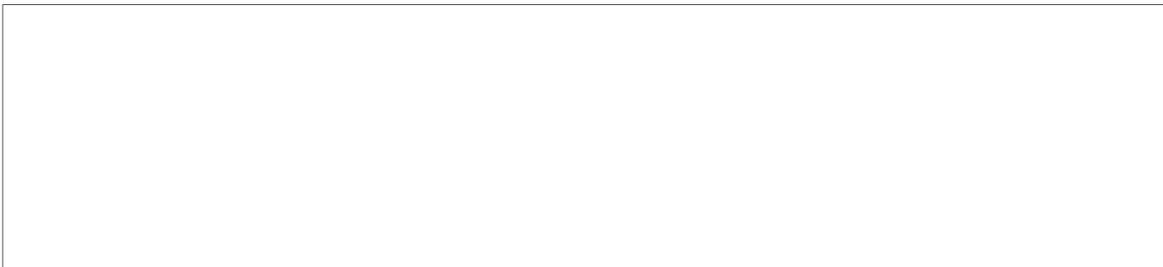
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The programs for collecting signals intelligence (known as SIGINT) by satellite were established to provide information not available to, or collectible by, conventional ground based or airborne reconnaissance resources. SIGINT satellites are designed and tasked primarily for unique collection of telemetry, radar, communications intelligence,

SIGINT systems constitute a vital element of the total collection capability of the United States. We currently have

the P-989 system, and the PARCAE Program. 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 13), 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 up from a few days to more than two years for most 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.

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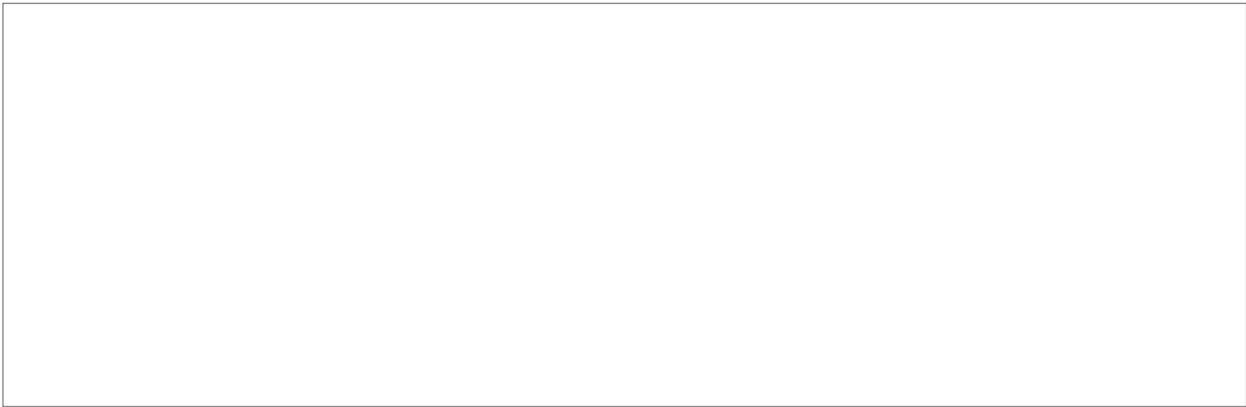
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P-989

The next major signals intelligence program is Program 989, (viewgraph 22), which consists of a number of independently operating, low-orbiting satellites each of which is capable of providing worldwide general search, and operational and technical signals intelligence. P-989's offer unique capabilities that are not present in other overhead SIGINT intelligence collection systems. These satellites complement rather than compete with the high orbiters by performing, for example, precise technical measurements or electronic-order-of-battle and world-wide surveillance that is difficult for, or outside the frequency ranges of, [redacted] They are the primary contributors to electronic-order-of-battle data outside of the [redacted]

The six P-989's currently in operation provide significant information in the areas of locating communications links and determining their signal characteristics, locating special interest radar systems and obtaining technical intelligence

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data on Soviet ABM and other radar systems. Most of these P-989 systems are not currently working at their maximum capability as several have been in orbit well beyond their expected life, and experienced various levels of degradation.

P-989 vehicles are launched from HEXAGON satellites. For this reason, they are often referred to as a passenger payload. After separating from HEXAGON, the satellite is placed in a near earth circular orbit using on-board rocket motors. The tasks the satellite and receives the collected data through the Air Force Satellite Control Facility network. The P-989 satellites have the unique capability to be tasked for coverage of any area of the world.

Our FY 78 request (viewgraph 23) of \$25.1 million is \$7.8 million above our FY 77 appropriation. This increase is attributable primarily to the initial incremental cost for procurement of the next P-989 satellite to preclude an out year gap in collection capabilities. A small portion of these additional monies provide for the replacement of components in a satellite which has exceeded its shelf life. The actual lifetimes of spacecraft procured in the early 1970s have exceeded the calculated average life, thereby enabling us to reduce procurement rates. The last spacecraft was procured in FY 74, a follow on buy was slipped from FY 75 to FY 78.

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A special effort dealing with an extremely high frequency experiment is being developed as an additional passenger payload on a future HEXAGON mission. This experiment will be of value in determining the extent of development of new and unusual Soviet and PRC emitters and their impact on intelligence collection efforts. The total experiment will cost about \$8 million over the next four years.

The P-989 has been credited with the initial intercepts of several Soviet made SAM and AAA radars in Syria, Iraq, and in various locations in the USSR. The system has intercepted and located uplinks to the Soviet Molniya II communications satellites. It provided the initial intercept of a modified SAM system in the PRC. The system has the unique ability to quickly redirect its coverage to any area of the world during periods of crisis.

Mr. Chairman, this concludes the presentation of individual systems. Prior to answering questions you might have, I would like to address additional subjects of interest to the NRP:

effort, the vulnerability/survivability of NRP satellites, the Emergency Reaction Reconnaissance System concept, mission support and Shuttle related activities.

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THE NRP R&D PROGRAM

The NRP mission system capabilities must be responsive to changing Intelligence Community 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 Projects are generally pushing new technology at the front of technical development, but with high potential payoff. The R&D program is intended to cover the entire range of unique technologies required by the NRP. We take maximum advantage of the technical capabilities and programs outside of the NRO and perform only that work which is uniquely necessary for satellite reconnaissance.

The scope of the R&D programs covers the entire range of technologies employed by the NRP. Technical areas include large spaceborne optics, electro-optical detectors for the visible spaceborne data compression devices, large antennas, wideband data communications equipment, ultrahigh speed digital electronics, and others.

A few specific examples illustrate the nature of the program. We are sponsoring development of very lightweight optics using

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composite materials and minicomputer driven activators to correct errors in shape of the large mirrors while on orbit. These techniques will permit optics as large as 150 inches in diameter to take maximum advantage of the Space Shuttle. On another front, we are examining the feasibility and utility of doing [REDACTED]

[REDACTED] In the SIGINT area, we are continuing investigation of the potential for satellite collection [REDACTED]

Signal processing equipment for satellite use are being developed to enhance our ability to sort desired signals from interference in ELINT environments which are rapidly becoming more dense. An example of our work in a general technology area is our quest for very high speed analog to digital converters which are at the heart of our most advanced systems. Our performance requirements are more severe than those of other defense or intelligence programs, thus we sponsor this work to meet our specific needs.

The NRP R&D request (viewgraph 26) for FY 78 is [REDACTED]

The [REDACTED] increase over our FY 77 approved funding level results from inflation, from increased requirements in vulnerability R&D, and from an accounting change which

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transfers Navy funding for R&D into the NRP
account.

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VULNERABILITY/SURVIVABILITY OF SPACE SYSTEMS

'NRP satellites have been designed, built and operated based on the premise that interference by an adversary was highly unlikely. This premise stems from a history which asserts that reconnaissance satellites are tacitly accepted. In the Strategic Arms Limitation Talks (SALT) they are referred to as "national technical means of verification" which support the National Command Authority, and are therefore regarded as a stabilizing influence in periods of crises. National guidance to the NRP has been to maximize intelligence collection within available resources--a policy which has resulted in not devoting major efforts to making satellites invulnerable to foreign interference.

In July 1976, the National Security Council (NSC) issued National Security Decision Memorandum 333 (NSDM 333), which called for an action plan to enhance United States satellite survivability. This direction came at a time when the Soviets were increasing their antisatellite activities. We have participated in a DOD-Intelligence Community response to NSDM 333. Studies that we have conducted indicated that we could: (1) implement certain low cost survivability measures immediately in accordance with the NSDM objectives; (2) provide an increased level of satellite survivability, if desired,

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contingent on the availability of required funds which are not currently within the NRP budget; and (3) conduct investigations on a Quick Reaction Reconnaissance Satellite type system(s) for certain critical missions and a backup to existing systems.

The studies that we conducted were intended to aid in policy formulation by indicating the various levels of survivability which could be achieved with various levels of investment. If a general funding level were to be selected, detailed performance/cost studies would be conducted. We are currently anticipating specific direction from the Policy Review Committee of the NSC on the level of effort to pursue. In the interim, the NRP survivability program has been increased in FY 78 from to perform an initial analysis of threat models, countermeasures and their effectiveness.

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SHUTTLE RELATED ACTIVITIES

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

The total out year costs associated with transitioning NRP satellites to the Space Shuttle are large even though they provide only those modifications essential to be able 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 program studies will define the necessary minimum modifications to existing NRP systems to permit the spacecraft to be launched by the Space Shuttle, while retaining the capability for expendable booster launch in the event of Shuttle schedule delays or grounding. It is anticipated that this expendable booster backup capability will be retained only until the Space Shuttle has demonstrated the reliability and capability necessary to support the NRP mission requirement. Spacecraft should be able to more fully capitalize on the increased weight and volume capabilities of the Space Shuttle once the STS has demonstrated its reliability and

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the expendable backup boosters are no longer required. NRO transition efforts for FY 78 (viewgraph 27) will cost \$10.2 million and consist of payload, facility and interface studies designed to more fully define the planned Shuttle transition.

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Mission support consists primarily of the Satellite Control Facilities which provide launch and on-orbit support to a number of NRP satellites as well as Air Force and other agency satellites. The SCF, the acronym that we use for the Satellite Control Facilities, was initially configured in the 1956-57 period to support the CORONA (the predecessor to the HEXAGON program). Since that time, other activities have used the available time of the SCF but NRP activities still require the dominant portion of the SCF services.

The other major item within this account is the photographic film and chemicals required to make the initial positive and negative copies from the original negatives returned from space. The magnitude of this effort can be approximated by appreciating that the normal HEXAGON mission carries 230,000 feet of film which is then reproduced on approximately 5.6 million feet of film for the intelligence community.

The remaining items make up less than 10 per cent of the mission support area and consist of costs for second destination transportation charges, a launch facility communications cost, and minor miscellaneous operations costs. Costs for propellants and controlled targets for the imaging systems

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that were in FY 77 and prior years have been assumed as direct costs to the systems that they support effective in FY 78.

The FY '78 mission support program (viewgraph 29) is \$135.8M, up \$1.2M from FY 77. This increase is largely in the SCF line and is attributable to a 6.6 percent increase in labor intensive service contracts (\$4.4M), \$1.0M increase in logistical service contracts and \$2.0M to continue a data processing modernization project started in FY 76. Decreases are related to the transfer of propellants and targets to the system accounts. The net result being the \$1.2M total increase.

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Summing up all of our efforts, the total NRP request of increase from FY 77 program level, as reflected on the next viewgraph (viewgraph 30). While the increase over FY 77 is higher than normal, it should be noted that the FY 78 request is only

increase over the FY 68 appropriation. Over the three years since FY 75, inflation more than accounts for this increase. In that the NRO has been able to delay many procurements since FY 74, FY 74 is a better year for comparison of the increase since it was prior to the actual inflation impact. While we have maintained a relatively even annual funding level in the FY 68-78 time frame, our budget, when considered in terms of buying power, has declined dramatically, as reflected on the next viewgraph (viewgraph 31). For example, if we tried to buy in FY 78 what we procured in FY 68, it would cost 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

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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 32) depicts the major NRP segments and recognizes the gradual reduction and phase-out of aircraft related capabilities and activities from the NRP.

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

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