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CONTROL SYSTEMS JOINTLY

NATIONAL RECONNAISSANCE OFFICE

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

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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Mr. Chairman and Members of the Committee.

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

and Colonel Robert Rosenberg, who is the Acting Director of the National Reconnaissance Office Staff. As I know you are generally familiar with the National Reconnaissance Program, and as we have presented 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 briefing charts to explain the functions of our office and the specifics of our program. So you can follow the cost of each of the programs as we go along, I prepared a funding chart for your ready reference. Each major program on this chart will be addressed. Before I get into our program, I would like to put the security aspects of the National Reconnaissance Program in context, especially since classification and covert activities are high on the list of national items of concern.

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As you know, 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. 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 remain secure. Third, if the U.S. Government were to admit officially and openly our satellite reconnaissance program, it could render the program open to official protest by either friendly or adversary foreign governments.

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Although it is considered a "poor secret" that selected NRP satellites exist--in that the NRP's existence has surfaced openly on several occasions and the satellites can be tracked--the official "fact of" has not been acknowledged by our Government. It is also a policy not to discuss openly or identify the NRO management structure outside of specially established control channels. This policy has been reviewed by several Administrations and was most recently endorsed and sustained in the President's Omnibus Executive Order on Intelligence. The "fact of" policy does not attempt to keep all satellite reconnaissance a secret per se, because satellite weather reconnaissance, for example, is discussed. What the "fact of" policy does is to serve as a means of assuring that our sensitive and vulnerable satellite reconnaissance programs remain viable. Our objective is to sustain the NRP's ability to provide timely, vital, and otherwise irreplaceable intelligence information to United States decision makers.

The NRP

The National Reconnaissance Program was established to consolidate all national reconnaissance satellite activities under a single management program. The program is designed to satisfy those foreign intelligence needs of the Government which can best be met by overhead satellite reconnaissance. The NRP mission is to develop, procure and operate reconnaissance satellites which

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obtain photographic and signal intelligence data from denied areas of the world and to provide this data to the intelligence community for exploitation and dissemination. The data is used in fulfilling national, political, economic, strategic and tactical military, and science and technology 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 satellites collect information that can be analyzed to determine both the capability and help in projecting the intent of the USSR and People's Republic of China (PRC). Let me give you just a few specific examples of some of the vital information obtained by NRP satellites and how this information is used. Over 70 percent of the information contained in the current DIA briefing on Soviet capabilities was obtained by NRP satellites. This briefing, which has been made available to members of the Congress, reflects the agreed judgment 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

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identifies, through information obtained primarily from our satellites, 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 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 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. We have conducted studies and exercises which address the feasibility, applicability, and operational usefulness of providing an

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increasing quantity of intelligence information to tactical commanders. NRP systems such as  and the P-989's can provide significant, tactical information and indications and warning, especially during crisis situations. KENNEN's near-real-time capability will significantly increase the quantity of information available. Exercises such as GALLANT SHIELD in 1975 and BOLD EAGLE, held in February 1976, have provided realistic data on integrating imagery and Electronic Intelligence at the tactical operational level. The NRO has provided technical guidance to the studies and field exercises to insure that those military applications defined are technically and operationally feasible. These are but a few of the many contributions of NRP satellites. Many more specific examples by individual system are contained in our FY 77 Justification Book.

United States vs. Soviet Satellite Reconnaissance Capabilities

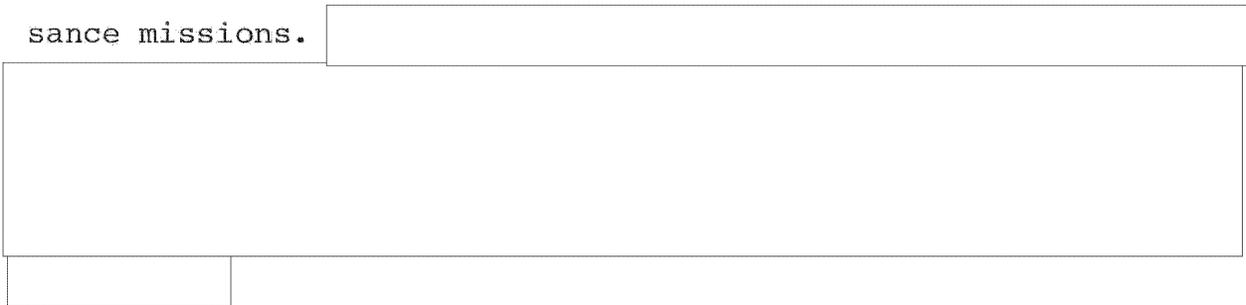
There are large asymmetries in United States and Soviet space capabilities (Chart 1). The necessity for the United States to acquire scientific and technical intelligence from denied areas of the world has driven the requirement for space oriented photo and electronic intelligence collection. This requirement 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

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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. The Soviets also have an orbiting radar satellite which is capable of performing near-real-time ocean reconnaissance missions.



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, of which less than 30 percent were for military and intelligence applications. Of the 31 launches, 5 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

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electronics intelligence collection; however, their systems are far inferior technically to those of the United States. Their best photo resolution is three to seven feet, depending on type of mission. This compares to [ ] to 2 feet for our satellites. Their systems also return much less film than ours. The Soviets launched 34 photo satellites in 1975 as compared to four for the NRP and 9 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.

[ ] the Soviets' best geoposition capability is believed to be 5NM. 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.

Intelligence Community Reorganization and the NRP

The President's Omnibus Executive Order on Intelligence, issued on 18 February 1976, has changed the organizational environment of the intelligence community. The Executive Order is the culmination of over a year of intensive study and review of the intelligence community. The direct effect of the reorganization on the NRP should be minimal. 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

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Committee on Foreign Intelligence, chaired by Mr. Bush, the Director of Central Intelligence. We will continue to receive our long range and day-to-day requirements guidance from whatever mechanism replaces the United States Intelligence Board. The USIB is currently being retained on a temporary basis. The Operations Advisory Group, which replaced the old 40 Committee, will weigh the international political sensitivities and implications in granting approval for our missions. Our interface with the President's Foreign Intelligence Advisory Board is expected to continue as in the past. 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.

The NRO

The National Reconnaissance Office, 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

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on a few main points. First, satellite reconnaissance, from the initial 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 named "DISCOVERER" returned photographs of Russian mainland military installations. Subsequently, President Eisenhower decided that a new reconnaissance satellite development effort should 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 National Reconnaissance Program.

The Secretary of Defense is the executive agent for the NRP, and I am, along with 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

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Office of the Secretary of the Air Force for Space Systems. 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.

NRP Management Concepts and Procedures

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 government military and 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, 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

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of our programs which are of 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, a policy of no stockpiling of satellites is followed. 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 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

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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 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

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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

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 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,  are jointly operated with the National Security Agency, where processing of the signals data begins immediately upon receipt of the data  The National Security Agency,

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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.

Types of Satellites

The NRP has two types of satellites, 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 collect [ ] 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, [ ]

[ ]

HEXAGON and GAMBIT provide a highly successful complementary mix of HEXAGON's medium resolution for search and surveillance

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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 [redacted] KENNEN, [redacted]

[redacted]

The Imaging Reconnaissance Satellite Mix

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 [redacted] of GAMBIT. If our predictions are realized, GAMBIT will be phased out or cancelled. It is unlikely, however, that KENNEN can [redacted]

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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 also retain the option to continue the GAMBIT system. The current imagery program is structured to retain this flexibility.

HEXAGON (Chart 2) 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 in known installations, as well as for periodically surveilling large numbers of known installations. HEXAGON's broad coverage capability makes it uniquely applicable to monitoring agreements such as the Strategic Arms Limitation Treaty. It is the only system capable of supporting 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.

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

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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.

Our FY 77 request (Chart 3) for HEXAGON is \$138.8 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

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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 5 launches per 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 5 per year to 1 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, 8 major aerospace contractors work as partners with some 45 major subcontractors under them, with in excess of 1,000 suppliers and vendors from across the country. It takes in excess of four and a 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

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of the HEXAGON system requires that we maintain a minimum work force in excess of 2,000 highly trained 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

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years is reflected on the next chart (Chart 4). 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 2 feet.

GAMBIT

GAMBIT (Chart 5), 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

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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.

The FY 77 (Chart 6) 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 8 systems per year, each of which had a mission life of about 10 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 5 per year. GAMBIT launches have decreased gradually since that time to where we now plan to fly 2 missions in FY 77, with an on-orbit life of about 45 days--each yielding 90 days of on-orbit performance. Our current program protects the option to continue flying GAMBITS at the reduced rate of 1 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

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the combined effects of inflation and decreasing production rates on unit cost. In the 1968-69 timeframe, when we were producing the vehicles to support a launch rate of 8 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, increase 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 (Chart 7), as with HEXAGON, reflects Russian launches, the significant increase we have realized in mission days on-orbit, and continued improvement in resolution--down to a best of

KENNEN

KENNEN (Chart 8) will fill the requirement for a long-life, imaging system with continuous near-real-time imaging data

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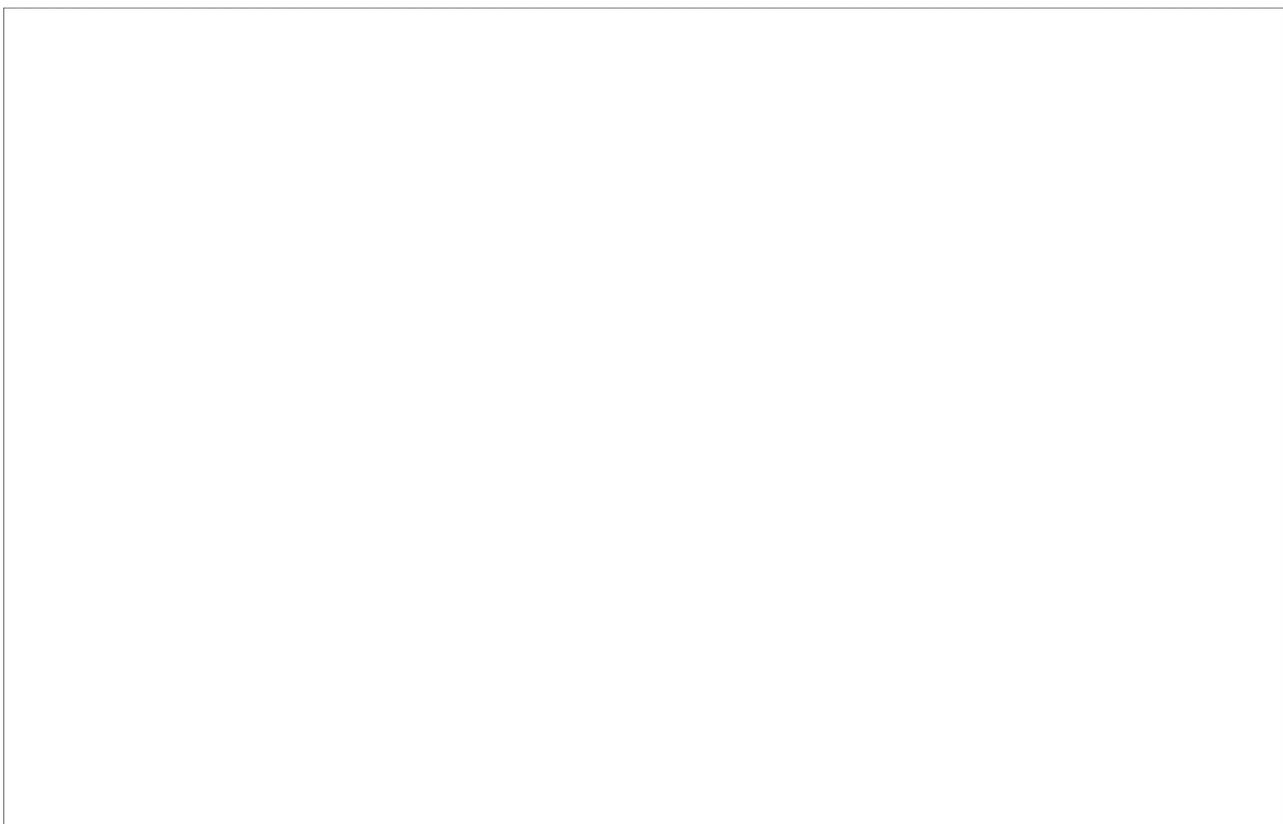
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return. The need for a near-real-time imaging capability has been recognized for several years. Technical research in the late 1960s and early 1970s resulted in continued advancement in the development of solid state electro-optical imaging devices. 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 predominately as a surveillance system with the unique attribute of near-real-time return



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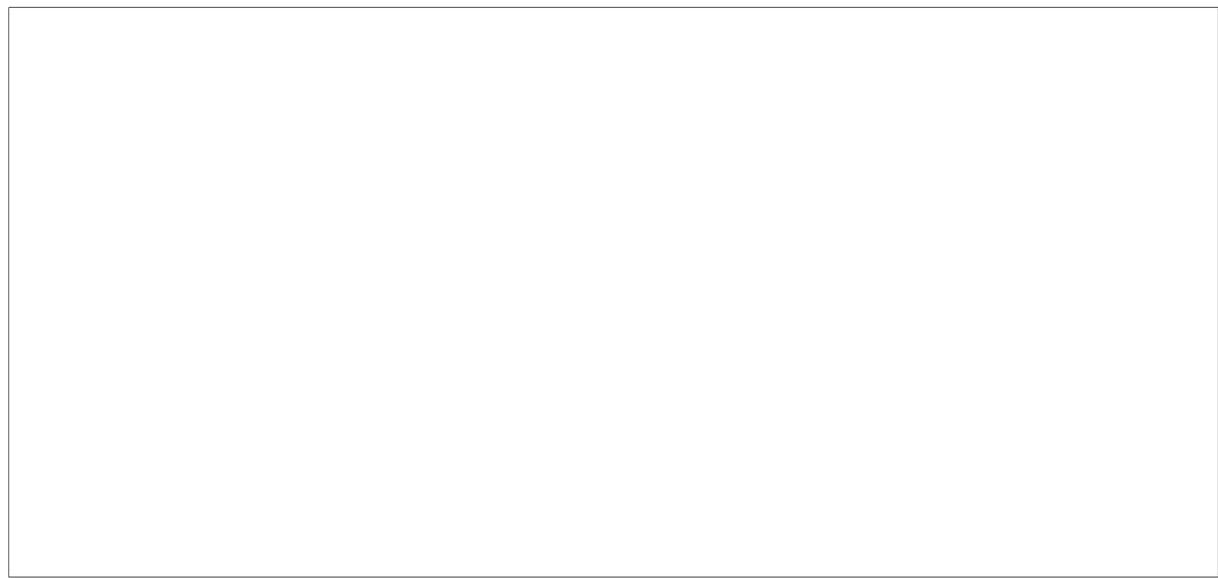
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Signal Intelligence Satellites

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, and [redacted]

[redacted] SIGINT systems constitute a vital element of the total collection capability of the United States. We currently have [redacted] Program 989, and POPPY/PARCAE. We have, over the years, significantly improved the capability, reliability and mission life of our SIGINT systems. As you can see by the next chart (Chart 10), 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

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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.



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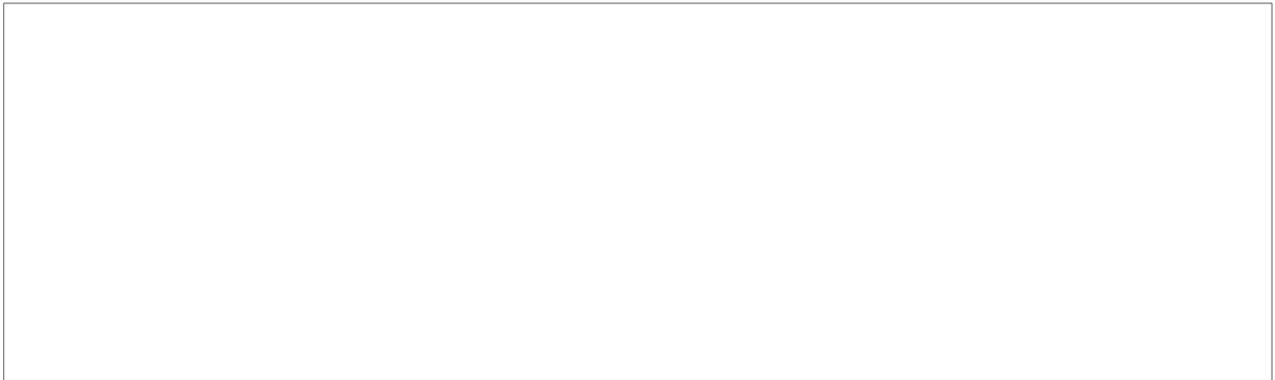
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POPPY/PARCAE

The POPPY and PARCAE systems consist  of low-orbiting Electronics Intelligence satellites with a primary mission of ocean surveillance and search. POPPY is our current system, and PARCAE is our follow-on replacement to POPPY.





Program 989

The last major Signal Intelligence Program is Program 989-- frequently referred to as P-11 (Chart 19). 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-989's are the primary contributors to electronic order of battle data

P-989's offer unique

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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-989's currently in operation provide significant information in the areas of locating communications links and determining their signal 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. [redacted] tasks the satellite and receives the collected data through the Air Force satellite tracking network.

The FY 77 funds of \$15.2 Million (Chart 20) 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

[Redacted]

SIGINT Experiment

[Redacted]

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 [Redacted] 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.

The NRP R&D request for FY 77 is [ ] The [ ] increase over our FY 76 approved funding level results from inflation and increasing requirements to support Space Transportation System studies.

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 [ ] and are included in our R&D request.

FY 77 Funding Summary

Summing up all of our efforts the total NRP request for FY 77 is [ ] below the FY 76 appropriation level. This 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. However, our budget, when considered in terms of buying power, has declined dramatically, as reflected on the next chart (Chart 21). 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

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of the intelligence derived per dollar spent. The next chart (Chart 22) depicts the major NRP segments and recognizes the gradual reduction and phaseout 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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FISCAL YEAR 1977 BUDGET REQUEST FOR THE  
NATIONAL RECONNAISSANCE PROGRAM

- - -

WEDNESDAY, MARCH 10, 1976

- - -

United States Senate

Subcommittee on Intelligence  
Operations of the Committee  
on Appropriations,

Washington, D. C.

The subcommittee met at 10:00 a.m., pursuant to notice,  
in Room 1223 Dirksen Senate Office Building, Hon. John L.  
McClellan (chairman of the committee) presiding.

Present: Senators McClellan and Hruska.

Also present: James Calloway, Staff Director, and Guy G.  
McConnell, Professional Staff Member.

Chairman McClellan. Today the subcommittee will review  
testimony from the Honorable James W. Plummer, Under Secre-  
tary of the Air Force. Secretary Plummer will speak in  
support of the Fiscal Year 1977 budget request for the  
National Reconnaissance Program.

Very well, Mr. Secretary, we welcome you and we will  
let you proceed in your own way with inserting a statement,  
if you have one, and highlighting it if you desire.

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STATEMENT OF HON. JAMES W. PLUMMER, UNDER SECRETARY OF THE AIR FORCE; (ACCOMPANIED BY: [redacted] COMPTROLLER, AND COLONEL ROBERT ROSENBERG, ACTING DIRECTOR, TECHNICAL STAFF)

Mr. Plummer. Yes, Mr. Chairman, it is a pleasure to be here today to report on the National Reconnaissance Program. I brought with me my Comptroller, [redacted], who will participate in the hearing here and help in what he can as an expert on any financial matters of our program, and Colonel Bob Rosenberg is Acting Director of our Technical Staff.

I also have an observer, Major Cullinane, who came just to witness the meeting today.

Now, we have prepared a statement which has been issued to you here, and with your agreement, Mr. Chairman, I will not read that but simply submit it for the record and then proceed with some comments to highlight certain areas I think should be brought to you.

Chairman McClellan. It may be submitted.

(The statement referred to follows:)

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Chairman McClellan. You may proceed.

Mr. Plummer. We have, as we discussed yesterday in Secretary Ellsworth's presentation to you, submitted as part of the large group of volumes the National Reconnaissance Program Congressional Budget Justification Book. Ours is Volume V of that series and consists of some 275 pages of the details of our program. It is highly classified, as you commented yesterday, Mr. Chairman, and it is available to you and your staff as you see fit.

Chairman McClellan. I will direct the staff, as I did yesterday, to examine it. I guess they want to come over to the Pentagon and do that.

Mr. Plummer. Any way that is convenient, sir.

With your indulgence I am going to use some briefing charts, and you have in your hand the charts that we will be using this morning.

You will notice the chart that you are inspecting right now is our flip chart which folds out, and as you flip through the rest of the book will serve as a constant reference to the various programs that we have, and we will be talking about in some detail, and outlined in the dotted heavy box there you will find the FY 77 request, and those are the numbers that we are requesting and will be talking about in detail today.

Chairman McClellan. Well, yes, sir. At first glance it

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looks like it is considerably less than last year; is that right?

Mr. Plummer. Yes, Mr. Chairman, it is. And you will see that it is less than last year and generally lower than the program we have had for about the last decade. We will explain the reason for that.

Chairman McClellan. Proceed.

Mr. Plummer. Mr. Chairman, before proceeding with the detailed technical and cost part of our National Reconnaissance Program I would like to comment a moment about the security aspects and put that in context. I would like to comment about the security aspects of the program. The NRP consists of satellites that have this unique capability to overfly the denied areas of the Sino-Soviet area.

Now, we conduct these programs in an extremely sensitive tight security method in order to obviate the possibility of being denied this very vital function for this government.

The first reason that we have in this security policy is that we believe that the more that our adversaries know about the quality and capability and successes of our spy satellites the more they may be inclined to take action to limit this capability.

Second, satellites, by their very nature, are relatively vulnerable to attack or to other types of countermeasures.

We know that the Soviets do have a capability with their

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anti-satellite systems to either destroy or degrade these systems.

Chairman McClellan. What chart should I be looking at?

Mr. Plummer. Right now I am just highlighting; I am not to the charts. I will call them in a moment for the first chart. Then finally relate to our security plan, we believe strongly in the Executive Department that if the U.S. government were to officially admit and openly state that our satellites are overflying the denied territory, it could render the program open to official protest by either friendly or unfriendly foreign governments.

Chairman McClellan. Off the record.

(Discussion off the record.)

Mr. Plummer. To continue, then, with the statement. The fact that we fly is a poor secret, we know, but we want to make sure that the official fact has not been and will not be acknowledged by our government in order that we would not run into the possibility of having them register an official complaint.

Now we know and admit that we fly other types of satellites for various functions -- for example, weather reconnaissance. We admit that openly to all the world on the basis that it is entirely a friendly and non-overt action.

Chairman McClellan. If they know that you are flying these satellites and you have not acknowledged that, don't

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they know that you could just as easily fly one to get military data?

Mr. Plummer. Yes.

Chairman McClellan. They know that?

Mr. Plummer. But it is under the same situation I just explained, Mr. Chairman. Relative to military reconnaissance we do not admit we do it. Relative to weather, the friendly aspect of weather and communication satellity -- that type of thing -- we do admit.

Chairman McClellan. Does Russia admit she flies them over here for weather purposes?

Mr. Plummer. Yes.

Chairman McClellan. It is just a stand-off?

Mr. Plummer. Yes, sir.

Chairman McClellan. Both ways?

Mr. Plummer. Yes, sir.

Col. Rosenberg. Mr. Chairman, I would like to add that one of the reasons for this agreement in principle between the Soviets and ourselves is that both the U.S. government and the Soviet government need these reconnaissance capabilities to support national means of verification in support of the SALT agreements. We both informally understand the other side has a capability.

Chairman McClellan. Without admitting it to the rest of the world?

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Col. Rosenberg. Without admitting it to the rest of the world.

Chairman McClellan. Each knows what the other is doing?

Col. Rosenberg. In general they know what they are doing. They do not know how good we are.

Chairman McClellan. You do not necessarily know how good they are?

Col. Rosenberg. That is right.

Chairman McClellan. You think you know.

Mr. Plummer. We have a very good set of intelligence data which we believe is quite accurate.

Chairman McClellan. It is kind of like a gentleman's agreement, I am going to try to do all I can and I am going to do all I can but we are not going to let anybody else know about it.

Mr. Plummer. That is right.

Chairman McClellan. That is what it amounts to?

Mr. Plummer. The National Reconnaissance Program 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 for exploitation and dissemination. The data that we provide is used in fulfilling national political, economic, strategic and tactical military and science and technology intelligence. The photo and signal

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intelligence information that we provide supports the national objectives and requirements such as SALT monitoring the MBFR, Mutual Balance Force Reduction, negotiations, cases and warning, crisis monitoring and operation and command support.

Let me give you a few examples of some of the vital -- Chairman McClellan. You still haven't reached any chart now?

Mr. Plummer. Not yet.

Chairman McClellan. Tell me when we get to the chart.

Mr. Plummer. I am sorry. I hope this isn't confusing, but I wanted to introduce some of these basic thoughts before we get into the details of the charts.

Let me give you just a few examples of some of the vital information obtained by the National Reconnaissance Program satellites and how this information is used.

Over 70 percent of the information that was contained in the recent Defense Intelligence Agency presentations to a large number of you Senators and Congressmen was based on data from our satellites. This briefing which has been made available generally to members of the Executive and the Congress reflects the agreed judgment of the national intelligence community. The briefing identifies the current capabilities and the trend, momentum and scope of the Soviet military.

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For example, the DIA briefing identifies, through information obtained primarily from our satellites, as I said, a new family of Soviet ICBMs with considerably improved accuracy and throw weight. Photo satellites, through coverage of missile sites, provide knowledge of silo modification and conversions and tell us when and where the new family of missiles is being deployed. Information of this nature is vital to the strategic arms limitation monitoring and in weighing the U.S. strategic requirements. Our satellites are also the primary source in obtaining data on Soviet ballistic missile submarine production and deployment. The data we obtain, the technical characteristics and the production base of the Soviets' strategic and tactical aircraft is extremely important in assessing the threat of our forces that they will encounter. Our 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.

The NRP satellites also have been providing considerable information regarding Soviet wheat growth potential during the past two years, which is of great interest to this country from an economic --

Chairman McClellan. You can tell by this how their crops are getting along?

Mr. Plummer. Yes, sir, very vital input to the overall

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assessment of their total crop production.

Chairman McClellan. You go by acreage?

Mr. Plummer. By quite a large number of factors -- acreage, the type of things that they are growing, the presence of the right sources of grain and things like that, the presence of some sort of a disaster like high winds or something like this. All of these are put together in a fairly complex calculation to predict the actual --

Chairman McClellan. You can get an idea whether they are having a good crop or poor crop?

Mr. Plummer. We can predict very accurately their crop successes.

Chairman McClellan. What do you do with that information when you get it?

Mr. Plummer. It is used by this government, CIA, State Department, Commerce Department and a large number of agencies.

Chairman McClellan. How about the Agriculture Department?

Mr. Plummer. And Agriculture Department.

Senator Hruska. An example of its detail is found in this country where corn blight of several years ago was estimated as to area and progression. It is that fine a means of detecting and analyzing the status and the environmental proofness of crops. We use it very much in detail in this country. That comes out through the hearings, Mr.

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Chairman, on Agriculture Appropriations.

Mr. Plummer. Yes, sir. We don't have that much detail on the Russians.

Senator Hruska. You wouldn't need it yourself; it is more strategic, more wide in scope. It is nice to know whether they are running short or having a surplus.

Mr. That is right. I wanted to comment just briefly here on the relative balance between the U.S. situation and the Soviet situation in our overall systems. The necessity for the U.S. to acquire scientific and technical intelligence from denied areas of the world has driven the requirement for space-oriented photo and electronic intelligence collections. We have an open society here in the United States; the Russians have a closed society. The Russians are able, through our technical publications such as Aviation Week, Aerospace Daily, and the like, to read very closely our overall capability, and we, on the other hand, have very little information from their open press.

Therefore, we have designed our systems pretty much to make up for this deficiency. They, on the other hand, have designed their systems primarily for the current and long-term operational motives principally directed to military purposes.

If you will now turn to Chart 1.

Chairman McClellan. A, B and C?

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Mr. Plummer. Let me insert here a comment about these first charts -- A, B, C and D.

Chart A, the very first one in your book -- and, Senator Hruska, that foldout chart will be the overall reference that we will use for the details of the program. It will all tie back together. In the first chart we show at the bottom of the page the total national foreign intelligence program -- \$3.7 billion. That is the number, Mr. Chairman, that Secretary Ellsworth developed for you yesterday relative to this category.

Now, at the top of the page then you see the makeup of that. The National Reconnaissance activities, [REDACTED] It is in that line item highlighted by the orange stripe that we find the NRP.

If you will turn to Chart B. That [REDACTED] for the National Reconnaissance activity is made up of two parts: the National Reconnaissance Program at [REDACTED] and the special Navy activities, Mr. Chairman, that were discussed by Secretary Ellsworth with you yesterday. So this is the line item that we are here to talk about today - the [REDACTED]

Chairman McClellan. The Navy, when we talked about yesterday [REDACTED]

Mr. Plummer. Yes, sir. That is the other part of the overall special activities that we have in this category.

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We are here only to talk about National Reconnaissance Program.

You might be interested that the [ ] million breaks down by obligation into procurement of missiles, [ ]  
[ ]

[ ] This year our military construction is zero. So that is the breakdown by authorization.

I might take a quick look at Chart No. 3, which shows in context --

Chairman McClellan. Three?

Mr. Plummer. I am sorry, Chart C.

Chairman McClellan. C.

Mr. Plummer. As in Charlie.

You see there the breakdown from Fiscal Year 1967 to the present fiscal year. The data is shown both in then year dollars -- it is the lower solid line -- which shows that our program has generally skirted along somewhat under one billion dollars, and the current level is trending downward. And in the dotted line above you have the same data shown in constant Fiscal Year 77 dollars. You see the general decline which represents the loss of buying power that we have had, like all of the rest of the units of government.

Chairman McClellan. As I understand this, the [ ] is then year dollars? In other words, in 1967, [ ]

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would have bought what  million buys now?

Mr. Plummer. Yes, sir.

Chairman McClellan. In other words, that in that you could have gotten it for less than half?

Mr. Plummer. Just about half. It gives you quite a good feeling for the decrease in buying power.

Chairman McClellan. It is double -- the cost of these things have doubled?

Mr. Plummer. Yes.

Chairman McClellan. That includes the cost of labor, salary increases and procurement and so forth?

Mr. Plummer. Exactly. Charted, as in dog, is the same basic data shown in then year dollars and broken down to the various elements of our overall program. So you can see the relative share between the imaging systems, the signal intelligence systems known as SIGNIT, research and development support, and finally the mission support.

You may also notice, Mr. Chairman, that the aircraft programs have phased out. We provided you the data about the SR-71, not as part of this program but just part of Air Force's overall program.

Chairman McClellan. That has been completely phased out?

Mr. Plummer. Yes, sir.

Chairman McClellan. How long?

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Mr. Plummer. Since 1976 Fiscal Year as shown in the chart. It went to zero in '76. Our last active year was '75.

Senator Hruska. You mean by that that is all that we are going to procure in that - all the planes we are going to procure?

Mr. Plummer. What this means is that the National Reconnaissance Program -- my office in the National Reconnaissance Office, no longer has anything to do with airplanes. The aircraft have been turned over to the Strategic Air Command in the Air Force, and they are just handled as any other reconnaissance airplane at the present time.

Chairman McClellan. You don't handle any of these reconnaissance planes getting this information?

Mr. Plummer. No, that is done in the Air Force. I am Under Secretary of the Air Force. I have an interest in this part of the business.

Chairman McClellan. That is all done where?

Mr. Plummer. Air Force.

Chairman McClellan. You are Under Secretary of the Air Force?

Mr. Plummer. Yes, that is what I am saying. I have an interest in that capacity, but I am reporting today as Director of NRO and, therefore, in that capacity I have no responsibility for those airplanes.

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Senator Hruska. To what command has this activity been assigned?

Mr. Plummer. Strategic Air Command.

Chairman McClellan. Well, haven't we split it up? It seems to me we split it up. It seems like to me all of this ought to be under your command.

Mr. Plummer. Well, it is quite the opposite, I believe. It isn't splintered; it is trying to get it divided out so we don't have it splintered up.

You were given some data yesterday by Secretary Ellsworth of the amount of reconnaissance done by the military in the other intelligence appropriations and you commented about some of the size of those organizations. All we have done is taken these aircraft which have been operated by the military and put them over in the military appropriations, just to be consistent with the basic --

Senator Hruska. Was the operation by the military under your custody, under your supervision previously?

Mr. Plummer. Yes, sir.

Senator Hruska. You have cut that supervision off and they are continuing the operation and reporting to you?

Mr. Plummer. Not to me.

Senator Hruska. To whom?

Mr. Plummer. They report to the Secretary of Defense. It is all run by the military for the military.

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Senator Hruska. Then through him, of course, it is processed to the Executive Committee?

Mr. Plummer. Yes, exactly. It has the same oversight-type of things through Congress and controlled by the various Executive organizations that are involved, like the 40 Committee. But it does not go through the NRO in any way, shape or form.

With that background then on the general financial orientation I would like to go to Chart 1, which now picks up this comparison between the U.S. and the U.S.S.R.

On the left side of the page we have the United States elements, and on the right side of the page the U.S.S.R. elements. At the top we have listed the unique capabilities of the two countries. Under the U.S. you see that we feature communications intelligence shown there as COMINT, telemetry intelligence shown there as TELINT, and NUDETS, which stands for nuclear detection systems.

And these are systems you will notice that the Russians do not have.

The U.S.S.R., on the other hand, has a radar satellite, which they are having operational, which flies over the oceans and reports to their systems, and we have evidence now that this radar satellite provides actually targeting against our ships or enemy ships using the SSN-3 and SSNX-12 missile. They can actually target these missiles which are submarine-

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launched through the Satellite Sea Surveillance System, which is in operation.

Now the relative accuracy, the relative state of the deployment of this we don't exactly know, but we do know the satellites are there and active; we read out their data; we know they have this basic capability.

Chairman McClellan. We have a radar satellite?

Mr. Plummer. No, sir, we do not.

Chairman McClellan. Do we have anything that is better?

Mr. Plummer. We have other systems that compensate for the needs we have and we have a series of plans that will give us a radar capability which I would like to talk to you about this morning.

Chairman McClellan. As of now?

Mr. Plummer. As of now we have none.

Chairman McClellan. They have an advantage?

Mr. Plummer. Yes, sir. In ocean surveillance with radar they, the Russians, have the advantage.

Chairman McClellan. Why couldn't we have it?

Mr. Plummer. We could, but we just haven't funded it in the past. We have in the past flown radar satellites. We have flown them successfully, but we have never deployed a system.

Senator Hruska. Had you made request for funding from your department?

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Mr. Plummer. No, sir. I would have to say --

Senator Hruska. In the department, not you, but in past years.

Mr. Plummer. In past years, the department has considered the relative value of a radar system and considering the general budgetary squeeze have decided it didn't need that compared to other systems. So it is a matter of relative priorities within the Department of Defense.

Chairman McClellan. The question is do we have anything comparable that would take its place to get the same information and have the same advantage that it provides for the Russians?

Mr. Plummer. We have a system which we will cover in some detail here. PARCOE is an ELINT detector which, by this technique, can locate Soviet ships on the high seas. We do not have even in plans a system which will use that PARCOE system in order to target missiles.

Chairman McClellan. Let us admit, if that is correct, Russia has an advantage over us in this particular area.

Mr. Plummer. That is exactly right, Mr. Chairman.

Chairman McClellan. Why?

Mr. Plummer. Because we just have not put it in the relative priority in our overall scheme.

Chairman McClellan. Is that advantage a serious advantage?

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Mr. Plummer. It could be a very serious advantage.

Chairman McClellan. Why are we not moving in that direction, too? We have the technology to do it, don't we?

Mr. Plummer. Yes, Mr. Chairman, we have the technology and I will have to say it is just in the overall planning of the Department of Defense and U.S. Navy to address that issue.

Chairman McClellan. Go ahead. I don't understand why, with something as good as this seems to be, we let Russia get ahead of us.

Mr. Plummer. It is something that has great potential.

Chairman McClellan. Sir?

Mr. Plummer. It has great potential for the Russians and it would have great potential, I think, for us, and will have to be part of the Department of Defense planning.

Chairman McClellan. Here is an area where we have to do some catching up.

Mr. Plummer. I think you are right.

Chairman McClellan. Meantime, we have nothing that actually substitutes for it adequately?

Mr. Plummer. That is correct.

The second system that the Russians have that we don't is the anti-satellite system, ASAT, that you see there. They have developed and over a number of years demonstrated a system, missile system, which can be launched from the Soviet Union and --

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Chairman McClellan. What?

Mr. Plummer. Can be launched from the Soviet Union and shoot down a satellite which overflies the Soviet Union. They have demonstrated it only on their own target satellites, and it does represent then a threat by them to ourselves or any other nation's satellite that they wanted to shoot down.

Chairman McClellan. They have the capability of shooting down our satellites?

Mr. Plummer. Yes, sir, they have had it for almost ten years.

Chairman McClellan. We have the capability of shooting down theirs?

Mr. Plummer. No, sir, not to date. We did have some years ago the capability but that has been dropped for a rather complex series of reasons.

Chairman McClellan. What advantage would that give here in case of war?

Mr. Plummer. In case of war it would give them ability to deny us the use of our satellites, reconnaissance, navigation, communication and so forth. The system that they have right now has only been demonstrated for low-altitude satellites and it could not work on some of the more complicated high-altitude satellites we will discuss today.

Senator Hruska. In what range?

Mr. Plummer. Up to 300 or 400 miles. Orbital altitudes

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of 300 or 400 miles. And, of course, it is possible with the same basic technology simply by using a bigger booster to go higher.

Chairman McClellan. She has an advantage over us in that respect?

Mr. Plummer. That is right.

Chairman McClellan. Are we doing nothing about it?

Mr. Plummer. This one I would have to say, Mr. Chairman, is tied up in almost like a detente kind of thing, stand-off agreement relative to the use of reconnaissance satellites and very few scenarios short of real shooting war that we would see that we actually in this country should develop.

Chairman McClellan. I don't understand this. In two vital areas she is very much ahead of us. She has been ahead in one of them ten years.

Mr. Plummer. Exactly. We have currently underway, for about the last three years have underway developing the technology, far advanced, a system of anti-satellite capability far in advance of the Russians, but ours is still only in the technology phase because we have decided not to go ahead with the system design. Dr. Mal Currie has reported that to the Congress.

Chairman McClellan. Mr. Secretary, it seems to me we ought to think and concentrate and focus on those things that will help us in time of war.

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Mr. Plummer. Exactly.

Chairman McClellan. Some of these instances here, two instances where apparently we are not doing that.

Mr. Plummer. We are doing much more in the second category -- that is, ASAT -- as far as the study is and the overall evaluation of our vulnerability, because that is an intelligence community concern and an Air Force concern. I can't personally report there is much work going on in the ocean surveillance area.

Chairman McClellan. Has it given you any concern in these areas Russia is very much ahead of us?

Mr. Plummer. It gives us great concern, but I would have to simply state that in relative priorities over these years they just have not come up as high as the ones we have done.

Senator Hruska. You indicated that there are involvements with detente. That would indicate the State Department has something to do with this whole question of making a decision and maybe some of these decisions would have an impact on the priority of ASAT on our part. What comment would you have on that?

Mr. Plummer. Well, I wouldn't want to give the impression that the State Department has entered into the situation we have relative to ASAT, although they are aware of our general misbalance with the Russians. If we were to go forth strongly to develop an ASAT system, I think State Department

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may become concerned if they thought we were going to upset the Russians' ability to use satellites for this national technical means of verification, which is part of the SALT agreements to date.

So they would, I think, assert themselves if we went too strongly forward. I think that the resolution of this problem right now is being discussed at the National Security Council level which, of course, does involve State Department. So their voice is being heard on this.

Chairman McClellan. Does SALT I restrict us in any way from developing these systems?

Mr. Plummer. It doesn't restrict us from developing them, but it restricts us from using them.

Chairman McClellan. If we had them we couldn't use them?

Mr. Plummer. Yes, sir.

Chairman McClellan. While Russia can use hers?

Mr. Plummer. They can't use theirs either, but they have developed it.

Chairman McClellan. They are available to Russia, though, in time of war?

Mr. Plummer. That is right.

Chairman McClellan. It doesn't keep her from using it then?

Mr. Plummer. In time of war they could use them.

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Chairman McClellan. We cannot develop them; we are bound not to develop them?

Mr. Plummer. We can develop them if we want to, but we would be then just --

Chairman McClellan. Just like Russia, not using them except in time of war?

Mr. Plummer. That is right.

Chairman McClellan. That is what we are doing with all of this?

Mr. Plummer. War devices.

Chairman McClellan. Isn't it?

Mr. Plummer. Yes, sir.

Senator Hruska. You indicated that in the event of hostilities their employment of ASAT would mean the U.S. would be deprived or relatively lower level satellites?

Mr. Plummer. Yes, sir.

Senator Hruska. Would that mean they could maintain and continue to operate their lower level satellites?

Mr. Plummer. Yes, sir.

Senator Hruska. That is a definite disadvantage, isn't it?

Mr. Plummer. Yes, sir. The only thing we could do would be to launch another satellite and try to make up for the deficiency. Or another tack that comes into consideration on this thing is a person could make the case that a launch

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of an anti-satellite against one of our national technical means of verification devices, one of our reconnaissance satellites would, in fact, be the first step in starting a war and we could threaten them with a second step in a war, and you know how escalating of wars would go. So one of the factors that would come along would be an indicator of the first step of the start of a major war and we could escalate nuclear threat and so forth.

Senator Hruska. Are there any estimates as to what it would take to develop ASAT on our part?

Mr. Plummer. Yes, sir. We have studied that in great detail. As a matter of fact, I personally was involved in a Defense Science Board study four years ago now on this subject, and we outlined a program that said we should proceed with the technology and that should there be a decision made by this government to have such a system we could field one probably in about three years.

Senator Hruska. Three years?

Mr. Plummer. Yes, sir.

Senator Hruska. Could you do some preliminary work and then have it in a closer state of lead time?

Mr. Plummer. We are doing that at the present time, Senator. For example, we have active R&D contracts at the present time with the small device that goes from the original booster and attacks the satellite. It has both the

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high explosive, not nuclear warhead; it has the pellets, it has the guidance system and control system. So we are doing the actual prototype development of the pieces of the system.

Chairman McClellan. Don't we realize we won't have time if war comes?

Mr. Plummer. Yes, sir.

Chairman McClellan. We are going to win the next war with whatever we have available?

Mr. Plummer. That is right.

Now I would have to point out here to both you Senators that the anti-satellite system is not part of the NRO.

Chairman McClellan. Not part of what?

Mr. Plummer. Not part of the National Reconnaissance Office. That would not be our responsibility.

Dr. Currie has reported on this to the Armed Services organizations and there is a program in the Department of Defense in this anti-satellite area. But I have to tell you there is no decision to proceed with an actual development at this time.

Col. Rosenberg. Mr. Chairman, a comment regarding Senator Hruska's concerns over our being exposed and shot down. That is one of the reasons we treat our programs as such extensive programs, compartmented information, so that we don't give the Soviets detailed knowledge of where we are flying. And since they have a relatively limited capability

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with their ASAT, they don't have an operational force of them like the ICBM force, we would hope they would have some problem distinguishing out of all of the U.S. satellites flying which targets they would want to go after. They might chose to go after the reconnaissance systems if they specifically knew where they were. We try to disguise our missions so they don't have that detailed knowledge.

Mr. Plummer. Let me proceed then with some more detail on this chart. I would like to comment about one other unique system that the U.S. will soon have, and we will cover in this morning's briefing in some detail, and that is known as the KENNEN program.

Mr. Chairman, this was covered in a very short manner by Secretary Ellsworth yesterday, but let me say that this is a new near real time photo-image kind of a system that will allow us to see what is going on in any part in the world in a very, very short time. The picture would be reconstructed, for example, and delivered to an executive of this government within  of the time that it actually happened. So it is essentially a real time system. You can imagine what an advantage in a war that would give us if we weren't shot down. I have to come back to that. That gives us a view of what is going on, indications of the warning point of view or from an attack point of view.

Chairman McClellan. That depends on the satellite, if

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the satellite is shot down you don't have this advantage.

Mr. Plummer. Right.

Chairman McClellan. You say they can shoot them down and they are prepared to shoot them down and you would expect them to shoot them down during war?

Mr. Plummer. Exactly.

Chairman McClellan. Where are we left?

Mr. Plummer. Well, I guess I should comment on one other thing. In the anti-satellite situation the studies that we are doing there have really two considerations. First, that we would have a capability for our own ground-to-surface anti-satellite; and second, a self-defensive missile which could be made available on a given satellite to protect itself from an oncoming attack. And both of those things are in the same basic study area. So in that case should we have one of these self-defensive missiles we could detect their launch and we could protect ourselves at least for one attack or as many of these as we would carry. But this is really quite a ways beyond where we are in the capability today.

Senator Hruska. You have referred several times to Secretary Ellsworth testifying yesterday.

Mr. Plummer. Yes, sir.

Senator Hruska. Before what committee?

Mr. Plummer. Before this committee.

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Senator Hruska. It was Mr. Bush who was here yesterday.

Mr. Plummer. In the afternoon.

Senator Hruska. I beg your pardon.

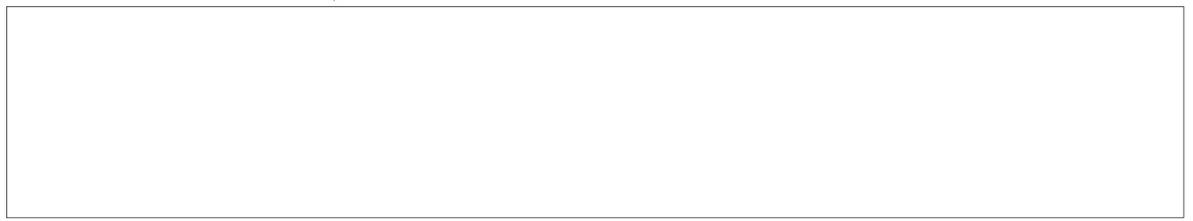
Mr. Plummer. I came over with Secretary Ellsworth in the afternoon.

Senator Hruska. I was otherwise engaged. Mr. Bush did refer briefly to the KENNEN.

Mr. Plummer. Yes.

Let me just quickly go down in this category of COMINT capability. This is really a comparison of the U.S. capability in photosystems and ELINT systems. You will notice that we have both high-resolution and low-resolution photosystems, and so do the Russians. And insofar as electronic intelligence devices, these are satellites which detect the presence of and locate radars or ELINT in the denied areas. So both countries have that capability.

Last year, Mr. Chairman, you asked some questions of me as to the relative performance of the two systems, and that is what is shown in the next line under the technical capabilities. The high-resolution capability that we have provides photos of



They could only see things three feet in size.

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In the low-resolution systems which are used for broad area coverage to search out very large land masses -- and, incidentally, we will show you some examples here today -- we have a resolution capability of two feet compared to theirs of seven feet. So you see, generally we are getting better clearer pictures than the Russians.

A similar situation obtains in the ELINT area. We both have this capability; we both cover the basic radar frequency, but you will notice we cover a broader band. We have a more complete system than they do.

A very important item relative to the ELINT is the locational accuracy that we have. We can locate a radiating system, a radar, on a denied area of Russia, China or wherever, to about a quarter of a nautical mile accuracy; whereas, their best accuracy is about five miles. This has quite a big importance when you think about some of the applications that I talked about in the introductory part of my statement today relative to planning bombers into Russia. That is our SAC bombers entering Russian territory at the time of war. With this accuracy we have better precision and better accuracy.

Under the quality and timeliness we have some big advantages there, too, but some disadvantages at the present time. You will notice that we have much more film expended every year, which means we cover more total territory and

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have a better overall picture -- 515,000 feet compared to 130 feet. In their case note they bring their smaller amounts of film back to earth in a larger number of recovery vehicles and they do this by operating their vehicles through much shorter time on orbit. That gives us a financial advantage because we get more lifetime out of our vehicles. It gives them a slight tactical advantage because they get their data quicker.

Now if you go back to the KENNEN system we described where we are going to get the data back by electronic means, we are going to have a big advantage on them on being able to see what is going on in a nearer time.

Now if you go to 1975 as a reference, the total Soviet space launches reached an all-time high of 92, and 70 percent of these 92 launches were in support of military intelligence missions.

Chairman McClellan. Where is that chart?

Mr. Plummer. This is a comment. It is in the prepared testimony. I wanted to highlight it here because I think it has an importance.

Senator Hruska. Would you give us those numbers again.

Mr. Plummer. The Russians in 1975, calendar year, launched 92 satellites, 70 percent of which were for military and intelligence purposes. The United States launched 31, and 30 percent or roughly ten of these were for military and

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intelligence purposes and only six were from our program in the intelligence area. So you see that the Russians are launching more satellites and putting more effort into their intelligence by a substantial factor.

Chairman McClellan. Do they have a desperate effort to try to overtake us, do you think?

Mr. Plummer. You will see in some of the later data here, Mr. Chairman, that they are. As I mentioned, their satellites are of shorter duration, and once a situation develops like the Middle East or Yugoslavia -- Angola would be a good current situation -- they will launch a number of satellites in a short time in order to get quick data back on that area, and we have to go to other means to get our data. So it isn't a matter so much as overtaking it; it is kind of anxiety to get the data back, and having to get the same total coverage in much smaller bites they have to launch more per year. But I do believe they are putting a bigger effort into it.

I guess one comment with respect to the comparison. What the Soviets are doing today is fairly comparable to what we were doing in the 1966-67 time period in terms of quality of performance and in terms of lifetime of system and number of launches. One of the reasons we have been able to hold a fiscal profile that has stayed about level since '67, below  is the fact

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that we have continually reduced the number of satellites dramatically from 30 to 35 a year down to 6 last year, and yet at the same time increasing the quality and the intelligence output of the systems. It has the disadvantage, as Secretary Plummer pointed out, you don't have the responsiveness that you would have when you launch a large number of satellites, and we will get into that a little later.

Senator Hruska. It is specialized responsiveness?

Yes, sir, to a particular situation.

Mr. Plummer. Before proceeding with a rundown through the chart I want to bring up one other thing. It has to do with what I would call the efficiency that we think we have in the National Reconnaissance Program, the concepts that we use in our management and the procedures that we use.

We have generally been credited by our observers as having an efficient and effective management approach for the design, acquisition and operation of these systems that we have been talking about. We have a very small organization by comparison to many others in the government and operate these entire programs with about 2400 total people. This 2400 people that we have is made up of about 600 which are involved in the technology development and acquisition of the systems we have been mentioning here. And in support of those 600 people about 1800 are government employees and military who man these support facilities, the tracking facilities that

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we have, the general support within the organization, such as CIA, that work with us in this organization, and Navy and other support facilities. So you see a grand total of about 2400 for essentially a billion dollar program, which compares favorably to what you have heard.

We don't pay for the military personnel that work in our programs, as is the case with most programs. But if you were to convert the salaries of the 2400 people that work in support and added it to our budget it would only come out to about a ten percent increase in total program cost. So you see, the management layer in the NRO is very, very thin compared to the average government.

Chairman McClellan. We would have those military personnel and be paying them anyhow whether they were engaged in this or not, wouldn't we?

Mr. Plummer. Exactly.

Chairman McClellan. That adds nothing.

Mr. Plummer. It really doesn't add. But I wanted to make the point that the management layer that we have in the NRO is very, very thin and we think that that is a demonstration of good management and it is a thing that we intend to retain through all of the current reorganization of the intelligence community and so forth. We are very proud of it and we think we do good work and we have a good organization. We accomplish that through the way we pick our people.

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They are all highly selected. We keep our people for a substantially long period of time rather than letting them rotate to other jobs quite so much. And I think we have built over the years a very good esprit de corps not only with our government people -- military and civilians -- but in the contractors that work for us.

Mr. Chairman, yesterday in the testimony by Secretary Ellsworth you asked me the question about the future when we got the KENNEN system operating as to whether we would eliminate some of the other photosystems, and I gave you a general answer at that time. I would like to slightly enlarge on that at this time.

The future imagery reconnaissance satellite mix of HEXAGON, GAMBIT and KENNEN, the three basic programs, has received considerable attention over the past two and a half years. The decision on the type and quantity of imagery satellites required to meet the intelligence requirements can only be made after a realistic on-orbit evaluation of the new program KENNEN.

However, based on performance predictions of KENNEN, a phased reduction of HEXAGON and GAMBIT missions has been programmed.

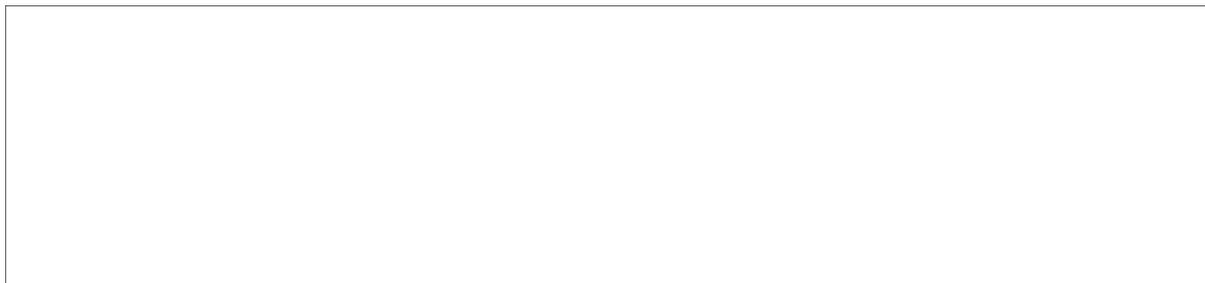
We anticipate that the quality of the KENNEN imagery will be equivalent to all but the very best of GAMBIT. If our predictions are realized, GAMBIT will be phased out or

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cancelled. It is unlikely, however, that KENNEN can perform



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 also retain the option to continue the GAMBIT system.

The current imagery program is structured to retain this flexibility.

If you would turn, sir, to Chart 2. I would like to run through this series of charts either as rapidly or as much in detail as you gentlemen would like. You have had access to this.

Chairman McClellan. Are you down to this now in your presentation?

Mr. Plummer. Yes, sir.

Chairman McClellan. To go through each one of these and explain?

Mr. Plummer. Yes, sir; I would like to cover these to the degree you want.

Chairman McClellan. You just go ahead and make your presentation and we will ask questions if we need to.

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Mr. Plummer. The first system is the HEXAGON. This is the search system I just referred to. It is a large vehicle -- 60 feet long, 10 feet in diameter and weighs about 26,000 pounds. It orbits the earth doing photography for periods up to about 150 days.

Chairman McClellan. How much does it cost to put one of these in orbit?

Mr. Plummer. I will show you. About \$100 million.

On the next page I will show much more detail. I will not go into detailed technical performance. I do want to point out some of the very outstanding features of the system. It carries a tremendous amount of film -- 230,000 feet of film per flight. That is a very large role of film, and you see in the picture that is almost a ten-foot diameter role of film.

Chairman McClellan. How do you recover it?

Mr. Plummer. We recover it by the recovery capsules that you see on the front end of the vehicles, those dome-shaped things facing downward, and there are actually four of those in line. The film comes off of the large spool, goes through the rotary cameras and then comes into one of the other of the four recovery capsules.

This system is a search system. It has the ability of looking at very large areas of the territory, photographing a swath on the ground of up to 300 nautical miles wide.

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If you want to look generally over an area of, say, Russia or China to try to find where they may have ICBM sites under construction, this is the system you would use.

If you wanted to look over the Middle East, the entire area, to see if there was any activity there by the Israelis or the Egyptians, this is the system you would use. You look here for the general searching function.

On the next page, Chart 3, you see the typical chart that we are going to be using this morning to show you the cost numbers that I am sure you are vitally concerned with. This green is the HEXAGON program and it shows for Fiscal Year 76, first, the program we have underway, the transfer quarter. But then the '77 request that we are justifying, and then over on the far right it shows the change in this year over last.

You will notice that we are down almost \$16 million in this current year.

This is as a result of the phase-down of this program relative to the KENNEN program, which is getting ready for launch that I discussed earlier. There have been ten of these launches to date. There is one currently in orbit and it is kind of interesting to note it is being specially programmed at the present time to get some of the most recent data on the SS-7 and 8 Russian ICBM where they are doing a lot of work. So we are getting some very vital current

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search data out of this system that is on orbit.

All of the vehicles that we have launched have been nearly perfectly successful, and it has been quite an outstanding program.

There is a line of interest there. The total program cost to date is \$1.8 billion. That is a lot of money but, of course, it has done a very large job over quite a number of years.

Notice the non-recurring costs to first launch. That is basically the developed costs. So you see that these systems that we design are very complex and a tremendous amount of detailed engineering is required. \$380 million to develop this basic system.

And now details, Mr. Chairman, of your question. The current mission vehicle cost, on the next-to-last line, \$104 million per copy.

Now later missions as we get up into the vehicle, 13 through 18, because of the lower launch rate and because of the sustaining costs that go with that and inflation factor, we figure it will be about \$112 million per vehicle.

Chart 4 shows now the photographic search systems, these general class that we have talked here, going all the way back to the start of our reconnaissance business in 1959.

In the upper left-hand corner you see the number of missions listed there. The little bars, the black bars

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meaning successful missions, and the open bars meaning attempts that were not successful. You will see back in the early days, '60 through '66, that we had some failures in the pioneer program that we had in those days known as CORONA. However, in recent years, from '67 on, we have had nearly perfect success. You will notice the launch rate is coming way down.

It is quite amazing that we used to consider 20 launches per year in this general business and be very pleased we would get 12 to 15 of these to be successful. We have gotten so successful in extending the life on these vehicles that we have been able to do the same job with much fewer vehicles and hence, much less money.

So you will note we are down to two vehicles per year at the present time and projecting going to one vehicle per year to do this search mission.

Now the lower left-hand chart shows the average mission length, and this is going dramatically up from the early days, one day per satellite, to the present time operating 120 days active reconnaissance work, and projecting in the very near future to go to 150 days per year. So with fewer satellites we are doing the job that we did in the early days.

As a matter of fact, doing a much better job than we did in the early days.

Now Charg No. 5 takes the other system. This is called

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the GAMBIT. This is the spotting system that does the high-resolution work, and it is quite a different type of satellite. It is still large and complex, 50 feet in length, 5 feet in diameter, coming from an earlier version. It has essentially a very precise telescope which permits us to look at the small part of the ground and fairly small frame size and gives us a detailed look at that area -- about four nautical miles wide on the ground. In other words, looking at a chunk of the city or a chunk of a harbor, but not even an entire air field would be covered by this kind of system. You would have to point it precisely to the thing you want and bring back the one picture. As stripped you can run a continuous photograph and lay out a four mile wide strip as long as you want with this kind of system. But fundamentally, it is an extremely precise thing that from many, many miles in the air we can look down and pick you a particular target out and shoot at it and get it.

We have had the pleasure of showing you pictures of the Capitol in the past and we have it very well centered and in detail. It is really unbelievable. We will show you a little bit of some of the Russian data that we have that comes from this system.

On the next page, Chart 6, we have GAMBIT, the same format of cost. I will not go through it in any great detail, but notice here also we are down in our Fiscal 77 request

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from our '76 approval, and the reason is the same thing; it is the oncoming KENNEN system that allows us to phase down the effort in this GAMBIT program.

These vehicles, Mr. Chairman, run around \$50 million a copy. It is a smaller vehicle; it is less involved. And you will notice, however, you go up into the later years that because of this stretchout and very, very low launch rate and effect of inflation, we get up to \$77 million a copy.

On the next page, Chart 7, we have the same comparison for this high-resolution system. You will notice that the number of missions in '64 went up to 67, and then has come down, until at the present time we are operating two vehicles per year.

I didn't comment on the HEXAGON, but I will here. Notice the red line on that same curve. That represents the Russians' comparison. So you see that the Russians, whereas in '73 we were launching four, the Russians were up around 25 launches to do the same basic function. This is very graphic, I think, in showing the relative capabilities and relative intent of the two countries.

Senator Hruska. What would be the relative productivity of film?

Mr. Plummer. We have more than they by a factor of two. We get just about twice as much total reconnaissance data back as they do, in spite of the fact they have more vehicles.

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I showed you that in the earlier chart where the comparison of total length of film had almost that ratio.

Here again we have a very dramatic increase in the mission life. Notice that the mission life on these GAMBIT vehicles has gone from just a couple of days up to the current operating point of 45 days. We operate for 45 days in this vehicle with two recovery capsules, so we load up the first 20 days and bring that data back, then do 20 more days.

The important thing about this program is the resolution. I am very anxious to show you some of the details that you can see with this kind of a picture.

I think there is one comment on this previous chart on page 7. You asked a while ago responsive to a particular situation. Note in '73 the tremendous psike in the red line peak. That was in response to the October Mid-east War where the Soviets were in fact launching one of these systems about every three or four days during that crisis. There is an advantage of having a large number of satellites available that can be launched in the event of a crisis.

Chairman McClellan. They have an advantage they can get by launching them; if some situation develops, they can launch them and get the information back quickly by launching larger numbers.

Yes, sir.

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Chairman McClellan. Whereas, yours would get equally good or better information but get it back slowly?

[redacted] Exactly.

Chairman McClellan. Who has the advantage there?

Col. Rosenberg. I might point out we use our SIGINT satellites in a case like that to provide near real time data back.

Chairman McClellan. You have another way of making it up?

Col. Rosenberg. Yes, sir.

Mr. Plummer. Of course the system that is the next one we want to talk about, in Chart No. 8, the one I kept referring to this morning, the KENNEN program, is the one that will

[redacted] This is our newest and this is, without a doubt, the most highly technological.

Chairman McClellan. How many of these do we have completed?

Mr. Plummer. We have one vehicle ready to launch. It will be launched in October, the first launch of the program.

[redacted]  
[redacted]

Chairman McClellan. [redacted]

Mr. Plummer. Yes, sir. [redacted]

[redacted]

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Chairman McClellan. [redacted]

Mr. Plummer. Yes, sir.

Chairman McClellan. What do these cost - each one?

Mr. Plummer. Turn back on the next page, Chart 9. You will see they cost about [redacted]

[redacted]

Senator Hruska. Lifetime?

Mr. Plummer. [redacted]

[redacted] This is one of the things that is going to help us to offset these relatively high costs. A very complex system. It has been a very big effort to develop it.

You will notice that the non-recurring cost for the first launch is [redacted] That is the biggest job we have ever taken on in NRO. I guess it is clear that this vehicle is a telescope, as you can see from the picture here, which points at a small segment of the ground, looking at [redacted]

[redacted]

It is a very precise device and it provides not a film system at all but through an electronic means converts the image to an electronic signal, much like television is done.

Chairman McClellan. Making dots?

Mr. Plummer. Yes, a bunch of very tiny dots that are

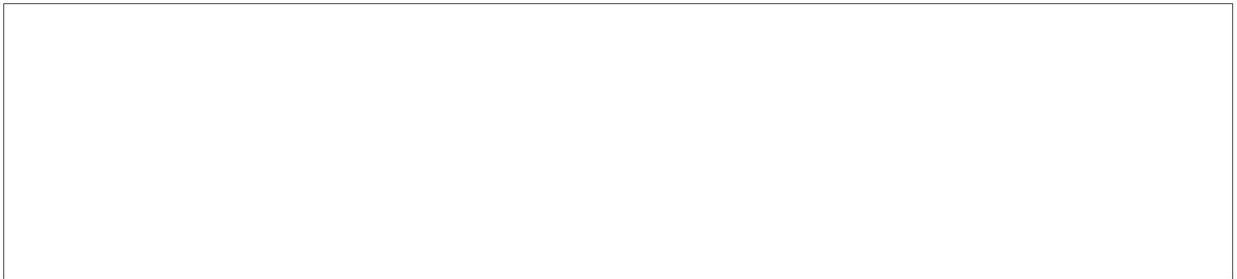
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reconstructed in the manner of television back here in Washington, D. C. The data from the satellites, through a communication antenna which is shown on top of the vehicle and goes off to one of two of the relay satellites which are



Chairman McClellan. 

Mr. Plummer. Yes, sir.

Chairman McClellan. 

Mr. Plummer. 

the signal to relay it down to Washington.

Senator Hruska. That is the transmitting satellite?

Mr. Plummer. That is the relay.

Senator Hruska. That is not this?

Mr. Plummer. No. The imaging satellite, in order to get a good image, is close to the earth and the details you can see there.

Chairman McClellan. It transmits to the satellite?

Mr. Plummer. It relays through the relay satellite. That is what is over on the left-hand side of the page. One of the things we are very proud of in this program is you all agreed to proceeding with this program in the Fall of 1971. I am sure you remember that date. At that time we

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planned for the launch of the vehicle in October of 1976.

We predicted at that time and got your approval to proceed on this program to cost [redacted] Now we have gone on in the program since the Fall of 1971 approval to the present time where we now said we will meet that launch date, October '76. We are going to make it in the same month we predicted. The cost has grown slightly but not very much. It has grown to [redacted] In other words, in a [redacted] program our total program growth has been [redacted] and that includes inflation and the improved changes that we have put in from the government side. So I do believe that this represents one of the best-run programs that I have ever encountered.

Now, I would like to have my friends here, [redacted] and Bob, show you some of the photographs that are typical of these photosystems that we use.

Col. Rosenberg. This particular photograph we are showing you here is an example of imagery taken by the GAMBIT high-resolution spotting system.

Chairman McClellan. Not the one you are developing?

Col. Rosenberg. This is a photograph taken recently from a vehicle on orbit on the 26th of November 1975. You will recall reading about suspected lasers pointing at some of our satellites in the newspaper. It was determined through this imagery that it was not a laser but in fact it was a

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gasoline explosion in the Soviet Union. Here we see the gas line itself, the pipes uncovered and broken pieces of pipe laying out here, and they are trying now with earth moving machines to cover it back up again.

Subsequent to this particular photograph we flew over the Soviet Union with the HEXAGON search system and on other occasions identified similar gas fires to the one that we noted in November and found that they all laid along this Soviet pipeline and were able to confirm that it was not a Soviet attempt to point lasers at our satellites but instead to  information being collected by the satellites and confirmed by photography.

Senator Hruska. Where is the pipeline on there?

Col. Rosenberg. Right there.

Senator Hruska. On this?

Col. Rosenberg. This is the same area here, and we are talking about running up through here. Here is the ROC and this is the Caspian, both of these pictures. So it is running up through here.

Senator Hruska. Where is the terminous?

Col. Rosenberg. I am not familiar with the terminous, sir.

Next, sir, we would like to show you an example of the kind of imagery that the HEXAGON search system provides. As Mr. Plummer told you earlier, this system can cover in one

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single operation and area as large as the Middle East. And in this particular case what we are showing you is a series of sweeps of the camera all put together in one image of the Suez area. Here is the Suez Canal, and next I am going to show you this particular point where the arrow is highlighted.

We were able to get from an example like this the entire order of balance of the Egyptian and Israeli forces at a particular point in time.

Chairman McClellan. Suppose hostilities broke out over there, how quickly could you now, if they broke out today, how soon could you have a map like that showing these things that you say it will produce?

Col. Rosenberg. At the present time, if we have an imaging satellite on orbit, it would be within a few weeks time.

Chairman McClellan. A few weeks. The war is over in a few weeks time.

Col. Rosenberg. However, sir, two points. Earlier I mentioned our SIGINT satellite capability. We have satellites sitting on orbit that can listen to the radar emissions, listen to the communications and give us near real time indications of a hostility as well as following during the activity.

Chairman McClellan. If you can do that now with something else, why do you have to have this which would, when

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it is finished, take too long for it to be of any great value.

Col. Rosenberg. The purpose of the HEXAGON system is not really to support a wartime situation; it is to support things like SALT monitoring, the location and upgrading of ICBM forces.

Chairman McClellan. I see.

Col. Rosenberg. Strategic.

Chairman McClellan. In combat it has very little value.

Col. Rosenberg. In combat it has very little value.

But the KENNEN system that Mr. Plummer talked about, the new near real time --

Chairman McClellan.

can have the information?

Col. Rosenberg. Yes, sir.

Chairman McClellan. Is that right?

Mr. Plummer. Yes, sir.

Chairman McClellan. But what you are showing us here now is a prelude to kind of keep a general idea all along of what is happening.

Mr. Plummer. Yes, sir.

Chairman McClellan. Once hostilities start you won't need this?

Col. Rosenberg. Once hostilities were to start.

Chairman McClellan. Go ahead.

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Col. Rosenberg. For example, on the 22nd of  
February --

Chairman McClellan. What does this show now?

Col. Rosenberg. You remember I pointed to an arrow on  
the large picture?

Chairman McClellan. Yes.

Col. Rosenberg. This is a blow-up of that picture and  
this shows pontoon barges across the Suez Canal at the termi-  
nation of hostilities and a barge and there are tanks, other  
vehicles remaining in the area.

Chairman McClellan. That was two or three years ago?

Col. Rosenberg. Yes, sir.

Chairman McClellan. At the termination of hostilities?

Col. Rosenberg. Yes, sir. This is simple an enlargement  
of the last picture I showed you.

Chairman McClellan. I understand. When was it made?

27 January '74.

Chairman McClellan. This year?

Col. Rosenberg. 1974.

Chairman McClellan. During the war?

Yes, sir.

Chairman McClellan. How long did it take you to get that  
while the hostilities were on?

Mr. Plummer. Two weeks, wasn't it?

About that.

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Mr. Plummer. When we finished that entire cycle and brought that capsule home, about two weeks, I can judge.

Chairman McClellan. Two weeks?

Mr. Plummer. Yes, sir.

Col. Rosenberg. A recent example of the use of the HEXAGON vehicle in the Mid-East occurred on the 22nd of February when a new U.S. listening site became operational in the Sinai and the Israelis pulled back and the Egyptians to a new position, the HEXAGON system was tasked to photograph the area and establish the order of battle of the Israeli and Egyptian forces.

In that particular case that was done on the last day. The bucket was brought down the next day and about two days later they had the actual photograph. So it was less than a week in that particular case.

Chairman McClellan. What does that show?

Col. Rosenberg. This particular example is high-resolution photography of Soviet tank transporters in garrison. All of these are Soviet tank transporters. This kind of photography gives us the ability to determine the size and number and location of Soviet forces. In accordance with the SALT agreements, the Soviets are limited to the number of ICBM sites they can have, and they are in the process of destroying some of their older sites which they can trade for this new SLBM, sea-launched ballistic missile capability.

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This photograph is an example where we detected the actual destruction of their ICBM silo facility. So we can accurately keep track of how many ICBM silos they have in operation.

Chairman McClellan. Can you say whether they are keeping their commitment with respect to destroying them?

Yes, sir.

Mr. Plummer. Yes. As we tick them off we would say in this number of silos that they are meeting the terms.

In this particular case this is the launch pad, and you can actually see, if you magnify it, where they have actually gone in and broken up the concrete pad and destroyed a 10 foot by 20 foot section of the center of the launch complex. So the launch complex is in fact inoperable at this point.

They have also taken out the refueling or the oxidizer tanks, the fuel that the missile used. Those have been destroyed. So we can in fact confirm that these two launch pads have been destroyed and are no longer operable.

Col. Rosenberg. The next series of photographs demonstrate the technical capabilities of the high-resolution system. This particular photograph is of the San Francisco area, and it was done for an engineering test with the GAMBIT system. And we are going to show you a blow-up of this particular area and we are going to look right in the corner of this spot. That is the second picture here, which is an

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amplification of the first one, and it is enlarged ten times. And the kind of things we use this for over the Soviet Union is to measure very carefully the capabilities of different kinds of equipments. And here we have a communications transmitting tower, and let's look at that enlarged again, which is the next image.

Here you see we can continue to enlarge it. This time it is enlarged over 40 times. And you see, we can begin to look at the  and understand the capabilities of a particular piece of equipment. Here it is enlarged again, this time 150 times.

Now we have the same capability to do that over the Soviet Union, and that is the next series of examples that I want to show you.

The next series is of a new over-the-horizon radar system located near Kiev in the Soviet Union. This particular photograph was taken in November '75. This is an extremely large antenna. It is over five football fields long and it is over a football field high. We are looking down at it from about 70 miles in space, and this antenna is sticking up in the air.

The next photograph is simply an amplification, an enlargement of the last one you looked at, where we can actually go in and measure the size of the antenna feeds and, therefore, have our scientific and technological people

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compute the capabilities of this antenna in terms of its ability to see our incoming bombs and missiles.

Chairman McClellan. How good is it?

Col. Rosenberg. It is suspected that it has some capability for incoming bombers. We don't know for sure what its capability is at this point in time. SIGINT collection systems are still being tasked against this radar to try to further assess its capabilities.

Chairman McClellan. What do you think they built it for? What is the mission, the purpose?

Col. Rosenberg. The mission would be similar to the mission of our own over-the-horizon radar system, to try to develop a capability for both bomber penetration information as well as early detection and warning of missile launches.

Senator Hruska. How low an observation can they get in altitude? You say over the horizon?

Mr. Plummer. Yes, sir. Not line of sight, but they could detect an SLBM launch with it, like we do, or detect an oncoming ICBM. Like all over-the-horizon systems it works by forward refraction and bends around the earth, and you can actually look around the bend.

Chairman McClellan. They can detect all of that?

Mr. Plummer. The Russians' capability in radar is reported to be very good, and particularly in warning radars, a capability quite similar to ours.

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Chairman McClellan. That is a tremendous thing. How many football fields?

Mr. Plummer. Five; 500 yards. They are gigantic.

[ ] Three hundred seventy feet high.

Chairman McClellan. That is a tremendous thing, isn't it?

[ ] Yes, sir.

Chairman McClellan. Must have cost a lot of money to build that. It is built out of steel?

[ ] Yes, sir. They have two of them right close together. This only shows one of them. This one faces the U.S. There is another one right about a mile or so away that faces the Republic of China.

Chairman McClellan. Is that adequate for their protection to give them what they need?

Mr. Plummer. They have many other systems, Mr. Chairman, in addition other radar types that work with their overall protection. The Russians are very much defense-oriented and they have a lot of defensive systems in addition to the radar things, like the example you saw there. They have their satellite warning systems. They have just recently gotten capability parallel to the U.S. capability to detect launches [ ] which we have not covered here because it is not part of our own mission. But these are satellites that detect the radars of oncoming ICBMs. We have had it for

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a number of years. The Russians have just developed the same system.

Chairman McClellan. I guess we had better proceed.

Mr. Plummer. We will continue, Senator Hruska.

Senator Hruska. Please.

Mr. Plummer. Before proceeding into a quick recitation of the signal intelligence systems I wanted to comment on one thing that is a very, very important current aspect of our imaging systems. As a matter of fact, all of our systems, we have been, for all of these years, to almost 20 years, working in support of a general strategic intelligence situation, sometimes referred to as a national intelligence system -- data that would be used here in Washington by government planners, and so forth, and not so much oriented toward the military commander.

With the capabilities that we have discussed here this morning you can see that there would be a great interest on the part of military commanders for the kind of data that we produce. We now identify this as being a tactical use of our data. When you get into things like the KENNEN program with its near real time, you can imagine a military commander who also has indications and warning problems who also wants to plan his actual battle in the event something were to start, he wants that data current. The systems we now have will provide that if we can get the data from Washington to the

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field commander.

Systems that we have approved in the Department of Defense and not part of our program, a system called the Defense Dissemination Program. Part of the intelligence-related activities which you review will actually take these photographs that we have produced here and retransmit them electronically to any part of the world, and we will have that system in operation about 1978 to 1980, depending on the approvals that we get.

So it is a tremendous new capability that has come about as a result of these national systems of getting tactical missions and the support that we need to do that. A very great new capability.

I would like to convert over to a quick discussion of our SIGINT systems and, Senator, if you look on the Chart No. 10 you will see a summary for all of these SIGINT systems in the same manner that we have shown you before. And the only thing I really want to point out here is that we have the same situation. The number of launches coming down, the capability and lifetime is going up, and we say we do this job very, very effectively providing many, many days of coverage per year, up to 250 days per year coverage on these various types of systems -- ELINT, TELINT and COMINT.

Now we can't lay out on the table beautiful, interesting pictures from this kind of a system. These are electronic

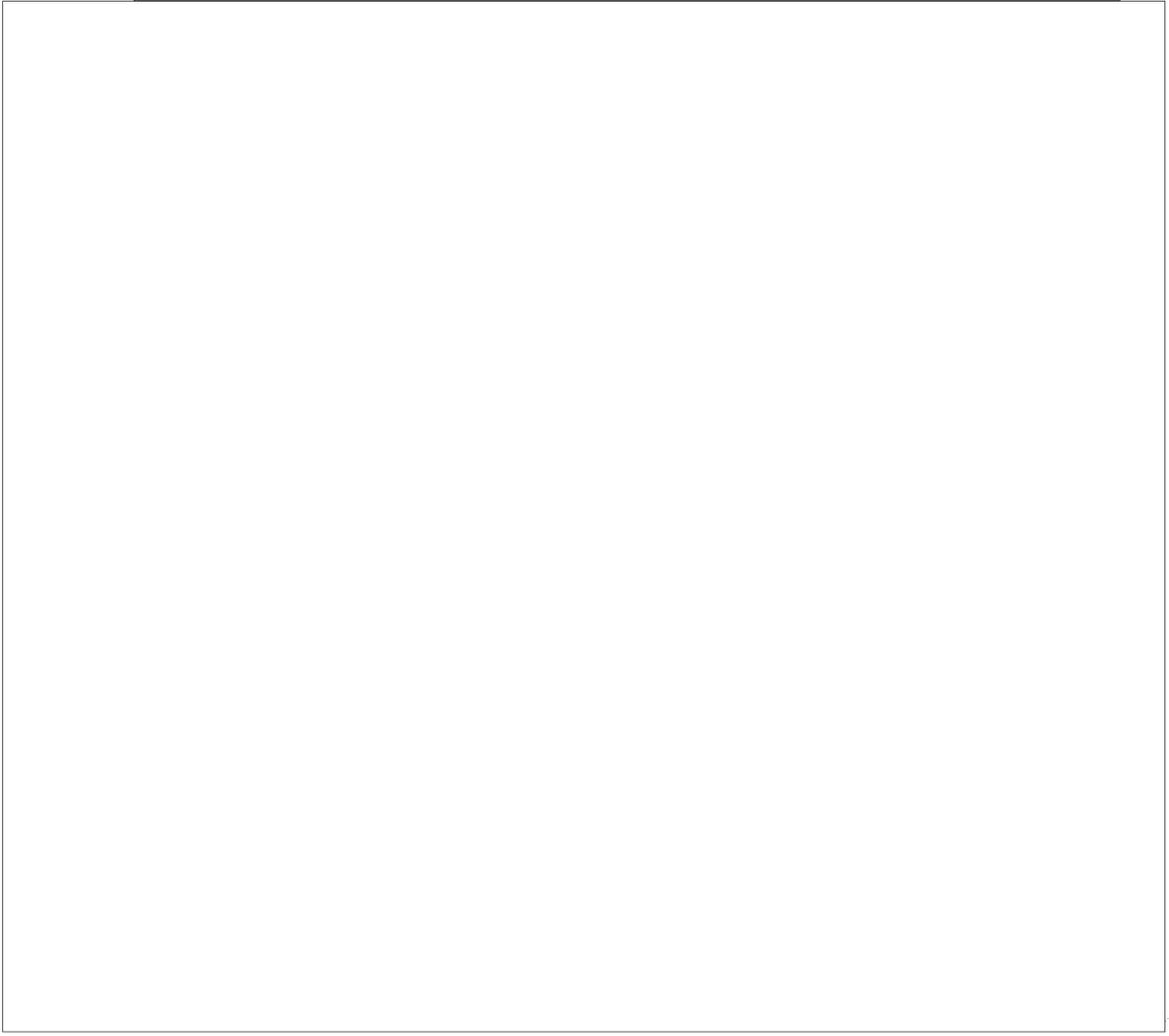
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signals. The output of the SIGINT systems must be used by specialists who have the ability to read the data, whether it be a communication in foreign language or whether it be some telemetry data of value to the Russian engineers on their part and our engineers looking over what the Russian engineers are doing on our part. And these do turn out to be very effective in the overall intelligence process.

Now Chart 11 shows one of these systems, which is in this case a communication intelligence system, or a COMINT system



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Mr. Chairman, in the interest of time I am not going to cover the details of the other programs, either. These are small programs. They are also ELINT programs. The PARCOE program is run for the Navy Department. This is the closest thing we have to ocean surveillance in this country. It follows another program called POPPY, which is currently operational.

Chairman McClellan. What does this one do?

Mr. Plummer. It is ELINT detection, electronic radar detection of Russian or any ships at sea. It is basically an ocean surveillance system on the basis of picking up emanated signals rather than radar, as we talked about in our earlier conversation.

I would like to skip to Chart No. 20.

Chairman McClellan. 19 here, passenger payload.

Mr. Plummer. We will look at Chart No. 19. This is passenger payload. These are small, specially designed signal intelligence satellites which are carried as passengers on some of our bigger systems -- HEXAGON at the present time -- and they just go along for a free ride. Once they get in space they separate from the big vehicle and go off and to a specialized mission. These are built basically for signal-type intelligence. They fly in their own special orbits and they have long lifetime. Cost of these things are quite attractive in that they are small, special-purpose,

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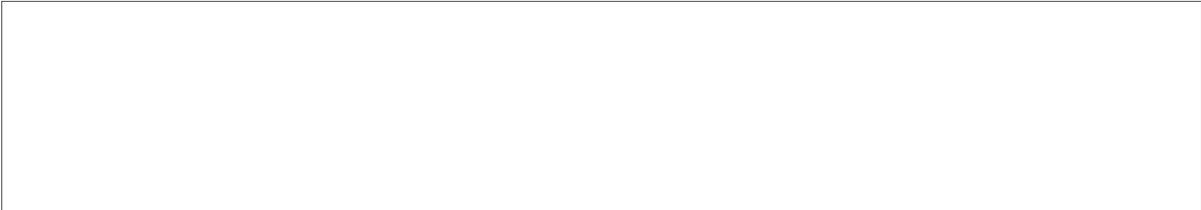
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quick-reaction capability-type vehicles.

Chairman McClellan. What do you get out of that?

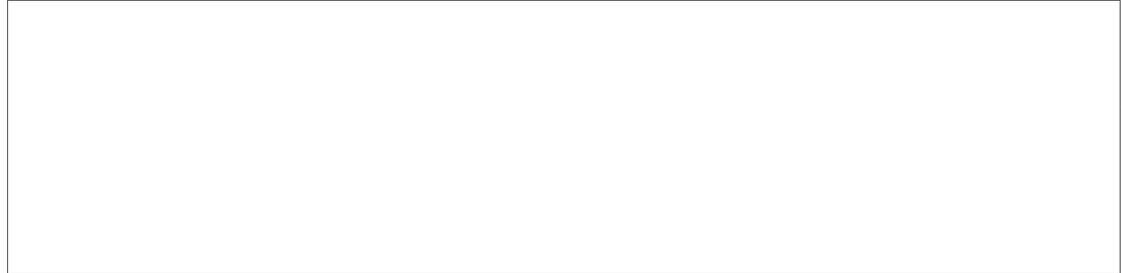
Mr. Plummer. Any type of signal intelligence. It can be rigged for communications intelligence, detectors could be built as a radar or ELINT locator. It can be a special search system. You go up and look for the presence of signals in some unknown band. It can do any sort of signal intelligence-type of thing.

Mr. Chairman, I would like to close our testimony today here with a quick referral back to this foldout chart that we pointed out to you at the beginning. We have accounted in this process this morning for most of all -- really of all the big programs that make up our [redacted] You will notice in Item 3, called Other, we have an R&D supported item. We have [redacted] and that has been relatively constant over the years as the amount of money that we think is necessary to keep the NRP aware of the state of the art, and in doing the things that will keep us better than the Russians. It is basically our objective in our R&D program. We spend this money to develop components that we will use in future systems or to do work that will give us a new capability.



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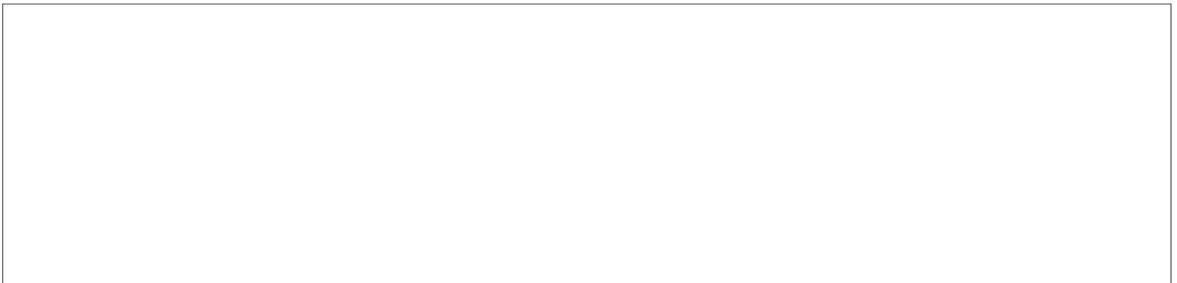
[redacted]. For operational, yes, sir, about the '78 time period. What we are really holding the technology is until we get KENNEN on orbit and can assess what its contribution is going to be, what we will be able to do in the phaseout or phasedown of HEXAGON and GAMBIT to really give us the resources within our roughly [redacted] to proceed with the development of that type of a system.

Senator Hruska. Given funds, however, you could accelerate that?

[redacted]. Yes, sir.

Senator Hruska. Considerably?

[redacted]. Yes, sir. We have had a number of plants, the program people have been willing to go actually this year, go out on an acquisition to start actually developing the system itself. We have elected to delay that because we are already putting in excess of [redacted]



The last item I would like to point out is under that

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Category 3, Other, called mission support. Notice that that is an area that has gone up in '77, and it is the only one that has gone up in this year. I wanted to explain that because you might be confused. Mission support includes all of the things like satellite test network around the globe that does all of the satellite tracking commands and so forth. The number is bigger this year for the following reasons.

It does account for inflation; it is bigger because in an earlier year, the reference year, '76, the satellite test center had a carry-over from an earlier year which caused its budget to be down. Therefore, this is a little bit higher. It does provide for the first time, due to change in our account principal, to provide for the money for our own airlift, the airlift we need provided out of our own funding. And finally, this new KENNEN system I mentioned has a fairly substantial bill in this year to buy the film that goes in the . So it is kind of a one-time cost in that case.

I thought it better to point out that. We are going up in the one area and it isn't inefficiency; it is just a special occasion of this year.

Mr. Chairman, that completes our testimony. Thank you very much for your very close attention. Obviously we are available for any questions you may have.

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Chairman McClellan. Just one or two questions. If you had to reduce your budget by ten percent, what impact would it have on us?

Mr. Plummer. Mr. Chairman, I would dread to have to do that. This is a very, very tight budget. As you know, we came down from last year. It would be very, very difficult for us to find a program in here which we would have to eliminate. I can state definitely that there you couldn't take ten percent out of each of these programs to get the ten percent and still maintain the program.

Chairman McClellan. That would destroy some of the programs.

Mr. Plummer. You have to eliminate something. Mr. Chairman, I am very impressed with your comments that there are some things we should be doing we aren't doing, and if we were to get such a direction from the Congress we would simply have to go back on a priority basis and try to find some one of these programs that we think are essential, that we would have to eliminate.

Chairman McClellan. Could you eliminate any one of them without the potential, a potential risk?

Mr. Plummer. No, sir.

Chairman McClellan. Or definite risk?

Mr. Plummer. Without a potential risk, I can answer that categorically, there would be a definite risk if we

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were to eliminate any one of these.

Chairman McClellan. There are areas now where we are taking a potential risk?

Mr. Plummer. Yes, sir.

Chairman McClellan. Because we are not meeting the situation?

Mr. Plummer. Right.

Chairman McClellan. Some of those were discussed earlier?

Mr. Plummer. Yes, sir. If I had got the opportunity to talk to any group of Senators and Congressmen on this issue, I would have defended this program.

Chairman McClellan. What would be the consequence, I guess is as good a word as any, if our whole system here, capability in this field, became known to the enemy?

Mr. Plummer. If our capabilities became known to the enemy he could start evasive action. He could camouflage, he could cover up, he could deny us the information, quite simply. That was all kind of covered in our general explanation of why we think we need secrecy. We know we are better than they are. We would like to stay better. We would like for them to not know we are better.

Chairman McClellan. Can we divulge these budget items or even the total of all of them without doing some injury or producing some adverse effects on our program?

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Mr. Plummer. We think we should not reveal these numbers to the general public and we should try to avoid these numbers falling into the hands of our enemy.

Chairman McClellan. There would be no objection from the standpoint of the general public except as it would make it available to the enemy?

Mr. Plummer. That is right.

Chairman McClellan. When we talk about making them public, I mean making them available to the enemy, we just lose a lot of programs we might as well not have?

Mr. Plummer. That is right. There have been a lot of inputs. The public think they know what our intelligence budget is and they do know pretty accurately. But we have never had our budget -- that is, for the reconnaissance satellite portion of this thing, we have never had our budget officially laid out in a place, and we would like to keep that just to knowledgeable people.

Chairman McClellan. I anticipate, don't you, Senator, that in the debate this year they will come within a very close figure of this total? Don't you anticipate they will be able to do that?

Senator Hruska. Pardon me?

Chairman McClellan. Off the record.

(Discussion off the record.)

Chairman McClellan. Well, thank you very much.

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Senator Hruska. I have one or two questions. Of course, one of the difficulties in cutting back, making reductions, is when any reduction will have an impact; is that correct?

Mr. Plummer. Yes, sir.

Senator Hruska. In terms of outlay, because of termination costs and so on?

Mr. Plummer. Yes, sir.

Senator Hruska. Now, so it is not simple; it is a very complex operation, I suppose.

Mr. Plummer. Yes, sir, it certainly is.

Senator Hruska. You have spoken in regard to GAMBIT and HEXAGON. You have spoken alternatively about a phaseout and a cancellation. Could you sharpen that up a little bit - comment on it?

Mr. Plummer. Sure. The HEXAGON system that we have described here will produce pictures of almost the same quality as GAMBIT. Now we believe that when we have the HEXAGON system operating -- I am sorry, KENNEN. The KENNEN system will produce these pictures at almost the same quality as the GAMBIT program. When the KENNEN program is operating, in order to save money we think we can probably get along without the GAMBIT system.

Senator Hruska. Operational, even with your present inventory and those in the line?

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Mr. Plummer. Well, we have quit buying them at the present time. We are essentially flying out those that we have under contract now. If we find that we really don't need them at all, we will simply take those and put them in the warehouse and never use them.

Senator Hruska. When will you know about KENNEN?

Mr. Plummer. We will know that as soon as we launch a KENNEN system.

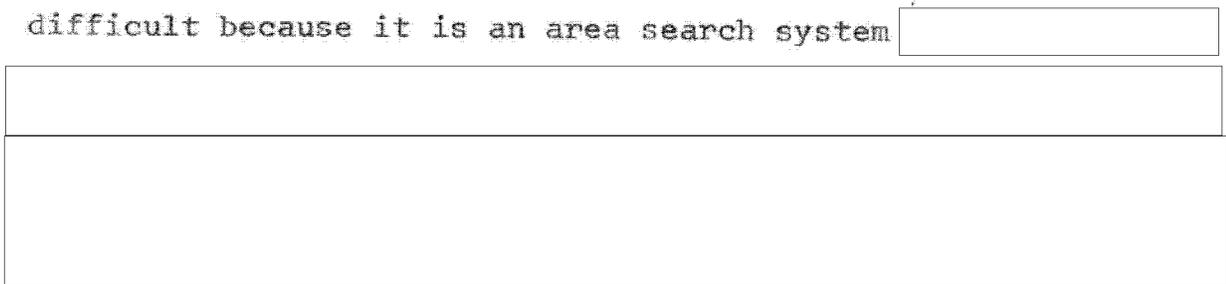
Senator Hruska. In a few months?

Mr. Plummer. Yes. We give ourselves a year. Give us one year to evaluate and then we are going to phase down the other programs or cancel.

Now if we find that the KENNEN system is truly outstanding we will simply cancel the other programs.

Senator Hruska. Both of them, GAMBIT --

Mr. Plummer. Possibly both. But HEXAGON is more difficult because it is an area search system



Senator Hruska. Thank you.

Mr. Plummer. It is a means of just trying to make the resources cover.

Senator Hruska. It wouldn't be substantial, but it would be satisfactory as a retrenchment, wouldn't it?

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Mr. Plummer. Yes, sir.

Chairman McClellan. Thank you, gentlemen.

We will stand in recess until 2:00 this afternoon, and we will meet over in the Capitol.

Mr. Plummer. Thank you very much.

(Whereupon, at 12:00 o'clock p.m., the subcommittee recessed, to reconvene at 2:00 p.m. in the Capitol.)

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