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NATIONAL RECONNAISSANCE OFFICE
14675 Lee Road
Chantilly, VA 20151-1715

11 January 2008

Case Number E01-0001

Per your of 1 January 2008, you have withdrawn your appeal to the ISCAP for the Perry History Volumes III a and b. The National Reconnaissance Office (NRO) has reviewed the enclosed document under the provisions of Executive Order 12958. The deleted portions of the text remain classified per Executive Order 12958, section 1.5 (c).

If you have any questions, please call me at (703) 227-9128 and reference NRO case number E01-0001.

Linda S. Hathaway

Linda S. Hathaway
Chief, Information Access and
Release Team

Enclosure:
Perry History Volumes III 3 A&B

A HISTORY OF SATELLITE RECONNAISSANCE

VOLUME IIIA - [redacted]

by

Robert Perry

January 1974

BYE-17017/74 IIIA 4 3

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Volume IIIA consists of 338 pages.

Copy 4 of 5 copies

Classified by BYEMAN - 1
Exempt from general declassification
Schedule of Executive Order 11652
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PREFACE TO VOLUME IIIA

[redacted] was conceived while Dwight David Eisenhower was President of the United States. Thirteen years later, when this preface was written, [redacted] It was, of course, a vastly different system from that first proposed shortly after Gary Powers' U-2 ran afoul of a Soviet antiaircraft missile in May 1960. At the time of that incident, the United States had no operational reconnaissance satellites and of the two developmental systems with apparent near-time potential, Samos E-1 was conceptually flawed and the other, Corona, had experienced a frustrating succession of operational failures. Four additional photo-satellites (Samos E-2, E-3, E-4, and E-5) were at some stage between invention and first launch; none was ever to return a single photograph of Soviet territory to American photo interpreters, although that preposterous outcome could not then have been foreseen by any rational participant.

U-2 penetrations had provided some useful insights into the research and development status of Soviet missile and aircraft programs by 1960, but the United States desperately needed information about the characteristics, numbers, and placement of operational ballistic missiles in the Soviet inventory. Notwithstanding the urgency of that need, President Eisenhower chose to disapprove plans for further U-2 operations over Russia rather than chance a nuclear weapons confrontation. In any case, the vulnerability of the U-2 was all too apparent. Lacking credible information about Soviet capabilities, the United States had in 1958 undertaken an enormous expansion and acceleration of its own ballistic missile program, hopeful that American industry could overcome what was generally assumed to be a substantial Soviet advantage in nuclear weapons delivery capability. No Corona satellite had yet functioned correctly; in mid-1960 that program was forced to retreat from launching operationally configured payloads to a resumption of engineering test flights, sans cameras, in the hope that malignant defects in orbital and recovery functions might be identified and eliminated.

In the near panic that followed the discovery that U-2 aircraft could no longer safely overfly the Soviet Union, intelligence specialists devised three major new photo-reconnaissance programs: Oxcart [redacted] aircraft that became better known as the A-11 "Blackbird" and later fathered the SR-71 and F-12 programs), Samos E-6 (designed originally to replace the languishing Corona satellite), [redacted] Political constraints finally kept Oxcart from fulfilling its considerable promise and Samos E-6 was technically deficient, like its five Samos predecessors. Stubborn CIA and Air Force program managers working with Itek, Lockheed, and General Electric engineers rescued Corona and by late 1960 had collected the evidence needed to demonstrate that Soviet missile rattling was mostly hollow bluster. [redacted] And notwithstanding the periodic appearance of programs and proposals for programs to supplement or supplant [redacted]

This volume contains the history of the [redacted] Like other volumes in this series, it is designed to stand alone in being fully comprehensible without reference to other sources, but because the several discrete elements of the National Reconnaissance Program are inextricably interrelated, the reader may find it advisable to consult one or another of those volumes for detailed information about events that impacted on [redacted] without being integrals of the program.

This history was prepared under terms of a contract between the Director, Special Projects, National Reconnaissance Office (Director, Program A), and [redacted] The principal author, Robert Perry, began research and wrote draft histories [redacted] employed first by the United States Air Force and later by The Rand Corporation. He undertook revision and expansion of those sections [redacted] At various times, parts of the manuscript have been reviewed by members of the staff of the National Reconnaissance Office and of Program A. The reviewers and suppliers of both data and documents are so numerous that it is not practical to list them here. Most are mentioned in source notes following the individual chapters. To acknowledge their invaluable assistance in this way is plainly an inadequate response, but there is no feasible alternative. In any case, for such errors and oversights as may have survived the scrutiny of contributors and reviewers, the author is entirely responsible.

CONTENTS, VOLUME IIIA

Illustrations have been separately bound in an Appendix volume.

XII [redacted] ORIGINS AND DEVELOPMENT

Like much of the National Reconnaissance Program, [redacted] was the product of technical and political ferment and international tensions that peaked during the Spring and Summer of 1960.* The need for new sources of high resolution reconnaissance photography had become critical in the aftermath of the U-2 affair and with the enforced suspension of U-2 operations over the Soviet Union. Generally, policy-making officials in the Department of the Air Force and the Department of Defense had become thoroughly disenchanted with what they had seen of the existing Samos program. Continued emphasis on "concurrency" as a program mode and a stubborn Air Force emphasis on readout rather than recovery techniques severely prejudiced the Air Force case, since both approaches were unacceptable to most officials above the level of the Air Staff. The pressures of international politics had made it quite difficult for the Eisenhower administration to openly sponsor a new or accelerated satellite reconnaissance development. Finally, attractive proposals for new orbital reconnaissance systems had appeared during the summer of

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*

The resume that follows is largely an encapsulation of Chapter VI of Volume IIA. For that reason, source citations have been used only when new material was employed.

1960. Adding body to the mixture were the facts that until mid-August the Corona had not returned any photographs whatever, while the only other capsule-recovery system then under development, Samos E-5, was regarded with something less than undiluted enthusiasm by much of the technical community.

[redacted]

[redacted]* Dr. E. H. Land, one of the key industry authorities in the reconnaissance program, personally brought the [redacted] proposal to the attention of Air Force Under-secretary J. V. Charyk, who was rapidly becoming the dominant figure in the Pentagon struggle for control of the Air Force satellite reconnaissance effort. Charyk opened direct contact [redacted]

* [redacted]

[redacted] shortly thereafter. He was particularly interested in the Eastman approach because it embodied two major elements toward which he was favorably predisposed: [redacted]

In the meantime, reconnaissance specialists of The Rand Corporation had renewed their efforts to induce the Ballistic Missile Division (BMD), immediate sponsor of the Samos program, to develop a spin-stabilized reconnaissance system along the lines of a 1957 Rand proposal. In response to a request from BMD, Rand in June 1960 began working with Space Technology Laboratories (STL) on a plan to develop a system which by taking maximum advantage of available technology could be made operational in the near term. BMD interest stemmed largely from Charyk's earlier sponsorship of such an approach.

On 7 July 1960, a group of Rand and STL specialists quietly assembled at the invitation of Colonel Paul Worthman of BMD, the sub-rosa Air Force manager of the Corona activity, to discuss details of a newly conceived variant of the original spin-stabilized satellite. Rand had concluded that it would be perfectly feasible to orbit a reconnaissance satellite [redacted]

[redacted] Rand's recommendation to STL covered a 1500-pound satellite carrying a 36-inch (focal length) camera system using spin stabilization to provide panoramic coverage at a ground resolution of about 17 feet. If the satellite were oriented so as to have its lens pointing directly downward while over latitude 55 North it would provide useful coverage of all of the northern hemisphere lying between 40 and 70 degrees.[1]

By early August 1960, STL had shaped the earlier scheme into a semi-formal proposal. It differed from the earlier scheme in being based on a camera with a 24-inch focal length and in certain other minor details. Apart from re-introduction of the spin stabilization mode after a lapse of two years, its chief attraction lay in the premise of operations [redacted]

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* [redacted] A three-axis-stable vehicle with a panning lens and fixed-position film was one; its chief practictioner was Corona. [redacted]

By 25 August 1960, when the President approved the establishment of a tightly controlled secretariat-level satellite reconnaissance organization, [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

On 20 September 1960, very shortly after the Secretary of the Air Force Samos Project Office (SAFSP) had legally come into being at BMD, Charyk met with Brigadier General Robert E. Greer (the program's new military director), Colonel Paul E. Heran (chairman of the E-6 source selection board), and Lieutenant Colonel James Seay (Greer's procurement advisor). After considering all the options, they agreed that the best course was [redacted]

[redacted]

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[redacted]

[redacted] Inside General Greer's organization, where relatively few people initially knew of [redacted] normal human preoccupation with the tasks of the moment proved a highly successful insulator against random curiosity. Most of the Air Force shared the uncritical assumption that "the establishment" could not accommodate effective internal secrecy and that because procurement and contracting had always been open matters--and "security" a special sort of club to which most cleared Air Force personnel were admitted without qualification--no large-scale development effort could possibly be concealed.

[redacted]

[redacted] The problem continued to trouble him for several months. Among all the space programs being conducted by NASA and the Air Force, only those contained within the reconnaissance effort were significantly concealed. Routine security screened several of the "military satellites," but experience had demonstrated that for a reconnaissance program "routine security" was not enough. The apparent susceptibility of any acknowledged satellite reconnaissance program to cancellation on political grounds was particularly acute in 1960-1961. [redacted]

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* It may be argued that the CIA had done all those things in Corona without arousing suspicion, but in fact Corona was tightly concealed under "Discoverer" for its first four years, and in any case CIA expenditures were not matters of public record, as was the case for al [redacted]

[redacted]

In such circumstances the academic concern General Greer had voiced six months earlier became a real problem. Not only was there [redacted]

[redacted]

[redacted] (the suggestion horrified the CIA, ultra-sensitive to anything that might invite close scrutiny of Discoverer and thus threaten compromise of Corona), [redacted]

While mulling over the contradictions between needs and possibilities, General Greer conceived an approach based in part on his earlier analysis of the problem of covert procurement. In November 1960 he had begun "black" contracting under the philosophy that since "everybody" knew it was impossible for the Air Force to buy anything expensive without going through established review and approval channels, one might do quite a lot of unsuspected buying and contracting by merely obtaining a direct authorization. It occurred to him that the solution to [redacted] might be found in the same thesis. He thereby invented the concept of the "null program," a development with no known origin and no specified goal. If such a program were conducted under the aegis of a highly classified payload, it should be entirely possible to purchase boosters, upper stages, and launch services through normal channels. Because "everybody" knew that the entire reconnaissance satellite program was in Greer's keeping, the assignment of "null program" responsibility [redacted] would serve to convince most observers that it had to have some objective other than reconnaissance. [redacted]*

Putting such a cover into effect required devious scheming and a high degree of ingenuity, but by June 1961 the plan had been reduced to specifics and generally approved by Undersecretary Charyk.[3] [redacted]

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* [redacted] Any other explanation of the obvious facts was, as General Greer had cannily anticipated, too illogical to deserve serious thought. [redacted]

[redacted] Again there occurred the phrase about "not assigned to a particular space project."[4]

Apparently the matter seemed so mundane to the Air Staff that the authorizing teletype managed to get lost somewhere in the Pentagon-AFSC headquarters maze. Nearly two weeks were needed to straighten out the resulting confusion and even then it proved necessary to apply considerable pressure before organizational inertia could be overcome.[5]

[redacted]

In a further exchange of teletypes, all written well in advance in General Greer's complex, the special projects office established

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** A Corona capsule did survive an unplanned reentry, in Venezuela, several years later--and nobody noticed.

[redacted]

[redacted]

A set of four rocket engines, each capable of producing 50 pounds of thrust, would provide for orbit maintenance. Six more such rockets were located in the aft section of the reentry vehicle. After reorientation of the satellite by 180 degrees and a 60-degree pitchdown had been completed, the reentry vehicle would be separated from the vehicle midsection and the engines fired. A velocity meter signaled shutdown.[14]

[redacted]

[redacted]

[redacted][16] [redacted] Corona was in one of its periodic spasms of operational difficulty, and the proposal for a Lanyard development was receiving generally friendly attention. (Lanyard was a re-engineered, single-camera E-5 system in Corona vehicles.) The need for [redacted]

[redacted]

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The options thus adopted encouraged some optimism about meeting schedules and performance requirements should the primary development systems encounter further difficulty. There was general agreement that the earliest possible date for initial launch would be [redacted]

[redacted]

He noted that the performance requirements of the system pushed the state of the satellite arts in three specific areas:

[redacted]

Charyk's report was relatively optimistic, although he refrained from any predictions of complete success in meeting either schedules or resolution requirements. He forecast a first flight date [redacted]

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NOTES ON SOURCES

1. Notes by A.H. Katz, Rand Corp. 7 Jul 60, on meeting with STL representatives, in Rand (Katz) files.

2. [redacted]

3. [redacted]

4. [redacted]

5. [redacted]

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XIII [redacted] OPERATIONS

[redacted] offered interesting departures from the "normal" cycle of research, development and operations observed by most DoD development agencies. It owed much in that respect to the precedent of the Corona program, the only earlier satellite reconnaissance activity that could even casually be called successful. [redacted]

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* [redacted]

[redacted]

While technical developments including the refinement of hardware and the introduction of new manufacturing techniques were of obvious significance, other and perhaps less tangible aspects of [redacted] project had greater potential long-term value. They were mostly of a program management sort. [redacted] Other projects in the space reconnaissance program had fallen almost entirely from the weight of overly ambitious early flight objectives. The result, with uncommon regularity, had been catastrophic failure and consequent abandonment of the program. Whatever had been invested was lost. Greer's forte had been that of a midwife to the new project--overseeing and guaranteeing a successful birth and infancy. His successor, Brigadier General John L. Martin, Jr.*, proved to be particularly adept at raising the child to maturity. Martin's handling of a midstream crisis [redacted] by re-orienting contractual incentives served as a model for future contracting practices as well as solving the problem of the moment. The elements of the incentive program were probably of less importance than its conceptual basis. It represented an acknowledgement that the goals of a project changed as it outgrew its developmental constraints, and that incentives suitable for one phase were not necessarily appropriate to another.

[redacted]

* Both Greer and Martin retired as Major Generals.

[redacted]

damage the program just as much as an unsuccessful first flight. Paradoxically, the very success of the first flight raised expectations for subsequent flights and could be expected to make later failures even more unsettling to those who ultimately controlled project funding. If enough success could be tucked away in the flight history of the basic hardware, then downstream failures could be treated as local problems rather than indications of a flawed conception. While no one knew how many successful flights or how much good output was required to create this aura, [redacted] Greer were both quite positive that at least the second flight would have to be a pronounceable success.

[redacted]

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Underestimating may have been the least important of several influences. In the early stages of the program, its managers were justifiably worried that it might be cancelled. The record of earlier failure in other satellite reconnaissance efforts, and financial overruns [redacted] provided reason enough for that worry. In any case, Greer perceived the urgency of extensive pre-flight tests to enhance the probability of program success even at the cost of schedule slippages. He had gone a long way toward hedging his bet [redacted] While lack of adequate test data continued to trouble the program for some months, it was clear in retrospect that Greer made the right tradeoffs. They were clearly responsible for the regular success and smooth progress which marked the program for all but the middle portion of its life.

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[redacted] Another class of problems included one-time failures, which once corrected did not reappear.

The third class of problem was intellectually the most interesting and operationally the most frustrating. Throughout the program instances of seemingly random failure occurred in components which had functioned correctly for many flights. The problem would persist through three or four flights, notwithstanding strenuous correction efforts, before succumbing. While there was nothing mysterious about the recurrence of a given failure, the sudden appearance of one where none had existed earlier was unusual for space vehicles, used only once and normally immune to wearout as such. No fully satisfactory explanation of the phenomenon ever appeared, although transient quality control and test program faults were generally blamed.

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[redacted] First, Corona had returned coverage of areas most U-2's could not reach or could not safely overfly, [redacted]

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Nearly two months earlier, program officers had advised Lockheed Missiles and Space Company of their increasing distaste for the high prices reflected in Lockheed bids on new Agena vehicles.

Costs were much higher than for earlier deliveries of approximately the same equipment. Procurement officers concluded that Lockheed was negotiating to protect a position rather than "in good faith."

[redacted] Even more than was usually the case for a sole-source supplier to the government. Lockheed was in a very favorable situation for negoitating follow-on procurement. Agena production had continued at a regular rate for years and bid fair to continue for several more. NRO people had long since explored and discarded as unfeasible the possibility of establishing an alternative production source. It promised to be an extremely costly course, and one involving considerable technical risk. Nor, in general, could Lockheed be faulted for inferior Agena performance. Although some quality control problems had occasionally appeared, the Agena was widely regarded, at the time, as a reliable vehicle-[redacted]

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concern of the NRO during the summer of 1965. The Washington staff had been involved in institutional bickering between the Pentagon and the CIA which in September 1965 led to the departure of Brockway McMillan, for more than two years the Director of the NRO. Although the possibility that the NRO might be entirely abandoned as an instrument of national reconnaissance policy was dispelled by the appointment of a successor to McMillan (Dr. Alexander Flax) and by the issuance of a new NRO charter, the whole of the reconnaissance program was in some disorder. Corona operations had been reasonably successful during that summer, only one major mission failure having occurred in three flights, but Corona did not return the detail that intelligence analysts had begun to expect and interpretation of Soviet force status had become heavily dependent on information [redacted] photography. Some part of the institutional infighting of 1965 was occasioned by disagreement over the management of the Corona program and some of the Corona project people on the West Coast were convinced that a serious failure of Corona operations could result if the authority for technical and operational control of that bifurcated activity was not promptly sorted out. Although in retrospect that appeared to be no more than a minor possibility, it contributed to uneasiness on both coasts. And finally, an extended controversy about the nature and timing of a replacement system for Corona, [redacted] was complicating plans for the continuation and improvement of both systems.

Flax had to turn his attention to several of these issues almost simultaneously; [redacted]

[redacted]

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[redacted]

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While some of these changes were routine enough and cheap enough to be continued thereafter, others were extraordinary measures adopted temporarily in response to what was widely regarded as a transitory crisis. The Air Force lacked the resources to support such a complex process of test and checkout through the life of an operational program. Recognizing that circumstance, General Martin began to plan for the adoption of a novel contract incentive scheme he had originated earlier, while serving as Greer's deputy. It was pointed [redacted] at first, [redacted]

[redacted] Martin's point of attack was the incentive fee contract [redacted] His study of the existent contract incentive provisions led him to conclude that they were most appropriate for the development stages of the program and decidedly inadequate for the operational phase [redacted].

The incentive structure earlier installed emphasized the importance of cost over operational performance. It had been, at least in part, prompted by lost control problems characteristic of [redacted]

A second point seems to have been the expectation that as the [redacted] the contractors, as a matter of course, would strive to earn the bulk of the performance incentive fee. The original contract incentive program perfectly reflected such considerations and beliefs.

The incentive structure had three major parts: schedule incentives, cost incentives and performance incentives. The schedule consideration was in fact a disincentive for late delivery of the vehicle. The maximum penalty for late delivery [redacted] with a ceiling [redacted] On the other hand, a cost overrun of 23 percent carried fee penalties of more than [redacted] be penalized at a 20-percent-of-fee rate for overruns until the fee was wiped out completely, and would profit at a 20-percent rate for underruns. Since the return to capital is computed by dividing fee by gross cost, that arrangement meant that the rate of return on gross costs was a variable function of vehicle cost, dropping sharply for overruns and rising sharply for underruns.

The performance incentive, unlike the cost incentive, was linear, being unrelated to the gross outlay for a given vehicle. A scoring system was devised on a scale from zero to 100. The critical region initially fell between 65 and 95, but these numbers increased as the system became more fully operational. A score of 80 was the breakeven point where no incentive fees were either gained or lost. For scores above or below 80, the fee changed in proportion to the change in the score. The maximum gain or loss in fee that was possible under such a system was on the order of half the amount that could be gained or lost via the cost incentive. To any rational contractor, that arrangement was an imperative to worry about cost far more than about performance.

One result of the bias [redacted] was motivated to delete as many control and test procedures as possible in order to save money in the production of the vehicle. If, for instance, the deletion of a given test procedure had the same effect on reducing cost as on decreasing the probability of a failure, it would rationally be deleted, since half of the savings would be returned as an incentive fee on cost--over and above any penalty for inferior performance. Because that accommodation also reduced the captial outlay of the contractor, the resulting fee increase would be proportionately larger than the fee differences arising from flight performance bonuses or penalties.

Taken to its logical extreme, the formula could result in the delivery of a minimum-cost vehicle (23 percent less than negotiated price) which failed catastrophically, but nevertheless earned a premium of [redacted] over and above the standard fee. The rate of return on invested capital in that case would be greater than 33 percent--about twice the normally acceptable return on fairly risky investments by private firms.

General Martin's arrangement left the schedule incentive essentially unchanged, but radically altered the relationship between cost and performance incentives. The new system paid no bonus for a cost underrun, a reflection of the belief that the cost of a vehicle built at that relatively late stage in the program could be estimated rather precisely. The maximum penalty that could be incurred for cost overruns was about what it had been- [redacted] The major change was in the performance incentive. From a maximum or minimum of [redacted] under the old system, it became a maximum or minimum [redacted] It no longer made sense to sacrifice performance for cost savings because costs below negotiated price brought no incentive fee, while performance shortfalls would reduce the fee at a much more rapid rate than before. Furthermore, even with an overrun of more than 25 percent, perfect performance meant a fee bonus of [redacted] dollars. Most military procurements of the period were suffering from overruns at least as large as 25 percent, so no rational contractor would quarrel with the conjunction of a large price increase coupled with an incentive fee.

In retrospect, General Martin's incentive system represented probably the most significant non-technical accomplishmen[redacted] program. It recognized the fact that contractor performance could, in some instances, be "fine tuned" to the objectives of the contracting agency. In this case, shifting the focus of the incentive system from development to operations had precisely its intended effect-[redacted]

Hindsight illuminates what General Martin saw: the contract performanc[redacted] 1965 steadily deteriorated, while fees did not. It seems clear[redacted] reacting to an inappropriate incentive structure. Perhaps the change could have been made earlier. But the signs that seemed to stand out clearly after the fact--workmanship deterioration, faulty inspection, inadequate testing, and catastrophic failures resulting from such causes rather than from basic engineering design problems--were not readily detectable in the normal events of the [redacted] program. [redacted] make the identification of these problems any easier; when all goes reasonably well, prophets of doom have small voices.[52]

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* Somewhat sketchy historical accounts of the early Samos program appeared in the Air Force histories prepared at Wright Air Development Center (later the Aeronautical Systems Division of the Air Force Systems Command) in the mid-1950s but even then access to program details was difficult to acquire. Still sketchier records appeared in early chronological summaries of activity at the Ballistic Missiles Division (later the Space and Missiles Systems Organization of the Air Force Systems Command) from about 1956 until early 1960. The

*(continued) first serious attempt to write a history of any such program was sponsored by Major General (then Brigadier General) Robert E. Greer in 1962. He arranged to have Robert Perry, at that time the Air Force historian for the Air Force Space Systems Division, assigned to his organization, the Special Projects Office, on an informal, part-time basis. Greer's expressed purpose was to insure that accounts of the increasingly complex Air Force reconnaissance satellite program were prepared before the vital records disappeared. His support was continued and enlarged by his successors (Generals J. L. Martin, W. G. King, Lew Allen, and D. D. Bradburn). The activity to be covered by the history also expanded substantially, largely at the urging of Colonel Paul E. Worthman, an early Corona program manager and subsequently the long-term chief of plans for successive heads of the National Reconnaissance Office staff in the Pentagon. Perry continued to work toward a comprehensive satellite reconnaissance program history after leaving his Air Force position to join the research staff of the Rand Corporation in 1964, and became a contract historian after transferring from Rand to Technology Service Corporation in 1972. He was briefly assisted by W. D. Putnam, another former Air Force historian employed by Rand, in 1969-70. Bureaucratic considerations (the "blue suit" Air Force would not agree to the expenditure of Project Rand contract funds on such work) interrupted the preparation of the history between 1969 and 1973, and relatively little was done in the years 1967-69 because of Perry's primary commitment to the Rand Corporation assignments. The work was taken up again late in 1972 under contract between the Special Projects Office and Technology Service Corporation, at which time Robert A. Butler, a consultant with that firm, became a collaborator. The product of that spasmodic work over a period of ten years (to the time of this note) is this manuscript--which includes coverage of the background of Samos, the several E-series Samos programs, Corona and its descendants, [redacted] evolution of the National Reconnaissance Office and its early activities, and related issues and programs. To the best knowledge of the present authors and present and past members of the NRO staff, there is no formal history of any other reconnaissance program ever conducted by the United States. A CIA-sponsored bostory of Corona was nominally in preparation late in 1972, and apparently some effort within CIA has been devoted to preserving records of the Idealist (U-2) and Oxcart (A-12) aircraft programs, but that represents the sum of such history. The ancestor of all such programs, the balloon-carried reconnaissance camera system of the mid-1950s, appears to have disappeared from the records. Given the volume of documentation of reconnaissance program activity by 1970, that is unlikely to happen again--

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* (continued) but detailed source material of the kind available in the early years of ~~Gambit and~~ Corona had become a casualty of the records destruction process by 1970, so there is no assurance that all of the important events can ever be captured for historians. (RP, March 1973)

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NOTES ON SOURCES

1. [redacted]

2. [redacted]

3. [redacted]

4. [redacted]

5. [redacted]

6. For details, see Vol V this history, p 112, et seq.

7. [redacted]

8. [redacted]

9. Msg, SAFSP-F-13-9-936, MGen R. E. Greer, Dir/SP, to B. McMillan, DNRO; 13 Sep 63. Msg, SAFSS-1-M-0196, McMillan to Greer, 17 Sep 63; msg, Blade 3462, Greer to McMillan, 18 Sep 63.

10. Msg, 0698, B. McMillan, DNRO, to MGen R. E. Greer, Dir/SP, 24 Oct 63.

11. [redacted]

12. [redacted]

13. Msg [redacted] 0918, B. McMillan, DNRO, to MGen R. E. Greer, Dir/SP, 12 Feb 64.

14. Rpt, National Reconnaissance Program Status, 29 Jan 64, SP-3 files [redacted] pp 4-22 and 4-25.

15. NRP Status, 29 Jan 64, p 3.

16. [redacted]

17. [redacted]

18. Ibid; NRP Status, 29 Jan 64.

19. Msg [redacted] 0918, McMillan to Greer, 12 Feb 64.

20. [redacted]

21. Ibid, pp 5-18 to 5-21.

22. [redacted]

23. [redacted]

24. See Quarterly Program Review, December 31, 1965 (hereafter cited as QPR) for details [redacted] The scoring system had changed slightly up to that time and was overhauled completely in December.

25. Msg [redacted] 4267, SAFSP to SAFSS, 18 Feb 64.

26. [redacted] 4357, SAFSP to SAFSS, 3 Mar 64.

27. Msg. [redacted] 4362, BGen R. E. Greer, Dir/SP, to B. McMillan, DNRO, 4 Mar 64; msg. [redacted] 1030, BGen J. L. Martin, Dir/NRO Staff, to Greer, 17 Mar 64.

28. Msg. [redacted] 4562, MGen R. E. Greer, Dir/SP, to BGen J. L. Martin, DNRO Staff, 25 Mar 64.

29. [redacted]

30. Msg. [redacted] 4562, 25 Mar 64.

31. Memo, J. Q. Reber, Chm, COMOR, to DNRO, 26 Mar 64, subj: Request for Epheimeris Data for Next KH-7 Mission, in SS files.

32. Memo, BGen J. L. Martin, Jr, Dir/NRO Staff, to Chm COMOR, 27 Mar 64, subj: Target Priorities, in SAFSS files.

33. [redacted]

34. [redacted]

35. [redacted]

36. [redacted]

37. [redacted]

38. [redacted]

39. [redacted]

40. [redacted]

41. SAFSP, Quarterly Program Review, 31 Dec 64.

42. [redacted]

43. Interview, MGen R. E. Greer by R. Perry, 20 Nov 64.

44. [redacted]

45. Ibid.

46. [redacted]

47. QPR, 30 June 65.

48. [redacted]

49. QPR, 30 Jun 65, Procurement Section.

50. QPR, 30 Sep 65; 31 Dec 65; see also Ch V of Vol V, this mss, and particularly pp 211 et seq.

51. QPR, 31 Dec 65.

52. Memo, BGen J. L. Martin, Dir/SP, to DNRO, 29 Aug 67, subj: Summary Analysis [redacted] atch 4; Interview, Martin by R. Perry, 8 Aug 67.

53. [redacted]

54. QPR, Sep 65.

55. QPR, 31 Dec 66.

56. [redacted]

57. QPR of 31 Mar 67; 30 Jun 67.

58. [redacted]

59. [redacted]

XIV THE DEVELOPMENT AND OPERATION [redacted]

Background and Nomenclature

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* As noted elsewhere, the abortive Samos E-3, E-5, E-6, and Lanyard systems were intended to perform surveillance functions of one sort or another, but none ever became operational and only Lanyard produced satellite photography.

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Apart from Corona, which had been operational for three years, one Lanyard flight of May 1963 which produced a few photographs of no great intelligence worth and the returns from one Samos E-1 mission (with resolution limited to about 100 feet), represented the only previous successes of a satellite reconnaissance effort that had been in existence for nine years and had been heavily funded for five. Corona, sponsored by the CIA, was not considered an element of the "Air Force" satellite reconnaissance program, being classified as an "interim" capability system even though developed, managed, and operated mostly by Air Force people. Both the Samos E-5 and Samos E-6 programs had failed and had been cancelled by the end of 1962-- after eight consecutive mission failures (nine, if the first Lanyard were counted). An effort that very probably cost more than [redacted] had yet to produce useful photography. [redacted]

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Disagreements and uncertainties marked subsequent developments. A major contributor was a bureaucratic competition for control of the satellite reconnaissance program. But for the most part such skirmishing concerned matters other than the [redacted]

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* Director of the National Reconnaissance Office from February 1963 to October 1965.

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Flax served as Acting Director at various times between July and September 1965, during McMillan's temporary absences. McMillan's plans were known to the NRO staff in July.

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TABLE B

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1. Rpt, SAFSP Quarterly Program Review, 10 July 1964; (hereafter cited as QPR, with date).

2. Memo, E. M. Purcell, Chm, Reconnaissance Panel, to DCI, Jul 63, subj: Panel for Future Satellite Reconnaissance Operations; memo, B. McMillan, DNRO, to Dir CIA, 11 Sep 63, subj: Implementation of Purcell Panel Recommendations, both in SAFSS files.

3. MFR, MGen R. E. Greer, Dir/SP, 15 Aug 63, subj: Plans for ~~Ultra-High Resolution Satellite Reconnaissance.~~

4. [redacted]

5. [redacted]

6. Msg, [redacted] 3952, MGen R. E. Greer, Dir/SP to BGen J. L. Martin, Dir/NRO Staff, 27 Dec 63.

7. [redacted]

8. [redacted]

9. [redacted]

10. *Ibid*, pp 14-1, 14-2.

11. [redacted]

12. QPR, 10 Jun 64.

13. [redacted]

14. Msg, [redacted]1311, BGen J. L. Martin, Dir/NRO Staff, to MGen R. E. Greer, Dir SP, 2 Jan 64; msg, [redacted]5002, Greer to Dr. B. McMillan, DNRO, 3 Jan 64; msg, Whig 1319, Martin to Greer, 4 Jan 64, in SP files.

15. [redacted]

16. QPR, 30 Sep 64.

17. QPR, 31 Dec 64; memo BGen W. G. King, Dir/SP, to Dr J. L. McLucas, DNRO, 28 Apr 70, subj: [redacted]

18. Msg, [redacted]6158, MGen R. E. Greer, Dir/SP, to Dr. B. McMillan, DNRO, 22 Oct 64; msg, [redacted]2209, McMillan to Greer, 30 Dec 64.

19. Memo, B. McMillan, DNRO, to DepSecDef, 4 Jan 65, subj: [redacted] in DNRO files.

20. Msg, [redacted]2242, BGen J. T. Stewart, Dir/NRO Staff, to MGen R. E. Greer, Dir/SP, 8 Jan 65; [redacted]

21. QPR, 31 Mar 65.

22. Msg, [redacted] 2215, BGen J. T. Stewart, Dir/NRO Staff, to AFSC, 4 Feb 65.

23. [redacted]

24. QPR, 31 Mar 65.

25. Msg, [redacted] 7260, MGen R. E. Greer, Dir/SP, to Dr. B. McMillan, DNRO, 8 Mar 65; msg, [redacted] 2621, BGen J. T. Stewart, Dir/NRO Staff to Greer, 9 Mar 65.

26. QPR, 31 Mar 65.

27. QPR, 30 Jun 65. There is some ambiguity in this source, however. [redacted]

28. QPR, 30 Jun 65.

29. QPR, 30 Sep 65.

30. QPR, 30 Jun 65.

31. Ibid.

32. QPR, 30 Sep 65; 31 Dec 65.

33. QPR, 30 Sep 65.

34. QPR, 31 Dec 65.

35. [redacted]

36. QPR, 31 Dec 65.

37. [redacted]

38. QPR, 31 Mar 66.

39. [redacted]

40. QPR, 30 Jun 66. Such optimism, a consistent problem for several years, was sometimes as much as 60 percent off from results actually achieved. See memo, [redacted]

41. [redacted] Note that "z" time is Greenwich Mean Time (GMT). When daylight savings time is in effect, there are seven hours difference between GMT and Pacific Time; when not, the difference is eight hours.

42. [redacted]

43. QPR, 30 Sep 66; memo, [redacted] 28 Apr 70.

44. [redacted]

45. [redacted]

46. Msg, [redacted] 5591, Dr. A. H. Flax, DNRO to BGen J. L. Martin, Dir/SP, 10 Aug 66.

47. Min, NRO ExCom Mtg, 17 Aug 66.

48. Memo, Dr. B. McMillan, DNRO to R. McNamara, SecDef, 11 Jan65, subj: [redacted]

49. Min on NRP ExCom Mtg, 17 Aug 66.

50. [redacted] QPR, 30 Sep 66.

51. [redacted]

52. [redacted]

53. Msg, [redacted] 1434, 31 Aug 66.

54. QPR, 31 Dec 66.

55. QPR, 30 Sep 66, 31 Dec 66; memo, BGen J. L. Martin, Dir/SP, to Dr. A. H. Flax, DNRO, 2 Feb 67, subj: [redacted]

56. Msg, [redacted] 3375, 14 Dec 66.

57. Msg, [redacted] 3733, 23 Dec 66.

58. Memo, [redacted] 28 Apr 70, Atch 1, Tbl 1, and main report.

59. See Ch XIII.

60. [redacted]

61. [redacted]

62. [redacted]

63. [redacted] See also MFR, BGen R. A. Berg, Dir/NRO Staff, 23 Mar 67, subj: Telephone conversation with Gen Martin.

64. [redacted]

65. QPR, 30 Jun 67. "The contractor appears to have significantly improved his component and manufacturing quality control," was the project office evaluation.

66. QPR, 31 Mar 67.

67. MFR, Berg, 23 Mar 67.

68. [redacted]

69. [redacted]

70. QPR, 30 Jun 67; [redacted]

71. Msg, [redacted] 9644, 3 Jul 67.

72. [redacted]

73. Msg, [redacted] 3375, 25 Jul 67.

74. Memo, Dr. A. H. Flax, DNRO, to DepSecDef, 6 Jul 67, subj: National Reconnaissance Program (NRP) Issues and Pending Decisions.

75. Ltr, Dr. A. H. Flax, ASAF/R&D, to C/S, USAF, 13 Oct 66, subj: SLV-3A Launch Vehicle Requirements, SAFSS files; msg, [redacted] 5849, Dir/NRO staff to Dir SP, 24 Oct 66; msg, [redacted] 3461, SP to SS, 16 Nov 66.

76. [redacted]

77. Min NRO ExCom Mtg, 23 Nov 66.

78. Min NRO ExCom Mtg, 17 Aug 66.

79. Memo, A. H. Flax, DNRO, to DepSecDef, 20 Sep 66, subj: The DNRO Recommended FY68 Budget for the National Reconnaissance Program.

80. Min, NRO ExCom Mtg, 23 Nov 66.

81. Memo, MGen J. T. Stewart, Dir/NRO staff, to DNRO, 30 Jun 67, no subj, NRO files.

82. Memo, James Reber, Sec NRP ExCom, to DNRO, 9 Dec 66, subj: Agenda; Min, NRP ExCom Mtg, 16 Dec 66.

83. Msgs, [redacted] 6102, 20 Jan 67; [redacted] 4889, 14 Feb 67.

84. [redacted]

85. QPR, 31 Mar, 30 Jun, 30 Sep 67.

86. BGen R. A. Berg, Dir/NRO Staff, to DNRO, 25 Jul 67, no subj.

87. [redacted]

88. Memo, BGen R. A. Berg, Dir/NRO Staff, to A. H. Flax, DNRO, 1 Sep 67, no subj.

89. QPR, 30 Sep 67.

90. Memo, A. H. Flax, DNRO, to C. Vance, DepSecDef, 6 Jul 67, no subj.

91. [redacted]

92. Msg, [redacted] 1923, 26 Oct 67.

93. QPR, 31 Mar 67, and 31 Dec 67.

94. [redacted]

95. [redacted]

96. Ltr, Chm, USIB, to SecDef, 4 Apr 68, with atch, New Coverage Requirements, 27 Mar 68.

97. Memo, A. H. Flax, DNRO, to Chmn, USIB, 10 Apr 68 (draft), subj: [redacted]

98. [redacted]

99. [redacted]

100. Msg, [redacted] 0199, 16 Aug 67.

101. [redacted]

102. [redacted]

103. [redacted]

104. [redacted]

105. [redacted]

106. Msgs [redacted] 9431, 23 Oct 67; [redacted] 1897, 25 Oct 67.

107. [redacted]

108. Min, of NRP ExCom Mtg, 17 Nov 67.

109. Memo, MGen J. M. Reynolds, USAF (Ret), Office of the Dir, CIA, to BGen R. A. Berg, Dir, NRO staff, 15 Sep 67; subj: Utilization of the KH-7 [redacted] Reconnaissance Systems for Mapping, Charting and Geodesy Requirements, in DNRO files.

110. Memo, BGen R. A. Berg, Dir/NRO Staff, to A. H. Flax, DNRO, 26 Sep 67, no subj. (Flax's marginal note in reply is quoted here); memo, J. J. Schadegg, [redacted]

111. [redacted]

112. [redacted]

113. QPR, 31 Dec 67.

114. [redacted]

115. Msg, [redacted] 4229, 18 Jan 68.

116. Msg, [redacted] 4834, 29 Jan 68; msg, [redacted] 4858, 30 Jan 68; [redacted]

117. [redacted]

118. Msg, [redacted] 5298, 13 Mar 68.

119. [redacted]

120. [redacted]

121. Memo, BGen R. A. Berg, Dir/NRO staff, to Dir, [redacted]

122. Msg, [redacted] 1800, 9 Apr 68.

123. [redacted]

124. Msg, [redacted] 7756, 6 Jun 68.

125. [redacted]

126. [redacted]

127. Msg. [redacted] 4222, 17 Jul 68.

128. [redacted]

129. Ltr, BGen R. A. Berg, Dir/NRO Staff, to Dr. A. H. Flax, DNRO, 14 Nov 68, no subj.

130. [redacted]

131. [redacted]

132. [redacted]

133. [redacted]

134. [redacted]

135. [redacted]

136. Memo, LCol F. L. Hofmann, NRO Staff to Dr. J. L. McLucas, DNRO, 25 Oct 72, subj: [redacted] msg, H. Cohen, SAFSP (SP-3) to McLucas, 25 Oct 72; interview, H. Cohen by R. Perry, 21 Dec 72.

137. QPR, 30 Jun 72.

138. [redacted]

139. Msg, BGen L. Allen, Dir, SAFSP, to Dr. J. McLucas, DNRO, 7 Oct 70.

140. [redacted]

141. QPR, 30 Jun 70.

142. [redacted]

143. [redacted]

144. Memo, J. L. McLucas, DNRO, to SecDef, 18 Dec 72, subj: Taking Stock of the National Reconnaissance Program; memo, McLucas to SecDef, 21 Dec 72, subj: Taking Stock, both in SAFSS files.

145. Memo, BGen D. D. Bradburn, Dir/SP, to Dr. J. McLucas, DNRO, 20 Mar 73, [redacted]

146. Memo, BGen D. D. Bradburn, Dir/SP, to Dr. J. McLucas, DNRO, 23 Jul 73, [redacted]

147. [redacted]

148. [redacted]

149. [redacted]

150. [redacted]