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CORONA HISTORY  
Volume II

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CORONA PROGRAM HISTORY

VOLUME II  
GOVERNMENTAL ACTIVITIES

19 May 1976



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PUBLICATION REVIEW


This report has been reviewed and is approved.

  
CORONA Project Officer  
Directorate of Science & Technology  
Central Intelligence Agency

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SECTION I

CORONA PROGRAM MANAGEMENT

The development of a management organization within the Government for the CORONA Program did not follow any specifically designed, coordinated plan. It was not that there had been a lack of thought about satellite reconnaissance activities in the United States. Indeed, the Air Force and US industry had been engaged in technical studies in the field of reconnaissance from space since 1946. Even before the Air Force was given official cognizance over long-range missiles, its consulting organization, the Rand Corporation, was continuing work on the concepts of earth satellites. Insight into this 1949 activity is provided by Rand's Third Annual Report:

"Further progress has been made in the satellite vehicle program; here Rand has also been designated as the agency primarily responsible for study and research. A systematic examination of the potential military utility of a satellite has been initiated including the feasibility and advantages of using such a device for reconnaissance or weather observation. The very important question of the value of a satellite as a weapon in psychological or cold warfare is being carefully examined, with the collaboration of the Rand Social Science Division and consultants. Comparative studies of possible auxiliary power plant devices which could be used to operate television and radio equipment in a satellite for extended periods of time are continuing."

In March 1950 the Air Force gained a major jurisdictional victory when the Joint Chiefs of Staff recommended assignment to the Air Force of exclusive responsibility for long-range strategic missiles. The formal assignment was made on 21 March by Defense Secretary Louis Johnson. This was the "go ahead" the Air Force needed. Two positive Air Force actions followed:

- A. Rand was directed to explore and make specific studies concerning the military utility of an unmanned satellite.
- B. A recommendation was made to the Air Staff for an expanded study of reconnaissance applications of the satellite.

The initial result of this Air Force directive is reflected in Rand's report, Utility of a Satellite Vehicle for Reconnaissance (R-217), issued in April of 1951.<sup>1</sup> Rand concluded that:

- A. No radically new developments are indicated but rather a reconstitution of known theory and art in rocketry, electronics, engines, and nuclear physics.
- B. A two-stage rocket vehicle weighing about 74,000 pounds and carrying a 1,000 pound payload of television, power plant, and control equipment will be at least capable of conducting weather and pioneer terrestrial reconnaissance; i.e., with a resolvable surface dimension of about 200 feet.
- C. To increase the utility of the reconnaissance satellite will require improvement of television equipment to a state already available under laboratory conditions.

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Rand went on to state, "It is believed that minimum resolvable surface dimensions of the order of 100 feet can be provided with continuous coverage over most of the USSR every day (over the entire target system every other day); also, that these dimensions can be further reduced (at the expense of daily coverage) to values as low as 40 feet, complete coverage being attained after no more than a month's operation. With resolvable dimensions of this magnitude, a large portion of useful military reconnaissance can be accommodated by the satellite vehicle during periods in which weather permits ground observations."

In the March 1954 report entitled Project FEED BACK,<sup>2</sup> Rand prefaced its findings with the remark, "Soon satellites...and later other spacecraft, are likely to grow from these beginnings. Therefore, it seems only right to supply a roster of those who have taken part in this study." The roster is an impressive cross-section of US industry, consulting firms, and individuals engaged in the eight-year Rand satellite study.

The conclusions and recommendations of Rand's final report show considerable insight for the time period and are repeated below verbatim:

"Primarily, emphasis in the report is on reconnaissance utility, and results of interpretation of simulated satellite photographs are included. Secondly, a typical example of hardware needed to accomplish such a task is shown with the hope that this will serve as a guide to future investigators.

"It is estimated that such an accomplishment will not require radically new technology or enormous cost. A rocket vehicle of 178,000 pounds gross weight is indicated. Presently available propulsion, guidance, and television will suffice.

"It is believed that complete development and initial operation can be accomplished in about seven years for a cost in the order of \$16 million. This cost figure is believed to be reliable within a factor of two.

"The overall conclusion to be drawn from studies of simulated satellite television pictures is that reconnaissance data of considerable value can be obtained, and that complete coverage of Soviet territory with such pictures will result in a major reversal of our strategic intelligence posture with respect to the Soviets.

"Rand has been working on the satellite vehicle for eight years. During this period the metamorphosis from a feasibility concept to a useful reconnaissance purpose has occurred.

"Cognizance is now being turned over to the Air Force with the recommendation that the program be continued on a full-scale basis."

By the fall of 1954 "reconnaissance," as a function of unmanned earth satellites, was well established in theory. The Air Force's satellite effort was designated "Advanced Reconnaissance System," promptly dubbed "ARS" and classified SECRET. To implement the program, the Air Force established a formal research and development project at the Western Air Development Command.

The year 1955 marked the formal beginning of the implementation of the collective thinking within DoD which ultimately led to the decision to proceed with the development of a satellite possessing military utility.

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General Operational Requirement No. 80 (SA-2c) was published on 16 March 1955 by the Air Force, thus establishing the formal requirement for a strategic reconnaissance satellite weapon system.

The resultant action was the solicitation from industry of design study proposals. A small group of select companies were chosen: Radio Corporation of America, the Glen L. Martin Company, and Lockheed Aircraft Corporation. Bell Telephone Company declined to participate in the design study competition.

Individual studies were conducted from the period June 1955 to March 1956 and were ultimately evaluated by an Air Force Contractor Evaluation Board. Lockheed's proposal was considered most satisfactory and Lockheed was so notified. Although contractual authority establishing Lockheed as Prime Weapon System Contractor was not formalized until 29 October 1956,<sup>3</sup> Lockheed continued its satellite design studies and reporting activities. These studies were conducted under Project WS-117L and the code name PIED PIPER.

After the successful firing of Sputnik I on 14 October 1957 and the initiation by the Senate Preparedness Subcommittee of an investigation into the US "missile lag," there was pressure from all quarters to accelerate the US missile and space program and much public discussion of civilian versus military control of the space program. It was against this background that the President's Board of Consultants on Foreign Intelligence Activities submitted its semi-annual report to the President on 24 October 1957. The Board urged an early review of new developments in advanced reconnaissance systems to replace the vulnerable U-2 collection system noting in particular the CIA's follow-on manned aircraft (A-12) and the several proposed reconnaissance satellite projects of the Defense Department (WS-117L). However, there appeared to be little prospect that either of these would produce operational systems sooner than the spring of 1959, and it was likely that the U-2 would be obsolete for overflying the USSR by that time. The Board emphasized that the requirement for an interim photo reconnaissance system was even more urgent.

On 8 November 1957, President Eisenhower appointed Dr. James R. Killian, outstanding American scientist, and President of Massachusetts Institute of Technology, to the position of Special Assistant to the President for Science and Technology. Upon taking office, Dr. Killian immediately tackled the problem of filling the expected reconnaissance gap, meeting and discussing the problem with those Executive Branch officials concerned and with White House consultants such as Dr. Edwin H. Land who had been instrumental in the initiation of the U-2 project under joint CIA/Air Force management. All possible means of quickly developing an interim intelligence collection system were explored.

The desire of top administration officials for the most expeditious and secure conduct of such a program brought forth the idea to carry out the interim photo reconnaissance satellite project on the same basis that the U-2 project had been managed; that is, joint CIA/Air Force management under the direction of

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Mr. Richard M. Bissell, Jr., of CIA and Brigadier General Osmund J. Ritland, Deputy Commander of the Air Force Ballistic Missile Division (BMD) and former Deputy Project Director of the U-2 project in 1955-56. The Bissell/Ritland team had been very effective in their previous association. This relatively small project staff was made up of experts in all phases of aeronautics, photography, industrial procurement, and the vital areas of support such as finance, communications, and security. With the experience gained by these experts in successfully bringing the U-2 system into being, this group represented (in the mid-1950s) a unique capability.

The CIA had become involved in the U-2 project beginning in November 1954 as a result of recommendations of a White House level external advisory panel, with President Eisenhower's agreement. There was no National Security Council Directive (NSCID) which specifically authorized the Director of the Central Intelligence Agency to conduct overflight reconnaissance operations; however, NSCID No. 5 gave the CIA primary responsibility for the conduct of clandestine intelligence activities abroad. The collection of intelligence by means of aerial reconnaissance was therefore considered to be within the responsibilities assigned to the CIA under the National Security Act of 1947, as amended.<sup>4</sup>

Additional factors leading to CIA involvement in the satellite reconnaissance program were: (1) the ability and authority of the CIA to use unorthodox methods in contracting with industry for expeditious procurement of components, (2) the ability to maintain maximum security, and (3) the desire of CIA to have a part in the program to orient it toward the collection of intelligence to fulfill priority requirements.<sup>5</sup> A CIA role was assured by the timely furnishing of [ ] from the Director's Reserve by Mr. Allen Dulles to buy the photographic payloads and install them in the satellites.

Plans for the interim satellite photo reconnaissance system entailed the overt cancellation of the interim THOR-boosted satellite portion of WS-117L, and the reinitiation of the project under the Bissell/Ritland management structure. The Air Force would continue to pursue other portions of WS-117L.

The plan was favorably received by Deputy Secretary of Defense Donald Quarles; Assistant Secretary of the Air Force for Research and Development, Richard E. Horner; Generals Bernard Schriever and Ritland; and Messrs. Dulles and Bissell; among others.

Meanwhile, on 7 February 1958, Department of Defense Directive 5101.15 established the Advanced Research Projects Agency (ARPA) with the mission of directing and performing advanced research and development projects in the fields of space science and technology, ballistic missile defense, and other

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advanced research and development. Subsequently, ARPA's Director, Dr. Roy W. Johnson, and his Chief Scientist, Dr. Herbert York, as the new managers of DoD space activities, became involved in discussions of the THOR-boosted satellite portion of WS-117L. This phase was renamed Project CORONA by Mr. Bissell's Development Project Staff.

On 28 February 1958, a memorandum from the Director of ARPA to the Secretary of the Air Force directed that BMD's interim THOR-boosted reconnaissance system be cancelled and authorized the use of available THOR boosters (built for the Air Force by Douglas Aircraft Company) for test flights of satellite vehicles developed by Lockheed under the WS-117L program. This included provision for recovery of biological specimens in the furtherance of manned satellite flights projected for the future. The provisions of this ARPA directive formed the basis for the original classified cover story for Project CORONA.<sup>6</sup>

During March 1958, discussions among representatives of ARPA, Air Force, and CIA were held with regard to the configuration of the CORONA system.

The Air Force prime contractor for the interim systems was the Lockheed Missile and Space Company (LMSC). A series of technical meetings between Mr. Bissell/General Ritland and the contractor's representatives took place on 24, 25, and 26 March 1958 at the Flamingo Motel in San Mateo, California. Mr. James Plummer was the principal representative of the prime contractor. Tentative decisions made at these meetings included:

- A. Scheduling aimed at production of elements of the system by 1 July 1958 and a program of 19 weeks of assembly and testing to readiness for first launch.
- B. The photographic record would be recovered by physical recovery of the film. General Electric would be issued a subcontract for development of the recovery capsule.
- C. Agreement that Cooke Air Force Base (later renamed Vandenberg Air Force Base) was the most advantageous launch site.
- D. Initial procurement would be ten vehicles, with three additional, if available during the life of the project.
- E. The urgent need for new contracts to be negotiated to replace those ordered cancelled by the Air Force at the end of February brought the promise that [ ] DPS Contracting Officer, would visit the suppliers the following week to commence negotiations.

Subsequent to that meeting, a competitive proposal for a more sophisticated camera design with a 24 inch focal length which was stabilized with relation to the horizons and the earth's center, was made by Itek. Itek was a company established in January 1958 which grew out of Air Force contracts with the Boston University Physical Research Laboratory. The camera system gave promise of achieving a ground resolution of twenty feet.

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Mr. Bissell drafted a project outline for CORONA which, after revision and coordination with ARPA and other necessary agencies, was forwarded for Presidential approval via the Special Assistant to the President, Brigadier General Andrew J. Goodpaster, on 16 April 1958. Later on the same day, a telephone call from General Goodpaster to Mr. Bissell confirmed approval at the highest level.<sup>7</sup>

The outline called for the development and subsequent operational use of a short lived reconnaissance satellite from which, at the completion of its mission, a recoverable capsule containing exposed film would be separated for return and pickup in a preselected ocean area. The basic vehicle was a two-stage rocket consisting of a Douglas THOR booster and a Lockheed AGENA second stage. The payload would consist of a pod containing a 24 inch focal length camera and a recoverable capsule into which exposed film would feed as the camera operated. Ground resolution of 20 feet was anticipated which would allow the distinguishing of one structure from another and the identification of such major Soviet targets as missile sites under construction in areas which previously had been inaccessible to US reconnaissance.

The program, to consist of 12 firings, was expected to become operational around June 1959 and be completed in the spring of 1960. The division of administrative responsibilities for CORONA was to be as follows:

- A. ARPA would exercise general technical supervision over the development of the vehicle.
- B. The Air Force Ballistic Missile Division, acting as agent for ARPA, would perform detailed supervision of vehicle development and provide ground facilities for launching, tracking, and recovery in collaboration with the US Navy.
- C. CIA would supervise the technical development and covert procurement of the reconnaissance equipment and have overall responsibility for cover and security.

When CORONA was initiated, Mr. Bissell bore the title of Special Assistant to the DCI for Planning and Development, as well as Project Director of the U-2 activity. Within CIA, he also added the title of Project Director for CORONA. He, together with General Ritland who headed the Air Force efforts in support of CORONA, gave strong leadership and management to the project under the liberal overall direction of ARPA. A strong and cooperative bond developed in the day to day working relations between Mr. Bissell's Development Projects Staff (DPS) and General Ritland's Ballistic Missile Division (BMD) personnel assigned to support the CORONA Program.

In contracting with LMSC for the initial order of CORONA systems, the Work Statement contained a paragraph concerning the management and technical direction of CORONA which was later subjected to different interpretations. These interpretations surfaced after departure of the Bissell/Ritland team. That paragraph read as follows:

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"Technical direction of the program is the joint responsibility of several agencies of the Government. In the interest of effective management, however, such direction will be provided primarily by and through the Air Force Ballistic Missile Division acting as the agent for all interested components of the Government. A Project Officer will be established in BMD as the single day by day point of contact for the contractor. This officer will have authority to make on the spot decisions within the scope of the work statement on all matters pertaining to the program other than those of major importance. From time to time the Government agencies concerned will jointly review the progress of the program. The Government will make arrangements to permit the prompt rendering of major decisions concerning the program which cannot be made by the Project Officer."<sup>8</sup>

Despite this loose management criteria and the broad authorities which the BMD Project Officer might be led to assume under the wording of this paragraph, Mr. Bissell exerted direct program control over CORONA through the monthly suppliers meetings. This was the same means he used for liaison and control during the U-2 development period. While the BMD project office in Palo Alto (initially run by Colonel Lee Battle, USAF) was the day to day contact point for the contractor, CIA maintained direct and frequent contact with the working level people at the Lockheed Advanced Project (AP) Facility at Palo Alto. This contact was made through visits, and after 1 June 1959, by assignment of a liaison officer to the AP Facility. An organization chart for CORONA in the early development period is shown in Figure 1-1.

The Operations Staff of DPS, whose principal responsibility at the time of CORONA's inception was operational direction of CIA's U-2 activities, also played an important role in the early stages of CORONA.

25X1  Chief of DPS Operations, and his staff participated in July 1958 with BMD/ARDC personnel and representatives of the Tactical Air Command in planning for a C-119 squadron to be assigned the support function of retrieving nosecones after re-entry. The 6593rd Test Squadron (Special) was activated by a General Order as of 1 August 1958 and assigned to duty station at Hickam Air Force Base, Hawaii. Agreements were reached with Edwards Air Force Base (the Air Force Flight Test Center), and with PACAF for the training and support of that squadron.

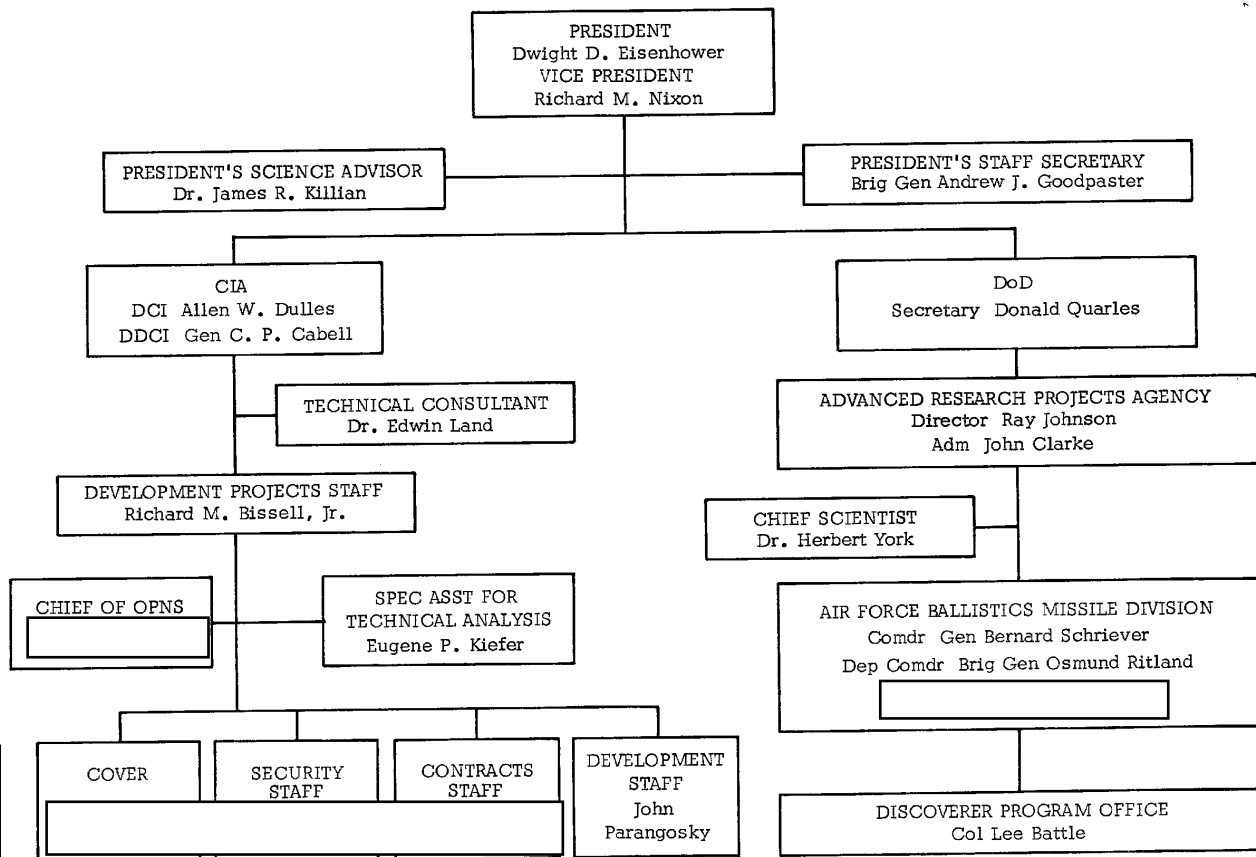
The DPS Operations Center in the Matomic Building in downtown Washington was designated as the CORONA Project Control Center, and communications were activated through the special signal center in DPS to the Lockheed AP Facility and BMD's Los Angeles headquarters.

The DPS Operations Staff took the initiative in drawing up operational control procedures for CORONA in the summer of 1958 to include requesting requirements of the Air Weather Service for climatological studies and weather support through previously established channels. In September 1958, agreement was reached between DPS Operations and BMD that DPS would draft an operations order formalizing the operational relationships and control procedures among the various participants with regard to CORONA. A Reports Control Manual,

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1958 CORONA ORGANIZATION



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which was coordinated with BMD and LMSC in October, was printed and distributed by DPS in November 1958. The DPS Operations Staff also took initiative in doing some preliminary target studies and mission planning in conjunction with the Ad Hoc Requirements Committee (ARC). The members of that group had all been cleared for CORONA by January 1959.

Before the CORONA photo reconnaissance system became operationally ready for launching, a number of reorganizations took place within the Government which directly affected the management of CORONA activities.

CORONA had been approved as a project by the President in April 1958. That same month, another very important organizational decision had been made by the President. The National Aeronautics and Space Agency was established and assigned responsibility for all of the non-military space programs. Effective 1 January 1959, Mr. Bissell was appointed to the position of Deputy Director for Plans (DDP), CIA. In addition to taking on all of the problems which that position entailed, he was instrumental in bringing about an amalgamation of all Agency air activities and placing the newly formed division under the DDP. The Development Projects Staff, with its sensitive, manned, and satellite reconnaissance projects, was used to form the nucleus of a new Development Projects Division (DPD). Although this reorganization was effective on paper as of 16 February 1959, it took most of the balance of the year to sort out and solve the major problems involved in establishing this new Division.

The effect of this CIA reorganization on CORONA caused problems. Mr. Bissell, on being appointed DDP, became more and more involved in all the time consuming matters of the Plans Directorate and consequently had less time to give to daily CORONA affairs. He maintained his overall control as Project Director and was successful in his efforts to obtain continued high level approvals and the necessary funds to carry CORONA forward.

As a result of the amalgamation, however, the former DPS officers responsible for the support of CORONA found themselves with added duties related to the worldwide activities inherited with the Air Division, and thus their time and efforts were spread more thinly among the various projects. The DPS CORONA project staff had never been set up as a separate entity, but all those staff members given support duties for CORONA also had responsibilities for one or more additional activities. When DPD evolved, the same held true because one of the principal purposes of the amalgamation was to achieve savings in manpower as well as funds.

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CORONA clearances were given only to those DPD, Pentagon, and contractor personnel actively involved in the project, on a need to know basis. In the early days, each new clearance had to be approved by Mr. Bissell personally. As the program continued into 1959, it became more and more difficult to segregate those staff members who were CORONA ("C") cleared from those who were not. One example of the difficulties encountered was the necessity to hold staff meetings in two sessions, prepare two separate sets of minutes, and make separate distribution of those including CORONA items to cleared staff members only.

The Operations Division of DPD continued its CORONA support with mission planning, weather studies, monitoring the continuous training, and equipment testing for payload recovery. It also furnished air transportation between the East and West Coast and various contractors' facilities and the Project Supply Depot in California. This service was provided in the interest of secure and expeditious delivery of vital project components. The contracting, security, and cover functions in support of CORONA, begun under DPS, were carried forward under DPD.

In the spring of 1959, an effort was made by the US Army, on behalf of the Army Map Service, to obtain ARPA approval for a reconnaissance satellite program to obtain precise geodetic data on the Soviet Union for the ultimate purpose of pinpointing strategic targets. Because such a program would impinge upon CORONA from a security standpoint and would compete for launch facilities, it was decided through coordination with the Secretary of Defense that the program would be administered within the organizational framework of CORONA. This was done to protect the security of the latter and to establish priorities for launch scheduling. An agreement between CIA and ARPA on the control of the mapping project, named ARGON, was signed on 7 July 1959. This gave CIA authorization to contract for the exploitation of ARGON's product for the Army Map Service and to maintain security control over the project. Approval was received from the White House on 21 July 1959.

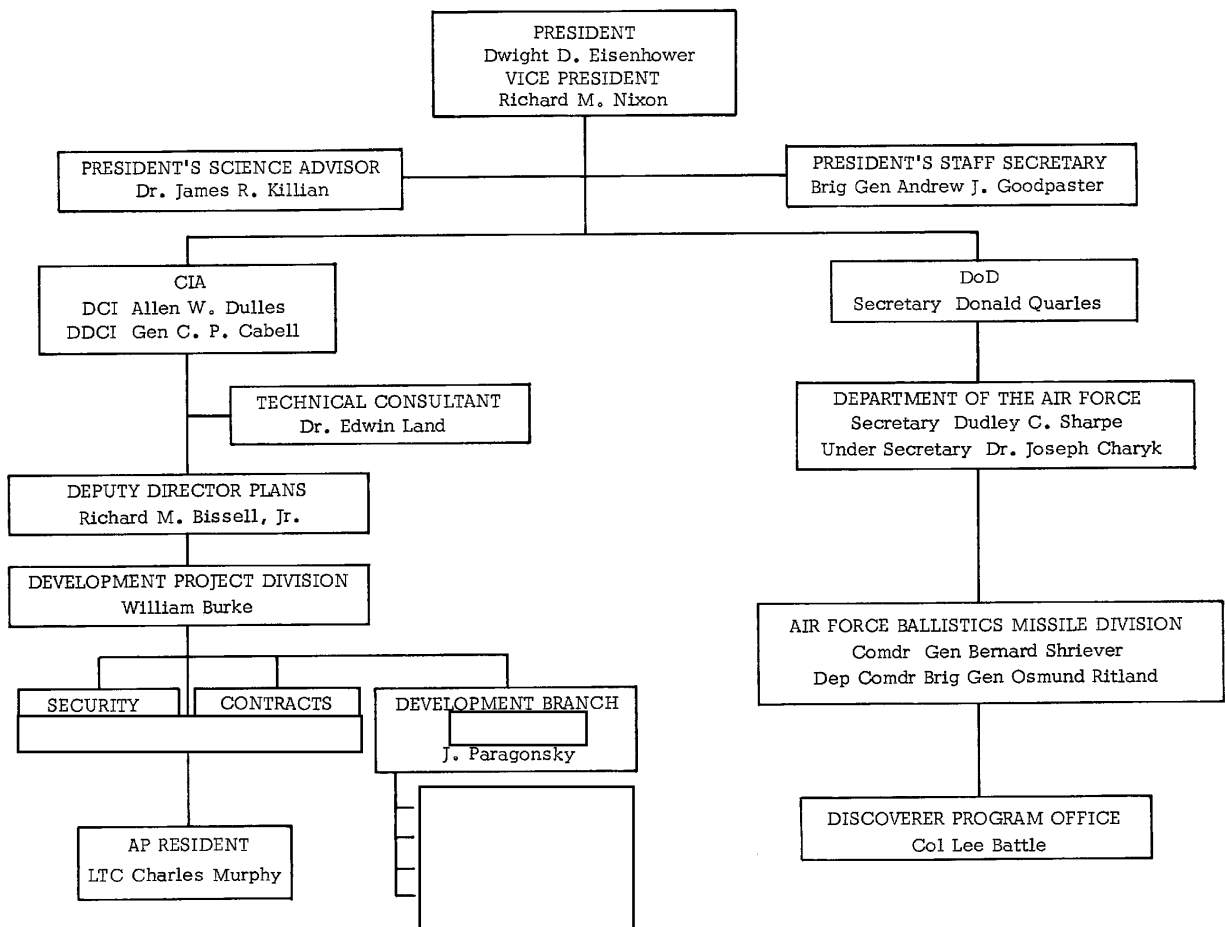
Shortly thereafter on 24 September 1959, the Department of Defense announced the reorganization of its military space programs to give the Air Force the prime role and to give back to the military services most of the projects previously assigned to ARPA. The Air Force, minus a major role in manned space, thus assumed the general technical supervision over development of the CORONA photo reconnaissance vehicle which now looked to have more than the originally planned short interim space role. Figure 1-2 presents the organizational chart for CORONA as it looked in late 1959.

Toward the end of FY 1960, the assumptions with regard to the continuing photo reconnaissance of denied areas for the period from FY 1961 thru 1970 were as follows:

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1959 CORONA ORGANIZATION





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A. Lacking an international arms agreement, there would be continuing need for photo reconnaissance of the Soviet Bloc.

B. If an arms agreement were reached, there would still be need of photo reconnaissance for inspection purposes which could include both manned, lower altitude flights to give high resolution photography and large area coverage by satellites to fill in time coverage gaps between low level flights.

C. If an arms agreement were reached, the necessity for covert reconnaissance satellites would probably disappear in view of the requirement. The general conclusion of DPD, therefore, was that CIA could possibly end its participation in the CORONA reconnaissance satellite program by the close of calendar year 1961.<sup>9</sup>

These conclusions were drawn two weeks before 1 May 1960 when the Russians shot down the U-2 over Sverdlovsk. Khrushchev later boycotted and caused the cancellation of the Summit Meeting in Paris; and a period of very strained relations ensued between the US and the USSR. Any hope for an arms agreement was postponed and, at the same time, the intelligence obtained from satellite reconnaissance became even more vital to the US in face of bellicose Soviet threats and claims of missile superiority.

With the initial success on 19 August 1960, CORONA quickly became the nation's most important space program. A requirement for the extension of CORONA was necessitated by continued technical difficulties and failure of the SENTRY/SAMOS programs to acquire useful imagery. The Under Secretary of the Air Force, Dr. Joseph Charyk, and Mr. Bissell agreed to carry out an improved six-vehicle CORONA/MURAL stereo photography program, the six systems to be available in 1962. Separate contracts with Lockheed, Itek, and General Electric for production of the hardware were negotiated by CIA effective March 1961. At the same time, Dr. Charyk insisted that a well defined systems engineering contract be written. Since Lockheed was opposed to the Air Force inserting an outside systems engineering group into this program, it was agreed that Lockheed would furnish a Systems Engineering and Technical Direction (SETD) group under contract with the Air Force and responsive to [ ] This SPO, under Colonel Lee Battle, was set up to support CORONA/ DISCOVERER as a unit of Space Systems Division (SSD), formerly BMD.

Two organizational changes in this period were related directly to the role of various agencies in overhead reconnaissance. First in September 1961, an agreement was signed between the DCI, Mr. Dulles, and the Deputy Secretary of Defense, Mr. Roswell Gilpatric, for the establishment of a "National Reconnaissance Program," under which all overhead reconnaissance projects would be financed and controlled centrally. A definitive agreement was spelled out in May 1962 establishing the National Reconnaissance Office (NRO) and giving broad powers to the Director of NRO (DNRO) in technical and financial management. The DNRO was to be appointed by the Secretary of Defense, with DCI concurrence.

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The first appointee to that position, Dr. Joseph V. Charyk, was also the Under Secretary of the Air Force. This position has continued to be filled by the incumbent Under Secretary.

The second organizational change was an internal CIA reorganization after the retirement of Messrs. Dulles and Bissell in the aftermath of the "Bay of Pigs." It was initiated by the new Director, Mr. John A. McCone, and consisted of bringing all scientific and technical activities of the CIA together under a new Deputy Director for Research (DDR). Because of bureaucratic difficulties, this reorganization, initiated early in 1962, also required several months to implement. Effective 14 February 1962, Mr. Richard Helms had succeeded Mr. Bissell as Deputy Director of Plans. On 19 February, Mr. McCone established the Office of Deputy for Research noting that certain of the activities of the Development Projects Division (DPD) would also be transferred to the DDR along with other activities in research and development.

One of the offices of the new directorate was the Office of Special Activities (OSA). OSA, as originally established under the DDR, represented the transfer of the special projects of DPD, i.e., the U-2, the A-12, and CORONA. Between the announced transfer of DPD to the DDR and its actual reconstitution as OSA, there was added to the normal confusion of a reorganization the trauma of relocating in the new headquarters building at Langley, Virginia. The Acting Chief of DPD, Colonel Stanley W. Beerli, finished his tour with the Agency just as the changeover took place, and an Assistant Director for Special Activities (Colonel Jack C. Ledford) was named on 4 September 1962.

Mr. Kiefer continued as technical advisor on CORONA matters in his new position as Assistant for Technology to the Assistant Director of Special Activities. He provided the main source of continuity in the CIA management. The Development Division of OSA, as well as the Contracts, Logistics, Operations, and Administrative Divisions, continued their support for CORONA; however, the CORONA project was not set up as a separate unit within OSA. The one full time staff member and the day to day CIA CORONA manager was Lieutenant Colonel Charles L. Murphy. Since July 1959, Colonel Murphy had been stationed at the Lockheed Advanced Projects Facility in Palo Alto as the CIA representative to coordinate CORONA activities with Lockheed and with BMD's [ ] group.

The agreement reached on 6 September 1961 concerning the establishment of a National Reconnaissance Program was in very general terms. The program was to be directed by the Under Secretary of the Air Force and the DDP of CIA, acting jointly with powers delegated to them by their superiors. A National Reconnaissance Office was to be established on a covert basis to manage the NRP, with a small staff drawn from DoD and CIA. Requirements and priorities would be set by the United States Intelligence Board

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(USIB), and the program elements and operations would be reviewed regularly by the Special Group of the National Security Council (NSC). The Air Force, as the operational agency for management and conduct of the NRP, was set up to operate directly out of the Office of the Secretary of the Air Force in a special management arrangement with a direct line to reconnaissance system directors in the field and without intervening reviews and approvals.<sup>10</sup>

Between the signing of this initial agreement and a further agreement between Mr. McCone and Mr. Gilpatric, signed on 2 May 1962, setting forth the responsibilities of the NRO for the conduct of the NRP, CIA's overhead reconnaissance projects were transferred to the Deputy Director for Research. The NRO Agreement of 2 May 1962 therefore stipulated in paragraph 7:

"The Deputy Director (Research), CIA, will be responsible for seeing that the participation of CIA in this Agreement is carried out."<sup>11</sup>

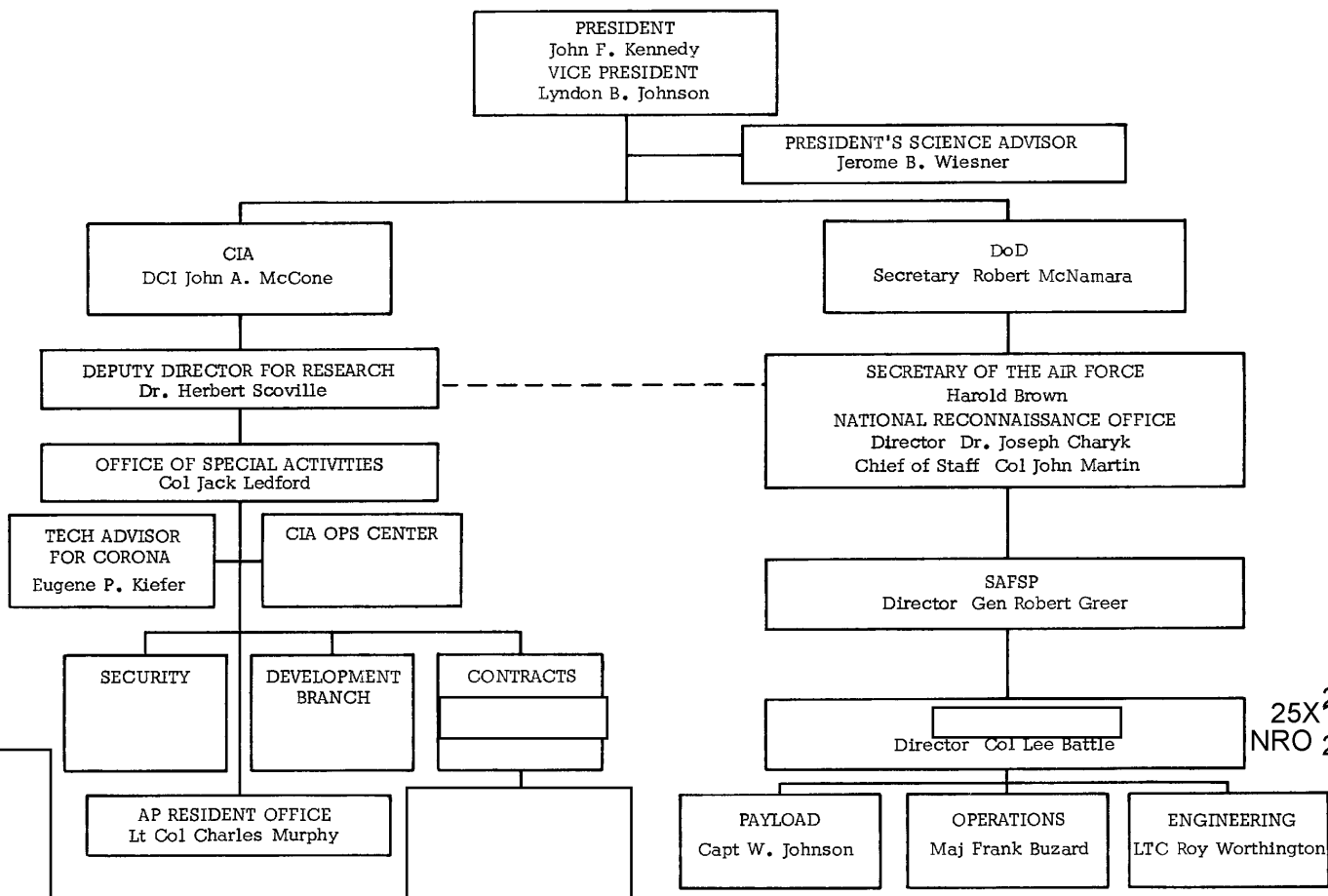
The first directive on organization and functions of the NRO was issued by Dr. Charyk. It established Program A (USAF) under the Director of SAFSP and Program B (CIA), and said that the Director of Program B was responsible for the NRP effort conducted by the NRO through utilization of CIA resources. It also stated that the activities and office of the Director, Program B, were covered by his overt duty as Deputy Director, Research, in CIA.<sup>12</sup> Dr. Herbert Scoville, in turn, transferred the title of Director Program B to the Assistant Director of Special Activities, who was then responsible for management of CIA reconnaissance activities (including CORONA); and assigned himself the title, Senior CIA Representative to NRO, in view of his overall responsibilities to the DCI for all phases of the NRP. An organization chart showing the Government organization for CORONA in 1962 is contained in Figure 1-3.

In 1963, another CIA reorganization was to affect the CORONA management. Dr. Scoville resigned from the Deputy Director of Research post effective 14 June 1963. Mr. McCone then proceeded to bring under the DDR those additional scientific activities of the CIA which thus far had not been amalgamated. The Office of Scientific Intelligence and the CIA's automatic data processing activities were brought under the DDR, and the resultant directorate was redesignated the Directorate for Science and Technology (DS&T). On 5 August 1963, Dr. Albert D. Wheelon was appointed the first Deputy Director for Science and Technology.

Shortly after Dr. Wheelon's assumption of his duties as DDS&T, the DNRO (Dr. McMillan) made a request to Mr. McCone that CIA relinquish all responsibility in regard to CORONA and transfer complete control of the Program to the Director of Program A and SAFSP. At that time General Greer and SAFSP had no formally agreed responsibility for the CORONA payload, the original agreement being between BMD's  and CIA/OSA.<sup>13</sup>

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1962 CORONA ORGANIZATION



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The previous year, 1962, had seen an increase in successful missions. Of the 17 CORONA/MURAL stereo payloads launched, all 17 orbited and 14 of them were retrieved. Of the three failures, two were caused by the tearing of parachutes during air catch attempts and one by failure of the parachute to deploy. Of the film payloads launched, 69% were recovered.<sup>14</sup>

In 1963 there were a series of vehicle failures, not only CORONA, but also with the LANYARD and ARGON satellites. Of 16 CORONA, ARGON, and LANYARD system launches in 1963, there had been two that failed to orbit due to failures of the THOR boosters and another seven failures caused by difficulties with the AGENA vehicles. Three AGENAS had failed to orbit, one had achieved a bad orbit, and power system anomalies were experienced on the other three. One mission failure was due to a failure of the capsule to eject and two partial failures as a result of camera malfunction. It appeared that "Murphy's Law" was working overtime; however, analysis conducted following each mission indicated that others besides "Murphy" were involved in the malfunctions which occurred. Many were traceable to human error. Quality control and the philosophy of zero defects seemed to have disappeared. When the CORONA "J" system with dual recovery buckets was introduced in August and September 1963, the first two flights were only partly successful. The first bucket was retrieved but both number two buckets were lost, one through AGENA inverter failure and over temperatures and the other through failure of the signal decoder in the AGENA vehicle to respond to command. In addition to the AGENA flight failures, it was clear from the ground test that the J system was sensitive to film tracking difficulties.

It was at this point that Dr. McMillan made his proposal to Mr. McCone that General Greer take over CORONA in its entirety and the CIA relinquish its CORONA responsibilities. Dr. McMillan maintained that, as DNRO, he could not be held responsible for the success of CORONA missions unless he had ultimate control over all matters relating to the project including boosters, spacecraft, and payloads.

The first proposal by Dr. McMillan for the transfer of CORONA to the Air Force was rebutted by Mr. McCone and General Carter. The DCI felt strongly that the Air Force should not monopolize the satellite reconnaissance program and was anxious that CIA participate actively, particularly in the definition of intelligence needs and the development of requirements for future advanced systems. It was Dr. Wheelon's opinion that assigning the CORONA Program to General Greer would not be the answer to the recurring technical problems, particularly since the cause of the largest number of failures had been the Air Force THOR and AGENA vehicles. Therefore, it was his recommendation that: (1) CIA strengthen its participation in the technical and programming aspects of CORONA by establishing a project office headed by a senior CIA officer with appropriate technical and administrative support to assume responsibility for the payload; (2) this project office work out the interface problems between vehicle and payload with the Air Force on the partnership basis which initially characterized

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this program; and (3) CIA re-examine its contract with Lockheed for systems engineering and technical direction to ascertain the effectiveness of LMSC's performance.<sup>15</sup> This recommendation by Dr. Wheelon, made in November 1963, for a special project office to manage the CIA satellite activities was eventually adopted; however, it was almost two years before it was totally implemented.

Between 13 November 1963 and 8 February 1964, a Photo Working Panel (known also as the Drell Panel), chaired by Dr. Sidney Drell, was convened by Dr. Wheelon to make an analysis of the CORONA photographic product and to isolate factors adversely affecting its quality. The Panel's findings were of great value not only in evaluating the CORONA system, but in providing vital information required for the successful development of the improved systems.

In March 1964, the Air Force announced that SPO [ ] was being dissolved and its personnel transferred; and that a new group (SPO [ ] under Colonel Paul Heran and reporting directly to SAFSP would take over the operational support of CORONA. The primary reason for the change was the corroded security of the SPO [ ] unit which ostensibly was under the command of Space Systems Division, but which in fact was responsible to the NRO. An additional factor was that cover such as SPO [ ] and DISCOVERER had furnished was no longer necessary since the promulgation of DoD Directive 5200.13 had clamped a cover of secrecy on all military satellite operations.<sup>16</sup> On 9 April 1964, General Greer named Colonel Heran, Chief of SPO [ ] to be Chairman of the CORONA Configuration Control Board (CCB).

On the CIA side, Dr. Wheelon began to strengthen the CORONA staff. Dr. Wheelon, in response to the DCI's charge to him, had spent a great deal of effort in building and refining his staff in both the technical and support areas to make it capable of handling CORONA and other satellite programs. He had recruited Mr. Jackson D. Maxey from OSI in October 1963 (formerly head of the Systems Analysis Section of Space Technology Laboratories) to organize a Systems Analysis Staff within the Office of the DDS&T. This staff was responsible for stimulating and coordinating DDS&T research and development efforts embodying new concepts and advanced technologies, and coupling these to the Directorate's intelligence collection operations.

[ ] a former Lockheed engineer, was temporarily assigned to the AP Facility to assist Colonel Murphy. Col Murphy was reassigned by the Air Force in July 1964 and was replaced by Lieutenant Colonel Vernard Webb, another Air Force assignee to CIA.

In July 1964, Colonel Heran and General Greer initiated action to place the systems engineering and technical direction of CORONA under the Aerospace Corporation (a company supported by Air Force contract). The DNRO, without agreement of CIA, on 14 August 1964 directed that information be sent to CORONA contractors informing them that the Aerospace Corporation, under the management of the SAFSP, would be

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responsible henceforth for the general systems engineering and technical direction of their contracted efforts. LMSC was relieved of its SETD contract and asked to create a systems integration group under contract with the Air Force to conduct mating and testing of the CORONA system at Palo Alto. Being aware of the Government controversy, Lockheed demurred in signing a contract, but did continue to furnish the required systems integration pending the eventual establishment of authorities. At the 1 September 1964 NRP Executive Committee meeting, Mr. McCone and Deputy Secretary Vance agreed that no changes in contracting responsibilities for CORONA would be made until the NRO management problem was settled.

Dr. Wheelon, with the knowledge and concurrence of the DCI, on 1 September 1964 created a Special Projects Staff (SPS) as an interim mechanism for managing the Agency's NRP activities. The personnel ceiling and incumbents of the Systems Analysis Staff were made available to SPS and Mr. Jackson Maxey was named Chief of this temporary management staff. Selected administrative personnel in OSA engaged primarily in satellite activities were earmarked for support to SPS. The technical field personnel on duty on the West Coast were placed under the operational jurisdiction of SPS, and four OSA officers were detailed to add technical strength. A limited number of new employees were also hired to satisfy essential requirements. Among these newcomers was Mr. John J. Crowley who was recruited in August 1964 for the position of senior CIA CORONA Project Officer. Mr. Crowley had for the previous ten years worked in operational analysis, planning, and direction of rocket and missile activities for the Defense Department and for General Dynamics. He was expected to provide the strong leadership and technical management expertise needed to bolster the CIA CORONA team. He was placed in an available Scientific Pay Schedule slot and attached to the Office of the DDS&T until the organizational structure could be firmly established.

The year 1964 began with several of the same type failures that were experienced in 1963. Two of the first three missions had been failures due to malfunctions of the AGENA. However, by mid-1964 the technical difficulties had been essentially corrected and June thru September saw a series of six perfect missions. AGENA problems caused partial failures on two launches in October, but after those incidences it could be said that the technical problems on the J-1 system development were solved.

Management discussions between Mr. McCone and Secretary of Defense McNamara commenced toward the end of 1964. These discussions were intended to lead to a restatement of the NRO Agreement which would clearly detail both the CIA and Air Force roles in national reconnaissance.

Principles to guide negotiation of a new agreement from the CIA viewpoint were formulated by Mr. McCone based on the following premises:

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"The acquisition of intelligence by overhead reconnaissance is a responsibility of the Director of Central Intelligence. Satellite photography makes a most important input into the intelligence inventory. The DCI in discharging his statutory responsibilities for producing estimates concerning the security of the United States must direct this intelligence-acquiring facility to meet his needs. To do this the DCI, directly or through subordinates responsible to him, and with the continuing advice of the United States Intelligence Board, should determine the frequency of satellite missions, the targets and the priority in which they must be treated, and the control of the satellite when in orbit to insure coverage of the targets and therefore the acquisition of information considered essential by the DCI."<sup>17</sup>

Mr. McCone believed that the Defense Department was the proper authority of Government to coordinate satellite missions and carry out launch and recovery because of its facilities, organization, and available funds. He also felt that where a major component of a system was assigned to another agency, the procurement and technical direction of that component must be the undivided responsibility of the agency assigned to develop it.

Mr. McCone did not enter into the discussions further, as he resigned as DCI effective on 28 April 1965. However, a week before his departure, he gave explicit instructions to Dr. Wheelon that the CORONA contracts with LMSC, GE, and Itek should clearly establish the fact that CIA had the responsibility and authority to provide technical direction for the CORONA payload.<sup>18</sup>

On 26 February 1965, Dr. Wheelon, in a memorandum to General Carter, outlined his proposal for the establishment of a satellite office within the DDS&T. General Carter had agreed to discuss this with the Director. The new office would be responsible for all development, operation, and management of the Agency's satellite efforts in Washington, and on the West Coast provide technical direction as well as management of on-orbit operations.

Dr. Wheelon's plan for a satellite office under the DDS&T and the negotiations related to the rewriting of the NRO Agreement were among the pieces of business which were still pending at the time both Mr. McCone and General Carter resigned from the Agency on 28 April 1965. Negotiations in regard to the new NRO Agreement were resumed by the new leadership of Admiral William Raborn and Mr. Helms with the assistance of Mr. John Gross, Deputy for National Intelligence Programs Evaluation. These negotiations were not concluded until August 1965, and the satellite office under the DDS&T was not formally organized until after the agreement was signed.

The following interdepartmental principles were set forth by the NRO Agreement of August 1965:

A. The stronger role of the NRP Executive Committee, established to "guide and participate in the formulation of the NRP through the DNRO;" the DNRO was to sit with the Committee as a non-voting member.

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B. The position of the Deputy Director of NRO was strengthened in that he was to serve full time in a line position directly under the DNRO and act for and exercise the powers of the DNRO in his absence.

C. The assignments for the development of new optical sensor subsystems gave to CIA the development of improvements in the CORONA general search optical sensor subsystem and the development of the optical sensor subsystem for a new advanced general search system to follow CORONA.

Higher authorities in both the Defense Department and the White House were unwilling for the NRP to become a strictly military operation, and thus CIA's role in satellite reconnaissance was reinstated and specific projects assigned.<sup>18</sup>

On 9 September 1965, the DDS&T formally requested approval in a memorandum to the DDCI for the establishment of the satellite office under the DDS&T, which was given the name "Office of Special Projects" (OSP). Dr. Wheelon indicated that in view of the August NRO Agreement which reaffirmed the CIA responsibilities as a participant and assigned to CIA definite program areas, the time had come to implement the planned organization.<sup>19</sup> Mr. John J. Crowley was chosen as the first Chief of this new office of DDS&T.

On 1 October 1965, Mr. Helms advised the new DNRO, Dr. Alexander H. Flax, of: (1) the reorganization within CIA for carrying out the new NRO Agreement; (2) the consolidation of satellite activities in the OSP; (3) the cancellation of the "Program B" concept, relieving General Ledford of responsibility for satellite activities; and (4) designation of a "Director of CIA Reconnaissance Programs," [redacted] reporting through the DDS&T to the Director and Deputy Director. This appointment provided the DNRO with a single authoritative point of contact within the CIA for all reconnaissance programs. The assignment of [redacted] also provided a diplomatic negotiator to balance the direct approach of the DDS&T in handling NRP matters.

As one of his first duties as Director of OSP, Mr. Crowley formalized the responsibilities of his CORONA team on the West Coast. Mr. Crowley appointed [redacted] as CORONA Program Manager. [redacted] was assigned as Technical Director, and [redacted] continued in his position as Operations Officer. An organization of the CORONA management in later 1965 is shown in Figure 1-4.

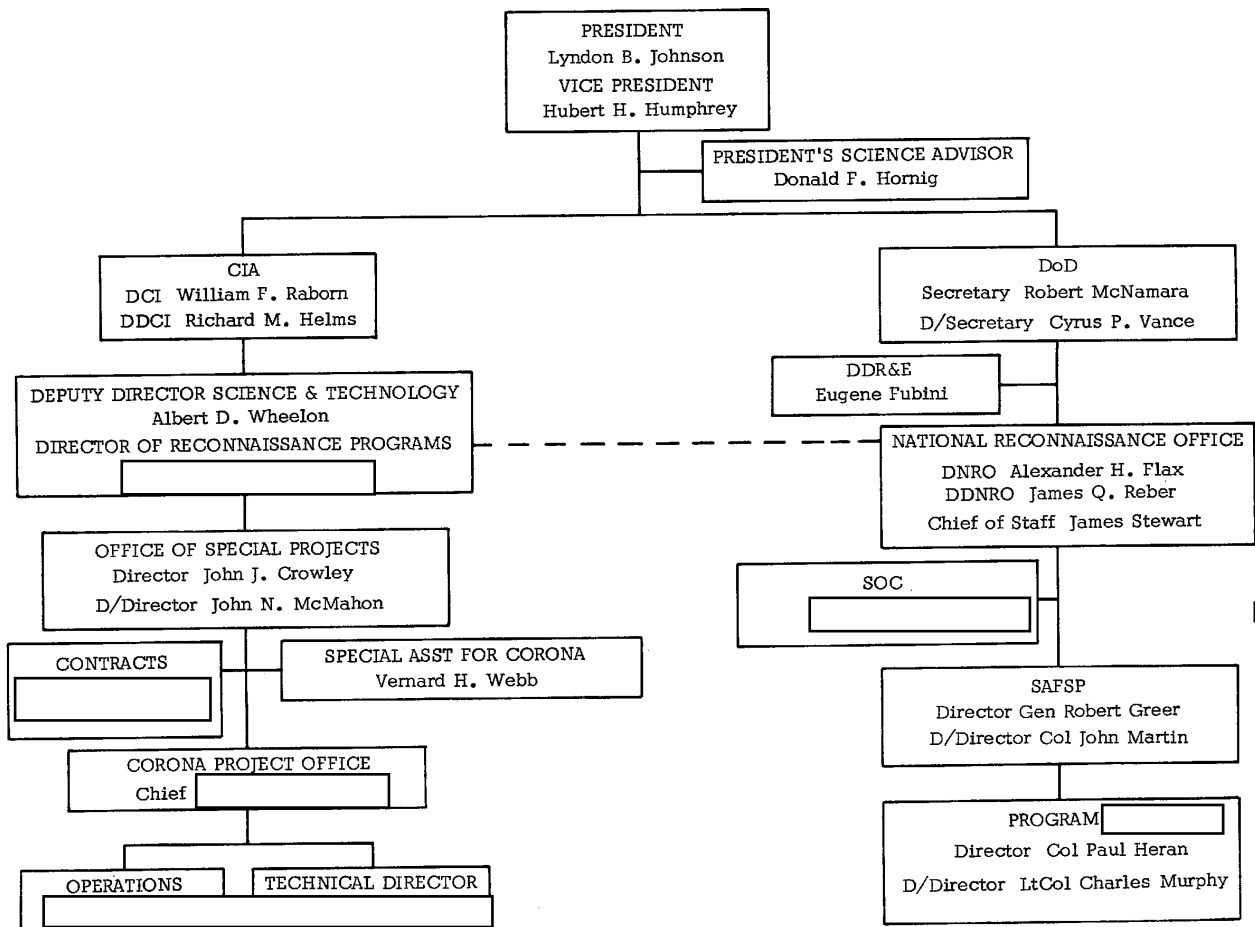
A directive was issued by Dr. Flax on 22 June 1966 for the purpose of setting forth the tasking agreed to by the Executive Committee.<sup>20</sup> The provisions of this directive were:

A. The Director of SAFSP was designated CORONA System Project Director (SPD) with responsibility for overall system engineering and system integration; overall system master planning, programming, and

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Figure 1-4

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budgeting; assembly and checkout of the system at the launch pad; launch and mission operations; capsule recovery; and delivery of film to the DNRO designated processing facilities (EK or AFSPFF). The SPD's use of the services of Aerospace Corporation in a general systems engineering role was accepted with Aerospace engineers having free access to information and data from the payload contractors, but exercising no technical influence on matters wholly within the payload sphere.

B. The Director of Reconnaissance, CIA, was made responsible for direction and supervision of the development and production of the CORONA Payload Sub-Assembly (PSA) reporting directly to the DNRO. He was to establish a CORONA Payload Sub-Assembly Project Office (PSAPO) and designate a Director thereof, responsible through the Director of Reconnaissance, CIA, to the DNRO for the total PSA development and production, and to the SPD for overall system matters.

C. Additional specific responsibilities were assigned to the SPD including the Thrust-Assisted THOR and THORAD boosters; the AGENA booster/spacecraft; procurement of the DISIC; acquisition and operation of system assembly facilities (excluding the Lockheed AP Facility) and launch facilities; on-orbit command and control facilities; and capsule recovery forces and equipments.

D. Specific responsibilities assigned the Director PSAPO, through the Director of Reconnaissance, CIA, to the DNRO for the total PSA development, production (excluding the DISIC), and assembly and test; operation of the AP Facility; adherence to master system specifications, interface specifications, and master project plans established by the SPD; provision of software support to the Satellite Operations Center before, during, and after missions; assistance to the SPD with regard to prelaunch activities in the Payload Sub-Assembly area at Vandenberg, certifying to its readiness and acting as principal PSA assistant to the SPD during premission planning, on-orbit operations, and post-mission analyses.

E. The basic PSA structural, dynamic, thermal, power, and other requirements were to be given proper weight in determining overall system configuration and characteristics. In trade-offs within the system, the SPD was directed to attempt to resolve problems with a minimum effect on the sensor. However, both the SPD and the PSAPO were directed to analyze their interface and trade-off problems in terms of a successful overall system performance.

F. In clarification of the division of responsibilities, Dr. Flax's directive emphasized that each party must honor the other's prerogatives, granting full and free access to all data, and carrying on properly coordinated informal and direct communication at all levels. In the way of general guidance, Dr. Flax cautioned both agencies:

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"Despite good intentions on both sides, differences in interpretation of this management directive, the question of whether or not a problem has interface implications, etc., probably will occur periodically. When such an instance arises and cannot be settled in the field, I desire that the problem be called to my attention promptly for resolution. The successful implementation of this management arrangement will require the wholehearted cooperation of both CIA and SAFSP. I enjoin each of you to insure that your respective subordinates put forth every effort in that vein."

With the management responsibilities clarified, it remained only to be seen if the human factor in the relations between CIA and the Air Force could be "directed" back to the truly cooperative spirit which had prevailed during the very early days of this joint endeavor. Fortunately for CORONA and for the nation this proved no problem. The Air Force/CIA cooperation on the CORONA Program was excellent throughout the J-3 program.

The J-3 program had actually been initiated in the spring of 1965 when the DDR&E, Dr. Eugene Fubini, suggested to Mr. Crowley, then the CORONA Program Manager, that a look at a CORONA Improvement Program would be desirable. Mr. Crowley directed his West Coast Resident Officers, [redacted]

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[redacted] to study the problem and report to him not later than 1 June 1965. A series of meetings followed with contractor representatives from LMSC, GE, Itek, Col Paul Heran's Program [redacted] office, and the CIA project office. Failure modes and operational deficiencies of the existing J system were studied as were the CORONA system coverage requirements, weather data, reliability data, etc. From the studies a matrix of feasible system designs was developed with all of the recommended designs incorporating an improved panoramic camera, stellar/index cameras, and command system. The major variables in the matrix were the launch vehicle, film load, orbital lifetime, and RV configuration. The CIA project office had concluded that significant cost savings could be realized by adopting the ATLAS-AGENA or THORAD senior launch vehicle, 30 day orbital missions, increased film load, and reduced launch rate. The Program [redacted] office preferred to maintain both the MARK V (MK-V) RV and the Douglas launch team.

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The DNRO, Dr. Brockway McMillan, was briefed jointly by the CIA and Program [redacted] staffs on 21 June 1965. Dr. McMillan approved the camera improvements but elected to retain the Douglas THOR booster and existing launch rate, with a modest upgrading of the booster to allow for the increased weight of the new cameras. This booster decision dictated that the MK-V RV and J film load also be retained.

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Approval was issued on 29 June 1965 to Douglas, Fairchild, and Itek for the manufacture of the THORAD, DISIC, and constant rotator systems, respectively.

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Between summer of 1965 and the end of March 1966, major progress was made on the design and development of the J-3 constant rotator camera; and all camera interfaces were completed. When the CORONA Management Plan was approved by the NRP Executive Committee in April 1966 and later promulgated by the DNRO, the final approval was given for the CORONA Improvement Program; however, the delay in this action caused the first launch date to slip from January 1967 to July 1967. The J-3 qualification program went smoothly through July 1967; however, corona static discharge markings were noted on the product from both the panoramic and stellar/index cameras during thermal altitude testing. A repeat test was required, resulting in a six week delay in the launch. The first J-3 launch (Mission 1101) took place on 15 September 1967, and recovery of both buckets was completed on 28 September 1967. The J-3 was considered an outstanding success from a technical standpoint since all design goals were achieved. Problems experienced on the first mission were of a minor nature, correctable without major rework before the next flight was scheduled. The performance was judged to be the best ever from a CORONA system. The J-3 was able to fly a lower orbit and get better photographic scale and more information content per picture, with resolutions of better than six feet being achieved.<sup>21</sup>

During the 1968-1972 period, a number of important Government changes transpired. Mr. Richard M. Nixon had been elected President and with him had come new leaders for the Defense Department. Mr. Melvin Laird was named Secretary of Defense with Mr. David Packard as his Deputy. The time period had brought major changes in the NRO and in the Air Force and CIA organizations as well. At the NRO level, Dr. Flax had remained as DNRO from September 1965 to the spring of 1968 when he resigned and was replaced by Dr. John McLucas. Mr. James Reber had served as Deputy Director under Dr. Flax, but with Dr. Flax's retirement, Mr. Reber returned to the Agency and was replaced by Dr. Robert Naka, a long time associate of Dr. McLucas. Colonel Lew Allen was transferred from SAFSP to Washington in June 1968, and in June 1969 he replaced Brigadier General James Stewart as Chief of the NRO Staff. Colonel Allen remained in that position until September 1970 when, after promotion to Brigadier General, he returned to SAFSP. General Allen was replaced as Chief of the NRO Staff by Colonel Edwin Sweeney. Colonel Sweeney had been the Chief of the Satellite Operations Center prior to this assignment.

General Greer retired on 30 June 1965, and Brigadier General John Martin had been named to replace him as head of SAFSP. General Martin remained in that position until the summer of 1969 when he transferred and was replaced by Brigadier General William King.

As a part of the Air Force security policy, the CORONA Program designator had been changed from ☐

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☐ Colonel Paul Heran retired in 1966, and Colonel Charles Murphy replaced him as Director of

Program ☐ In the summer of 1968, Colonel Murphy was transferred to Vandenberg Air Force Base, and

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O [ ] replaced him as Program Director. [ ] continued in that position until completion of the CORONA Program.

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The major personnel changes within CIA included the appointment of Mr. Richard Helms as DCI and the naming of Mr. Carl Duckett as DDS&T and Director of Reconnaissance. Mr. Duckett had been associated with the CORONA Program since its inception, having been the leader of the Army Technical Intelligence Team which played such a key role in the evaluation of the early missions. Mr. John Crowley retired in 1970 and was replaced as Director of Special Projects by Mr. Harold Brownman.

The 1967-1972 period is generally referred to as the phaseout period of the CORONA Program. On paper, CORONA had been phasing out ever since 1960, but failures and technical difficulties with the advanced programs had required that the "workhorse" be extended and upgraded to meet the intelligence needs. Although no new CORONA contracts were let in the 1967-1972 timespan, delays in the preparation of the final specification and approval of funds for the follow-on systems under CIA development required continuation of CORONA. On 20 September 1966, the NRO Comptroller, [ ] notified the Director of Reconnaissance that the DNRO's recommended budget for FY 1968 had requested a revised schedule for CORONA launches during the projected overlap period. This extension of CORONA was based on the strength of the longer life of the J-3 satellite systems, as well as budgetary considerations. Contrary to the launch a month coverage considered the desirable frequency in previous years, there were to be ten launches each in FY 1967 and 1968, nine in 1969, and a reserve of six to be launched in FY 1970, if needed.

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By 15 July 1967, a technical crisis in the production of the advanced camera system had further slipped the anticipated date for a replacement. Therefore CORONA launches in FY 1967 were reduced from ten to eight in an effort to extend this program even further to provide the required coverage.

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25X1 In this same time frame, [ ] were temporarily reassigned to Washington in support of the follow-on program. [ ] was named Chief of the CORONA AP Resident Office in 1968. [ ] was assigned as Technical Director and [ ] as Chief of Operations. 25X1 This team functioned very effectively together throughout fiscal 1969.

A request was included in the CIA's FY 1969 NRO budget for the procurement of three additional CORONA systems to provide for an overlap with follow-on programs. The DNRO preferred to stretch out the CORONA launch schedule, and no provision was made for any launch or system failures which might occur and which, in turn, would lead to a failure to meet search and surveillance requirements. Early philosophy of

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CORONA had been to schedule 13 flights to assure 12 successes, but in the critical phaseout period, official CORONA planning called for a "zero defects" program.

A top level Review Committee was convened in June 1969 to study the status of the advanced system and the prospects for making the first launch date of December 1970. On the strength of its report, the Executive Committee decided to: (1) approve the recommendation for extending the remaining CORONA vehicles to allow for a one year overlap of CORONA, and (2) not to order any more CORONA systems, but to reconsider the situation in December 1969.

The failure of the forward-looking camera on J-3 Mission 1107, launched on 23 July 1969, heightened the concern felt by Mr. Crowley for the critical aspects of the CORONA phaseout period, particularly those of personnel attrition at the AP Facility, the quality assurance program, and the availability of spares. A meeting held on 25 July 1969 examined closely these three problems, and as a result the following actions were taken:

A. A previously planned OSP reorganization was made on 1 August 1969 to integrate the CIA photo reconnaissance staffs into a Photographic Systems Division in order to insure the most efficient use of the experienced personnel available to the OSP.

B. Planning began for the physical transfer of the AP Facility from Palo Alto to Lockheed, Sunnyvale, in order to have available a supply of technicians to replace those [ ] technicians who were leaving the program during the phasedown period. It should be noted that because of labor union regulations, Lockheed employees could not be placed in the [ ]

C. Planning was initiated for the procurement of spares and refurbishment of systems including cost and reliability considerations.<sup>22</sup>

[ ] was named Chief of OSP's new Photo Reconnaissance Systems Division. [ ] returned to the role as Chief of the West Coast Project Office. [ ] was transferred from Washington to California to work again as [ ] was named Chief of Operations under the new organization. An organization for CORONA in 1970 is shown as Figure 1-5.

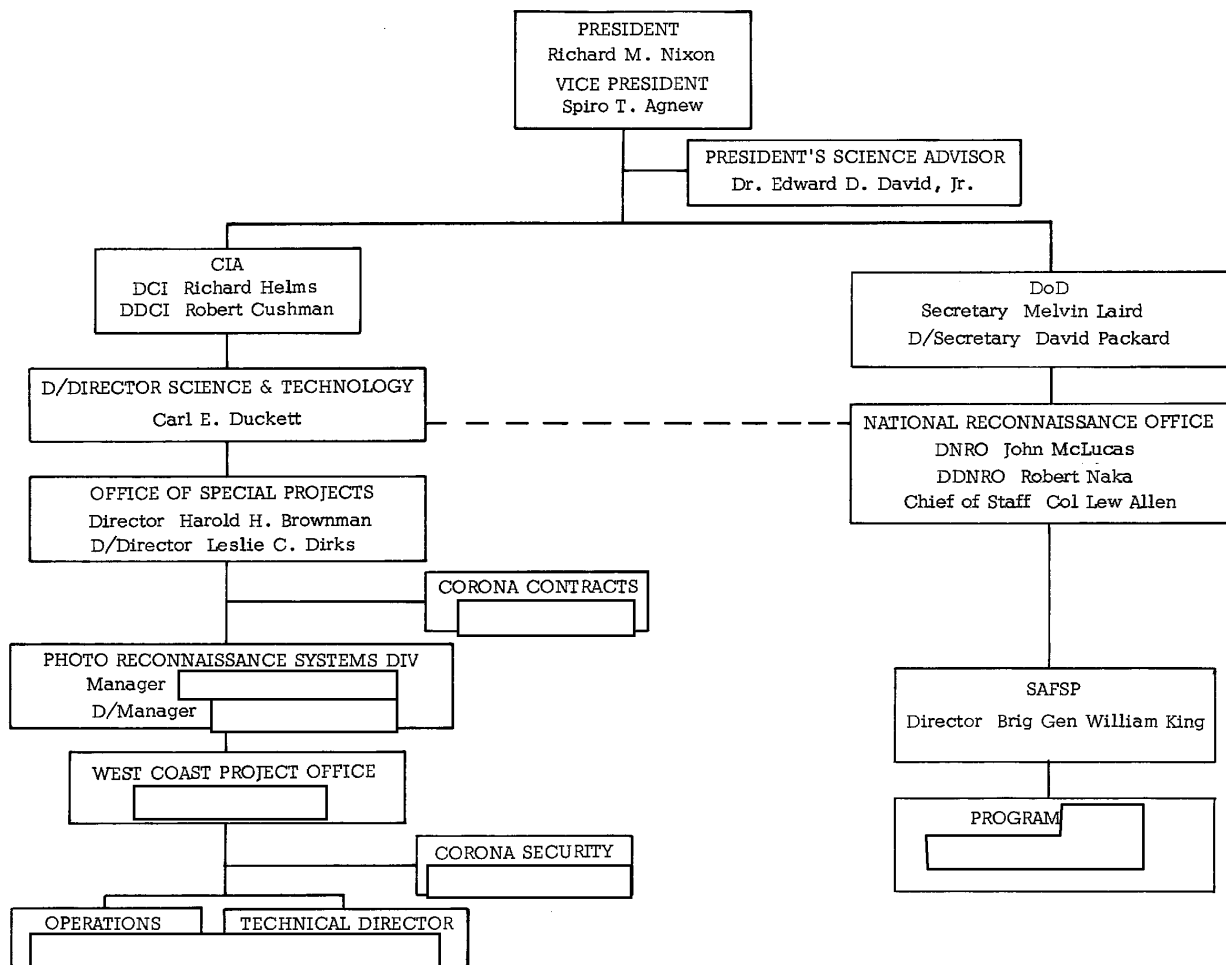
The 145th and final CORONA launch took place on 25 May 1972 with the final recovery on 31 May 1972. That recovery marked 165 for the CORONA Program, more than the entire total of space recoveries for the remainder of the free world. CORONA's impact on the intelligence photo interpretation field had been tremendous.<sup>23</sup> and 24

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Figure 1-5

1970 CORONA ORGANIZATION

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SECTION III

CONTRACTS AND COSTS

The contractual history of CORONA reflects the changing life expectancy of the program as its success and concurrent difficulties with other programs necessitated the continuation and improvement of CORONA.

The CORONA Project Outline<sup>46</sup> of 15 April 1958 had estimated the total cost for 12 launches at [ ]  
[ ] The boosters (12 [ ]) were to be financed by ARPA under the Air Force WS-117L  
program. The payloads, consisting of recoverable capsules [ ] cameras [ ] pods and  
assembly [ ] were to be furnished by CIA out of its reserve. Other costs such as launching and  
tracking operations were not estimated since they represented use of existing military resources and were  
charged to other programs. Mr. Bissell's understanding had been, as stated in his Project Outline, that the  
whole cost of the basic vehicle would be funded within presently approved programs. He also assumed  
that the boosters already approved for the WS-117L program would simply be diverted to the CORONA program.

At the time of approval of CORONA on 16 April 1958, however, it was expressly stipulated that all funding  
for research and development and procurement of hardware should be provided by the CIA and ARPA. The intent  
of this instruction was that funding for these purposes should not be provided by the Air Force.<sup>47</sup>

On 25 April 1958, Mr. Allen Dulles, in a memorandum to the Comptroller of CIA, directed that release of  
[ ] from the Agency Reserve for Contingencies be sought as an unprogrammed requirement for which  
other funds were not currently available. At the same time, he made Mr. Bissell, who then held the title  
"Special Assistant to the Director for Planning and Development," responsible for obtaining the required  
documentation to support the expenditure of those funds and directed that the Agency Audit Staff be prepared to  
audit accounting records of the project.<sup>48</sup>

Arrangements were made by the Development Projects Staff Comptroller to have CORONA funds handled  
by an allotment symbol under the series of accounts applicable to Project CHALICE (the U-2 Program). This  
decision was made to preclude questions which would result from establishing a new project through  
the Agency Comptroller's office as a separate entity. The staff, in making commitments for CORONA, was to  
 earmark those charges so that the DPS Comptroller would be able to separate those costs and render accountings  
on them to the Project Director, Mr. Bissell.

A reassessment of the project costs meant that an additional [ ] for each of the 12 THOR boosters  
would devolve to ARPA. Mr. Bissell brought this to the attention of Dr. Roy Johnson, Director of ARPA, on  
25 June 1958 and said if ARPA could not fund the overt procurement for CORONA, that the financial status of

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the project must be reviewed. ARPA included an additional [ ] in its 1959 funds for CORONA boosters, along with [ ] for WS-117L. An additional seven THOR firings under WS-117L (four testing and three biomedical) were programmed by ARPA. At this time questions arose as to the cost of the biomedical capsules.<sup>49</sup> As a result, the Bureau of the Budget (BOB) became vitally interested in these cost estimates. A thorough review of both programs was made at a meeting in Dr. Killian's office on 5 August 1958, attended by the Director of the Budget, Mr. Maurice Stans; the Deputy Secretary of Defense, Mr. Donald Quarles; the Special Assistant to the President, Brigadier General Andrew J. Goodpaster; and Mr. Bissell.<sup>50</sup>

As one result of that meeting, Mr. Bissell was directed to prepare a revised CORONA Project Outline explaining the changes in cost estimates since the project was originally approved. This he did and on 8 August 1958 copies of this paper were sent to the White House, BOB, ARPA, and Defense.<sup>51</sup> After some further questions by the BOB on the matter of expenditures for biomedical shots for cover purposes, the BOB accepted the revised paper upon the assurance by CORONA project staff representatives that BMD would finance those missions. However this did not end the financial crisis, and a protracted review of both the SENTRY and CORONA Programs continued. The funding/financial situation expanded to include a number of individuals and organizations who became involved in: (1) managerial decisions concerning the allocation of costs; (2) the best use of the data from test flights; (3) ways of handling security and publicity; and (4) possible program modifications.

In September 1958, an additional release of CIA Reserve funds in the amount of [ ] was obtained from the BOB for exploitation equipment to be procured for the Photo Interpretation Center and for other miscellaneous expenses. Soon thereafter, cost overruns under the prime contract for CORONA required another approach to the BOB for additional funds of [ ] from the Reserve, as well as a transfer of [ ] from DoD/ARPA funds to cover prime contract costs transferred from an overt ARPA/Air Force contract to a covert CIA contract for security reasons. Mr. Robert Macy of the BOB asked for assurance from Mr. Bissell that the total FY 1959 cost for both the SENTRY and CORONA Programs not exceed the forecast ceiling of [ ] Mr. Bissell's information from Defense had estimated the cost to ARPA for the two projects plus CIA costs for CORONA [ ] which totalled [ ] Mr. Bissell, in writing up his negotiations with the BOB on CORONA funding, stated in a memorandum:

"For the record, the undersigned will never again assume any responsibility for the success of a major program without having a reasonable degree of control over its funding either through reliance on Agency funds or by means of an ironclad agreement with the Department of Defense."<sup>51</sup>

By the end of November 1958, most of the management problems relating to CORONA were apparently resolved, and Mr. Bissell wrote to General Jacob Smart, then Assistant Vice Chief of Staff of the Air Force, saying that hopefully the responsibility for day to day management of CORONA could now revert to BMD and

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CIA in their respective spheres of responsibility. ARPA would, of course, continue to monitor the program and concern itself with policy decisions.<sup>52</sup>

One of ARPA's decisions was to cancel four of the planned 12 flight DISCOVERER series, as well as two of the three biomedical flights in order to free funds to finance an Air Force follow-on program which would add flights to make up for this cut in 1960.

On learning of the proposed cut in the CORONA Program, Mr. Bissell persuaded the DCI, Mr. Dulles, to ask for a meeting with Defense and the White House to discuss this proposal. Mr. Dulles, in a memorandum to the Deputy Secretary of Defense and the Special Assistant to the President for Science and Technology, called for such a meeting and said:

"I am well aware, of course, that CORONA is being financed for the most part by the Department of Defense and that the availability of funds for this activity is bound to be affected by changes in the general financial situation and plans of the whole Defense establishment. It may well be that the proposed curtailment of the CORONA schedule is wise in the light of the many competing, high priority requirements for funds. Nevertheless, in view of the manner in which the decision to establish CORONA as a separate project was originally made, I would like to suggest that we meet to discuss the status of this project before the curtailment decision is finally made."<sup>53</sup>

A review of the situation which extended over the next three months brought the conclusion that the high priority requirements for photographic coverage of the USSR would not be met in 1960, as had been anticipated, by the SENTRY/SAMOS Program which had been delayed due to technical difficulties. It was believed, however, that an extended CORONA Program could be financed within approved Air Force and Department of Defense budgets.

On 11 March 1959, Mr. Bissell put forward a proposal for the extension of CORONA which would restore the four flights to the 1959 series and add eight more for 1960. Additional funding in the amount of  was required by ARPA, to be furnished from Air Force and Defense emergency funds. The additional payloads would continue to be procured by CIA covert methods as long as the security of the CORONA Program's mission required it.<sup>32</sup>

The proposal for extension of CORONA received White House approval and, in addition, the same cover and security arrangements were directed to be continued. Thus, CIA's role in CORONA was further perpetuated through the additional eight-launch series planned for calendar year 1960.

In the summer and fall of 1960, a special panel under Dr. Killian surveyed the entire US aerial reconnaissance program. This review was made in the wake of the May Day U-2 incident. Recommendations

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for future reconnaissance efforts were made and the Air Force restructured its organization for the handling of these new efforts. At its meeting on 28 June 1960, USIB approved recommendations presented by the Satellite Intelligence Requirements Committee on what constituted desirable resolutions from satellite reconnaissance photography. Soon thereafter the Air Force's direct readout satellite system (SENTINEL) was cancelled, and the Air Force program diverted to development of a high resolution pointing camera.

In August 1960, CORONA had its first successful flight including the recovery of a photographic payload. CIA pursued a program to improve payload engineering for the purpose of increasing reliability and photographic quality; this effort was underwritten with Defense funds. The overall CORONA Program continued to function under the joint CIA/Air Force management arrangement through 1960 and 1961.

25X1 As the satellite and manned reconnaissance programs of the US Government evolved, an effort was started in an attempt to establish a common basis for developing and operating all strategic overhead reconnaissance systems, the cost of which had risen by 1961 to almost [ ] excluding SAMOS. The first such attempt was to form a "National Reconnaissance Program" which would combine the capabilities of both CIA and the Department of Defense. The first National Reconnaissance Office (NRO) Agreement, signed in September 1961, was only a continuation of the effective partnership between CIA and the Air Force which stemmed from the U-2 Program. A second, more detailed agreement was signed in May 1962 and gave the lead to the Air Force while preserving all "covert" aspects for the CIA. The third agreement, signed in March 1963, gave the Air Force virtual control over all CIA programs and established the NRO as an operating organization with implied line authority over those elements of the CIA involved in reconnaissance. An NRO funding agreement signed a month later eliminated direct appropriations from Congress to CIA for its programs in the reconnaissance field and thereby passed budgetary control of that effort to the Defense Department.<sup>54</sup>

While there have been minor changes since the 1963 NRO Agreement, the financial structure has remained virtually the same, with the NRO in control of funds for all overhead reconnaissance activities (with the exception of war zone operations). The offices of the Directorate for Science and Technology of CIA were responsible for satellite and manned reconnaissance and other projects funded under the NRP in 1970. They are required to plan and program their projects with the guidance and assistance of the DDS&T Comptroller and within the limits and guidelines set by the NRO Comptroller. These budget proposals are sent to the DDS&T and the DCI for approval and then forwarded to the DNRO for staffing and eventual inclusion in the overall NRO budget. The NRO budget must be approved by the NRP Executive Committee, which is made up of three voting members (the Deputy Secretary of Defense, the DCI, and the White House Science and Technology Advisor).

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The cost for all CORONA activities of ARPA, Air Force, and the CIA over the 16 year period was reconstructed at [REDACTED] This figure includes all available Air Force "white" and "black" expenditures as well as cost of the ARGON and LANYARD Programs. A breakdown by fiscal year is given in Table 3-1. From FY 1958 thru FY 1962 costs were borne by CIA and DoD appropriation separately. With the formation of the NRO in 1963, separate allocations were given by the NRO to the Air Force and the CIA.

TABLE 3-1

COST OF THE CORONA PROGRAM BY FISCAL YEAR  
(millions of dollars)

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When the Development Projects Staff of CIA took over the development of the CORONA payload, one of the first orders of business was renegotiation of the prime contract previously held by the Air Force with Lockheed Aircraft Company's Missile Systems Division (LMSD). An interim letter contract was negotiated by the DPS Contracting Officer, [redacted] on behalf of the US Government. The contract was [redacted] signed in alias by [redacted] and was accepted by LMSD on 29 April 1958. [redacted]

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NRO

[redacted] the CIA internal contract number assigned to the contract (RT-100) was used within the project staff. The effective date of work performance was made retroactive to 15 March 1958, at which time the Air Force contract had been cut off.<sup>55</sup>

The letter contract with LMSD was changed from a cost-plus-fixed-fee contract to a fixed price, redeterminable contract by a 17 June 1958 amendment. These terms remained in effect until 30 June 1958, when a formal contract was signed in the initial amount of [redacted]. The Work Statement<sup>8</sup> attached to the contract outlined the scope of work including the subcontracting for the camera and the satellite re-entry vehicle (SRV).

NRO 25X1

A letter subcontract between LMSD and Itek was approved on 29 April 1958 for the design and manufacture of the reconnaissance camera and associated equipment. Itek, in turn, subcontracted with Fairchild Camera and Instrument Company (FCIC) on 5 May 1958 for the design engineering and fabrication of the operational cameras. It was decided that the basic research should be centered around selecting parameters of the high acuity (HYAC) panoramic camera, developing the design of the lens system, and that supervision and technical direction over the FCIC design efforts under its subcontract were to be performed by Itek. Itek was also respon-

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sible for providing engineering services for the installation and checkout of cameras in the operational vehicles and their final testing prior to flight. The definitive subcontract with FCIC was signed by Itek on 25 October 1958 (retroactive to 1 May 1958) for [ ] LMSD's subcontract with Itek was signed 17 November 1958 in the amount of [ ] This value included the amount of the FCIC subcontract with Itek.<sup>56</sup>

Since nothing was known about the actual operation of a panoramic camera in an orbiting satellite, a great variety of technical problems had to be solved by Itek. A testing laboratory had to be designed and fabricated to simulate operational velocity and altitude in order to check their effect on camera resolution, as well as the dynamic effect of the camera's operation on the vehicle.

Because of the relative infancy of Itek as an industrial company, the representative of the Auditor General of the Air Force, Mr. W. H. Gross, conducted a survey of proposed practices and procedures which Itek intended to follow with regard to CORONA's government furnished equipment (GFE). Mr. Gross found them generally adequate but recommended a follow-up of their implementation. The use of Air Force auditors for secure auditing of CORONA contracts followed the arrangements previously established for the U-2 Program in 1955. Itek had more than 1,000 items of GFE in its possession. These items had been assigned under an Air Force photographic project which had been cancelled prior to Itek's being awarded the CORONA contract. Arrangements were made through the Air Materiel Command for Itek to retain those items which would facilitate work on CORONA.<sup>57</sup>

Itek's performance under this first subcontract was beset with difficulties resulting in slippages and late delivery of cameras, as well as overruns in expenditures. Funding for a design review and modification of the HYAC camera to increase performance and reliability was requested by LMSD and approved by Project Headquarters in May 1959; however, the first improved camera was not delivered for test until June 1960.

The final audit of the first Itek subcontract with LMSD was completed 11 April 1960 showing total costs of

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[ ] This included an overrun of [ ] of which only [ ] was allowed, making a total amount of [ ] to Itek for the first series of "C Prime" cameras.<sup>58</sup>

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25X1  
A letter from LMSD to General Electric dated 29 April 1958 authorized submission of a proposal for the first series of CORONA recovery vehicles. It was answered by a GE proposal for a contract of [ ] plus [ ] about [ ] fixed fee. A revised definitive contract for [ ] was later approved by Contracting Officer [ ] on behalf of Project CORONA on 9 January 1959. GE's first overrun in February 1959 was for [ ]

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GE encountered difficulties in developing rockets and rocket propellants due to stringent weight and size limitations placed on the nose cone by the available amount of booster power. Each development had to be an advance in the state of the art. For instance, the ablation shield of the nose cone had to be made a structural part of the cone. This was a new departure and resulted in a rejection rate of two to one in the early development period. Changes in the biomedical missions produced added costs in fabricating the capsules for that program. It was apparent that GE had not fully appreciated the difficulties involved when its optimistic quotations were made.<sup>60</sup>

In view of the extension of CORONA into 1960 and the additional release of reserve funds, approved by the BOB in March 1959, the GE overrun was covered and the contract was continued with a new total budget of [redacted] 25X1  
[redacted] A "project control system" was established at both GE and Itek to prevent further such overruns from occurring. The GE contract was completed with the furnishing of vehicles for the first series of twelve CORONA launches, and final settlement was made on 10 May 1963 with final audit 11 July 1963. The total price for the first buy was [redacted] 25X1 61

Contract RT-100 between CIA and LMSD was issued with a ceiling price of [redacted] This amount 25X1  
was obligated and charged to various fiscal year funds of CIA, except for [redacted] of DoD no-year 25X1  
funds obligated in FY 1959. Final price redetermination showed an accepted final price of [redacted] which 25X1  
covered the LMSD, Itek, and GE costs for the first twelve CORONA systems.<sup>62</sup> Two capsules were expended on diagnostic flights. The other ten were launched, but only one payload was put into orbit successfully and its exposed film safely recovered.

A second round of contracts and subcontracts was entered into for the first extension of CORONA when the March 1959 proposal for eight additional missions was approved. Lockheed continued as the prime contractor with subcontract arrangements similar to the initial "C" camera system. The "C Prime" system was an upgrading of the former configuration incorporating a better velocity/height compensation system and modifications in the recovery system. The mission duration was extended to two days and the recovery vehicles were able to carry up to 40 pounds of film. Design improvements were also added to the camera system to increase reliability and photographic quality including an "on-off" capability.

A letter contract (JL-1922) was written with LMSD on 26 July 1959 for eight flight systems; a definitive contract was later executed and the number of units increased to eleven. One flight system was stored as a spare, and the other ten were launched between 26 October 1960 and 15 November 1961. Five out of the ten were successful with the capsules being recovered. This second buy of eleven payloads cost approximately [redacted] 25X1

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In addition to the original prime contract with LMSD, separate arrangements were made in June 1958 for liaison to be set up between Eastman Kodak Company (EK) and Itek for EK to furnish a supply of special film to Itek for compatibility testing with the CORONA camera system. No new contract was negotiated with Eastman for film or processing of the CORONA product at that time because, other than test film, there would be no requirement for CORONA processing until the first operational mission succeeded in bringing back exposed film. Meanwhile, there was money available in the CIA contracts with Eastman for the U-2 photographic requirements which could be diverted to cover the small amount of CORONA work.

A moderate amount of friction developed during 1958-59 between Itek and Eastman because of doubts expressed on the part of Itek as to Eastman's ability to retain maximum system resolution using their proposed processing equipment and techniques on the Itek camera product. Project CORONA photographic experts and personnel from the Photo Interpretation Center visited both plants to satisfy themselves as to the best combination of equipment and procedures to accomplish CORONA processing.<sup>63</sup>

In anticipation of the successful retrieval of a large volume of satellite photography, plans were made during 1958-59 for modifying existing equipment and providing additional new equipment at the Eastman Processing Facility originally set up to handle U-2 photography, and at PIC in Washington to effectively handle this volume of CORONA film. Contracting with Eastman for processing and other services related to satellite photography began in FY 1960 with a small contract for film, paper, chemicals, and other supplies in the amount of [redacted]. In FY 1961 costs under that contract rose to more than [redacted] and in FY 1962 to [redacted]. The first film processing contract initiated in FY 1961 obligated [redacted] in FY 1961 and 1962, and the successor contract obligated almost [redacted] in the first half of FY 1963. Development and production of various pieces of photographic and imagery interpretation equipment for the use of PIC in its analysis of satellite photography between FY 1961 and 1962 totalled more than [redacted].<sup>64</sup>

With the establishment of the NRO, that office was given responsibility not only for specific collection systems but also for the processing of the product of those collection systems. A "Memorandum of Understanding Regarding Chemical Processing and Reproduction of Photography from NRP Missions" was agreed to and signed by Dr. Herbert Scoville, Jr., for CIA and by Dr. Joseph V. Charyk, Director of NRO, on 11 August 1962. Under that agreement the Air Force and the CIA facilities at Eastman were to be combined under CIA (DDR) management and updated to initially process all of the high quality material and prepare duplicates for PIC and the community's use. Additional large scale production of duplicates for other customers was to be carried out by the Air Force Special Projects Production Facility at Westover Air Force Base, Massachusetts. This Facility also was established as an alternate for processing the CORONA original

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and did indeed process CORONA original negatives in this role. The NRO Staff was responsible for coordination of the production activities and determining and assigning production workloads at both installations to meet the priorities/suspenses established by the United States Intelligence Board (USIB). The CIA part of this effort was to be carried as a line item in the CIA portion of the NRO budget.<sup>65</sup>

On 19 December 1962, the CORONA Contracting Staff issued a contract to Eastman for work in the area of research and development on photographic processing. At Dr. Charyk's direction, the Air Force Special Projects Office under Brigadier General Robert Greer negotiated a similar contract with Eastman, and CIA was directed to withdraw from this work. Dr. Scoville declined on the basis of the agreement of 11 August 1962, and the matter was held in abeyance while both contracts moved slowly ahead. After 1 March 1963, when Dr. Brockway McMillan succeeded Dr. Charyk as Director of NRO, he directed that the CIA contract be cancelled and that General Greer assume technical management for work in the R&D area at Eastman, with CIA handling only the covert contractual arrangements.

Although Dr. Scoville had misgivings about the transfer of the research and development contract, in practice all of the R&D activities at Eastman continued from 1963-1974 to be run by a three member Configuration Control Board (CCB) consisting of a chairman from SAFSP, a representative from CIA, and a representative from the NRO Staff. Except for the R&D contract, all of the other production related activities at Eastman remained under the technical direction of the CIA.

Because of intimate involvement with the processing and duplication of imagery produced by the CORONA system, the AFSPPF function also included photographic research and development to improve the quality of the imagery delivered to the intelligence community. This included the development of equipment and techniques in processing, printing, macrodensitometry, microdensitometry, films, chemistry, and processes. This proved advantageous in expanding the research effort throughout the photographic industry rather than limiting the work to Eastman Kodak alone. This effort was carried out under SAFSP guidance until the later years of the CORONA Program when, at the direction of General Lew Allen, Jr., then at SAFSP, the CCB began to review AFSPPF R&D efforts.

With the expansion of CORONA to fill the requirements for satellite reconnaissance which the SAMOS Program had failed to achieve, a new contract with LMSD (BH-1937) was entered into which was retroactive to 7 June 1960. This contract called for the procurement of six additional systems similar to those previously furnished. The letter contract of 27 June 1960 called for a camera similar to the C and the C Prime manufactured by Fairchild under subcontract to Itek. However, work on that camera system was cancelled in September 1960, and Itek began the manufacture of a new version called the "C Triple Prime" camera. The

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negotiated contract was signed with LMSD on 2 June 1961 for an estimated cost of [ ] and a fixed fee of approximately [ ]<sup>66</sup> 25X1

Continual improvements in the THOR and AGENA vehicles were also being made to allow more positive injection of desired parameters with greater weight capabilities. The six C Triple Prime systems were launched between 30 August 1961 and 13 January 1962. One failed to orbit; one failed after orbiting; and four operated successfully and their payloads were retrieved.<sup>67</sup> Performance under this LMSD contract was completed in May 1962, and it was closed out in December 1966 without an overrun.

During this time period, the National Reconnaissance Program was established, and the control of the program and all of its various projects was centralized under the National Reconnaissance Office, its Director, and Staff. During this same time frame, CIA's satellite reconnaissance activities, which had been under the overall direction of Mr. Bissell, first as Special Assistant to the Director and later as DDP (1959-1961), were transferred to the newly designated Deputy Director for Research, Dr. Herbert Scoville, Jr. It was under Dr. Scoville's Directorate for Research that these activities were initially established, first in the Office of Special Activities (OSA) along with the U-2 and A-12 manned reconnaissance projects.

At the time of the NRO Agreement of May 1962, an understanding had been reached between Drs. Scoville and Charyk that the OSA Contracts Staff would be available to do covert procurement in furtherance of NRP objectives.<sup>68</sup>

[ ] replaced [ ] in the fall of 1960 as Chief of the OSA Contracts Staff. His headquarters contracting staff together with an additional contracting officer, who was nominated by the Office of Logistics and assigned to General Greer's SAFSP office, negotiated covert procurement contracts for CIA and Air Force satellite reconnaissance programs.

While the major CIA effort in the satellite reconnaissance field was devoted to CORONA in this early period, the ARGON and LANYARD Projects were also given major support from the contractual and security standpoints.

Project ARGON was a geodetic mapping program of the Army Map Service, for which CIA carried out covert procurement contracting for a total of fourteen ARGON vehicles over the period from 1959 thru 1963, at an approximate cost of [ ]. The systems contract was given to LMSC who subcontracted for ground data reduction equipment with Autometric Corporation, and with Fairchild for a three inch focal length camera with low distortion lens which would provide terrain coverage over 70 degrees of view.

Twelve of the ARGON systems were launched between February 1961 and August 1964, seven of these twelve were successful in some degree. This program did provide imagery for establishing considerable

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On 5 April 1962, the DCI concurred in an agreement between the DDR and the Under Secretary of the Air Force whereby CIA agreed to the management procedures for Project LANYARD, an interim add-on to CORONA. LANYARD was designed to use the CORONA vehicle with a camera which was a modification of the Air Force E-5 camera system. The Director of SAFSP, Major General Greer, was responsible for technical management of all aspects of LANYARD while CIA undertook contract administration for the payload and covertly procured portions of the recovery system.<sup>69</sup>

25X1 The first five LANYARD systems plus three additional "L" systems were contracted with LMSC by [redacted] the CIA Contracting Officer assigned to General Greer's SAFSP office, between 2 August 1962 and 11 March 1963 for an estimated total cost of [redacted] Under the LANYARD Program the increased performance capability of the "Thrust Augmented THOR" (TAT) was demonstrated; however, LANYARD had only three launches. The first, launched on 18 March 1963, failed to achieve orbit. The second was launched on 18 May and recovered on 20 May 1963; however, there was no payload transfer. Mission 8003 was launched on 30 July and the SRV recovered on 1 August 1963. This mission was only partially successful due to a thermal defocus in the camera. The program was cancelled shortly after the second launching of the Air Force's advanced spotting camera system on 8 September 1963 which produced superior photography. 25X1

25X1 On 23 October 1963, Dr. McMillan (DNRO), directed General Greer to terminate LANYARD contracts for the convenience of the US Government and to issue stop-work orders immediately on all work associated with LANYARD. A subsequent review brought a delay in the cancellation of the LMSC contract, wherein some additional work was accomplished for the Air Force. This increased the total price of the LMSC contract to [redacted]

25X1 As the THOR-AGENA vehicle was given improved capabilities, it became possible to develop a two camera system capable of furnishing stereoscopic photography. Dr. Charyk authorized the development of such a system within the CORONA Program. Lockheed's Advanced Projects Division was given a CIA contract effective 20 March 1961 for six dual "C Triple Prime systems with stereo capability." Under the MURAL development, in order to try to reduce program costs and to maintain more effective project control, Mr. Bissell and Dr. Charyk agreed to separate contracts with LMSC, Itek, and GE by Project CORONA whose Contracts Staff would be responsible for monitoring the contracts and keeping costs in line. At the same time, LMSC was given a "Systems Engineering and Technical Direction" (SETD) contract from SAFSP to guarantee an optimum effort by the contractor toward perfecting the total system design. In November 1962, the systems engineering contract with LMSC reverted to a CIA contract. This contract ran until August 1964 when development work on the MURAL system was virtually complete. 25X1

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In 1962 the number of MURAL systems procured was increased to 22 units at a total cost of approximately [redacted] Six additional MURAL systems were procured under a modification program which introduced the dual payload system named JANUS (later redesignated as "J"). A total of 26 MURAL payloads were procured and launched between February 1962 and December 1963. Six failed due to various component anomalies, but 20 capsules were successfully recovered. Table 3-2 presents a contract summary of MURAL payloads.

TABLE 3-2

MURAL PAYLOAD CONTRACTS SUMMARY

CONTRACT	UNITS	PERIOD	COST
LMSC 2-24/2-26/3-03	1-28 (Inc. JX27 & JX28) SETD	3/61 - 7/64 3/61 - 10/62	[redacted]
GE CC 1500 (A-45)	33 (Inc. Seven Units Flown on "C" System)	4/61 - 3/63	
Itek 8214	27	3/61 - 9/63	
Total Cost of MURAL Payloads			

The Thrust-Assisted THOR (TAT), which made it possible to double the weight of the CORONA payload, led to the next improved configuration. The JANUS or J Program specifications as presented by LMSC in November 1962 and again after a revision on 12 January 1963, called for the development and production of 20 photographic reconnaissance satellite systems using the TAT booster; the AGENA D satellite (Lockheed); two modified Mark 5A recovery systems (GE); one modified 70mm CORONA M panoramic camera subsystem (Itek); two Stellar/Index camera subsystems for attitude-indexing reference (Itek); and a space structure subsystem (payload frame, timers, interface, flight program equipment, etc.). The major difference between the J and M configurations was that the J included two re-entry vehicle subsystems instead of one, which resulted in an increase in the film capacity to 160 pounds, or 16,000 feet.<sup>70</sup>

The AGENA D vehicle was optimistically expected to provide about eight days of stabilized flight out of a 30 day planned orbital life during which time photographs were to be taken. The mission plan might call for a five day operation of the camera and transport of exposed film into RV-1; after ejection of RV-1, the satellite could be programmed into a controlled tumble for up to 20 days, with the power to the payload turned off. The satellite could then be stabilized for a further photographic operation of the camera and transport of the second

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spool of exposed film into RV-2; and finally, the ejection of RV-2 could be signalled, and its recovery would complete the operation. The Zombie mode, as the tumble was called, was tested on Mission 1015, but SOC personnel in Washington were concerned about the potential for loss of RV-2 and this mode was never used operationally. Instead, the J-3 Program redesign was directed toward a progressively longer active lifetime from the AGENA, these longer lifetimes also benefitted the later J-1 missions.

In April 1965, Itek commenced work under contract to provide a Pan-Geometry (PG) capability for the J-1 cameras. This would allow the mapping and charting community a means to more accurately determine geographic location of targets on the CORONA photography. PG consisted of providing rail holes with appropriate lamps so that a reseau could be determined, and an IMC trace would be imaged on the pan camera film. Using calibrated data from the cameras, the cartographic community could reconstruct the internal geometry of the camera system. A design goal was to have the accuracy to provide maps in the 1:50,000 scale range.

Of the first 20 J system flights, one system (two capsules) failed to orbit, six SRVs were not recovered from orbit, but the remaining 32 capsules were successfully recovered in the re-entry area. The first of this series was launched on 24 August 1963 and the 20th on 9 June 1965. Meanwhile, another contract for 19 additional J systems plus the conversion of two of the last M units to J series was given to LMSC on 23 November 1964 (effective as of 3 March 1964). Itek and GE continued to furnish the camera and re-entry subsystems. Of the 42 capsules represented by the second procurement of J systems, one system (two capsules) failed to orbit, and 40 capsules were successfully retrieved. This series was launched between 18 May 1965 and 16 June 1967. The third procurement of J systems was for 11 additional units awarded to LMSC, Itek, and GE in September 1966. The first of this series was launched on 9 May 1967. Table 3-3 provides a summary of the contracting information for the J payloads.

With the completion of the "J" (J-1) series in September 1969, Dr. John L. McLucas (then NRO Director and Under Secretary of the Air Force) wrote the following to the DCI on 23 October 1969:

"The successful performance of CORONA Mission 1052 concluded a series of 52 satellite reconnaissance missions which have provided critical intelligence essential to our national security. When the history of space reconnaissance is compiled, it will be noted that the CORONA Program conquered the initial technological problems, produced vital national strategic intelligence for years, and provided a sound basis for development of advanced systems.

"The J-1 system served the national needs with distinction for six years, and its remarkable record has been due, of course, to the outstanding efforts of the people responsible for its development, production, and operation. I offer my thanks and appreciation for a job well done to you and your staff. Please also extend my congratulations to the appropriate contractors and other government personnel."71

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TABLE 3-3

"J" (J-1) PAYLOAD CONTRACTS SUMMARY

<u>CONTRACT</u>	<u>UNITS</u>	<u>PERIOD</u>
LMSC 8-91	1-20	10/62 - 4/65
LMSC W02 & W05	21-39	3/64 - 3/67
LMSC C 01	40-50	6/65 - 6/69
LMSC 8-92	SE	11/62 - 6/63
LMSC 2-65	SE	7/63 - 8/64
Total LMSC		
GE K10	Dev of Dual System	10/62 - 5/65
GE K11	61 (Inc. 13 Capsules Flown on M & L Programs)	8/61 - 3/67
GE TA	52	9/64 - 1/68
Total GE		
Itek 8268	26 (Inc. 6M)	10/62 - 1/65
Itek 8416	22	3/64 - 6/66
Itek 9222	3 PC Mods	4/65 - 2/67
Itek 8623	3J, 5PG	9/65 - 6/67
Total Itek		
Total Cost of I Payloads		

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The J-3 development was initiated in the spring of 1965 as a comprehensive improvement in the continuing CORONA Program. The design goals for the J-3 series were:<sup>21</sup>

A. Primary Sensor

1. Removal of camera system oscillating members and reduction of error budget vibration components.
2. Improvement of V/h match from 5% to 2%. A nodding cam IMC which provided image motion in object space rather than image space was introduced on J-3.
3. Proper camera cycling rates at altitudes down to 80 nm (minimum J-1 altitude was 100 nm).
4. Elimination of camera failures caused by film pulling out of rails (two J-1 systems experienced orbital failures due to the design deficiencies).

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5. Exposure control through variable slit selection.
6. Capability of handling alternate film types and split film loads (color, infrared, etc.).
7. Improved lens performance (the J-3 systems produced 180 c/mm dynamically).
8. Pan geometry without effect on imagery (J-1 systems required IMC traces in the format area; they were placed outside the format on J-3).
9. Capability, if feasible, of handling ultra thin base (UTB) film. Although UTB was successfully flown on Missions 1103 and 1105, its use was discontinued due to ground test failures and concern for maximum reliability.

B. DISIC

1. Improved Terrain camera performance (increased focal length 1.5 to 3 inches).
2. Independent mapping capability.
3. Improved shutter reliability.
4. Removal of stellar launch window restrictions (J-1 launch windows were governed by stellar windows).
5. Elimination of Stellar camera flare (increased knee angle and improved baffle design).

C. Spacecraft

1. Increased command flexibility.
2. Increased orbital life.
3. Improved orbit maintenance.

D. Launch Vehicle

1. Increased thrust.
2. Accommodate system improvements.

E. All Systems

1. Removal of limited shelf life items.
2. Removal of items affecting R-1 readiness capabilities.

Approval was issued in July 1965 to Douglas, Fairchild, and Itek for the manufacturing of THORAD, DISIC, and J-3 systems, respectively. The first J-3 launch was targeted for January 1967; however, for budgetary and other reasons, the DNRO delayed issuance of the "go-ahead" to LMSC and GE until April 1966. This eight month delay resulted in a six month slip in schedule, with the first launch being rescheduled at the April 1966 Interface Meeting for 25 July 1967.

Schedules of critical design reviews, qualification test programs, hardware deliveries, and system test activities were established to meet this new target date. Final design reviews for the camera, SRV, electrical system, structural aspects, and total payload were set for 23 August 1966, 7 September 1966, 7 October 1966,

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17 February 1967, and 14 April 1967, respectively. All were conducted according to plan. Deliveries of the camera systems and SRVs to AP were several weeks behind the target schedule; however, this time was made up during the systems test phase. The J-3 qualification program proceeded smoothly throughout, with J-3 being somewhat of a "first" for CORONA in that a full quality program was conducted prior to the first launch. In early July 1967, it appeared as though the target launch date might be met; however, a corona problem was uncovered on both pan and DISIC cameras during thermal altitude testing, and two High Vacuum Orbital Simulator (HIVOS) test reruns were required. The J-3 system was available for launch on 7 September 1967.

At the June 1965 briefing to Dr. McMillan, the Resident Office presented one time cost estimates for the payload portion of the CORONA Improvement Program. These estimates and actual costs are shown in Table 3-4.

TABLE 3-4

ONE TIME ESTIMATED COSTS FOR J-3 SYSTEM IMPROVEMENT PROGRAM  
(millions of dollars)

	<u>JUNE 1965</u>	<u>ACTUAL</u>
LMSC		
ITEK		
GE		
TOTAL		

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As can be seen, the major variance was with the pan camera development. The increased costs at Itek were primarily associated with the expanded scope which included the UTB, PG, and exposure/filter control developments, and a lens improvement program. Actual one time design and qualification costs at LMSC were extremely low since the [ ] also took into account the one time development costs of [ ] for a data subsystem. This subsystem included a recoverable digital tape recorder and its ground automatic data processor. The tape recorder data proved extremely beneficial both in flight and during ground testing. This highly successful tape recorder was later modified and employed in other space programs.

One time costs at GE included [ ] for two sets of new SRV aerospace ground equipment (AGE). This cost was low relative to other NRP projects, partly because of the use of mini-block terminals with pin inserts which eliminated the need for costly terminal board panels. A DoD cost improvement award was given to GE personnel for their design work on the J-3 AGE.

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DISIC integration costs are included in the LMSC and GE figures; however, DISIC one time development costs and THORAD development costs are not shown. The increase in cost of a J-3 payload over a J-1 payload was approximately

From a technical standpoint, the J-3 development was an outstanding success. The pan camera performance predictions as presented to the DNRO at the 15 June 1965 CORONA Improvement Program briefing were as shown in Table 3-5.

TABLE 3-5  
TWO SIGMA GROUND RESOLVED DISTANCE  
PERFORMANCE PREDICTIONS FOR PAN CAMERA  
(feet)

<u>Direction</u>	100 NM		90 NM		80 NM	
	<u>0°</u>	<u>30°</u>	<u>0°</u>	<u>30°</u>	<u>0°</u>	<u>30°</u>
In-Track	7.6	8.7	7.0	7.9	6.4	7.2
Across-Track	7.7	14.9	7.1	14.0	6.5	13.2

In conjunction with the J-3 development program, a forward-looking program of photographic investigation was carried out to determine the most promising techniques of intelligence enhancement. The program, designated EKIT because of the cooperation between Eastman Kodak and Itek, provided the foundation for the systems testing of the first four constant rotator camera flights.

These payloads carried lengths of special camouflage detection color film or high speed, high resolution black and white film. The test series accomplished its fundamental purpose of demonstrating the J-3 camera's capability to handle new photographic techniques due to the added flexibility of having two changeable filters and four changeable exposure slits on each camera. These new features allowed the use of mixed film loads and/or different filters. No degradation occurred to the primary intelligence requirements of these missions because of these tests.

These tests drew such interest throughout the Intelligence Community that a CORONA J-3 Ad Hoc Committee was convened by the DNRO on 4 December 1967 and formally constituted in February 1968. Its purpose was to analyze and evaluate the experiments conducted on these test flights. Specific findings of the Committee included the recommendations that: (1) further testing of color films and techniques should be conducted against specific intelligence requirements; (2) a special subcommittee of the Committee on Imagery Reconnaissance and Exploitation (COMIREX) should be constituted to evaluate the utility of satellite color photography; and (3) a well planned color collection program be worked out with the close cooperation of the system program offices, the SOC, the intelligence analysts, and the photo interpreters.

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The J-3 Program consisted of 17 systems. One (Mission 1113) failed to attain orbit due to a THOR turbo pump malfunction. On the remaining 16, however, all 32 capsules and 96% of all film were successfully recovered. The J-3 systems produced not only the finest imagery but also the highest reliability of all the CORONA designs. In view of the extended schedules and losses of personnel in the period of program phaseout, this was a truly remarkable record. Of the 17 J-3 vehicles procured, the first 13 were contracted in 1965-66 and the follow-on procurement of 4 authorized in July 1967. Table 3-6 provides a summary of the contract information for camera RV and payload.

TABLE 3-6

## J-3 PAYLOAD CONTRACTS SUMMARY

<u>CONTRACT</u>	<u>UNITS</u>	<u>PERIOD</u>	<u>COST</u>
LMSC C 03	1-12 & QR-2	3/66 - 6/69	
LMSC C 07	13-16	7/67 - 6/69	
LMSC C 04	LOE 67	7/66 - 6/67	
LMSC C 06	LOE 68	7/67 - 6/68	
LMSC C 08	LOE 69	7/68 - 6/69	
LMSC C 09	LOE 70	7/69 - 6/70	
LMSC C 10	LOE 71	7/70 - 6/71	
LMSC C 11	LOE 72/73	6/71 - 12/72	
Total LMSC			
GE CC1900 (VJ)	1-26 (+6 Refurb)	4/66 - 3/69	
GE CC1202 (WR)	27-34 (+4 Refurb)	9/67 - 6/72	
GE DC72 4014 (IA)	Program Support	7/71 - 12/72	
Total GE			
Itek 9232	1-12 (plus QR 1 & QR2)	7/65 - 6/68	
Itek 9265	13-16 (plus QR 2 Refurb)	9/67 - 5/69	
Itek 9493	Program Support	6/69 - 6/70	
Itek 9495	Program Support	7/70 - 6/71	
Itek 9496	Program Support	7/71 - 12/72	
Total Itek			
Total Cost of J-3 Payloads			

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SECTION IV

REFERENCES AND HISTORICAL DOCUMENTS

This section sequentially lists all sources referenced in the previous sections of Volume II. In some cases there are subsequent references to the same document, in those instances the original reference number is repeated in the text. When it was determined that one of these documents was of significant historical value and available in the original form, the document has been reproduced, numerically cross-referenced to the list below, and physically included in this section. The reproduced documents are identified with an asterisk (\*) and by page numbers.

<u>Vol II Ref No</u>	<u>Section IV Page No</u>	<u>Vol II Page No</u>	<u>Reference Document</u>	
1		-	Rand Report, R 217, April 1951, Utility of a Satellite Vehicle for Reconnaissance	
2		-	Rand Report, R 262, 1 March 1964, Volumes I and II	
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5		-	R. M. Bissell, Jr., Memo, 19 November 1957, Subj: Proposed Advanced Reconnaissance System, TS-16471	
* 6	4-5 to 4-9	1-5	CORONA Cover Plan, 8 December 1958, COR-0160, TS	
* 7	4-10 to 4-13	1-6	Project CORONA Outline, 15 April 1958, COR-0013, TS, with covering Memorandum for General Andrew J. Goodpaster from Richard M. Bissell, Jr., Special Assistant to the Director, COR-0014, TS	
* 8	4-14 to 4-16	1-7	Work Statement, Development of a Satellite Reconnaissance and Recovery System (CORONA) by Lockheed Missile Systems Division, 25 April 1958, COR-0016	
9		-	"Status of CORONA," 17 April 1960, DPD Unnumbered Document in OSA retired files, S	
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17		-	John A. McCone, Memo, 2 February 1965, Subj: Principles to Guide the Preparation of a New NRO Agreement, [REDACTED] TS	25X1
18		-	James Q. Reber, Chief SIGINT Committee (former DDNRO), April 1970, Subj: DDS&T Relations with National Reconnaissance Office, [REDACTED] Unnumbered (Appendix D, TAB 78, DDS&T History), S	25X1
19		-	A. D. Wheelon, DDS&T, Memo to DDCI, 26 February 1965, Subj: Establishment of a Satellite Office within the S&T Directorate, [REDACTED] S	25X1
* 20	4-21 to 4-24	1-20	Alexander H. Flax, Director, National Reconnaissance Office, Memorandum for: Director of Reconnaissance, CIA and Director of Special Projects, SAF, 22 June 1966, Subj: CORONA Management Plan and Organizational Responsibilities, [REDACTED] TS/C	25X1
* 21	4-25 to 4-27	1-24	The CORONA Improvement (J-3) Program Development History, 27 October 1967, COR-6148-67, TS	
* 22	4-28 to 4-30	1-26	John J. Crowley, Director of Special Projects, Memorandum for the Record, 29 July 1969, Subj: CORONA Program Planning, [REDACTED] with covering Memorandum to Director, National Reconnaissance Office, from Carl E. Duckett, Director, CIA Reconnaissance Program, 31 July 1969, Subj: CORONA Program Planning, [REDACTED] S	NR 25X1 25X1
* 23	4-31 to 4-33	1-26	Transcript of Speech by Arthur Lundahl, Director, National Photographic Interpretation Center, on the Occasion of the Dedication of the CORONA Museum 25 October 1972	
* 24	4-34 to 4-38	1-26	Transcript of Speech by Richard Helms, Director of Central Intelligence, on the Occasion of the Dedication of the CORONA Museum 25 October 1972	
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* 26	4-50 to 4-52	2-2	CORONA Cover Story, 23 June 1958, COR-055, TS	
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* 37	4-55 & 4-56	2-6	Department of Defense Directive No. S-5200.13, 15 November 1962, Subj: Security Policy for Military Space Programs (U), S
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CORONA COVER PLAN

SITUATION: Until September 1958 the CORONA Project was to be concealed in the first phase of the WS-117L Military Reconnaissance Program. It was then decided that such a situation was undesirable because of the following reasons:

1. The WS-117L program has been openly identified as a Military Reconnaissance Satellite and all phases of the program have therefore been tainted with a reconnaissance effort.
2. The international political climate is now hostile to any form of overflight and reconnaissance and this hostility has manifested itself to the point where high government officials might cancel the CORONA program should it continue to be identified with such efforts.

OBJECTIVES: In light of the above, this plan has been guided by the following requirements:

1. ARPA (Advanced Research Projects Agency) participation must be logically explained.
2. Any intelligence community interest or association in the CORONA effort must be concealed.
3. Any scheduled or contemplated military reconnaissance effort, photographic or otherwise, must be concealed.
4. Any direct connection with a subsequent WS-117L ATLAS phase utilizing identical equipment must be concealed except where obvious engineering advancements would profit ATLAS and other satellite programs.
5. A logical explanation must be given for the required polar orbit, stabilized flight and recovery.
6. Cover missions must satisfy professional curiosity by a logical sequence of technical effort and the production of a product having military application.
7. A relationship with the press must be maintained to prevent continued speculation.

SEPARATION:

1. The true nature and purpose of WS-117L have already been the subject of such extensive public discussion and the number of persons in various contractor companies and in the military services knowledgeable of the program is so large that it is believed to be wholly infeasible to deny that a satellite reconnaissance system is being developed. Accordingly, to secure acceptance of an explanation of the CORONA firings which denies any connection with reconnaissance or with other similar sensitive military activities, it is necessary to describe the entire Thor-boosted series of flights as an activity entirely separate from the WS-117L program. To accomplish this, ARPA has issued a directive separating the WS-117L program into two distinct series, one identified as DISCOVERY (CORONA Thor Boost) and the other as SENTRY (117L Atlas Boost). DISCOVERY will be identified as a practical space platform for the conduct of experiments aimed toward the development of improved military systems.

2. The actual break between WS-117L and the CORONA series occurred on 28 February 1958 when the Director, ARPA, in a memorandum to the Secretary of the Air Force, directed that the development of a proposed interim reconnaissance system utilizing the Thor boost be dropped. That memorandum ostensibly authorized the use of the Thor boosters for test flight of Lockheed developed satellite vehicles and included provisions for the recovery of biological specimens in furtherance of manned satellite flights. To the allotted number of vehicles, ARPA added an additional 10 to permit the acceleration of other programs contemplated for later launchings. A total of nineteen (19) Thor boosters thus became available for the CORONA series, though the specific number of vehicles need never become an intended matter of publicity.

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EXPLANATION:

1. To give public circulation to the desired explanation it is vital that at least a minimum amount of information be released and that normal announcements be made. To attempt to deny the press any information regarding the launchings would not only invite a penetration effort on the part of the opposition but create an air of mystery and encourage damaging speculation. At the same time it will be necessary to give consistent but much more complete technical explanations (which will be at least in part classified) to the considerable number of persons who do not need to know the true purpose of CORONA but are in a position to guess what it involves unless they are provided with a convincing alternate explanation. These are mainly military and company personnel working at the launch site, in the recovery force, and in companies and military organizations concerned with the series.

2. Though it is contemplated that Vandenberg Air Force Base be designated a "maximum security area," it is virtually impossible to conceal the activities preparatory to or at the time of launch. The physical conditions of the facility are such that unauthorized observations can be accomplished with relative ease. Publicity efforts must therefore allow for some "open" firings when public viewing will be permitted through the media of the press, television and radio. The spacing of non-CORONA launchings is such that an occasional open shot is possible and to introduce these shots to the press would (1) promote a cooperative spirit among the media so they will be more likely to respect the closed shots and (2) exhaust the Vandenberg area as a major news story so that, in time, it should be possible to conduct launchings without the glare of publicity which certainly will accompany the initial firings. Since CORONA and non-CORONA vehicles are identical in outward appearance, there is little concern with the unauthorized observations that may occur.

3. It is not intended that publicity accompany only the so-called "open shots." Closing the CORONA launchings to the public and press can be justified under the policy established for the launch area, i.e., that results obtained from certain activities could be of potential significance to the security of the United States in its development of classified military systems, however, a brief statement should be made to the press announcing the intention to launch. Releases for public consumption can refer to the launchings as being what they are in fact, experiments in the development of guidance and recovery techniques in space vehicles designed exclusively to advance the state of the art in pilotless space flight for whatever application may be deemed desirable. To this extent, CORONA flights can be characterized as hardware development and an evidence of a continuing improvement of U.S. payload capability. Some of the earlier flights can also lay claim to being the means of proving out the instrumentation to facilities of the new Pacific Missile Range and its complex of ground environment stations located in Alaska and Hawaii. In each instance the release prepared to cover the actual CORONA launching should emphasize the development of hardware rather than the collection of scientific data in order to avoid the interference of the vast number of scientists who claim a right to such data.

UNCLASSIFIED COVER:

1. Within the DISCOVERY series, a total of 5 biomedical vehicles have been plotted against the launch schedule. Three of the five have actually been committed to the schedule under launchings three, four and seven. The first two will carry mice and the latter will carry a primate. The remaining two vehicles are reserve back-up for use in the event of a failure in the heavier primate vehicle. To further support the cover plan, ARPA will develop two payload packages designed specifically to (1) study navigation of space vehicles, and (2) obtain data useful in the development of an early warning system.

A. Bio-Medical

The true bio-medical payloads will be publicized as tests to determine the environmental conditions of outer space and the effects such conditions have upon living specimens. These will be unclassified launchings toward which more detailed publicity can be directed. An initial release issued to the press in support of CORONA will have established these flights as one of the primary objectives of the DISCOVERY series. The data obtained from such flights will be reported as contributing to the joint NASA/ARPA Man-in-Space program. Though NASA does not have the responsibility for the conduct of these bio-medical flights, they have agreed to support them as being useful to the furtherance of manned satellite flights.

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B. Navigation and Early Warning

During the earlier stages of the CORONA program, any reference to the special payloads being developed by ARPA can only be utilized as "internal classified information" needed to satisfy the professional curiosity of personnel in ARPA, BMD, and LMSD. Because these programs are in themselves classified, there should not be any public discussion of their existence in the program until such time as they are actually committed to the launch schedule. At that time, the objective involved in the launching can be disclosed but without the usual details that will accompany the bio-medical firings. In the meantime, the development of these special payloads will become known within the various facilities, thus satisfying the curiosity of personnel as to what is forthcoming in the series.

CLASSIFIED COVER:

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2. It was thus made known that certain classified payloads were being developed by the Lockheed Missile Systems Division under rather strict security conditions. Therefore, when a military classification is given to the launching of a particular vehicle and the press is denied access to the launch area, it would appear logical to the unwitting personnel associated with the program that the data from such flights would be of concern only to those personnel assigned to the special facility that developed the instrumentation. The press, on the other hand, would be required to accept the classification on the basis of the maximum security policy established for the launch area.

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4. The current launch schedule for the Thor-boosted series lists the CORONA launchings objectives as "Advanced Engineering." These would not necessarily have to be changed since the schedule has been in being for a considerable period and appears to have been accepted as a working paper by those who are familiar with the fact that the payloads for these launchings are classified. Further, any announcement made to the press during a CORONA launching will, of necessity, speak in rather vague terms due to the restrictions governing closed shots.

5. The series will obviously experience a percentage of failures and since such failures cannot be predicted in advance, it is necessary to maintain a cover plan that is flexible enough to adjust to slippage in the program. Therefore, no explanation should be committed to a given vehicle that would prevent its subsequent use in the event of a failure.

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RECOVERABLE CAPSULE:

1. In many instances there will be a need to explain the use of a recoverable capsule. The large number of personnel involved in the recovery effort makes it virtually impossible to conceal this phase of the operation. In preparing the recovery crews for their mission, both Air Force and Navy personnel should be reminded that the object to be recovered must remain in its original condition and must in no way be tampered with, for to do so would destroy the valuable data and equipment contained therein. They must be impressed with the fact only professional personnel, specifically trained, can handle the sensitive equipment and instrumentation being recovered.

2. Use of a recoverable capsule can best be explained as being the one means the United States has for preventing outside interrogation of the satellite, preserving the ultimate application of the data to the specific military system under development. It further enables a visual examination of any physical changes in the condition of the equipment, furnishes the most accurate data return when combined with some telemetering and also enables the re-use of valuable instrumentation when such is economically feasible.

LOW ALTITUDE - POLAR ORBIT:

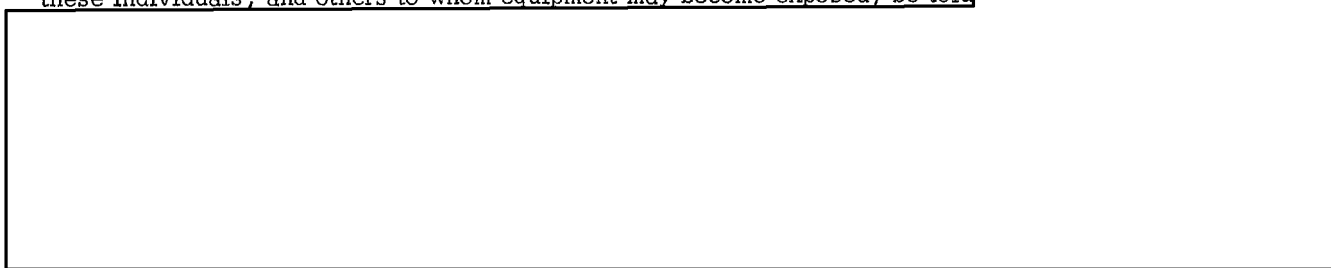
1. The requirement of low altitude and polar orbit will obviously have to be explained and defended. Each of these requirements will have to be explained separately so that one or the other does not suffer through guilt by association. For example: First, a polar orbit can be dictated by Range Safety; second, it is necessary in order to properly exercise the early warning net to detect attack which will logically come from a polar direction. The dictations of Range Safety are well founded. The fact that we are not firing from Patrick AFB, Florida, eliminates our use of offshore free water space. Vandenberg AFB Range Safety does not permit launchings to the East for they would endanger the vast land mass and populace of Southern California, Mexico and Central America. To launch in a Westerly direction would cause us to lose the advantage of the earth's rotation. Therefore, the restrictive conditions limit the launch area to 165° to 180° and the fact that the satellite passes over the Soviet Union becomes coincidental rather than intentional.

2. The low altitude obtained by this satellite can best be explained as the limit of our ability. This being the heaviest satellite launched by the United States would not necessarily subject the orbit altitude to question, particularly in light of the various failures the U.S. has experienced in orbiting lesser weights. Again the launch angle can be introduced as a governing factor. Since we cannot launch in an easterly direction, we lose the advantage of the earth's rotation. Explaining such matters to the press will require a careful play of words, and releases dealing with such matters might well have to take on the appearance of an excuse for this limited ability. It is believed, however, that a successful launch of the DISCOVERER, placing nearly 2,000 pounds in orbit, will be accepted by the press as a major accomplishment and will need little if any explanation.

RESERVE COVER PLAN:

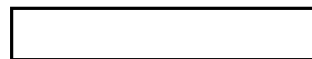
1. It is recognized that in dealing with certain personalities in the military structure and in various fields of industry, there will be a need to reveal that a camera system has been developed and is being utilized. In order to keep from revealing the true purpose of this equipment, it is believed advisable that these individuals, and others to whom equipment may become exposed, be told

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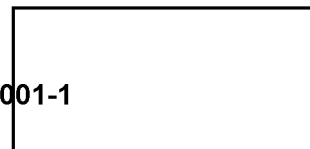


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3. It is not intended that any of the above claims be published in advance of a particular launch, Rather it is intended for use as "Highly Classified Information" to be used in the event we must retreat from other explanations due to a vehicle malfunction exposing vital optical equipment, or some other unforeseen situation.

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COPY

16 April 1958

MEMORANDUM FOR: General Andrew J. Goodpaster

Attached hereto is an outline of Project CORONA. This paper is the result of discussions with Mr. Roy Johnson and Admiral John Clark of ARPA; Mr. Richard Horner, Assistant Secretary of the Air Force for Research and Development; and General Osmand Ritland, Vice Commander, Air Force Ballistic Missile Division. It has been seen by Dr. James Killian.

The course of action proposed herein is satisfactory to these individuals and to their organizations, and is recommended by the Director of Central Intelligence.

(Signed)  
RICHARD M. BISSELL, JR.  
Special Assistant to the Director

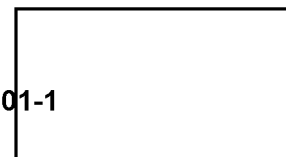
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Volume II

TOP SECRET

15 April 1958

PROJECT CORONA

1. Purpose: Project CORONA contemplates the covert development and subsequent operational use of a short-lived reconnaissance satellite from which, at the completion of its mission, a recoverable capsule containing exposed film is separated for return and pick up in a preselected ocean area. Prior to the initiation of this project, the development of such a system had been started by the Air Force as a part of Weapons System 117L but was officially cancelled early in March. Thus, CORONA involves the picking up and carrying through covertly of a program already undertaken together with technical modifications therein as indicated below.

2. Configuration: Taking advantage of arrangements already made by the Air Force, the basic vehicle for project CORONA will be a two-stage rocket consisting of the same second stage that is being built by Lockheed for WS-117L with a Thor booster as the first stage (in place of the Atlas booster which will be the first stage of the WS-117L vehicle). The payload will be a pod containing a twenty-four inch focal length camera and a recoverable capsule into which the exposed film feeds as the camera operates. Either the whole second stage of the vehicle, or possibly only the pod containing the payload, will be stabilized after it is in orbit and will serve as a platform from which the camera continuously looks downward to the earth and takes pictures by scanning at right angles to the path. This configuration is expected to yield a resolution of about twenty feet on the ground which should be sufficient to permit structures to be distinguished from one another and to allow the detection and identification of such major reconnaissance targets as missile sites under construction, previously unobserved communities, or other major installations in the areas hitherto inaccessible to reconnaissance such as the Soviet far north.

3. Program: It is proposed that twelve vehicles in the above configuration be produced. Although it has not yet been possible to establish a firm schedule of delivery dates, it appears probable that the first firing can be no later than June of 1959. It is tentatively planned to schedule firings initially at the rate of one a month but to achieve a faster rate, perhaps as high as two per month, as soon as possible. Assuming that this timing can be achieved, the twelve firings should be completed in the spring of 1960. It must be assumed that by no means all of these vehicles will be successfully orbited, operate without malfunction, and be recovered. At a later date it may be desirable to consider whether this program should be extended, with or without further technological improvement.

4. Modification of Earlier Plans: The configuration briefly described above differs from that contemplated in the program originally launched by the Air Force. The earlier plan called for spin stabilization of the pod containing the payload, a six inch focal length camera without image motion compensation, and a very short exposure time. Such a configuration could be available as much as six months sooner and would involve somewhat less technological risk (because of its reliance on a proven method of stabilization) than the one presently proposed. On the other hand, it would require the use of fast film which results in grainy photography and would yield a resolution of only sixty feet on the ground. To carry through the development of the original configuration and at the same time to undertake the development of the modified configuration in parallel would have obvious advantages but would add [redacted] to the total cost of the program and would complicate the problem of maintaining cover. On balance it is believed, (a) that efforts should be concentrated on the development of the more sophisticated modified version and (b) that the earlier availability date of the original configuration does not justify the cost in terms of funds and effort of continuing its development in parallel with the modified configuration.

5. Administration: CORONA is being carried out under the authority of the Advanced Research Projects Agency and the Central Intelligence Agency with the support and participation of the U. S. Air Force. ARPA has authorized, and will exercise general technical supervision over, the development of the vehicle. Detailed supervision of vehicle development is being performed by the Air Force Ballistic Missile Division acting as agent for ARPA. The Ballistic Missile Division is responsible also for the provision of necessary

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ground facilities, which are in any case required for the WS-117L program. CIA is participating in supervision of the technical development, especially as applied to the actual reconnaissance equipment, is undertaking all procurement that must be handled covertly, and has general responsibility for cover and for the maintenance of security. In the operational phase actual missile launchings will be carried out at Cooke Air Force Base by technical staffs of the companies concerned. Tracking will be carried out from stations being established by the Ballistic Missile Division. Recovery will be accomplished by a Navy task force. The line of command for these field activities of launching, tracking, and recovery will be through the Ballistic Missile Division. Subject to approval by the appropriate political authorities, the general schedule of launchings will be determined by the availability of vehicles and launching facilities. Specific timing within this schedule will be determined so far as possible on the basis of weather prevailing over target areas. For both cover and control purposes, weather will be reported through an already existing CIA channel and firing dates will be selected by the Central Intelligence Agency.

6. Cover and Security: As noted above the initial step taken to place this undertaking on a truly covert basis was the cancellation of the program already started by the Air Force as a part of its WS-117L development. The cover and security arrangements already made or contemplated are as follows:

a. Subsequent to the ostensible cancellation, limited numbers of individuals in the participating companies were cleared for and advised of procedures to be employed in CORONA. Compartmentation of this project from other activities is being established in a satisfactory manner in all of the companies and an internal cover story is being worked out for use in each company to explain to unwitting company personnel the nature of the compartmented and highly classified work which will be going forward. Generally speaking the personnel actually employed in the design and production of the classified reconnaissance equipment must be witting of its true purpose.

b. Since actual missile firings attract public attention, a cover explanation will be required during the operational phase to explain plausibly the dozen or more launchings that will take place and the recovery operations which will be carried out by the Navy and will involve considerable numbers of Naval personnel. A cover story for certain parts of the developmental work and for some or all of the firings will explain these observable events as parts of a program to conduct experimental space flights with laboratory animals. Partly in support of this cover, but also for their own inherent scientific value, a recovery capsule suitable for carrying an animal and appropriately instrumented will actually be developed and a number of biomedical launchings and recoveries will be undertaken. It is planned that when reconnaissance equipment is to be launched, the pod containing it will be substituted for the biomedical pod just before firing and it is believed knowledge of this substitution can be limited to a few witting individuals in the launching crews. As a supplementary cover story it may be possible to explain some of the firings as events in a program of nose cone re-entry tests.

c. Great technical ingenuity and carefully worked out procedures will be required to maintain the plausibility of either or both of these cover stories. Although planning is still at an early stage, it is believed that this can be accomplished. It would be highly desirable, however, not only to provide an innocent explanation of the quite unconcealable firing and recovery activities but also to conceal the fact that the vehicle ever enters into orbit, since the suspicion will inevitably arise that any orbiting vehicle, however described, is in fact being used for reconnaissance. With this objective in view, the possibility of describing the vehicle as a missile rather than a short-lived satellite is being studied. If this appears feasible the cover stories will be appropriately modified.

d. The strictest security control is being maintained over all aspects of CORONA. All communications which reflect the existence of this project are handled within Top Secret procedures. A list of all individuals who are witting of the project is maintained. Individuals are cleared for and made knowledgeable of the project only on a strict need-to-know basis. Additional clearances may be granted only with prior approval from the CIA project office and this authority will not be delegated to any other organization concerned with the project.

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7. Procurement: Of the total procurement required for CORONA, as large a proportion as possible will be handled relatively overtly as a part of the WS-117L and other programs. In accordance with this general plan, both the Thor booster, which is produced by Douglas for a number of military applications, and the Lockheed second stage vehicle, which (as noted above) is being developed for WS-117L, will be procured by the Air Force. The Thor boosters will be allocated from a group of deliveries already earmarked for certain miscellaneous Air Force programs (including re-entry tests and biomedical programs). The second stage vehicles will be allocated from production already scheduled for the WS-117L program. Only the pods containing reconnaissance equipment and the recoverable film cassettes will be [redacted] by the Central Intelligence Agency. Production of only the covert items will be compartmented in the several companies. The responsibility for systems integration and final assembly will rest with Lockheed. Arrangements are being made which will permit Lockheed's production, testing, and the bulk of its check-out activities to be compartmented and securely carried out up to the moment when the reconnaissance pod is substituted for a biomedical or instrumented nose cone payload.

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8. Financing: The total cost of the program herein outlined, assuming that it will be limited to twelve vehicles, is estimated at approximately [redacted]

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a. Of this amount, covert procurement of the payload would account for approximately [redacted]  
[redacted] as follows:

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Recoverable Capsules  
Cameras  
Payload Pod & Assembly Costs  
Total

[redacted]

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It is proposed that these costs be financed by the Central Intelligence Agency, subject to obtaining the funds from the Agency's reserve.

b. The largest part of the [redacted] total represents the cost of the Thor boosters and the Lockheed second stage vehicles. A rather arbitrary allowance of [redacted] per completed vehicle has been included for these items which therefore account for [redacted] of the total. Since these will be procured in connection with other programs, as noted above, they will be financed by ARPA through the Air Force as elements of the WS-117L and biomedical programs. There is some question, however, concerning the allocation of the cost of the Thor boosters. In any case the whole cost of the basic vehicles will be funded within presently approved programs.

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c. In addition to the foregoing costs for development and procurement of hardware there will be significant operational costs. Moreover certain ground facilities, including especially two new launching pads at Cooke AFB and certain tracking facilities, will be built sooner than they would otherwise be needed. It would be difficult to make a meaningful estimate of costs of this character properly chargeable to CORONA and no such estimate has been attempted. The ground facilities required for CORONA would in any case be needed for WS-117L. Certain operational costs may properly be treated as developmental costs for WS-117L and certain operational costs (for example part of the cost of search and recovery) are not truly additional costs since they represent the use of military resources already in being. These costs must in any event be charged to other programs for reasons of cover and will be absorbed by those programs.

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REFERENCE NO. 8

COPY

25 April 1958

WORK STATEMENT

DEVELOPMENT OF A SATELLITE RECONNAISSANCE  
AND RECOVERY SYSTEM

Develop and provide, except as specifically set forth below, all equipment, services, and facilities necessary to complete a program of photo-reconnaissance of the Soviet Union. The photo-reconnaissance system shall have the following design parameters and objectives:

- a. A satellite-borne system compatible with the WS-117L system but employing the Thor booster.
- b. The design will be compatible with the overt biomedical program of WS-117L.
- c. Photographs shall be obtained at a ground resolution of 25 feet or better (as defined in the basic WS-117L contract) with a locational accuracy objective of  $\pm 1$  mile.
- d. Maximum possible ground coverage shall be obtained consistent with the ground resolution requirements and payload capability of the booster system.
- e. Latent image film shall be recovered by means of ballistic re-entry and land or sea recovery.
- f. The center of the recovery area shall be within 200 nautical miles of a designated location with a dispersion (90% of impacts) of  $x = \pm 200$  nautical miles,  $y = \pm 75$  nautical miles or less.

Delivery of equipment to the flight test and operations shall be in accordance with the attached schedule. The actual firing dates will be governed by target operational factors. The dates set forth on the delivery schedule represent the flight readiness dates.

The following shall be provided by the Government and shall not be developed or supplied under this contract:

- a. Thor boosters, associated receipt checkout and launch facilities, equipment and services.
- b. All items and services developed or used on the WS-117L program which can profitably support this reconnaissance program. These elements will be programmed overtly in appropriate quantities and in a timely fashion, as part of either the basic WS-117L or the biomedical satellite programs, or of other programs as may be determined but will actually be intended to support this recoverable reconnaissance program. The intent is to retain as many elements of the overall operation in an overt status as possible. Where an item or service can be programmed openly without revealing its ultimate usage, it will be charged to the cover program and not to this contract.
- c. Recovery ships and/or aircraft, and their normal operating personnel and support. (Special equipment, training or trained personnel required for search and recovery will be provided by the contractor).
- d. Special receipt and checkout space and facilities at the launch site.

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Establish and maintain technical and management control of such sub-contractors as are required for the proper execution of the work statement. Major sub-contractors include:

- a. ITEK Corporation will develop and manufacture the reconnaissance camera and associated equipment.
- b. General Electric Company will develop and manufacture the re-entry body.

Technical direction of the program is the joint responsibility of several agencies of the Government. In the interest of effective management, however, such direction will be provided primarily by and through the Air Force Ballistic Missile Division acting as the agent for all interested components of the Government. A Project Officer will be established in BMD as the single day-by-day point of contact for the contractor. This Officer will have authority to make on-the-spot decisions within the scope of the work statement on all matters pertaining to the program other than those of major importance. From time to time the Government agencies concerned will jointly review the progress of the program. The Government will make arrangements to permit the prompt rendering of major decisions concerning the program which cannot be made by the Project Officer.

Special security measures will be required throughout the program. The complete security plan, clearance of facilities and of individuals knowledgeable of the program, and other matters relating to security will be under the direction of a designated authority within the Government. The contractor will provide such special security measures within his own facilities, sub-contractors' facilities, or Government facilities provided for this project, as may be required to conform with the security plan.

Prepare monthly letter status reports which present in brief form the technical and fiscal status of the program. The fiscal status shall show separately the status of the major subcontractors.

Attachment:  
Delivery Schedule

Total 2 pages w/1 1-page attach.

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DELIVERY SCHEDULE

ITEM	CY 1958												CY 1959											
	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D			
DESIGN RELEASE																								
Structure & Installations			x																					
Auxiliary Power Unit			x																					
Antennas			x																					
Ground Equipment			x																					
PROTOTYPE																								
Fabrication & Assembly					x																			
Test						x																		
MOCKUP																								
Complete Space Utilization			x																					
Complete Weight & Balance				x																				
FLIGHT UNITS																								
Assembly & Test									1	1	1	2	2	2	2									
Spare Units									1	1														
FLIGHT SCHEDULE												1	1	1	1	2	2	2	2					

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REFERENCE NO. 14

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COPY

11 March 1959

MEMORANDUM FOR: Brigadier General A. J. Goodpaster  
The White House

PROJECT CORONA

1. Herewith, slightly edited but otherwise unchanged since you read it, is the paper on CORONA which summarizes its history and proposes the extension of the Project. This paper has been seen by Dr. Herbert York, and he confirms that the Department of Defense concurs in this proposal.

2. The proposal has been reviewed with [ ] and Dr. Killian, and I believe that the latter is favorable to it. Dr. Killian has not seen this actual paper since he is away for a few days.

NRO  
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(Signed)  
RICHARD M. BISSELL, JR.  
Deputy Director  
(Plans)

Attachment:  
COR-0372

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CORONA HISTORY

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11 March 1959

PROJECT CORONA

1. The original outline of the CORONA Project (Document No. COR-0013) was submitted for approval on 15 April 1958. As then planned it called for twelve flights of the CORONA vehicle during the calendar year 1959. The total separately accountable cost was estimated as slightly over [redacted] made up of [redacted] to be provided by ARPA for second stage vehicles and [redacted] to be funded by the Central Intelligence Agency for the classified payload.

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2. Under date of 8 August 1958 a report on this Project was submitted which pointed out that the original cost estimate was incomplete on two grounds. First, it contained no allowance for the Thor boosters (first stage vehicles) on the assumption that these would be furnished by the Air Force. Second, it included none of the costs that would be incurred with either four engineering flights to be carried out before the first CORONA launch as part of the development of the CORONA vehicle or of three biomedical flights planned in part for cover purposes. This report gave a revised figure of [redacted] as the cost of the CORONA flights including Thors but still excluding the associated flights referred to above.

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3. Rather extensive discussions took place in the early autumn of 1958 concerning the cost of the whole program, since christened the DISCOVERY program, in the context of the ARPA budget for FY 1959. In the course of these discussions it appeared that certain cost estimates had to be revised upward. Moreover, it appeared that if an appropriate share of development and facilities costs were allocated to CORONA the total cost would come to something in excess of [redacted] although it was recognized that the allocation of these overhead items between related programs is essentially arbitrary. When this cost study was completed in October, it still appeared that the entire DISCOVERY program of nineteen flights (twelve CORONA plus four engineering plus three biomedical) could be funded within existing budgets.

4. During late autumn of 1958, a further study was made of both the DISCOVERY and SENTRY (WS-117L) programs by ARPA and the Air Force. In November, decisions were made concerning the ARPA FY 1960 budget. As a result of these revisions, and in the light of the program review just concluded, the decision was made by ARPA to cancel four of the twelve CORONA flights and two of the three biomedical flights and thus to reduce the DISCOVERY program from 19 to 13 flights. This decision was influenced by the expectation that the Air Force would be prepared to fund additional flights using CORONA vehicles and payloads which would be scheduled late in CY 1959 and in CY 1960, so that the ARPA cut would be more than made good.

5. Under these circumstances, production schedules were left unchanged and development continued at full speed pending further studies of (a) intelligence requirements during 1959 and 1960, (b) the effects of modifications in the SENTRY program, which contemplates the use of an Atlas-boosted vehicle, larger payload, and more sophisticated equipment, and (c) the availability of funds. These investigations led to the following conclusions:

a. There is a high priority requirement for photographic reconnaissance of the USSR both in 1959 and in 1960 by numbers of flights sufficient enough to give complete coverage twice in each year. Because of the prevalence of cloud cover, twice over coverage will be required to give even moderately complete photography of the more important areas. The most important single objective is to require further evidence on the status of the ICBM program during the phase when construction of launch sites may be expected to be in progress.

b. The SENTRY program could not be accelerated to provide the required coverage in 1960.

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PROJECT CORONA

c. The extended CORONA program can be financed within approved Air Force and Department of Defense budgets.

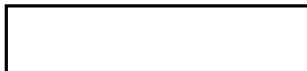
6. Accordingly it is proposed that the presently reduced CORONA program of eight flights in 1959 be augmented by twelve additional flights, four to be restored in 1959, and eight to be conducted in 1960. On this basis there will be a total of twenty CORONA flights. The requirement for twelve in 1959 as against eight in 1960 reflects an anticipated improvement in systems reliability and performance. The whole DISCOVERY series will include in addition to the 20 CORONA flights, four engineering flights as originally planned (one of which has aborted and a second carried out with nearly full success) and one biomedical flight which is largely for cover purposes.

7. The proposed restoration of four flights in 1959 and an addition of eight flights in 1960 will require additional funding in the amount of [redacted] of which [redacted] will be in 1959 funds, [redacted] in FY 1960 funds, and [redacted] FY 1961 funds. The breakdown of additional cost by purpose and funding agency is shown on the attached table. In accordance with the decision made at the inception of CORONA, all of these additional funds, with the possible exception of the cost of additional payloads, will be transferred to ARPA which will authorize procurement by the Ballistic Missile Division, ARDC. Procurement of additional payloads may be undertaken by CIA (as with the initial CORONA program) or by BMD, depending on the requirement for security. BMD will act as executive agent for the DOD and the CIA in the operational phase including launching, tracking, and recovery operations.

8. The maintenance of security, that is effective concealment of the true purpose of these missile flights, will be exceedingly difficult at best and will give rise to serious problems. The DISCOVERY series has been described as a development activity. Specific ostensible missions are being defined for each flight and data will be accumulated ostensibly resulting from the DISCOVERY flights to be furnished on an unclassified basis or with low classification to interested persons. No matter how carefully cover explanations are developed and supported, however, it is impossible to prevent speculation in the technical press and by Communist governments to the effect that the DISCOVERY flights involve reconnaissance of some kind. Accordingly, even if security is successfully preserved, that is any unauthorized disclosure by persons witting of the true purpose of DISCOVERY is avoided, the cover for this operation may be eroded. If it is desired to preserve the cover and deny the true purpose of the 1960 flights as well as of those scheduled for 1959, a decision to this effect should be made immediately so that administrative and security procedures may be designed with this end in view.

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S E C R E T

Attachment to  
COR-0372

DISCOVERER EXTENSION

SCHEDULE

CY 1959

CY 1960

8 Original

May 1  
June 1  
July 2  
August 2  
September 2

12 Extension

October 2  
November 2

May 2  
June 2  
July 2  
August 2

— COST ESTIMATES —  
(in millions)

FY 1959  
OSD Emergency Funds AF Funds

FY 1960  
AF Funds

FY 1961  
AF Funds

LOCKHEED 2ND  
STAGE VEHICLES

8 Vehicles  
for 1960  
4 Vehicles  
for 1959  
8 Launchings in  
1960  
4 Launchings in  
1959  
8 Payloads for  
1960 Flights  
4 Payloads for  
1959 Flights

THOR BOOSTERS

12 Launchings  
12 Vehicles  
RADC  
Support

TOTAL



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S E C R E T

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CORONA HISTORY

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REFERENCE NO. 20

TOP SECRET/CORONA

COPY

(S) NATIONAL RECONNAISSANCE OFFICE  
Washington, D.C.

Office of the Director

June 22, 1966

MEMORANDUM FOR: DIRECTOR OF RECONNAISSANCE, CIA  
DIRECTOR OF SPECIAL PROJECTS, SAF

SUBJECT: CORONA Management Plan and Organizational Responsibilities

The purpose of this memorandum is to set forth the CORONA management arrangements and assignments of system responsibilities which were approved by the NRP Executive Committee on April 26, 1966.

There follow specific instructions and guidance on CORONA management and assignments of system/sub-system responsibilities.

PROGRAM MANAGEMENT:

The Director, SAFSP, is designated as the CORONA System Project Director (SPD). In addition, SPD will direct and supervise the development and production of various sub-systems as defined herein. The Director, SAFSP, will establish a CORONA System Project Office (SPO) to discharge assigned functions and responsibilities, and will appoint a Deputy Director, SAFSP, for CORONA who, as Deputy System Project Director (DSPD), will manage the day-to-day activities of the SPO.

The Director of Reconnaissance, CIA, will direct and supervise the development and production of the CORONA Payload Sub-Assembly, as defined herein, reporting directly to the DNRO. The Director of Reconnaissance, CIA, will establish a CORONA Payload Sub-Assembly Project Office (PSAPO), and designate a Director thereof, responsive and responsible through him to the DNRO for the total Payload Sub-Assembly development and production and to the SPD for overall system matters, as set forth below.

SPECIFIC SYSTEM RESPONSIBILITIES:

The Director, SAFSP, as SPD, is responsible for: overall system engineering (including master system specifications) and system integration (including major sub-system interface specifications); overall system master planning, programming, and budgeting; assembly and check-out of the system at the launch pad; launch and mission operations; capsule recovery; and delivery of film to DNRO-designated processing facilities.

In addition, the SPD is responsible for: the thrust-assisted THOR and THORAD boosters; the AGENA booster/spacecraft; procurement of the DISIC; the acquisition and operation of system assembly facilities (excluding the LMSC-AP facility) and launch facilities; on-orbit command and control facilities; and capsule recovery forces and equipments.

The Director, PSAPO, is responsible through the Director of Reconnaissance, CIA, to the DNRO for the total Payload Sub-Assembly development, production (excluding procurement of the DISIC), assembly and test; operation of the LMSC-AP facility; for adherence to master system specifications, interface specifications, and master project plans established by the SPD in accordance with the provisions of this management plan; and the provision of software support to the NRO Satellite Operations Center before, during, and after missions. By definition, the CORONA Payload Sub-Assembly includes the panoramic cameras, the SI and/or DISIC, film transport mechanisms, the RV's, supporting structure and shell, and those other items normally installed and tested at the LMSC-AP facility.

In addition, the PSAPO is responsible to the SPD to assist and manage, as appropriate, those Payload Sub-Assembly system assembly and pre-launch activities at Vandenberg AFB,

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to certify at appropriate times that the Payload Sub-Assembly is ready, and to act as the principal Payload Sub-Assembly assistant to the SPD during pre-mission planning, on-orbit operations, and post-mission analyses.

SAFSP/CIA-OSP RELATIONSHIPS:

It is not possible, at this time, to forecast future engineering/performance trade-offs which may be made as detailed design and development of the J-3 CORONA proceed. The NRO objective in the CORONA Project is to acquire and operate the overall most effective search and surveillance satellite system possible within the constraints of time, technology, and available resources. The Payload Sub-Assembly contains the key element (i.e., the camera) of the system and, as such, its fundamental basic structural, dynamic, thermal, power, etc., requirements must be given proper weight in determining overall system configuration and characteristics. When the necessity does arise for a trade-off between the Payload Sub-Assembly and another sub-system in terms of total system performance, the SPD will always attempt first to resolve the problem in such a way as to minimize the effect on the sensor. However, such resolutions of interface problems must always be tested to assure that over-all system performance is not seriously degraded. Thus, both the SPD and PSAPO must analyze in terms of total system effectiveness when considering interface and trade-off problems.

In this arrangement, the CORONA System Project Director (SPD) responsibilities will not include sub-system engineering, technical direction, or contract supervision for the Payload Sub-Assembly (except for DISIC procurement); the CIA will be responsible to the DNRO for these functions. The following discussion of management relationships is intended to clarify the division of responsibilities:

1. As stated previously, the SPD is responsible for overall system engineering and integration. In this capacity, he also is responsible for all sub-system interfaces. In such matters, the Payload Sub-Assembly Project Office is expected to be responsive to appropriate direction from the SPD. However, the SPD, in the exercise of this interface responsibility, will give special consideration to the basic environmental requirements of the Payload Sub-Assembly as established in consultation with the CIA.
2. On the other hand, the SPD is not expected to accomplish engineering on technical matters pertaining solely to the Payload Sub-Assembly, unless his assistance is requested by the PSAPO. SPD actions elsewhere in the system affecting interfaces with the Payload Sub-Assembly do require the concurrence of the PSAPO. Similarly, PSAPO actions which affect interfaces with other elements of the system do require the concurrence of the SPD.
3. The SPD is responsible for master planning, master programming, and overall budgeting; however, he is not authorized to alter program or budget estimates of the PSAPO. Conversely, the PSAPO is expected to program and budget in accordance with the master schedules issued by the SPD. (Note: CIA-OSP will submit budget estimates in the normal manner direct to the DNRO; however, the SPD will also include payload sub-assembly schedules and budget estimates in the System Project Plan for information purposes).

The most significant area of SAFSP/CIA-OSP relationship is that pertaining to interface between the sensor sub-system and other system elements. I cannot emphasize too strongly the need for close daily rapport between the respective offices. Representatives of both offices are expected to attend all meetings on subjects having possible interface impacts.

The SPD and PSAPO are expected to have free and full access to all information and data pertaining to the system. This includes, as appropriate, access to contractor plants, engineering staffs and test facilities. However, supervision and technical direction of the contractor's activities will be solely by CIA-OSP for elements of the Payload Sub-Assembly and by SAFSP for other system elements.

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If either the SPD or PSAPO infers a possible interface effect resulting from an action by the other, he is expected to so advise the other promptly. When a possible problem of this nature is raised, it is to be resolved by the SPD and PSAPO without delay (if resolution in the field is not possible, the matter will be brought to my attention for decision).

Informal and direct communications between appropriate working personnel of both the SPO and PSAPO must be authorized and encouraged (when opposite project office personnel and contractors are involved, prior coordination with the Government Agency supervising the contractors is required).

ON-ORBIT OPERATIONS:

The SPD will operate a CORONA Operations Command Post at the Satellite Test Center, Sunnyvale, continuously during a mission. The Payload Sub-Assembly Project Office will station appropriate Project Office personnel and contractor representatives there as well as at the LMSC-AP facility during missions. The Satellite Operations Center in the Pentagon will deal principally and directly with the CORONA Command Post and the LMSC-AP facility, as appropriate, during a mission.

The SPD is the final field authority during a mission operation from launch through recovery. The SPD is expected, in normal situations, to assign responsibility to the senior Payload Sub-Assembly Project Office representative for matters of payload sub-assembly readiness, on-orbit operation, analysis of technical difficulties, etc. The senior Payload Sub-Assembly Project Office representative, in turn, will provide Payload Sub-Assembly status reporting on an agreed-on regular basis or upon request of the SPD. However, when there are differences of opinion in the case of technical difficulties, and when in the judgment of the SPD that mission failure may be imminent, the operational decisions of the SPD shall always be overriding the final.

SECURITY:

In furtherance of the management responsibilities assigned herein, both the SPD and the Director, PSAPO are authorized to grant CORONA clearances to Government employees and contractor personnel under their jurisdiction in accordance with established security policies and procedures. This authority can not be delegated further. The SPD and PSAPO shall keep each other and higher authority informed on a continuing basis of current project access lists.

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The SPD and PSAPO shall each honor, without question, a need-to-know determination on the part of the other that a properly cleared person requires access to project information and/or data.

In order to insure consistency in the security practices of the SPO and PSAPO, a CORONA Security Guide will be prepared jointly by SAFSP and CIA-OSP and submitted to the DNRO for approval as soon as possible. Additional guidance will be provided on this matter in the near future.

AEROSPACE CORPORATION:

The SPD will utilize the services of Aerospace Corporation in a general systems engineering role. Aerospace Corporation employees supporting the SPO shall have free access to information and data at the Payload Sub-Assembly contractor(s), but shall exercise no technical influence or judgments over matters wholly internal to the Payload Sub-Assembly, and shall not be charged by the SPD with advising him on such matters.

The exchange of information contemplated herein will require direct contact by appropriate Aerospace employees with contractor engineering staffs at the PSAPO contractor

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plants and test facilities. However, all such direct contacts must be prior-coordinated with the PSAP0. Such coordination is both for the purpose of informing the PSAP0 and permitting his participation or monitoring of such direct contacts. The PSAP0 is expected to honor the requests of the SPD for any item of information or data, or requested direct communication with contractors. The converse applies to the SPD with regard to similar PSAP0 requests for information or data, or direct contact with SPD contractors.

GENERAL GUIDANCE:

Despite good intentions on both sides, differences in interpretation of this management directive, the question of whether or not a problem has interface implications, etc., probably will occur periodically. When such an instance arises and cannot be settled in the field, I desire that the problem be called to my attention promptly for resolution.

The successful implementation of this management arrangement will require the wholehearted cooperation of both CIA and SAFSP. I enjoin each of you to insure that your respective subordinates put forth every effort in that vein.

Signed: Alexander H. Flax

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27 October 1967

THE CORONA IMPROVEMENT (J-3) PROGRAM  
DEVELOPMENT HISTORY

In the spring of 1965 the DDR&E Dr. Fubini suggested to Mr. Crowley, the OSP CORONA Project Manager, that a look at a CORONA Improvement Program might be desirable. Mr. Crowley directed his West Coast Resident Office to study the problem and report to him NLT 1 June. A series of meetings followed between LMSC, GE, Itek, [ ] and the Project Office. Failure modes and operational deficiencies of the existing J system were studied, as were the "C" system coverage requirements, weather data, reliability data, etc. From the studies a matrix of feasible system designs was developed, with all recommended designs incorporating improved pan and stellar index camera systems and an improved command system. The major variables in the matrix were launch vehicle, film load, orbital lifetime, and RV configuration. The Resident Office had concluded that a significant cost savings could be realized by adopting the Atlas-Agena launch vehicle, 30 day orbital missions, increased film load, and reduced launch rate. The DNRO, however, elected to maintain the Douglas launch team, approving a modest upgrading to accommodate the increased payload weight of the new Constant Rotator and DISIC camera systems.

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A go-ahead was issued in July 1965 to Douglas, Fairchild, and Itek for the Thorad, DISIC, and CR systems respectively. As initially defined the first J-3 launch was targeted for January 1967, however, for budgetary and other reasons the DNRO delayed issuance of go-ahead to LMSC and GE until April 1966. The eight month delay resulted in a six month schedule slip, with the first launch rescheduled at the April 1966 Interface Meeting for 25 July 1967.

Schedules of critical design reviews, qual test program, hardware deliveries, and system test activities were established to meet this target date. Final design reviews for the camera, SRV, electrical system, structural aspects, and total payload were set for 23 August 1966, 7 September 1966, 7 October 1966, 17 February 1967, and 14 April 1967 respectively. All were conducted according to plan. Deliveries of the camera systems and SRV's to AP were several weeks behind the target schedule, however, these slippages were made up during systems test. The J-3 dual program proceeded smoothly throughout, with J-3 being somewhat of a "first" for reconnaissance payloads in that a full qual program was conducted, and the qual program was completed in advance of the first launch. In early July 1967 it appeared as though the target launch date might be met, however, a Corona problem was uncovered on both pan and DISIC cameras during thermal altitude testing and two HIVOS test reruns were required. CR-1 was available for launch on 7 September 1967, approximately six weeks behind the original target date of 25 July 1967. The first J-3 launch took place on 15 September 1967.

The design goals of the J-3 system were basically as follows:

Constant Rotator Panoramic Camera

- a. Removal of camera system oscillating members and reduction of error budget vibration components.
- b. Improvement of V/H match from 5% to 2%.
- c. Proper camera cycling rates at altitudes down to 80mm (minimum J-1 altitude is 100nm).
- d. Elimination of camera failures caused by film pulling out of rails. (Two such J-1 failures have been experienced in the past two years.)

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- e. Capability of handling ultra thin base (UTB) film. (An increase of 50% in coverage at no increase in weight.)
- f. Exposure control through variable slit selection.
- h. Capability of handling alternate film types and split film loads (color, infra-red, etc.).
- i. Improved lens performance.
- j. Pan geometry without effect on imagery (J-1 systems require IMC traces in the format area).

DISIC

- a. Improved terrain camera performance (increased focal length 1.5" to 3").
- b. Independent mapping capability.
- c. Improved shutter reliability.
- d. Removal of stellar launch window restrictions (J-1 launch windows are governed by stellar windows).
- e. Elimination of stellar camera flare (increased knee angle and improved baffle design).

All Systems

- a. Removal of limited shelf life items.
- b. Removal of items affecting R-1 readiness capabilities.
- c. Reduced power requirements.

At the June 1965 briefing to Dr. McMillan the Resident Office presented one time cost figures for the CORONA Improvement Program as indicated in Column I. Actual cost figures for the development program are shown in Column II.

	<u>Est. June 1965</u>	<u>Actual</u>
IMSC		
Itek		
GE		
Total		

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As can be seen, the major variance is in the pan camera development. The increased costs at Itek were primarily associated with enlarged scope of the UTB, PG, and exposure/ filter control developments; and with the addition subsequent to the briefing of a lens improvement program. Actual one time design and qualification costs at LMSC were extremely low since the [ ] includes one time development costs of [ ] for a data subsystem which includes a recoverable digital tape recorder and its associated ground automatic data processor. The tape recorder data has proved extremely beneficial both in flight and ground test.

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One time costs at GE include [ ] for two sets of new SRV-AGE. Costs of these AGE were less than one-quarter the cost of similar AGE procured by another NRP program in the same time period. Part of the cost savings were associated with the use of mini-block terminals with pin inserts, which eliminated the need for costly terminal board panels. A DOD cost improvement award was given to GE personnel for their design work on the J-3 AGE.

DISIC integration costs are included in the LMSC and GE figures, however, DISIC one time development costs and Thorad development costs have not been shown since these contracts were administered by [ ]. The increase in cost of a J-3 payload over a J-1 payload is approximately [ ].

From a technical standpoint the J-3 development has been an outstanding success. All design goals have been achieved, and the first flight has demonstrated the adequacy of the qual program and the reliability and compatibility of the hardware. The problems experienced on the CR-1 flight were of a minor nature, and can be corrected for CR-2 without major rework. The two sigma pan camera performance predictions as presented to the DNRO at the 15 June 1965 CORONA Improvement Program briefing were as follows:

	100 NM		90 NM		80 NM	
	0°	30°	0°	30°	0°	30°
Along Track	7.6	8.7	7.0	7.9	6.4	7.2
Across Track	7.7	14.9	7.1	14.0	6.5	13.2

The better Corn target performance data from the forward camera on Mission 1101 yielded approximately 6 feet along track and 10 feet across track from an altitude of approximately 89nm. The loss of scan resolution has been attributed to a dynamic lift problem aggravated by lower than normal temperatures on orbit. The performance nonetheless was judged to be the best ever from a CORONA system, and substantiates the validity of the design concept. Since the improved lens does not become available until CR-4 and since the altitude of Mission 1101 was higher than desired, the ultimate performance of the J-3 system is yet to be demonstrated.

In conjunction with the J-3 development program, a forward looking program of photographic investigation has been carried out to determine the most promising techniques of intelligence enhancement. The program, designated EKIT because of the cooperation between Eastman Kodak and Itek, has provided the foundation for Systems Testing on CR-1 through CR-4. The CR-1 through CR-4 tests will in turn provide the basis for a deeper investigation into the potentials of multiband work in intelligence reconnaissance work in the future.

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MEMORANDUM FOR: Director, National Reconnaissance Office

31 July 1969

CORONA Program Planning

I am forwarding an evaluation of the recent problems that have been confronted with the CORONA Photographic System and the remedial measures that are being taken to insure that this important collection system is maintained in an effective state throughout its remaining lifetime.

(Signed)  
CARL E. DUCKETT  
Director  
CIA Reconnaissance Programs

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NRO

Distribution:

1 - DNRO	7 - PD/H
2 - DDNRO	8 - [redacted]
3 - General King	9 - RB/S&T
4 - DD/S&T	10 - RB/S&T
5 - D/OSP	11 - RB-OSP
6 - D/OSP	

DD/S&T/OSP/JJCrowley [redacted] (29 July 1969)

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ARTHUR LUNDAHL'S SPEECH TRANSCRIPT AT CORONA MUSEUM DEDICATION

As the Director of NPIC for the years before the CORONA Program, in the years during its operation and since, perhaps I may be permitted a few observations about this Program which I think would be worth recording.

This has been the largest and most successful single intelligence program the United States has ever accomplished. Historians of the present and future will record this as being far more significant on the impact of our time than gun powder was on warfare of its time. It didn't come easy, but it came with a prodigious amount of speed. In making these comparisons, I'd like to show some of the things that have happened to us here.

Before the early fifties, the Central Intelligence Agency had no photographic intelligence activity at all. When we started we had less than thirteen people, less than 800 square feet of floor space and a budget of less than [ ] a year. One of the great consequences of the Program is the enormous rush of growth that it created in our own photographic intelligence resources. Now the National Photographic Interpretation Center is probably the largest, or one of the largest, photo-intelligence activities in the world; certainly the largest in the West. Now, in the fall of 1972, we have [ ] people dedicated to the exploitation of these products; we have a budget each year which is pretty close to [ ] over 400,000 square feet of floor space and a program that is steadily growing.

Little did we realize what was going to develop so quickly when the first satellite was successfully retrieved on August 19, 1960. It flew for only one day, had 16 or 17 passes -- eight of them over the Soviet Union -- and 20 pounds of film came back. With that film in hand, and in less than seven days, we produced 130 pages of text and had 1.5 million square miles of coverage of the Soviet Union. This was the harbinger that warned us of what was coming and as we were suddenly gearing up and trying to get ready for the instrumentation and procedure and data handling products, the film was flowing in.

By the time the Program ended we were dealing with film that was coming in at the rate of 32,000 instead of 3,600 linear feet per mission. We had covered over 520,000,000 square miles of real estate, produced millions of pages of reporting and were involved in all the

NOTE: This speech was presented by Arthur Lundahl, NPIC Director, at the Dedication of the CORONA Historical Museum, Washington D. C., 25 October 1972.

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issues of our time. All of the ICBM complexes in the Soviet Union had been discovered; for example: by 1964 all their SAM sites, all their air fields, all their nuclear weapons testing and storage sites, all of their "Y" class submarines, all their enigmatic problems. We were right on top of these and were involved in major decision making.

There was a tremendous demand upon the people in this Center, which is not manned solely by CIA personnel. We have enjoyed a cooperative relationship with the contractor which is second to none in the Washington area; a unique organization. When I wanted to talk to someone at Eastman Kodak, Itek, Lockheed, SAMSOC or at General Electric, they were as close as the telephone and they were there within hours on the problems we were involved with. It was a tremendous demonstration of how men commonly dedicated to a great cause could work together and could indeed achieve something.

As we grew we were abundantly involved in briefings with the President(s). Each and every one of us had our moments with him. I remember well my briefing with President Kennedy. (This was one of the early CORONA missions.) When he had trouble understanding the magnitude of the film that was involved, he said to me, "Lundahl, give it to me in some single example which I can recall." "Well Mr. President," I said, "if you like, think of it as a single photograph which is wider than the right hand side of the freeway, extending from Washington to Baltimore, and we photo-interpreters, all of us, are crawling along on our hands and knees between Washington and Baltimore looking for objects about the size of the things on our watch." He said, "That's a wonderful example; I'd like to use that." And every once in a while thereafter at the White House, he'd call me in -- he'd have Henry Ford or Ed Land or somebody there -- and he'd say, "Tell them that story about crawling along the freeway from Washington to Baltimore."

Later on, of course, we briefed President Johnson who was so carried away by the scope of the Program and the creation that it had made, he literally stunned all of us when he stepped before the press of the world and said, "In the total American Space Program, the value of the Photography alone far exceeds its worth ten times as much as the total cost of the Program." Well we made a hasty calculation. The total cost of the program at that time had already topped [ ] and the President of the United States was writing up the value of the CORONA photography at something ten times that fact.

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Each and every one who had a hand to bear in this Program has made a small fingerprint on history. Indeed as we prepared to guide our leadership in the event of war, at the same time our leadership had a far more visionary process in mind, and that was to lead us eventually to peace, which is what we are all seeking. Little did we realize that the tremendous accomplishment the Program offered to the total intelligence picture was going to be superseded by another accomplishment now before us.

This was in the Strategic Arms Limitation area. As we built ourselves up, we didn't realize what we were building to. In those early days we had little stereoscopes that were worth \$10. Now we have single stereo viewing devices that are worth  We have 25X1  
developed a plethora of hardware, computer automatic data handling equipment, which is now in full and complete demand to handle the needs of the Strategic Arms Limitation Treaty people. I can't think of any better way in concluding, than to read to you something which has just come out as the latest statement by Ambassador Girard Smith, the Director of the Armed Control and Disarmament Agency, in his latest speech. I read it to all who would listen, to inform them herein of the importance of what you have helped to create. He says, "In this connection, one key feature of the SALT agreement is an undertaking by the United States and the U.S.S.R. not to interfere with the national technical means" -- this means CORONA and its successors. This would prohibit interference with a satellite in orbit used for verification of the agreement. The two countries have also agreed not to use deliberate concealment measures to impede verification of national technical means.

"These undertakings are of far reaching importance. They lie at the heart of our confidence in the viability of the agreement and should facilitate further agreements which are in our national interest. Without our national technical means of verification, the SALT agreement would not have been possible. Thanks to a great extent to the efforts of some of you here today and to a number of the organizations represented here, the United States has the world's finest technical verification machinery. The country owes a debt of gratitude for this, which has made the SALT achievement possible." No more eloquently could it have been stated, and I would only say "Amen" to what Ambassador Smith has said and hope that we continue to bear the trust which has been placed upon us.

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RICHARD HELMS' SPEECH TRANSCRIPT AT CORONA MUSEUM DEDICATION

For a moment, let us think back to a point in time to October 24, 1957 to be precise. On that date the President's Board of Consultants on foreign intelligence activity submitted its report to President Eisenhower on the status of the intelligence community's collection capabilities. With strong urging from Dr. Ed Land, the Board called for a reassessment of the SAMOS satellite reconnaissance system then under development by the Air Force. This was a complicated system based on electrical transmission of images from space. At the same time the A-12 OXCART reconnaissance aircraft proposed by the Central Intelligence Agency was given a careful evaluation. The Board held that while both were promising programs, the critical need for intelligence at that point in time warranted an interim photoreconnaissance system that could get into operation earlier than the SAMOS could be ready. This was a significant decision particularly for that era.

Just twenty days before, the Soviet Union had orbited the world's first satellite, Sputnik I from the Tyuratam range. The United States was still three months away from launching its first small satellite. But the need for reliable intelligence on Soviet missile deployment was becoming more and more urgent. The so-called missile lag debate was already under way when the Senate prepared a sub-committee to hold hearings on this issue.

The White House responded rapidly to the Board's recommendation. Dr. James Killian, who had just assumed his position as Special Assistant to the President for Science and Technology, arranged a meeting for the first week of December, among the President, the Director of Central Intelligence, Mr. Allen Dulles, and the Deputy Secretary of Defense, Mr. Donald Quarles. At this meeting, only eight weeks after Sputnik I, the President decided to proceed with the joint CIA-Air Force interim photoreconnaissance satellite program to answer the critical intelligence questions about Soviet missiles. The system was to be based on physical recovery of film from the space vehicle. This decision marks the first of the remarkable CORONA Project. The full impact of the decision, however, can be comprehended only if we recall the primitive nature of our understanding of space technology and the critical need for hard intelligence information which existed at the point in time.

NOTE: This speech was presented by Richard Helms, CIA Director, at the Dedication of The CORONA Historical Museum, Washington D. C., 25 October 1972.

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The stalwarts of the CORONA management team were Dick Bissell, of CIA's Development Projects Staff, and Osmond Ritland of the Air Force Ballistic Missile Development Command. The two had worked effectively together in the crash development of the U-2 several years earlier. Within only a few months they put together a program outline for Project CORONA which showed remarkable foresight. One very critical decision made during this period concerned means for recovering the film from the CORONA vehicle. General Electric was assigned the task of developing the world's first space recovery capsule. In fact it was to be many years before the numerous difficult technology problems of electronic read-out were to be solved. Without film recovery, none of the photographic reconnaissance systems operational today would have been possible.

It was also decided to implement a radically new panoramic camera device. The basic concept had been developed by a spin-off group from Boston University which founded the new corporation called Itek. Taking off from Itek's concept, Lockheed carried the project forward by developing a stabilized space platform and integrating the camera and re-entry vehicle into a working photoreconnaissance satellite system. This is the design that Mr. Bissell presented to the President in his Project outline on April 15, 1958. Within two weeks, on the basis of this plan, the first CORONA contract was negotiated between the CIA and Lockheed. I am happy to see here today several of the men who, as early program managers, played such key roles in making CORONA a success.

It was not an easy success despite the promising start just described. Those were the days of the space pioneers when the solution to last month's failure only surfaced new problems for which engineering solutions must be rapidly found. There just was not time for long development spans.

We, of course, continued to think about the work toward long range solutions, but many of the early problems had to be met with Yankee ingenuity. For example, there was a problem with an on-pad payload cover. We had a good one on the drawing board, but we could not wait for it. So for the next flight we fabricated a shroud out of such material as ping-pong balls, brown paper and piano wire. We tested the interim design with a high speed sports car on the Bayshore freeway. Unfortunately the Highway Patrol responded with a speeding ticket for the test engineer. This design was phased out after one flight!

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For two of the key development problems, the early solutions seemed to be first rate and continued throughout the Program. One of these solutions was the use of cold gas for the critical re-entry vehicle spin system. There was also the "dry leaves" film problem which was solved by Eastman Kodak's breakthrough in coating emulsion onto a mylar base. The development of mylar base film was essential to the success of space reconnaissance.

Discoverer I was launched in February 1959. It was a long 18 months however, before we successfully recovered the first batch of film from Discoverer 14 in August 1960. Meanwhile the missile gap controversy had reached a boiling point during the preparation of the national intelligence estimate on guided missiles in the fall of 1959. The various intelligence agencies held widely diverse views on Soviet missile strength, and the infrequent U-2 flights had yet to photograph an operational Soviet strategic missile launch site. 1960 was an election year in which the missile gap had become a grave political issue. Moreover, the President was scheduled to meet with Soviet leaders in summit talks without the benefit of hard intelligence data.

Then came May Day of 1960 and the tragic loss of the U-2 over Sverdlovsk. The summit talks were cancelled, but the missile gap debate went on. We had lost the U-2, our only capability for obtaining reliable intelligence from Soviet missile deployment.

This capability was not only restored but drastically increased on August 19, 1960. On that day Discoverer 14 successfully completed the world's first satellite reconnaissance mission -- Mission 9009, as it was called. This single mission gave us more photographic coverage of the Soviet Union than the U-2 program had provided since its inception in 1956. The success of Mission 9009, coupled with the technical difficulties of the Air Force SAMOS program, signaled an extension for CORONA and firm realization of the importance of the exceptional intelligence asset. We soon improved the camera design and then added the stereo capability. The single recovery capsule was replaced by two, and finally both camera and system were upgraded to what was called the J-3 payload.

I think it is most important to remember that in the final analysis it was the people -- Air Force, Agency and Contractor who were the key to the success of this program. The early CORONA successes came before the Agency began its awards program, but several key OSP officers

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received the Intelligence Medal of Merit for their outstanding contributions to later systems development and improvement. There were no elaborate facilities. The work was done in a dairy farm building in Boston, an A & P warehouse in Philadelphia and a skunk works section

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NRO [redacted] The funds were limited; less than [redacted]  
were spent on the program from April 1958 to August 1960.

Even if the cost had been larger, the savings would have been great. Without CORONA, the missile gap controversy might well have continued through the decade with the defense budget based on fear rather than on knowledge. We are well into the Space Age now -- man has been to the moon and back. When he went, however, he took with him a repackaged version of the CORONA cameras with which to map the surface of the moon; and when he came back he was recovered from orbit by the same technology and procedures developed for Project CORONA. The list of firsts for this Program is a long one. The world's first recovery from space; the world's first aerial recovery; the first multiple recovery system. CORONA's 165 successful recoveries are more than the total of all the other United States programs combined. There were also firsts in spacecraft controls and certainly not least, the photography from space. CORONA provided photographic coverage of over 500,000,000 square miles of the earth's surface; a dramatic achievement in itself.

But the true importance to National Security was the intelligence produced by lifting the curtain of secrecy that surrounded the Soviet Union. In contrast to the frustration which existed in the intelligence community at the point in time that CORONA was undertaken in 1957, we had by 1965 photographed all of the Soviet ICBM complexes then in existence. The value of the Program to the United States intelligence effort is given dimension by this statement in the Agency's 1968 report. "No new ICBM complexes have been established in the U.S.S.R. during the past year." Such an unequivocal statement could be made only because of the confidence held by the analysts that if the missile sites were indeed there, CORONA photography would have disclosed them!

It was confidence in the ability of intelligence to monitor Soviet compliance to the commitment, that enabled President Nixon to enter into the Strategic Arms Limitation talks and to sign the Arms Limitation Treaty. Much, but by no means all, of the intelligence

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necessary to verify Soviet compliance with SALT will come from photoreconnaissance satellites. The CORONA program, which pioneered the way in satellite reconnaissance, deserves the place in history which we are preserving through this small Museum display.

"A Decade of Glory," as the display is entitled, must for the present remain classified. We hope however, that as the world grows to accept satellite reconnaissance, it can be transferred to the Smithsonian Institute. Then the American public can view this work and then the men of CORONA, like the Wright Brothers, can be recognized for the role they played in the shaping of history. Thank you.

I hereby dedicate this CORONA display which will take its rightful place in the Agency's Historical Museum Program.

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REFERENCE NO. 25

COPY

(Proposed Statement for the Press on DISCOVERER Series)

8 December 1958

Project DISCOVERER Satellite Program Announced by DOD

The first attempt to launch a satellite over the Pacific Missile Range will be made late this year or early next year from Vandenberg Air Force Base, California, the DOD announced today. This launching will be part of a series designated Project DISCOVERER -- to be carried out by the Department of the Air Force under the direction of the Defense Department's Advanced Research Projects Agency.

The purpose of ARPA's Project DISCOVERER is to continue development of a number of systems and techniques which will be employed in the operation of space vehicles. Although no precise number of launchings has been scheduled for the project, it is expected a considerable number will be attempted because of the nature and variety of the experiments involved and the fact that the satellites will orbit for short periods of time.

The initial launchings primarily will be to test the vehicle itself, especially its propulsion and guidance. Later, the satellites will contain biomedical specimens to seek data on environmental conditions which will be useful to the man-in-space program being carried out jointly by ARPA and the National Aeronautics and Space Administration. As part of this program, live animals also will be carried aloft and their recovery attempted in order to develop the techniques involved.

The first DISCOVERER vehicle is a 2-stage rocket. The main stage is a modified THOR IRBM produced by the Douglas Aircraft Company. The second stage is a new vehicle produced by the Lockheed Aircraft Corporation and powered by a Bell-Hustler engine.

The first DISCOVERER launched satellites are expected to weigh approximately 1300 pounds. This includes the weight of the second stage vehicle which will orbit as an integral part of the satellite after burn-out. Initial versions of the DISCOVERER satellite are designed to orbit for short periods of time at relatively low altitudes. High altitudes are not possible with the weight thrust ratio established for the DISCOVERER.

Much of the data expected to be obtained from Project DISCOVERER such as results of the biomedical flights, will be of general scientific interest and will be unclassified. Other results which will be highly significant for the development of later systems and techniques for space navigation involve national security and will be classified.

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(Prepared by   
Project Cover Officer)

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MEMORANDUM FOR THE SECRETARY OF THE AIR FORCE  
ATTENTION: Under Secretary Malcolm A. MacIntyre  
SUBJECT: Public Information - Project DISCOVERY

In confirmation of our several conversations, there is attached herewith for your information data and a procedure for public release relating to the Project DISCOVERY program at Vandenberg Air Force Base. The information which may be released is contained in the attached press release and a series of questions and answers. The initial release will be issued by the Department of Defense in the near future. Pending this release, no data relating to this program should be issued by the Department of the Air Force.

In accordance with our agreement, this office has accomplished the necessary clearances throughout the Department of Defense, the OCB, and in the Executive Office of the President.

In view of over-all policy restricting press coverage and public information of firings from Vandenberg Air Force Base, it is requested that all interested agencies within the Department of the Air Force be advised of the contents of this release, the questions and answers relating thereto and the requirement that publicity be limited entirely to the data contained therein.

A preliminary press plan, to be circulated through public information channels for concurrences or comment, is attached for your information. This press plan will be officially transmitted through public information channels, and will, after coordination, cover procedures for further public release on the DISCOVERY series. When releases have been authorized, every effort should be made to insure public understanding that, the DISCOVERY series is not associated with project 117L.

Any questions requiring responses beyond the information contained in these documents should be referred to the Director, ARPA. Your attention is invited to the fact that both the launching site and the components in the vehicle itself contain elements of military security. This is indicated in the press release and should serve to allay questioning beyond that contained in the press release and the questions and answers.

(Signed)  
Roy W. Johnson  
DIRECTOR

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Press Release  
Questions and Answers  
Press Plan

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6 November 1958

PROPOSED INITIAL PRESS RELEASE:

The Department of Defense will attempt to launch its first satellite from Vandenberg Air Force Base, California, Pacific Missile Range late this year or early next year, it was announced today by Roy W. Johnson, Director of the Advanced Research Projects Agency. This satellite is part of a series of missile and vehicle launchings designated "DISCOVERY" which will be performed under the direction of ARPA by the Ballistic Missile Division, Air Research and Development Command, Department of the Air Force.

The purpose of this series is to further the development of a number of systems and techniques which will be employed in the production and operation of space vehicles. Initial launchings will have as their primary objective the testing of the vehicle itself and of vehicle subsystems including propulsion and guidance. Later vehicles in the series will carry biomedical specimens and will seek valuable data on environmental conditions useful to the NASA/ARPA joint Man-in-Space program. Live animals will be carried aloft and their recovery attempted in certain of the flights in that series which will serve to develop the techniques involved in providing a suitable environment and recovery.

Much of the data expected to be derived from the "DISCOVERY" series, such as the results of the biomedical flights, will be of general scientific interest and will be unclassified. Other results which will be highly significant for the development of later systems and techniques for space navigation, could be of potential significance to U.S. security and as such will be classified.

The "DISCOVERER" vehicle consists of two stages both of which were originally developed for other programs. The first stage is a Thor booster produced by Douglas Aircraft Company. The second stage is produced by Lockheed Aircraft Corporation, Missile Systems Division. They were chosen on the basis of technical and scheduling considerations and because they could be combined with a minimum of modifications. The combination is believed capable of orbiting considerably heavier satellites than any previously launched by the United States. The basic vehicle will carry a number of different payloads specially designed for this series. Initial versions of the DISCOVERER will orbit for short periods of time at relatively low altitudes.

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QUESTIONS AND ANSWERS

Question: Is the Discoverer a reconnaissance satellite?

Answer: No.

Question: Is it part of the Weapon System 117L - or Sentry - or Pied Piper program?

Answer: No. Originally, the use of the Thor booster and certain other programs were included in the Weapons System that has, at various times, been publicly identified as a reconnaissance system. The Thor program was separated from this system early this year and assigned by ARPA directive to the Discoverer series. In effect, this enabled ARPA to accelerate the Discoverer program without prejudice to any other component of the weapons system.

Question: If the Discoverer is not part of WS117L, and if it is not a reconnaissance satellite, will it make a contribution to a reconnaissance satellite program?

Answer: Ultimately, the Discoverer, like any satellite that achieves orbital capacity, can be expected to make a contribution to every other satellite program. However, reconnaissance as such is still very much in the research stage and must, of necessity, be considered in terms of a future development.

Question: How many Discoverer launchings will be attempted?

Answer: As yet, no precise number has been established. Because of the nature and variety of the experiments involved and the fact that some will orbit for short periods of time, it is expected that a considerable number will be launched.

Question: Why is Discoverer being placed in a polar orbit?

Answer: Polar orbit is the only one from Vandenberg AFB with hardware presently available. Eastward launch from Vandenberg is prevented by safety considerations. Launch to the West would entail an unacceptable speed penalty.

Question: Why is a low altitude orbit being used?

Answer: High altitudes are not possible with the weight-thrust ratio established for the Discoverer. Because of testing instrument requirements, a rather heavy payload is contemplated.

Question: Why not launch the Discoverer from Cape Canaveral?

Answer: The facilities at Cape Canaveral are overloaded. One of the purposes in constructing a missile range on the West Coast was to reduce the burden on the Atlantic Range.

Question: What is the weight of the Discoverer satellite?

Answer: It is expected to be heavier than any satellite previously launched by the United States. The satellite including the integrated second stage vehicle is expected to weigh approximately 1300 pounds, of which 300 pounds is payload including instrumentation guidance and power supply.

Question: How many stages does the launch vehicle have and of what does each stage consist?

Answer: The main stage is a modified Thor IRBM. The second stage is a new vehicle developed by Lockheed. It is powered by a Bell-Hustler engine. The second stage vehicle, after burn-out, will orbit as an integral part of the satellite.

Question: Since it is biomedical, is it part of the joint NASA/MIS program?

Answer: It is a DOD contribution to the joint program.

NOTE: Any further questions should be deferred or referred to DOD as appropriate.

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PROPOSED INFORMATION PLAN FOR PROJECT DISCOVERY

A. OBJECTIVE OF PROJECT DISCOVERY

Beginning in late 1958 and extending into 1959, a series of satellites will be launched from the new Pacific Missile Range at Vandenberg A.F.B., California. These satellites will be powered by the Thor missile with a new high energy upper stage known as the Bell-Hustler. As such, the program is, in certain respects, a follow-on vehicle program to the Thor-Able combination.

The project is divided into two distinct phases:

1. The first two flights will orbit 300 pound telemetry payloads into 300 mile orbits with orbital lives of perhaps 10 days. These first two flights will provide tests of hardware and payload components and also of the instrumentation and facilities of the Pacific Missile Range and its complex of ground environment stations located in Alaska and Hawaii and possibly the Antarctic.

2. Depending upon success obtained by the first 5 - 7 flights, additional launchings of the DISCOVERY series will take place during 1959 to place up to 500 pound recoverable satellite packages into 300 mile orbits having 24 - 48 hour orbital lives with planned recovery by aircraft or naval vessels upon signal by one or another of the available ground stations. These flights will comprise a series of biomedical experiments with two containing mice; later flights also containing primates.

No follow-on program will be finalized prior to the successful completion of at least five flights. Data derived from the program will be applied to reentry and recoverable satellite space programs of the DOD and NASA.

B. PUBLIC ANNOUNCEMENTS:

1. The objective of this information plan is to insure that the various launchings in Project DISCOVERY receive news treatment related to their actual missions. Public releases on the project will be strictly controlled to insure such treatment. In particular, these flights must be disassociated with any U.S. reconnaissance program for which they have no capability.

2. In recognition of the fact that the first two DISCOVERY launchings have missions distinctly separate from those of the remaining launchings in the series, this public

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information plan, aside from an initial general release (TAB A), applies to the first two launchings only. Following successful completion of the first two launchings or of the component and range test program, a comprehensive public information plan to apply to the follow-on reentry and recoverable satellite launches for biomedical experiments will be issued by DOD/ARPA. Until release of this second plan, no follow-on announcements relating to the biomedical DISCOVERY project will be issued. Issuance of the over-all plan is not being accomplished at this time because of the requirements that such a plan will await results of the first two launchings. Until release by DOD/ARPA, the follow-on program, other than the ARPA release at TAB A, will be classified Confidential.

3. As regards the first phase of project DISCOVERY, no releases or public briefings beyond the release and questions in TAB A will be made until after the first satellite launching has taken place.

4. The actual launch of the first DISCOVERY satellite vehicle should be treated in accordance with procedures established herein.

a. Should the vehicle fail within site of the launch area or prior to the achievement of conditions which might lead PMR to believe the payload was in orbit, the statement provided in TAB B should be made by the Commander VAFB. No other releases should be made.

b. Should the vehicle fail to place the satellite in orbit, but should conditions exist which require determination of this fact in interrogation of tracking stations during a time period required for one or more revolutions of the payload, the statement attached in TAB B will be made by the Commander VAFB. At the time of this release, fact sheets may also be made available to the public concerning the ground environment of the PMR and its associated tracking network.

c. Should the vehicle successfully place the payload in orbit, a press conference will be held at the VAFB as soon as orbit is determined. Participating in this press conference will be the Director ARPA, Commander, ARDC; Commander BMD, or their representatives. The press conference will be initiated by the Director, ARPA, who will make an announcement within the limits of TAB C. Public statements by these officials will emphasize the range and

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component test aspects of the launching. At the conclusion of the press conference, fact sheets will be made available at VAFB and the Department of Defense, Washington, including data on the objectives of the launching, the booster and payload utilized, the organizations involved, and the PMR and its associated tracking stations. No indication will be given of future schedules nor will the facts relating to the second phase be elaborated upon. Analysis of telemetry and other data obtained from instrumentation of the vehicle may be released as appropriate. Interested agencies will develop and submit all proposed releases and fact sheets to DOD/ARPA where they will be approved prior to issuance.

5. Public releases of information on the launching of the second DISCOVERY vehicle in December 1958 or January 1959 should be in accordance with the procedures established herein for the launch of the first vehicle. However, in view of the fact that a new situation will pertain insofar as public information statements are concerned, TABS D and E will be substituted for TABS B and C, respectively.

The press conference at VAFB to be initiated by the statement in TAB E will conform to the tone of the statement. The same guidance will pertain for fact sheets to be issued at VAFB and DOD, Washington, in the event of a successful launch.

No information will be given of future schedules or about the second phase of the DISCOVERY series.

6. This press plan, upon receipt of policy approval within OSD, including ASD (PA) and within the OCB, will be personally presented to all interested operating elements of Lockheed, BMD, etc., and details thoroughly coordinated by a designated ARPA representative. Personal data, home town color, and exhibits will be developed in support of this plan by Commander, BMD.

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TAB B

Under the direction of the Advanced Research Projects Agency the Air Force launched the first of the "DISCOVERY" vehicles for test purposes at \_\_\_\_\_ hours today from the PMR Vandenberg AFB, California. The vehicle in its first test launch, (exploded on the launch pad, failed after \_\_\_\_\_ seconds of powered flight and destroyed itself, exploded after \_\_\_\_\_ seconds of powered flight, veered off course after \_\_\_\_\_ seconds of powered flight and was destroyed, failed to orbit the satellite although the launch appeared perfect).

The launching was intended not only as an initial test of the DISCOVERY vehicle but also to test the tracking, telemetry, and range safety facilities of the PMR. (The flight of the vehicle was successfully telemetered and tracked by the facilities of the range until missile failure, until communications with the satellite were lost \_\_\_\_\_ minutes after launch). Data is being analysed to determine cause of (malfunction, failure to orbit the satellite).

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TAB C

Under the direction of the Advanced Research Projects Agency, at \_\_\_\_\_ hours today at the new Pacific Missile Range, the Air Force launched a 300 pound earth satellite using the new DISCOVERY booster system to place the payload in a unique polar orbit.

The satellite, having a period of \_\_\_\_\_ minutes, was placed into a nearly circular 300 mile orbit and is expected to have a life of about 2-5 weeks. The payload contains a power supply and communications and telemetry equipment only. No scientific experiments are included because of the extent of internal telemetry components needed for test purposes.

The objective of this latest U.S. satellite is two-fold, and complete success has already been achieved on both counts. First, the DISCOVERY launching vehicle functioned perfectly in this first test flight. Second, the satellite was launched to test the tracking, telemetry and range safety facilities of the PMR and its associated tracking network. This network has stations in Alaska, Hawaii. All functioned, and are functioning as planned.

This is the world's first satellite with a polar orbit and its nearly circular orbit is testimony to the advancement in U.S. missile guidance and control techniques. This orbit is derived from the location of Vandenberg AFB and the PMR.

The DISCOVERY booster gives the United States an improved vehicle for future space programs. This new combination was developed by the BMD of the Air Force under ARPA sponsorship.

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TAB D

Under the direction of the Advanced Research Projects Agency, the Air Force launched a second DISCOVERY test vehicle at \_\_\_\_\_ hours today from the Pacific Missile Range at Vandenberg AFB, California. In its second test launch, the vehicle (exploded on the launch pad, failed after \_\_\_\_\_ seconds of powered flight and destroyed itself, exploded after \_\_\_\_\_ seconds of powered flight, veered off course after \_\_\_\_\_ seconds of powered flight and was destroyed, failed to orbit the satellite although the launch appeared perfect). As with the first launching day's event it was intended not only as an additional test of the DISCOVERY vehicle but also as a further test of tracking, telemetry and range safety facilities of the PMR. (The flight of the vehicle was successfully telemetered and tracked by the facilities of the range until missile failure, until communications with the satellite were lost \_\_\_\_\_ minutes after launch). Data is being analysed to determine cause of (the malfunction, failure to orbit the satellite).

The initial launch of the DISCOVERY vehicle took place on \_\_\_\_\_ Nov. 1958, and resulted in (failure as the booster blew up on the launch pad, failure as the booster blew after \_\_\_\_\_ seconds of powered flight, partial success as the booster was destroyed after \_\_\_\_\_ seconds of powered flight, complete success as the booster placed a 300 pound test payload into a nearly circular polar orbit).

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TAB E

Under the direction of the Advanced Research Projects Agency, at \_\_\_\_\_ hours today at the new Pacific Missile Range, the Air Force launched a 500 pound earth satellite using the new DISCOVERY vehicle to place an instrumented payload in a unique polar orbit. (This success comes after the initial attempt to launch a similar satellite on \_\_\_\_\_ Nov. 1958. This marks the second successful launch of a 500 pound earth satellite using the DISCOVERY booster system within a period of two months). The satellite, having a period of \_\_\_\_\_ minutes was placed into a nearly 300 mile orbit and is expected to have a life of about two years. The payload contains a power supply and communications and telemetry equipment (similar to those contained in the first DISCOVERY satellite). As with the first DISCOVERY launching, the objective of this latest satellite was two-fold and (again) complete success has already been achieved on both counts. First, the DISCOVERY launching vehicle functioned perfectly in the vehicle's second successful test flight, and we are satisfied that it has demonstrated its application for future U.S. space programs. Second, the satellite was launched as an additional test of the tracking telemetry and range safety facilities of the PMR and its associated tracking network. This network, with stations in Alaska, Hawaii, and Antarctic, (again) functioned and is functioning as planned. This is the world's second satellite with a polar orbit. The fact that we have again attained a nearly circular orbit is a great compliment to the work that has been done on the part of the U.S. missile organizations in the development of guidance and control techniques.

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REFERENCE NO. 26

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23 June 1958

CORONA COVER STORY

Requirements:

1. Unclassified story for use in public relations.
2. Classified story for use in areas where CORONA requirements are apt to become known to personnel working on the WS-117-L program.
3. Explanation for individual contractors to use when having to account for their relations with other companies.

Unclassified Story:

In view of the current international race to develop a means whereby man can be safely returned from outer space, it would appear best to explain all launchings as being tests of re-entry utilizing short-lived missiles. The capsule could thus be explained as a recoverable device containing instruments that will measure the gravity forces and other phenomenon associated with re-entry such as the deceleration forces and heat pulses imposed upon the vehicle during re-entry into the sensible atmosphere. Such studies will gradually gather together data, through the use of instruments, mice and primates, which scientists will use to develop a safe and reliable means for re-entry of human life as experiments progress to that stage.

In a situation such as this, the program must be able to account for the entire series of launchings. Public interest will naturally be aroused by the press who can be counted upon to follow the series very closely. The concern of the press will not always begin with the actual launching, for there will be occasions when they learn of the preparations being made at the launch site. The program, therefore, should be prepared to state the purpose of each launching, and at some future time, announce the results. The immediate concern of the press will most likely be to learn whether the particular missile went into its prescribed orbit. They will then expect to be advised as to the success of the re-entry, following up, at some future date, with inquiries as to the scientific knowledge obtained from such flights.

With the above in mind, the most logical procedure to use in dealing with the press would be to announce the first few launchings as tests of the primary vehicle. These would be followed by a series of instrumented flights with re-entry being attempted. Actually, one or several of these launchings should be bio-medical, though no mention of this fact need ever reach the press or the general public. The launching of a primate under the cover of an instrumented flight will enable the program to prove the safe return of the primate first, thus avoiding possible public embarrassment through a premature public announcement. Data obtained from such a flight could then be withheld for use in support of a photo-recon launching; the primate tests being used for its cover. Under no circumstances should there be any special or unusual precautions associated with a photo-recon launching. There should be a normal announcement to the press, either before or after the actual launch, depending upon the timing of their concern, utilizing bio-medical or bio-astronautical studies as the purpose of the flight.

If this sequence of launchings is followed, there will always be data available from previous launchings to adequately cover the CORONA missions and satisfy the hunger of the press and general public.

It is recognized that several personnel assigned to the launch pad will have to be cleared and told the true mission. Specifically, those coming in physical contact with the missile after it has reached the launch pad will have to be made knowledgeable of its mission. Others associated with the launching to a lesser degree, who are not in a position to know that a camera has replaced the primate but do know that a primate is not being launched, should be told that in the best interest of national security, public announcements are being altered. The purpose of this will be stated as being a means of denying the opposition a step by

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step progress report of the test series. Persons to whom this statement will be made should be impressed with the fact that this is not an attempt to hide failures or mistakes but rather it is a protective measure. The actual number of persons so informed should be kept to a minimum so as not to reduce the value of the statement; the theory being, that if a large number are told, it becomes general knowledge, whereas, if a few are led to believe they have been given classified information, they will and are bound to protect it.

Classified Story:

Within the Ballistic Missiles Division there is a need to account for the required horizontal flight pattern in low altitude orbit. To cover this requirement, ARPA will instruct BMD to covertly conduct some astro-physical measurements using low altitude (140 mile) satellites on polar orbits. These satellites will require instrumentation which must be recovered. The program will be explained as being an effort to determine the existence and characteristics of certain phenomenon which may seriously influence design of future military space vehicles and curtail further man in space travel. Though such an explanation would not satisfy a physicist, it will satisfy the category of personnel with whom we are concerned, namely the flight control personnel and others who will not be CORONA briefed.

To support the classified story and to logically account for the procurement of additional Thor booster vehicles, ARPA will dispatch a memorandum to the Air Force which will set forth the WS-117-L requirements.

The memorandum will state that a review of the WS-117-L Program indicates that additional Thor-boosted WS-117-L vehicles will be required over and above the ten currently authorized. At least nine additional Lockheed vehicles are required to meet a flight schedule of one per month, November 58 to March 59, inclusive, and two or more per month, April 59 to October 59 inclusive. Accordingly, the Air Force will be requested to take appropriate action to protect production lead times.

ARPA will indicate that they intend to have sufficient vehicles provided for the conduct of engineering flights; accomplish currently scheduled bio-astronautic flights; establish confidence in the WS-117-L vehicle reliability in view of its possible later use in the man-in-space programs and to provide for some special payloads designed to investigate and measure certain suspected space phenomena which may greatly influence future military space activities. ARPA will ask that AFBMD and LMSD provide secure arrangements so that these special payloads can be handled on a sensitive basis. Furthermore, in view of possible international and domestic complications that might result from bio-astronautic experiments with animals, it is desired that strict security be maintained relative to these aspects of the THOR-boosted program.

The letter will further indicate that in connection with possible payloads, it appears that the load-carrying capability of the vehicle system will be taxed. This in turn would dictate low altitude orbits. Suitable technical provisions, therefore should be made to meet this requirement.

Contractor Explanation:

1. Lockheed/General Electric. GE can admit its affiliation with the LMSD since they are manufacturing the re-entry capsule for both photo-recon and bio-medical satellite flights. Both are identical in appearance when they are shipped to the Lockheed Sunnyvale plant. It will be at the latter point where a given number of the capsules are covertly transferred to the Lockheed [ ] plant for the cutting of the camera aperture and other needed modifications.

2. Lockheed/Itek Corp. Itek requires a legitimate customer for the 12-14 cameras that they will be producing with Fairchild as a sub-contractor. Lockheed, their true customer is prepared to make payment either in sterile fashion or by overt payment. The latter means would identify Lockheed as the prime contractor but would not necessarily reveal the affiliation of the Missile Systems Division. Therefore, within Itek it can be said that the contract calls for a prototype camera and a few production models for special aircraft installation. Shipments can then be designated for delivery to Burbank, California rather than Sunnyvale, California, though in reality they will be removed from the normal shipment handling after each camera has been labeled. With camera production at one per month, it would appear possible to transport same by special airlift arranged by the CORONA Project Headquarters. The procedure suggested

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is that each camera be picked up at Boston or Long Island, depending upon whether shipments will originate from Itek or Fairchild, and transported to Washington, D. C. where the labels will be changed to permit bonded shipment to the LMSD [REDACTED]

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3. Itek/Fairchild. The most logical explanation to use to cover the Itek and Fairchild relationship is to carry out the same story used to explain the Lockheed/Itek contract. In this instance Itek will serve as the designers and Fairchild as the firm selected to do the fabrication. Again, every effort will be made not to connect LMSD with the camera being produced.

4. GE/Itek/Fairchild. The required contacts made at GE by personnel of Itek and Fairchild will be so few in number that it is best to explain them as normal business meetings of sales promotion attributed to products other than those allied to cameras and missiles.

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5. Lockheed-[REDACTED]/Lockheed-Sunnyvale. For the present and until such time as necessary, the Lockheed staff working at the [REDACTED] plant will remain under [REDACTED] explaining to no one what is being done there. Should problems occur within LMSD such as someone at the main Sunnyvale plant determining that

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Distributed to DPS Staffs  
and all Contractors.

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CORONA HISTORY  
Volume II

REFERENCE NO. 32

25X1

COPY

29 April 1959

MEMORANDUM FOR: Deputy Secretary of Defense

SUBJECT: Approval of Extension of Project CORONA

Herewith is a note, the purpose of which is to record certain decisions made some weeks ago and previously reported to you on the extension of CORONA. You will remember that following a meeting Mr. Horner and I had with you and subsequent discussion with Dr. Killian and Mr. Glennan, a paper recommending the extension was handed to General Goodpaster. Some days later he advised me that a favorable decision had been made which was reported to you and others in the Department of Defense. It was not until several weeks after the basic decision, however, that I received guidance from the same source on the handling of security and cover for the extended operations (as reported in the attachment). I understand there has been some uncertainty on this aspect of the matter and in any case it seems desirable to have a written record of the decisions. I am also attaching herewith in case you should wish to refer to it, the memorandum which was given to General Goodpaster and on the basis of which the decisions in question were made.

(Signed)  
RICHARD M. BISSELL, JR.  
Deputy Director  
(Plans)

1 Attachment:  
COR-0266/A

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CORONA HISTORY  
Volume II

25X1

COPY

5 May 1959

MEMORANDUM FOR: Deputy Secretary of Defense  
SUBJECT: Approval of Extension of Project CORONA

1. You will remember that, following a review of the SENTRY and CORONA Programs last fall and a series of conferences in December and January, agreement was reached among the interested agencies that it would be desirable to extend the CORONA Program through the summer of 1960. A recommendation to this effect, which included an outline of the funding proposed for the extension of the program, was addressed by the Under Secretary of the Air Force to the Deputy Secretary of Defense on 11 February and was subsequently approved by the latter. This paper served as the basis for a fuller memorandum (COR-0372) which set forth the same proposal against the background of a review of CORONA. With the concurrence of the senior officers concerned, this memorandum was presented to higher authority and approval granted for the proposed extension on the terms therein set forth.

2. The proposal thus favorably acted upon requested (without recommendation) an immediate decision as to whether an effort should be made to preserve the security surrounding the CORONA Project and to maintain its cover so as to deny true purpose of the 1960 flights as well as those scheduled for 1959. Although not stated in writing it was understood that the decision on this point might have a bearing on administrative arrangements since the decision to preserve security and cover would presumably imply the continuation of present organizational arrangements and of the present distribution of responsibility. Subsequent to the rendering of the basic decision referred to above the question of security was further considered and the decision was made to embark on the extended program with every effort and intent to continue along the same lines as in the past but to review the status of security and cover in approximately six months' time. It was contemplated that if security had deteriorated, or if there had been a change of political policy, the decision could then be made to surface the program but that in the meanwhile security precautions should be observed and planning should be on the assumption that the security status of the program would remain unchanged through the 1960 series.

3. Therefore, it is assumed, in accordance with the above decisions, that:

- a. Appropriate action is proceeding to schedule the four flights restored to the calendar year 1959 program and the eight flights proposed for calendar year 1960.
- b. The Central Intelligence Agency will initiate procurement of additional payloads as needed.
- c. Funding will be provided in accordance with the proposal as submitted and approved.
- d. Organizational arrangements and the distribution of responsibilities for the program will in the absence of further notice remain unchanged.

It is understood that the security and cover status of the program and related organizational arrangements may be reviewed at a later date.

(Signed)  
RICHARD M. BISSELL, JR.  
Deputy Director  
(Plans)

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CC: Dir/ARPA  
Gen Goodpaster

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Attachment 1

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CORONA HISTORY

Volume II

REFERENCE NO. 37

SECRET

COPY

November 15, 1962  
Number S-5200.13

SecDef

Department of Defense Directive

SUBJECT Security Policy for Military Space Programs (U)

I. PURPOSE AND SCOPE

This directive establishes security policy for military space programs and is applicable to all components of the Department of Defense.

II. GENERAL POLICY

- A. Adequate protection of military space programs is vital to the security of the United States. Therefore, the details of all DoD military space programs, including identification, mission, scope, capability, payload, launch, control or recovery operations, and results are classified.
- B. The security principle of need-to-know for military space projects must be vigorously enforced within DoD, DoD advisory groups, and by Defense contractors.
- C. Rigorous care must be taken to insure that information revealing the identification, mission, scope, or capability of specific military space projects and programs does not appear in unclassified documents and presentations.
- D. Unauthorized disclosure by Defense and Defense contractor personnel of the results, effectiveness, capabilities, and potentialities of specific military space projects and programs must be eliminated.

III. PROCEDURES

- A. Military space projects and space vehicles henceforth will be identified by means of numerical and alphabetical designators selected and assigned at random; except for boosters, names or nicknames no longer will be used.
  - 1. Military space projects will be identified by a numerical designator.
  - 2. Military space vehicles will be identified by an alphabetical prefix followed by a numerical designator, such as Orbital Vehicle (OV-7), Final Stage Vehicle (FSV-2), etc.
- B. The new method of identifying military space vehicles and projects will not be associated with their payload or mission except under the most strict security procedures and will be published in as few documents as possible. Titles of project documents will not refer to the mission or payload associated with the project. Launch or recovery schedules for specific payloads or mission areas will be classified SECRET or higher.
- C. Preparation and dissemination of over-all reports, development plans, and other documents on military space projects and programs will be severely limited and controlled. Detailed need-to-know justification will be required on the basis of need for specific information, rather than for particular documents. The number of persons authorized a blanket need-to-know will be sharply curtailed and continuously controlled.

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CORONA HISTORY  
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IV. RESPONSIBILITIES

- A. The heads of all DoD components having responsibilities for military space projects and programs, or aspects thereof, are responsible for insuring adherence to the provisions of this directive.
- B. The Secretary of the Air Force is responsible for:
  - 1. Determining and assigning identification nomenclature for all military space projects and vehicles.
  - 2. Maintaining a central registry of all military space project numbers and space vehicle designators.

V. EXCEPTIONS

- A. This directive does not apply to missiles or boosters.
- B. Exceptions to the provisions of this directive may be granted on a case by case basis by the Secretary of Defense or his designee.

VI. EFFECTIVE DATA AND IMPLEMENTATION

- A. This directive is effective immediately. Existing documentation on military space projects and programs will be superseded by new documents as rapidly as they can be prepared and issued.
- B. Every component of the Department will revise its regulations and other instructions to conform with the provisions of this directive.

VII. CANCELLATION

Dod Directive S-5200.13, dated 23 March 1962, is hereby canceled.

(Signed)  
ROSWELL GILPATRIC  
Deputy Secretary of Defense

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CORONA HISTORY  
Volume II

REFERENCE NO. 44

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Excerpt from Record of Actions, National Security Council  
502nd Meeting, 10 July 1962

The National Security Council, at its meeting on 10 July 1962 with regard to NSC Action #2454 (Space Policy and Intelligence Requirements), discussed the report of the ad hoc committee on political and informational aspects of satellite reconnaissance policy, prepared in response to National Security Action Memorandum No. 156, and approved the recommendations of the report as amended, as follows:

Recommended Policy:

1. The United States should maintain the legal position that the principles of international law and the UN Charter apply to activities in outer space and, specifically, that outer space is free, as are the high seas.
2. The US should therefore continue to avoid any position implying that reconnaissance activities in outer space are not legitimate. Similarly, we should avoid any position declaring or implying that such activities are not "peaceful uses."
3. The US should, to the extent feasible, seek to avoid public use of the term "reconnaissance" satellite, and where appropriate use instead such broader and more neutral terms as "observation" or "photographic" satellites.
4. Further studies should be made on an urgent basis to determine whether there are releasable data, such as mapping information, or procedures such as occasionally calling TIROS and NIMBUS vehicles "photographic" satellites, which would help create wider public acceptance of space observation and photography.
5. NASA should study urgently the possibilities of accelerating bilateral international cooperation to develop non-military space activities involving space observation, perhaps including photography.
6. It is recognized that the US cannot entirely avoid or disclaim interest in reconnaissance, so that where feasible the US should also seek to gain acceptance of the principle of the legitimacy of space reconnaissance.
7. When confronted by specific Soviet pressure to outlaw reconnaissance activities in space, the US should continue to take a public stand for the legitimacy of the principle of reconnaissance from outer space, the precise form and extent of which would depend upon the circumstances of the confrontation.
8. The US should not at this time attempt to conduct a truly clandestine program (by which we mean a program with covert and unregistered launchings, and public denial that the US is engaged in reconnaissance). However, the US should pursue the research and development for a standby capability for clandestine operations in case circumstances ever make such operations necessary.
9. The present practice of not identifying individual military space launchings by mission or purpose is sound. We believe, however, that there should also be a more open (but not more detailed) public reference to the general over-all military program. An appropriate nickname for public identification should be given to the over-all military program, with its objectives intentionally stated in broad and general terms. All military launchings would be described in terms of the general objectives of the over-all military program. No specific mission would be ascribed to any particular launch.

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10. The US should not, at this time, publicly disclose the status, extent, effectiveness or operational characteristics of its reconnaissance program.

11. Strict control over public statements and backgrounding concerning reconnaissance satellites should be exercised to ensure consistency with the policy guidelines suggested in these recommendations.

12. No public attention should be directed toward development of anti-satellite capabilities, and any publicized demonstration of developmental work and any actual test of such a capability should require White House approval, with full account given to the adverse effects for our reconnaissance satellite program. We should avoid any indications that physical countermeasures to reconnaissance vehicles would be justified, and as appropriate the US should make a positive effort to propagate the idea that interference with or attacks on any space vehicle of another country in peacetime are inadmissible and illegal.

13. The US should discreetly disclose to certain allies and neutrals selected information with regard to the US space reconnaissance program, making each disclosure orally and at a time and in a manner that will preserve the essential security of our program while impressing upon them its importance for the security of the Free World. Disclosures should be made in a manner that will preclude acquisition by the Communist Bloc of usable evidence of an official US acknowledgement that we are conducting a satellite reconnaissance program. Proposals for such disclosures should include clearance by the National Reconnaissance Office.

14. The US should in private disclosures emphasize the fact of our determination and ability to pursue such programs because of their great importance to our common security, despite any efforts to dissuade us.

15. The US should note in connection with private disclosures that, except in some cases for specifically defined disarmament agreements, the US cannot agree to (a) declarations of the precise purpose of all satellites, (b) declarations of the equipment of all satellites, (c) general requirements for advance notification of all satellite launchings and the tracks of satellites, (d) pre-launch inspection of the satellites, or (e) a specific definition of peaceful uses of space which does not embrace unlimited observation.

16. The possible roles of space reconnaissance in disarmament inspection arrangements or in creating military stability should be further studied.

17. The US should stand by the disarmament proposal for a provision in Stage One of a Treaty on General and Complete Disarmament banning weapons of mass destruction from being carried in satellites, and providing for advance notification and inspection of all missile and space launchings to insure that ban. The US should continue to exclude any ban on reconnaissance satellites.

18. The US should not, in presenting more detailed proposals for a separate group of measures to "reduce the risks of war," include advance notification of space launchings. If attempts are made by others to include space launchings with missile firings, the US should point out that (a) the trajectory of space vehicles can be distinguished from missile firings, so that space launchings would not be confused with missile firings, and (b) measures relating to disarmament of outer space, which we are proposing, include appropriate controls over space launchings.

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CORONA HISTORY  
Volume II

REFERENCE NO. 47

COPY

25 June 1958

25X1

MEMORANDUM FOR: Director, Advanced Research Projects Agency  
Assistant Secretary of the Air Force (R & D)

SUBJECT: Financing of Project CORONA

1. Under date of 15 April 1958, an outline of the above project (COR-0013) was submitted for the approval of higher authority after discussion with you and with Dr. James Killian. As you were advised shortly thereafter, the approval was granted. I was, however, given specific instruction with respect to the financing of this project. I am conveying the substance of this instruction to you at this time because it is relevant to arrangements which I believe are currently under discussion between the Advanced Research Projects Agency and the Air Force.

2. The project outline contained the following estimates and statements with respect to financing:

a. That covert procurement would require about [ ] which would be provided by the Central Intelligence Agency.

b. That first and second stage vehicles for twelve firings would cost approximately [ ] and that this procurement would be financed "for the most part by ARPA through the Air Force."

3. With respect to the first of these two categories of costs, the CIA has obligated [ ] and is about to obligate an additional [ ] to Lockheed Aircraft Corporation. It now appears likely that at least another [ ] will be required for the items to be covertly procured and this will be covered by CIA with FY 1959 funds.

4. The instruction referred to in Paragraph 1 above is relevant to the second category of costs, those of first and second stage vehicles. The instruction itself applied to both covert and overt development and procurement and was to the effect that "all funding for development and hardware must come from: (a) the Central Intelligence Agency and (b) the Advanced Research Projects Agency." The intent of this instruction was that funding for these purposes should not be provided by the Air Force.

5. I am confident that the arrangement which I understand is now contemplated, whereby the Air Force will obligate certain funds for CORONA in advance of reimbursement by ARPA, would be consistent with the foregoing instruction, since this sequence of events has been necessary with a number of ARPA programs. I feel, however, that if ARPA does not intend ultimately to fund vehicles procured for CORONA, this change of plans should receive appropriate clearance.

6. The language quoted in Paragraph 4 above of course leaves open the possibility that this Agency should fund a larger part of the whole CORONA program than contemplated in the project outline. Although this course of action is not precluded on policy grounds, the need for it was not foreseen, because what is now CORONA has been planned and authorized as a part of WS-117L before being split off as a separate, covert project, and its funding was assumed to be possible from already approved programs. It is recognized that the cost of first and second stage vehicles for CORONA was underestimated and that various ARPA programs including the acceleration of 117L require additional funding. The provision of sizable amounts in addition to those already budgeted would, however, raise serious problems for the CIA. Accordingly, if these developments render impossible the funding of overt procurement for CORONA by ARPA, the financial status of the project should be reviewed by the knowledgeable senior officers of the Department of Defense and this Agency.

COR-0057

(Signed)  
RICHARD M. BISSELL, JR.  
Special Assistant to the Director  
for Planning and Development

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CORONA HISTORY  
Volume II

REFERENCE NO. 48

S E C R E T

COPY

DPS-0025

25 April 1958

MEMORANDUM FOR: The Comptroller

SUBJECT: Project CORONA

1. This is to advise that this date I have approved subject project in the amount of  for FY 1958.

2. You are directed by this memorandum to seek release of the above amount from the Agency Reserve for Contingencies as an unprogrammed requirement for which other funds are not currently available.

3. The Office of Special Assistant for Planning and Development has the responsibility for obtaining the required documentation to support the expenditure of these funds. This Office is also responsible for maintaining appropriate accounting records clearly setting forth the funds received and the expenditure thereof. Such supporting documentation and accounting records will be subject to audit by the Audit Staff of the Agency at the appropriate time.

(Signed)  
ALLEN W. DULLES  
Director

CONCUR:

Richard M. Bissell, Jr.  
Special Assistant to the  
Director for Planning  
and Development

Lawrence R. Houston  
General Counsel  
28 Apr 1958

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CORONA HISTORY  
Volume II

REFERENCE NO. 50

25X1

COPY

9 August 1958

MEMORANDUM FOR: General Andrew J. Goodpaster  
SUBJECT: Project CORONA

1. Herewith is a revised estimate of the cost of Project CORONA which I promised to prepare for you. Its primary purpose is to explain how and why cost estimates have changed since submission of the original outline (COR-0013 and COR-0014) on 16 April.

2. Dr. Killian has been over this memorandum. Copies of it will be made available for information to Mr. Quarles and to Mr. Stans. In addition to the foregoing, who were present when this matter was discussed in Dr. Killian's office on 5 August, I am sending a copy to the Director, Advanced Research Projects Agency.

(Signed)  
RICHARD M. BISSELL, JR.  
Special Assistant to the Director

Attachment:  
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CORONA HISTORY

Volume II



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8 August 1958

PROJECT CORONA

1. Under date of 15 April 1958 an outline (document number COR-0013) of the above Project, including an estimate of its cost, was submitted for the approval of higher authority after discussion with the senior officers of the organizations concerned. The desired approval was granted and was accompanied with the specific instruction that all funding for development and procurement of hardware for CORONA must come from (a) the Central Intelligence Agency, and (b) the Advanced Research Project Agency. Partly as a result of this instruction and partly because the assumptions underlying the final estimates in the Project outline were incorrectly stated, it appears desirable to present a revised estimate at this time.

2. The Project outline contained the following estimates and statements with respect to financing:

a. That covert procurement of the payloads for twelve CORONA vehicles would require about [redacted] which would be provided by the CIA.

b. That twelve Thor (first stage) boosters and Lockheed second stage vehicles would cost approximately [redacted] on the basis of a rather arbitrary allowance of [redacted] per completed vehicle.

c. That this procurement of vehicles would be financed for the most part by ARPA through the Air Force but that there was some question concerning the allocation of the cost of the Thor boosters.

d. That in any case the whole cost of the basic vehicles (but not of the payloads) would be funded within then approved programs.

3. The following are the specific circumstances that now require revision of the foregoing statements:

a. The allowance quoted in paragraph 2.b. above of [redacted] per unit for the cost of the vehicles was incorrect. This figure was furnished for inclusion in the Project Outline on the assumption that the Air Force would absorb the cost of Thor boosters. [redacted] is the unit cost of the Lockheed second stage vehicle only. That of the Thor is approximately [redacted]. Accordingly, the true cost of each completed vehicle, including first and second stages (but excluding payload) amounts to [redacted].

b. The instruction referred to in paragraph 1, above, ruled out the absorption of any part of these costs by the Air Force. Accordingly, the cost to ARPA of 12 completed vehicles will be [redacted] instead of [redacted] as stated in the Project Outline.

c. In addition to the 12 Thor/117L vehicles which will be equipped with CORONA recoverable reconnaissance payloads, some 7 additional launchings of the same basic vehicle are programmed. Two of these will be instrumented vehicles for second stage propulsion and guidance tests; two will have as their primary purpose the testing of the recoverable capsule and recovery procedure but will carry small animals; and three will be biomedical vehicles carrying primates. The last named group of three are believed justified without reference to CORONA for the contribution they will make toward the Man-in-Space program but they will also serve significantly to improve the cover of the CORONA firings. The Thor test firings are essential to CORONA but will also flight

COR-0064



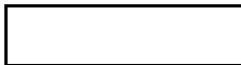
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CORONA HISTORY

Volume II



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test the second stage vehicle, which is essential to the basic 117L program. Thus some part of the cost of these seven non-CORONA vehicles could properly be charged to CORONA, since they are in varying degrees necessary for, or essential to, its success. On the other hand, any specific allocation of these costs would be arbitrary, since these seven firings also contribute or are essential to other programs in varying degrees.

4. It is understood that ARPA programs have been revised in the light of the above circumstances to include funds for 19 Thor/117L vehicles but that a problem may remain with respect to the cost of the biomedical recoverable capsules. This could affect CORONA since elements of the recovery system are common to CORONA and the biomedical program and part of its cost is being borne by the latter.

COR-0064

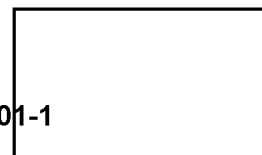
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CORONA HISTORY  
Volume II

REFERENCE NO. 52

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COPY

25 November 1958

MEMORANDUM FOR: Major General Jacob E. Smart  
Assistant Vice Chief of Staff, USAF

SUBJECT: Distribution of Responsibilities for CORONA

1. Two papers drafted and approved in April 1958 give a brief outline of the responsibilities of the several organizations concerned with Project CORONA. The first paper was a Project Outline submitted under date of 15 April 1958 to the White House for approval after approval by Mr. Roy W. Johnson for the Advanced Research Projects Agency, Mr. Richard E. Horner for the Air Force, Brigadier General Osmond J. Ritland for the Air Force Ballistic Missile Division, and Dr. James R. Killian. The second document was a Work Statement given to the prime contractor under date of 25 April 1958 which had been drafted jointly by representatives of BMD and this Agency.

2. The following is the paragraph in the Project Outline which deals with the administration of the program:

"CORONA is being carried out under the authority of the Advanced Research Projects Agency and the Central Intelligence Agency with the support and participation of the U.S. Air Force. ARPA has authorized, and will exercise general technical supervision over, the development of the vehicle. Detailed supervision of vehicle development is being performed by the Air Force Ballistic Missile Division acting as agent for ARPA. The Ballistic Missile Division is responsible also for the provision of necessary ground facilities, which are in any case required for the WS-117L program. CIA is participating in supervision of the technical development, especially as applied to the actual reconnaissance equipment, is undertaking all procurement that must be handled covertly, and has general responsibility for cover and for the maintenance of security. In the operational phase, actual missile launchings will be carried out at Cooke Air Force Base by technical staffs of the companies concerned. Tracking will be carried out from stations being established by the Ballistic Missile Division. Recovery will be accomplished by a Navy Task Force. The line of command for these field activities of launching, tracking, and recovery will be through the Ballistic Missile Division. Subject to approval by the appropriate political authorities, the general schedule of launchings will be determined by the availability of vehicles and launching facilities. Specific timing within this schedule will be determined so far as possible on the basis of weather prevailing over target areas. For both cover and control purposes, weather will be reported through an already existing CIA channel and firing dates will be selected by the Central Intelligence Agency."

3. The following is the paragraph from the prime contractor's Work Statement which sets forth the procedure for supervision of the contract by the U.S. Government:

"Technical direction of the program is the joint responsibility of several agencies of the Government. In the interest of effective management, however, such direction will be provided primarily by and through the Air Force Ballistic Missile Division acting as the agent for all interested components of the Government. A Project Officer will be established in BMD as the single day-by-day point of contact for the contractor. This Officer will have authority to make on-the-spot decisions within the scope of the work statement on all matters pertaining to the program other than those of major importance. From time to time the Government agencies concerned will jointly review the progress of the program. The Government will make arrangements to permit the prompt rendering of major decisions concerning the program which cannot be made by the Project Officer. Special security measures will be required throughout the program. The complete security plan, clearance of facilities and of individuals knowledgeable of the program, and other matters relating to security will be under the direction of a designated authority within the Government. The contractor will provide such special security measures within his own facilities, subcontractors' facilities or Government facilities provided for this Project, as may be required to conform with the security plan."

COR-0239

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4. With respect to the opening sentence of the statement quoted in paragraph 2, above, it should be noted that the wording was carefully devised to give expression to a White House desire. It had been expressly stipulated when the Project received oral approval that all funding for research and development and for the procurement of hardware should be provided by the Central Intelligence Agency and by the Advanced Research Projects Agency and that the Ballistic Missile Division should act as their executive agent in the management of the program.

5. In practice, the management of this program was handled exactly in accordance with the statement quoted in paragraph 3, above and proceeded extremely smoothly until major financial problems developed in September 1958 and gave rise to a protracted review of both the financial status and the content of both the CORONA and SENTRY programs. In the course of the review, a number of individuals and organizations became involved in managerial decisions concerning (a) the allocation of costs, (b) the best use to be made of certain of the Thor-boosted flights in the newly-named DISCOVERY series, (c) cover stories and publicity, and (d) possible modifications in the SENTRY Program. Such multiple participation in these decisions inevitably gave rise to considerable confusion.

6. It now appears that the first three sets of decisions have been substantially made and that the fourth is unlikely directly to affect the DISCOVERY series, or within it the schedule of CORONA flights. There would appear to be a possibility, therefore, that responsibility for day-to-day managerial decisions could revert in most matters to the Ballistic Missile Division and in certain others, especially covert procurement, cover, and security, to this Agency. The Advanced Research Projects Agency, Headquarters USAF, and Headquarters ARDC/USAF would of course wish to follow the program and would be concerned with any policy decisions.

(Signed)  
RICHARD M. BISSELL, JR.  
Special Assistant to the Director

COR-0239

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CORONA HISTORY  
Volume II

REFERENCE NO. 53

SECRET

COPY

4 December 1958

MEMORANDUM FOR: Deputy Secretary of Defense  
Special Assistant to the President for Science and Technology

SUBJECT: Proposed Curtailment of Project CORONA

1. I have been kept advised of the more important problems that have arisen from time to time with respect to Project CORONA, and in particular I have been aware of the review of that Project and of the SENTRY Project conducted by the Advanced Research Projects Agency during the past several months. As of two weeks ago, I was given to understand that agreement had been reached among all concerned on certain minor changes in schedules which had a bearing on the cover explanation for CORONA but that in other respects plans for the Project remained firm.

2. I now understand, however, that the Advanced Research Projects Agency has proposed to cut the CORONA schedule by one-third in order to free for other purposes funds previously committed to this Project. One of these purposes is a new series proposed for Calendar Year 1960 as a follow-on to CORONA but using different equipment.

3. I am well aware of course that CORONA is being financed for the most part by the Department of Defense and that the availability of funds for this activity is bound to be affected by changes in the general financial situation and plans of the whole Defense establishment. It may well be that the proposed curtailment of the CORONA schedule is wise in the light of the many competing, high priority requirements for funds. Nevertheless, in view of the manner in which the decision to establish CORONA as a separate Project was originally made, I would like to suggest that we meet to discuss the status of this Project before the curtailment decision is finally made.

(Signed)  
ALLEN W. DULLES  
Director

cc: D/ARPA  
Asst. Secty AF/R&D

COR-0214

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CORONA HISTORY

Volume II

REFERENCE NO. 67

25X1

29 January 1965

COPY

MEMORANDUM FOR: Deputy Director, Central Intelligence

SUBJECT: History of the CORONA System

1. The following memorandum is submitted for your information, and contains the history of the CORONA Program from initiation in March 1958 up to the present. The memorandum is divided into three sections. The first two: "Technical Development of the CORONA Program" and "Contractual Developments of the CORONA Program" are given as background of the third section: "Government Management." The information is presented in this manner as the technical developments and contractual arrangements provide a base and a prelude to the understanding of the government management developments.

2. Technical Development of the CORONA Program:

a. The first CORONA flights were made from a THOR-AGENA-A launch vehicle. The camera flown was a single f:5.6 scanning lens panoramic camera. The system resolution was in the neighborhood of 20 feet at the operating altitudes. The operating altitudes were rather high -- 120-150 N. Mi. With the limited performance of these early THOR-AGENA's and the primitive guidance system (which introduced large uncertainties in the injection parameters), the system was severely weight limited. The recovery vehicle was the Mark IIA. The recovery system was developed under cover of a biomedical program; the Mark II capsule could be used for flight of monkeys (such flights were not made). Following a development period of approximately 2-1/2 years, marked by 11 unsuccessful flights, success was finally achieved with a CORONA camera system in August of 1960. One "diagnostic" vehicle had been recovered one week earlier. Shortly thereafter, design improvements were proposed for the basic camera; and development was initiated on the C''' unit. This camera was basically a f:3.5, 24-inch focal length system, with resolution to the order of 10 feet. This camera differed from C primarily in that the lens rotated continuously during operation, rather than scan-and-return. Continual improvements were being made concurrently in the AGENA and THOR vehicles to allow more positive injection of desired parameters with greater weight capabilities. The first C''' was flown in August of 1961 (approximately one year after the first successful flight of the original CORONA system).

b. The increased THOR-AGENA capabilities made possible the introduction of a two-camera stereo model. (The necessary recovery system modifications had been accomplished under the ARGON Program.) This new model, called CORONA/MURAL, was formally initiated in March of 1961 and first flown in February of 1962. The system consisted of two C''' cameras in a 30° convergent stereo configuration. Because of continual difficulties with the time recording mechanism used on the CORONA cameras, a digital clock from the ARGON Program was modified and substituted for the original clock. Auxiliary cameras for extended ground coverage at low resolution (index camera) and a stellar camera for accurate attitude determination were added in later versions.

c. Concurrently, developments were made in the flight programming and command capabilities. The initial CORONA camera had only one ground command (a selection of the operating speed of the camera). More elaborate controls on v/n control were instituted, and an on-off capability for the program was added. All flights to date have used minor modifications of the original Fairchild Camera and Instrument Corporation flight programmer for flight command of the camera. Currently, three parameters of v/h time dependence, 10 separate programs, stereo-mono operation, and sequences of off-on can be commanded from the ground.

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d. Under the LANYARD Program, the increased performance capability of the Thrust Augmented THOR (TAT) was developed. This allowed almost doubling of the payload weight; a program was started under CORONA to double the film capacity and extend the useful mission life. This system, known as CORONA-J, used the basic MURAL camera with two recovery vehicles. The CORONA-J system was first flown in mid-1963. After a short period of program difficulties, the "J" System is operating satisfactorily and is providing the search surveillance for the community.

e. Two other programs were run concurrently with CORONA with a large overlap in technical personnel and management. The first of these was the LANYARD Program. LANYARD was a modification of the SAMOS E-5 System, designed to provide five-foot ground resolution photography with a swath width of about 40 miles. A single 66-inch focal length F:6 panoramic camera was used. This camera could be operated in an interrupted stereoscopic mode or in continuous monoscopic.

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The second program was ARGON, a program sponsored primarily by the Army Map Service and designed to establish a world-wide geodetic control network. A three-inch focal length, low-distortion lens provided terrain coverage over a 70° field of view, at about 200-300 feet resolution. Fairchild Camera and Instrument Corporation (FCIC) was subcontractor to LMSC for camera development. Autometric Corporation was a working associate of LMSC, responsible for ground data reduction equipment. The ARGON Program was continued until recently, including a second procurement with FCIC as associate to LMSC. Two systems are still in storage; flight is being considered at the present. The ARGON System has provided a reasonable amount of geodetic control for the mapping community.

### 3. Contractual Development of the CORONA Program:

a. Under the management philosophy used for the 117-L Program, the covert side of the DISCOVERER or CORONA Program operated with Lockheed Missiles and Space Corporation as Weapons' Systems Manager/Prime Contractor. However, Mr. Bissell, through the monthly suppliers' meetings, exerted rather direct program control. This monthly suppliers' meeting management control technique had been used in the IDEALIST and in the OXCART programs. Under this prime contract for C, C' (follow-on procurement, similar camera to C), and C'', Itek was the first tier subcontractor for the camera; and General Electric was subcontractor for the recovery system development. FCIC was subcontractor to Itek on C and C'. With the changed Government philosophies on contractual arrangements, and in order to reduce program costs, the MURAL Program was initiated with Lockheed, Itek, and General Electric as associate contractors. Technical support of the Government management continued to be supplied by Lockheed under a Systems Engineering contract, initially planned to be contracted for the Air Force, but subsequently reverted to a CIA contract. Control of the associate contractors was vested in a Configuration Control Board with representatives of various Government offices. The covert contracts on the program were handled by the CIA Contracting Office. The funding on the original CORONA Program (covert contracts) was CIA, the Air Force funding the vehicle developments and the "biomedical" recovery capsule developments. Subsequent funding, until the NRO was established, was through the Air Force, although justification for funds was ultimately made by the Agency (Mr. Bissell); i.e., the "Air Force funding" was primarily a bookkeeping matter.

b. From the inception through May 1961, the following statement was an official part of the direction to the contractors: "Technical direction of the program is the joint responsibility of several agencies of the Government. In the interest of effective management, however, such direction will be provided primarily by and through the Air Force Ballistic Missile Division acting as the agent for all interested components of the Government. A Project Officer will be established in BMD as the single day-by-day point of contact for the Contractor. This Officer will have authority to make on-the-spot decisions within the scope of the work statement on all matters pertaining to the program other than

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those of major importance. From time to time, the Government agencies concerned will jointly review the progress of the program. The Government will make arrangements to permit the prompt rendering of major decisions concerning the program which cannot be made by the Project Officer." In May 1961, this statement was changed to read as follows: "Overall technical direction of the program is the joint responsibility of several agencies of the Government. In the interest of effective management, however, such direction will be provided primarily by and through the Air Force, Space Systems Division, acting as the agent for all interested components of the Government. A project officer established in SSD will be the single day-by-day point of contact for the Contractor. LMSD shall establish and maintain technical and management control of sub-contractors as are required for proper execution of the work statement. Major subcontractors are Itek Laboratories and General Electric Missile and Space Vehicle Department. Subject to the overall management of SSD/Headquarters, LMSD shall fulfill responsible systems management of the C'' program as Weapon System Contractor. Government approval of the technical decisions of the Contractor shall not be required prior to implementation, except as specifically set forth elsewhere in this contract. This provision should not, however, be construed in any way limiting the right of the Government to direct or redirect the technical aspects of the Contractor's efforts at any time." Essentially the same language was carried through on MURAL and "J" although now Itek and General Electric were associate contractors, and Lockheed was both an associate contractor and assistant engineering contractor.

c. While the project at SSD was the single day-to-day point of contact for the contractor or contractors, the Agency maintained a rather direct and frequent contact (in addition to the controlling role in monthly suppliers' meetings) with the working level people through the operations officer (Col. Murphy) who was located at the Palo Alto facility. Col. Murphy acted in a triple role. His primary responsibility was, of course, operations; as a secondary responsibility, he had mainly technical oversight. Third, he had limited authority as a contracting officer. In 1964, with establishment of the CORONA Project Office [redacted] under General Greer, [redacted] was detailed from Los Angeles to the Palo Alto facility to provide the technical contact with the contract and, as such, really assumed the second of Col. Murphy's three roles.

d. As a sidelight on contractor relationships, in the early phases of CORONA, all contractors and subcontractors felt relatively free to discuss proposed changes and problems with all parts concerned. Final acceptance of the systems was performed by a Washington representative. Extensive communications between all parts concerned were generally prevalent, both cable and telephone plus frequent interchanges. Beginning in late 1961, and increasingly so as time progressed the contractors were restrained from direct interchange with Project Headquarters. By 1962, no cables could be released from the contractors at the Palo Alto facility to Project Headquarters without word-by-word approval from SSD. During late 1963 and 1964, communications channels dried up almost completely.

#### 4. Government Management:

a. The CORONA Reconnaissance Program started in March of 1958 under the joint direction of the Advanced Research Projects Agency and the CIA, with the support of the Air Force. Proposal work in early feasibility investigations had been performed earlier as part of Weapons System 117-L. The CIA was charged with the development of the reconnaissance equipment, security, cover, and covert procurement. The Air Force contracted and directed the detailed procurements on the overt side. These included the booster, the AGENA 2nd stage, control networks, launch facilities, and the basic recovery vehicle development under the Biomedical Program auspices. It appears somewhat mixed right now as to exactly who was doing detailed supervision of the cameras and associated equipment. (A small group of Ballistic Missiles Division in Los Angeles, basically charged with the photo systems under 117-L, consider that they had much of this responsibility. Some of these officers were: Col. Sheppard, Col. Oder, [redacted] Col. Battle

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of SSD was the official program director of the DISCOVERER Program, including both the Biomedical Program (cover program) and the operational flights. The CIA, under the direction of Mr. Bissell, then DDP, was in formal charge of the technical direction of the payload, and represented Project Headquarters. Messrs Kiefer, [redacted] and Parangosky assisted Mr. Bissell in these early days. [redacted] participated somewhat later. In February of 1959 an inert THOR-AGENA was launched, followed by two non-camera-bearing test vehicles. The first camera was flown in June of 1959 but did not orbit. In November of 1959, the ARPA responsibility was transferred to the Air Force under direction of the Secretary of Defense. At this time, there had been no successful camera operations in orbit nor recoveries. By April of 1960, camera operation had been accomplished (primarily because of a change to a polyester based film, rather than the acetate base used earlier). A recovery system diagnostic program was instituted, culminating, in August 1960, with the first successful recovery from orbit. Later that month, a camera system was flown and film was recovered. It should be noted that during this period, and for several years thereafter, CORONA was looked on as a short-term back-up for the developing SAMOS Reconnaissance Systems.

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b. Management during this period was basically joint and, as is obvious from conversations with various persons involved, without a single unified head; however, apparently good working relationships were maintained. Col. Murphy was the Chief Operations Officer for the CORONA Program on the West Coast. He was, at the time, assigned to the CIA and operated as the local Agency representative. Contact between the Government and both the prime and subcontractors was free and frequent. The original CORONA Program was extended without major system modifications (the C') and, in 1961, further extended with a major modification in the camera design (C''). The C''' was first flown in August of 1961. In 1961 Dr. Charyk, then Under Secretary of the Air Force, authorized the development of a dual camera-stereo configuration, known as "C MURAL." (The SAMOS E-6 system was concurrently under development.) By agreement, Dr. Charyk and Mr. Bissell changed the contractual arrangement of the MURAL Program. LMSC, Itek, and General Electric became associate contractors; and LMSC, in addition, was given the Systems Engineering Contract. Concurrently, a Configuration Control Board was established. The Board consisted of a representative from Col. Battle's office (Capt. Johnson), the CIA Operations Officer of Palo Alto (Col. Murphy), and a CIA Project Headquarters representative [redacted] Col. Howard, from NRO Staff, joined the Board shortly thereafter. The first CORONA/MURAL System was flown in February 1962.

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c. Rather early in the program, when severe technical difficulties were encountered, a high-level team of Government officers were assigned responsibility of solving the problem. The committee was known as the "Autumn Leaves Committee," headed by Mr. Kiefer. However, as Mr. Kiefer notes in a memorandum of 12 March 1964, "During two periods of great technical problems, subsequent to the establishment of the CCB, the engineering direction was largely pre-empted by Dr. Scoville on an ad hoc basis." The first of these problems was the electro-static discharge fogging problem, which is still plaguing us to some extent. The other was the [redacted]

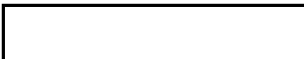
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d. Direction of the program proceeded under this Configuration Control Board until early in 1964. In late 1963 and early 1964, the Director, NRO played an increasingly strong role; and, in January 1964, specifically directed that all changes to the payload system be approved by himself, following review by the CCB. The CCB was not formally dissolved, but has not met since approximately March 1964.

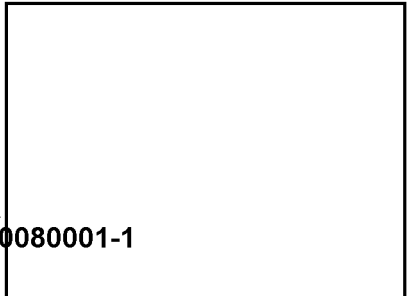
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e. From the inception of the program until 1963, the day-by-day technical direction of all contractors was under the general supervision of Col. Lee Battle, first in Ballistic Missiles Division and later in Space Systems Division (SSD). Col. Battle responded directly to Washington authorities: Mr. Bissell, Dr. Charyk, etc. The program was generally assigned (under the NRO) to Director, Program "B" in CIA. Col. Battle considered his line of command

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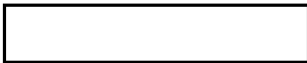


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as separate from the SAMOS Program. His successor, Col. Worthington, responded somewhat to Gen. Greer, Director, Program "A", nominally assigned to SSD, but actually heading an office (SAFSP) reporting directly to the Under Secretary of the Air Force (Director, NRO). Early in 1964, as part of the Air Force move to assume full control of the CORONA Program, the program was transferred to a new office, directly under and reporting to Gen. Greer and headed by Col. Paul Heran. Col. Heran had earlier been in charge of several photographic systems under SAMOS, most recently E-6. Since that time, Col. Heran has been taking an increasingly strong role in the program, not using the CCB or associated mechanisms and reporting to Washington offices only through Gen. Greer.

f. During the major portion of the CORONA Program, funding was from Air Force funds transferred to CIA. Budgeting information, etc., was also generated by CIA for submission. However, during 1964, budget submissions were made by the Director of Program "A" as part of the overall satellite reconnaissance program.

g. Throughout the course of the CORONA Program from inception to date, CIA has had the responsibility for security and actual contracting. They have maintained this role primarily because of certain prerogatives of the Agency and methods of doing business.

(Signed)  
ALBERT D. WHEELON  
Deputy Director for  
Science and Technology

Drafter:  
O/DDS&T  (29 Jan 65)

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