SAMOS*

The Samos reconnaissance satellite system development effort, with antecedents tracing directly back to the Air Force's earliest space investigation of 1946, loomed in Fiscal Year 1960 as the most important within the current military space program. Carrying an Administration-assigned highest national development priority since early in 1958, Samos became increasingly essential to the nation's security after the unfortunate U-2 intelligence flight of 1 May 1960 and the subsequent international outburst. Samos at this time took on new importance, appearing to be the most suitable and perhaps the least controversial means of reopening the most profitable avenue of American activity for obtaining the information so vital to the future well-being of the United States.

It was therefore extremely regrettable that, despite the urgency of requirement, Samos progressed under most uncertain conditions. These circumstances affected virtually every facet of the program— requirements, technical, planning, programming, and operational. Lack of decision, indecision and constant technical reorientation plagued Samos throughout the year. Underlying the problem were widespread differences between Administration civilian technical and fiscal experts and their military

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*The latest in a long list of name changes occurred on 7 August 1959 when ARPA redesignated the reconnaissance satellite system from Sentry to Samos. Although ARPA apparently selected a name without any pertinent significance, reporters frequently claimed that Samos was an acronym for Satellite and Missile Observation System. For convenience, the author has used here only Samos in lieu of any previous designation.

counterparts on many basic issues. A listing of these included "fly before you buy" vs. concurrency, the proper mode of information return (with vast financial savings a possible prize), estimates of reliability, sophistication of ground processing and dissemination facilities, assignment of processing and dissemination duties for Samos-derived data, and establishment of operational capability schedules and goals. Beginning shortly after the U-2 incident and proceeding into the next fiscal year, highest Administration officials took up these Samos uncertainties and hopefully directed unusual measures to resolve the outstanding problems and effect more efficient management, speedier development, and earlier operational capabilities.

Technical Confusion, July-October 1959

From its inception in 1956 as a system development, Samos had gradually increased in scope of intended mission to include not only photographic (visual) reconnaissance but also ferret (electronic emission) and [redacted] reconnaissance and geodetic mapping and charting. Once operational, Samos satellites outfitted with a specific payload to fulfill one of the above functions would be launched into a polar orbit. After obtaining the required data over Soviet-bloc territory, Samos would either transmit the information electronically upon command to ground receiving stations or rocket its data capsule toward Earth for air or land recovery. In development was a rather sophisticated processing subsystem (Subsystem I)

which would rapidly convert the signalled data into a useful product for dissemination to the various intelligence and operational agencies.[1]

In November 1958, ARPA broke off the experimental booster/satellite vehicle (Thor/Agena) and infrared development efforts and established them respectively as the Discoverer and Midas projects. Six months later, ARPA eliminated the geodetic mapping and charting phase of the project, although this had involved no ARPA funds, only the use of Samos as a carrier. Finally, on 23 June 1959, ARPA directed deferment of work on the photographic recovery subsystem. This left Samos with the job of obtaining photographic and ferret data and their transmitting it to ground stations (commonly called the readout subsystem).[2]

The Air Force considered deferment of recovery subsystem development most inappropriate, for the work had begun only months before and only after much debate and upon the urgent insistence of the intelligence community. The initial readout subsystem, the E-1, was basically test equipment capable of furnishing photographs of facilities with a 100-foot resolution. The follow-on system (E-2) would improve resolution to 20 feet, allowing the location and identification of airbases, large aircraft, industrial facilities, missile sites, etc. Intelligence officials, however, stated a requirement for photographs with a 5-foot resolution, to permit for example, identification of specific types of aircraft and missiles at the airbases and launching sites and of specific production and military at various industrial and military complexes. A readout version (E-3) with this capability was under study but was several years away from operational status. The Air Force had therefore proposed and ARPA finally approved

development of the E-5, a recoverable version with the desired 5-foot performance features.[3]

At the same time that ARPA directed elimination of the E-5, it also imposed a sizable reduction in the fiscal year 1960 financial support allocated to Samos. Instead of $160 million, the Air Force would receive only $135 million for development. ARPA explained that demands of other space projects had forced the cutback. Because of the E-5 deletion and the fund reduction, ARPA requested a revised 1960 development plan.[4]

AFBMD submitted its revised proposal to the Air Staff on 18 July 1959 and followed with a series of Pentagon briefings during 21-24 July. The division sought $168.5 million for fiscal year 1960 and estimated a requirement of [redacted] for the following year to carry out Samos development, including both types of visual reconnaissance, ferret reconnaissance, and the launching of 14 readout and 4 recovery test satellites between April 1960 and November 1961. If ARPA still refused to support the recovery work, AFBMD wanted the Air Force to reprogram about [redacted] for the two years. General Schriever on 1 August personally appealed to the Chief of Staff for his approval.[5]

Air Staff elements and the Air Force Council generally concurred in the proposed plan but were reluctant to start reprogramming until the Assistant Chief of Air Staff for Intelligence (ACS/I) revalidated the 5-foot photographic requirement and ARPA again refused financial support. ACS/I restated the requirement on 7 August. In the meantime, ARPA softened

somewhat from its earlier attitude, asking on 24 July for funding estimates to begin development and procurement of long lead items necessary to prevent slippage of the E-5 schedule. On 26 August, Dr. Charyk asked for York's assistance, claiming that Samos, with recovery development omitted, required $143 million in fiscal year 1960 but only $150 million with it reinstated.[5]

ARPA acted on 4 September 1959, in rather indecisive fashion. It directed that contract negotiations begin on the $143 million plan but if possible at a cost of only $135 million. ARPA also directed the awarding of an E-5 contract to protect the schedule, but authorized no funds pending receipt of fund estimates. Five days later, ARPA modified the original directive. It reinstated recovery subsystem development and increased the total Samos authorization to $148 million. This amount was still some $17 million under AFBmD's estimates and $12 million below the minimum stated by Charyk. ARPA also projected abou[redacted]for 1961 availability, also considerably below AFBmD's estimated needs.[7]

The 9 September decision only added to the current confusion. Both types of photographic subsystems were now desired, but funds were far below the required level. In effect, development of the recovery technique was being continued but at the obvious expense of the readout versions, and none was being adequately supported. Both AFBmD and Schriever asked for guidance. Schriever reported to Gen. White that the frequent changes were forcing day-to-day planning which rendered "essentially impossible" the establishment and conduct of a logical and orderly plan of action and the attainment of the required October 1961 operational date. The ARDE commander and AFBmD both asked for strong Air Staff support, noting

that their earlier requests of 18 July and [redacted] still remained unanswered.[8]

The Air Staff initially furnished little helpful or specific guidance. It directed AFBmd on 20 October to accommodate both readout and recovery development within the $148 million ceiling, with any delay from fund restrictions being reflected in the recovery portion. General [redacted] merely informed Schriever of an uncertain future. The Vice Chief of Staff voiced his concern over the confused state of affairs but held out the hope that the pending transfer of Samos management to the Air Force, as proposed in McElroy's 18 September directive, might ease resolution of the problem. Until the transfer occurred, Samos could count only on $148 million from ARPA plus $11.5 million that the Air Force would supply from 200-series funds to purchase boosters. LeMay also reported that AFBM's budget request of [redacted] for the following year had been reduced to $120 million but the Air Force hoped to [redacted] it.[9]

Schriever had also complained about lack of Air Staff action on a number of long-standing problems in the Samos ground support area, launching pads, tracking and acquisition stations, processing facilities, etc. These involved the use of 200- and 300-series funds, for which no OSD release had been authorized. Yet lead times demanded an early start to meet scheduled operational dates. LeMay reported the possibility of brighter days in view of his recent agreement with Adm. Burke on the Pacific Missile Range and Vandenberg Air Force Base complex and the expected early completion of the Gaither Committee investigations on missile and space ranges and support facilities.[10]

Continued Confusion, October 1959 - January 1960

McElroy's 18 September directive on the shift of management responsibility called for the preparation and approval of a new development plan (as well as operations and logistical plans) prior to actual transfer. The Air Staff therefore directed ASDC to prepare the plan for submission to Air Force Headquarters on 23 November and to OSD by 1 December 1959."

High level discussions on the mechanics of transfer and Samos technical objectives among York and his aides, Charyk, Schriever, and CIA representatives late in October and early in November 1959 soon invalidated the planning then under way at AFBmD. It appeared that York and his advisers thought that really valuable reconnaissance information would come primarily from recovery of Samos data capsules. Redirection of emphasis from readout to recovery also could mean vast savings in the construction and operation of ground support facilities. Additionally the scientists questioned the high development costs associated with the ferret and data processing subsystems.

York allowed the current Samos fiscal authorization of $[illegible] million to stand. However, he reduced the Air Force's overall space systems budgeting requests for fiscal year 1961 from [redacted]. Thus for Samos the Air Force could count only on $120 million contained in ARPA budget requests plus an undetermined amount of the $100 million instead of the previously planned [redacted].

As an outcome of these meetings, the Air Force was directed to emphasize and accelerate recovery subsystem development. Secondly, it was to evaluate Samos reliability and lifetime by increased ground and simulated

altitude testing, thereby reducing the chances of future failures of the type then plaguing Discoverer and obtaining greater accuracy. Finished 1961 budgetary figures for Samos were not fixed, but the entire sum for Discoverer, Midas, and Samos could not exceed [redacted] revised plan incorporating the technical and financial guidance was to be submitted to OSD by 15 January 1960 instead of 1 December 1959. Based on this understanding, OSD agreed to entertain a request for immediate transfer of Samos management to the Air Force. Secretary Douglas made the request on 6 November, and 11 days later OSD approved.[14]

The Air Staff passed the York-Charyk guidance to AFBMD on 12 November, asking that the new plan be readied for headquarters' review on 16 December. The division vehemently protested the new instructions citing the tremendous waste of previously expended time, money, and effort in a switch of emphasis from readout to recovery. The division also warned that its first hasty review disclosed a postponed operational date of 12 to 18 months—from October 1961 to perhaps January or July 1963—if the technical and financial guidance were allowed to stand. AFBMD asked permission to brief the Air Staff on the plans currently under way before imposing the latest changes.[15]

The Air Staff sympathized with AFBMD's protests, believing that worthwhile intelligence data could be obtained at an earlier date via the readout mode. But under the York-Charyk instructions, the Air Staff could only re-affirm its earlier guidance to the division. The staff made one concession. It allowed AFBMD to compile a supplementary list of items

essential to Samos that would require funds above the imposed ceiling. Should the list be favorably considered by the Weapons Board and Dr. York, the former would fund it by internal reprogramming.[15]

The Air Staff had intended for AFBmD to prepare a formal program plan, which would undergo review within Headquarters USAF before going to AFBmc for approval and forwarding to Dr. York. Charyk learned of the procedure and countermanded it, noting that the York-Charyk guidance was preliminary in nature and that he wanted only an informal presentation of possible alternative courses of action within the fund ceiling. Then, once AFBmc had examined these alternatives, Charyk would provide explicit instructions upon which the official development plan could be drawn.[17]

AFBmc reviewed the AFBmD proposals on 14 December 1959. Noting the highest national priority accorded Samos development as well as recent Russian successes in photographing the "dark" side of the Moon by means of a readout system, the division first proposed a "requirements" plan which continued visual and ferret readout development at the current rate of effort while increasing recovery activity. Based on this orderly program of development, Samos would require another $50 million for the remainder of Fiscal Year 1960 and more than [redacted] in the following year. Funding at these levels would also permit the beginning of [redacted] Samos launchings (with the first in June 1960, three months behind previous schedules) and attainment of an initial operational capability in July 1962. AFBmc contended that staying within the OSD-imposed ceiling would have

[redacted] disastrous results: A stretchout of [redacted] reduction of development effort on all advanced and [redacted] payload subsystems, elimination of certain ground facilities, and most importantly, an undetermined delay in Samos operational availability.[19]

AFBMC directed preparation of a plan based on the current ceiling for the two years — $159.5 million and [redacted] respectively. The committee again called for emphasis on the development of photographic subsystems at the expense of ferret subsystems, and within the former, of recovery at the expense of readout. There was to be no deletion of any of the advanced payload developments, but a reduction in the contemplated extent and sophistication of the ground receiving, processing, and disseminating facilities. Finally, AFBMC consented to the preparation of an add-on list of essentials and directed the Air Staff to study the possibility of funding the list. Because of these extensive changes, Charyk informed York that he could not furnish the required plan until mid-February 1960.[19]

The continued imposition of the ceiling and its probable drastic effects upon the scope and availability of Samos raised a hue and cry from ACS/I, SAC, and ADC. Major General James H. Walsh, ACS/I, deplored the uncertain operational date. He pointed to the growing Soviet ICBM capability and claimed that "our deterrent rests heavily on our knowledge of the nature, scale, locations, and hence vulnerability of the threat." On this basis, Walsh stated an urgent requirement for Samos in the summer of 1960, not an indefinite date some three, four, or more years in the future.[20]

SAC officials pleaded for an operational target date of July 1962 at

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[redacted]

the Intel[redacted]

progra[redacted]

without providing [redacted]

of false economy." [redacted] and urgency ratings accorded Samos and wondered about the [redacted] financial support. The Air Staff could only hold out the possibility of reprogramming after receipt of the AFBMD add-on list and asked SAC and ADC to propose items of lesser priority in their areas of operation from which funds could be shifted. This last suggestion received a rather cold reception at SAC and ADC.[21]

Interim Approval—Of A Sort, February - April 1960

AFBMD forwarded its latest development plan on 30 January 1960 and then devoted the next 10 days to briefing Air Staff elements and AFBMC. Using the December guidance, the division proposed a Samos "minimum [redacted] essential" research and development program involving $199.5 million in Fiscal Year 1960 and [redacted] the next year. (This would leave for Midas only a very small fraction of the overal[redacted] planned for the Discoverer-Samos-Midas programs in 1961.) Under terms of the plan, visual and ferret development would proceed concurrently with emphasis on the former. Within that category, recovery was to be favored over readout. AFBMD characterized reliability requirements "as the most critical problem to be solved" and described comprehensive procedures for simplifying

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and evaluating parts and components in ground and simulated altitude tests to insure a satellite operating lifetime of 15 to 30 days.

The flight test plans included 25 launchings between September 1960 (a slippage of another three months from the last projected schedule) and December 1962. Of these, 18 were for visual and ferret readout testing and 7 for visual recovery purposes. The first three tests would contain components of both the visual (E-1) and ferret (F-1) readout subsystems. Then a series of 8 E-2 (20-foot resolution) and 7 F-2 (digital) and [redacted] readout flights would follow. The first of seven E-5 (5-foot resolution) recovery launchings was scheduled for September 1961. If all went well, a limited initial operational capability and data useful for intelligence purposes would become available about August 1962.[22]

Interested Weapons Board panels and working groups on 1 February found the development plan satisfactory and recommended approval, as did the Weapons Board two days later. The AFBmc took similar action on 10 February and directed AFBmD to protect the integrity and schedules of the program, pending reaction from DDR & E. On 18 February, Charyk formally asked York for his approval of the plan.[23]

Dr. York was still dissatisfied with the proposed Samos technical reorientation. For more than two months, he made no official reply. However, in mid-March, York informally indicated his concern over the expanded flight activity (from 18 to 25 launchings), the proposed financial support for Fiscal Year 1961, and the technical objectives. He reiterated

[redacted]

much of this officially on 20 April 1960. At this time he approved the plan "in principle" but directed further adjustments in the technical approach and authorized the Air Force to proceed on an interim funding rate of $159.5 million for Fiscal Year 1960 and [redacted] for the next year. York again emphasized the desired order of development priorities: visual recovery, visual readout, and ferret readout. Financial adjustments and development slippages were to be concentrated, as necessary, in the last-named area.[24]

Thus, with most of Fiscal Year 1960 gone and Fiscal Year 1961 fast approaching, Samos still remained in an interim status. Nor did resolution of the problems appear much closer than it had at the beginning of the year.

Operational Preoccupation

The repeated inability of the Air Force to obtain Dr. York's blanket approval for any of its proposed Samos development plans stemmed not only from his doubts about certain of the technical approaches, but also from his dissatisfaction with apparent Air Force preoccupation [illegible] obtaining a Samos operational capability in advance of technical accomplishment. Following his latest refusal to approve completely the development plan and his call for reorientation, on 20 April 1960, York drafted what was intended as detailed guidance. At the same time, he spelled out in specific terms his views on the operational emphasis.

York contended that current attempts to conduct the Samos program under the concept of concurrency would only interfere with development and actually delay attainment of the end objective. He justified this

position with the following explanation:

> "At the present time many questions are unanswered about the capabilities of Samos that could have been answered by now if the development project had been carried out as originally conceived. Apparently, both the contractor and the technical support committees have been confused and slowed down by the impact of operational requirements before the actual capabilities of the system have been established on a developmental basis. This condition has led to advance planning, including facilities and hardware procurement, based on evaluation of hypothetical outputs and needs for the SAMOS system."

York wanted the expenditure of funds on Samos "operational aspects" stopped and concentration on development increased "to obtain proven feasibility and reliability of the system at an earlier date than now envisaged." Listed among the "operational aspects" slated for elimination at this time were the training of personnel, the SAC technical operations centers, several readout stations, operational launching facilities, and much of the [illegible] processing and dissemination subsystem.[25]

The Air Force had indeed been applying concurrency to Samos. Faced with urgent requests for intelligence data about the Soviet Union and gratified with results in the ballistic missile concurrency program, the Air Force hoped to have an operational capability by October 1961— only some 18 months after the contemplated first Samos launching. The Weapons Board on 22 July 1959 had recommended this planning and called for augmented financial support of the operational phase. The following day, Air Staff and AFBM representatives agreed on a schedule that would permit use of the first operational tracking and acquisition (readout) station by September 1960 and of two additional stations a year later;*

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*The first of these was to be at New Boston, New Hampshire; the other two, at Vetters, Iowa and Ft. Stevens, Oregon.

establishment of an operational processing and distribution center, near SAC headquarters by April 1960—in step with the first test flight and so located and manned to facilitate exclusive military control over intelligence data obtained during the flight test period; and construction of the technical operational center at SAC headquarters for use by October 1961.[26]

Several weeks later, the Air Force Council and the Chief of Staff approved these operational measures. They also conditionally agreed to the conversion of Atlas launching complex 65-1 at Vandenberg AFB for Samos operational flights. Finally, they permitted the start of planning to procure funds for the operational work.[27]

The operational objectives, in common with the technical program, met near afoul of the technical and funding discussions under way at the staff levels coincident with the planned transfer of Samos management responsibility from ARPA to the Air Force. York soon made known both his unsympathetic views on Samos concurrency and his reluctance to agree to early release of production funds. Thus, under the OSD-imposed financial restrictions, the AFSC in its 14 December 1959 review of Samos plans could only state that even a proposed July 1962 operational date was not valid and direct the retention of both the "sophistication and scope" of the planned operational facilities as part of the current economy move. In relaying AFSC's instructions to ARDC, the Air Staff directed omission of operational facilities in the preparation of the development plan. However, the Air Staff allowed the addition of what it termed a development/operational

annex to cover equipment needed to produce intelligence from data obtained during the flight test period.28

The "minimum essential" development plan submitted to AFBM late in January 1960 contained no definitive operational date, although this might be some time in 1964. The add-on Development/Operational Annex, forwarded at the same time, listed the work, equipment, facilities, and funds necessary to provide a base for the timely transition from development to operational status. This involved only $7.7 million in Fiscal Year 1960 [redacted] the following year to pay for a minimum amount of ground facilities, but it would allow a limited operational exploitation of data obtained in those flight tests occurring after July 1962. A full operational capability under SAC control could then follow by July 1963.29

[redacted] meeting at least a part of the unfunded contingency measures, the Air Staff and Weapons Board endorsed the development/operational annex and promised to reprogram the required funds from within Air Force resources. [redacted] on 12 February 1960 also agreed to the proposal, and on 18 February [redacted] asked DDR&E for approval and permission to reallocate funds.30

About the same time, Gen. Wilson directed AMC to undertake certain changes in the analytical and managerial areas to provide both facts and confidence on the technical reliability of the Samos system. Wilson pointed to the rapid progress of Discoverer and Atlas toward operational status and conjectured that this would not have been possible if those before-the-fact analytical studies and profit items currently applied to Samos had been

used on the missiles. "Nevertheless," he went on, "the central question today in DOD actions concerning MIDAS, SAMOS and DISCOVERER seems to center around the predicted reliability of these systems." Wilson asked that performance data from the ballistic missile program be compared with earlier predictions to form a factual basis on which the validity or inaccuracy of [illegible] predictions might be examined.

Wilson also directed enlargement of ARDC's management group responsible for [illegible] Air Force reliability work. This involved the addition of [illegible] officers at the contractor and subcontractor levels. Wilson concluded [illegible] with this significant comment: "We are [illegible] a 'massive assault' to overcome DDR&E reluctance to fund an early [illegible] military satellite capability. I regret that I will not have [illegible] to launch such an assault until I can be assured our [illegible] is adequate."

illegible

[illegible] York replied on 20 April 1960 to [illegible] 15 February [illegible] of the [illegible] development plan and its development/ [illegible] annex. York remained silent on the annex. However, [illegible] to the Secretary of the Air Force indicated [illegible] with the proposal and his continued unwillingness to permit the [illegible] funds for the transition facilities. Release of York's [illegible], however, was overtaken by events.

Aftermath of the U-2 Incident

The [illegible] outlook changed abruptly with the disclosure of [illegible] attack and downing of an American U-2 reconnaissance aircraft

over Soviet territory. On 9 May, Gen. Wilson wrote to his Director of Advanced Technology:[32]

> "It appears likely that the Air Force will be called upon to expedite and to develop fully the pre-operational photographic potential of project SAMOS. It is desired that you have a plan prepared to accomplish this purpose, and that it be submitted to the Weapons Board with the least delay."

Following a conference the next day among Charyk, Wilson, Schriever, and others, DCS/D on 16 May directed ARDC to carry out the directed planning and submit it "at the earliest possible date." ARDC reported that the plan could be ready by 15 June.[33]

While the planning for an accelerated effort was under way, Dr. Charyk on 25 May supplemented the earlier broad guidance with a detailed listing of what was wanted. This was passed to ARDC on 1 June. Charyk reviewed current Samos plans and emphasized the existing technical uncertainties and how they would likely affect the ultimate operational system configuration. To alleviate these uncertainties, Charyk presented a new set of rules for use in drawing up the new development plan. He wanted parallel testing of both the readout and recovery modes of data return and directed a re-examination and the use, if feasible, of additional camera equipment— on-the-shelf and in development— for the purpose of improving the "recovery" flight schedule. Charyk also requested the earliest possible flight date for the several payloads but with the following priority: visual recovery, visual readout, and ferret readout. Finally, Charyk directed the development of an "minimum essential capability to handle in reasonable fashion any operational take from the R & D flights." Construction and development of

[redacted] ground equipment and facilities to meet this objective was to be kept at the lowest and simplest level, [redacted] on the future of Subsystem I. Also to be considered in the Samos reorientation was the effect of "minimum essential" capabilities on Midas, which currently was slated to use some of these facilities in common with Samos.[34]

The Under Secretary of the Air Force raised a number of operational questions dealing with the location of the complex for controlling Samos inflight duties and for processing and distributing the intelligence "take." Was it essential that the Air Force establish this complex in the old Martin bombers plant near SAC headquarters, as currently planned? Was reactivation of a tiny portion of the huge plant desirable? Should both Samos and Midas control, processing, and dissemination activities be centered there, especially since NORAD wanted Midas facilities combined with those of BMEWS and other warning systems? Finally, was it necessary to provide special survivability provisions for the Samos ground complex or could it be outfitted on a peacetime basis? Charyk directed the Air Staff to study these operational questions and furnish the field commands with suitable guidance.[35]

The Air Staff thoroughly reviewed the operational points raised by Charyk, obtained answers for some, and concluded that others would have to await the results of actual flight tests and additional technical advice from ARDC. USAF headquarters decided that it was not essential during the transition period to have co-location of the operations control center and the processing facilities. It also agreed to conduct a "R & D take"

[redacted]

exploitation as a peacetime operation from "soft" facilities. Reactivation of a small portion of the Martin plant was, in the opinion of the Air Staff, neither economically worthwhile nor required. Finally, the Air Staff was undecided whether Midas processing equipment belonged with that of Samos or with NORAD's warning complex in Colorado and proposed further study before reaching a decision.[36]

The Air Staff distributed the operational guidance on 29 June, along with an advisory note that it was in no sense final. The guidance was being provided and was applicable only for purposes of exploiting Samos-derived data obtained in the flight test period. The final shape of the operational system would await results of forthcoming development. The interim system would rely primarily on existing ground facilities and equipment and would be quite rudimentary in nature. Nevertheless, the proposed systems appeared to be the best that could be "sold" to higher authorities at this time and constituted in certain respects support of Air Force concurrency efforts.[37]

Quite naturally, the abrupt cessation of intelligence flow from U-2 overflights of the Soviet Union caused major concern in ACS/I and SAC. General Power in a series of letters to Gen. White on 21 May, 16 June, and 24 June pleaded to get the Samos program "off center@." He asked that development proceed "with renewed vigor and all possible speed," that the philosophy of concurrency be given "added emphasis," and that a "strong, centralized, purposeful management" be established. With the question of

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ACS/I joined Power in seeking a speedup in Samos development and [redacted] noted its willingness to forego early F-1 (electronic ferret) testing to allow an increased probability of success in E-1 visual subsystem evaluations. On 21 June, when [redacted] the guidance was being coordinated, the intelligence officials expressed non-concurrence with the decision concerning construction of the Offutt ground complex.[39]

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To these protests of interim or half measures, Gen. White could only point to the facts as they existed. According to the Chief of Staff, Dr. York and several of his scientific advisory groups had labeled earlier Samos plans as "grandiose and unrealistic" and it was quite impossible to obtain approval for a full program of concurrency, although the Air Force would "plug for this at every opportunity." White contended that the interim program outlined during June was the best "which we can sell." He also noted briefly several other operational obstacles still to be hurdled but concluded: "I believe that the revised development plan that is to be presented to this headquarters early in July, if completely responsive to the above guidance [1 June and 29 June] will get Samos off dead center and on to a definite track."40

The Air Force had initiated its planning for an early interim exploitation capability in obvious anticipation of Administration and Congressional reaction to the U-2 disaster. This reaction was not long in

coming, although in many respects, from the Air Force point of view, it opened up a veritable Pandora's Box. On 10 June 1960, President Eisenhower asked Secretary Gates to re-evaluate the Samos program and then brief NSC by the end of the month on the following majors: the intelligence requirements on Samos, the technical feasibility of meeting those requirements, and the plans for Samos. As events transpired, a team of three—Dr. Charyk, Dr. John Hall, York's deputy, and Dr. George B. Kistiakowsky, the President's scientific advisor—was formed to make the presentation but resolution of many management, development, and operational questions forced several postponements until 25 August 1960.[46]

Within two days of the President's call for re-examination of Samos, the Senate Appropriations Committee issued what the New York Herald Tribune termed an "urgent" report. In this instance, the Committee deemed it a matter of national emergency to move forward as rapidly as possible with the reconnaissance satellite program." Accordingly, the committee proposed a Fiscal Year 1961 budget appropriation specifically for Samos that would add $108 million above the President's request in the hope of obtaining an operational capability at least one year earlier. The same day, 12 June, Senator Lyndon Johnson, in a television appearance, proposed a Manned program for Samos.[47]

These actions provided additional cause for an intensified and broadened re-examination of Samos to include not only the pending technical assessment but the intelligence requirements and the management and organizational structure as well. The eventual result was several decisive

steps by NSC and the President on 25 August recommended to clear the uncertainties and signal the start of a truly highest priority program reminiscent of the wartime Manhattan effort and the current Air Force and Navy ballistic missile programs.

By early in July, AFBMD had readied a number of development proposals for Air Staff and OCAF consideration, preparatory to submitting the formal development plan requested four weeks earlier. The proposals were based primarily on the 1 June and 29 June guidance, findings of a highly technical report rendered by a special group under direction of Bruce H. Billings, Assistant DCS/AF (Special Projects), and intelligence requirements recently revised by the United States Intelligence Board (USIB), a board with representatives from all governmental intelligence agencies.[4]

AFBMD proposed a number of actions designed to broaden the technical scope of the program and increase likelihood of success. The division suggested the use of additional contractors in both supervisory and development roles, development of alternate or backup payloads, more frequent Atlas-boosted launchings, employment of other feasible boosters [illegible] Thor/Vanguard) to relieve launching pad congestion and speedup the rate of diagnostic (environmental), component, and system flight tests, [illegible] or transfer of Subsystem I development, curtailment of Subsystem F effort, simplification of the early R-D equipment, and a host of others. In lieu of 25 currently planned flights ([illegible] readout and 7 recovery), AFBMD suggested [illegible], heavily favored to the visual recovery mode. There would be [illegible] of these and only 11 visual and ferret readout test flights. The

division estimated the cost of this broad realignment at about [redacted] for Fiscal Year 1961 — approximately equal to the President's budget request and the Congressional add-on [redacted]

To OSAF and Air Staff officials and interested working group representatives received these proposals between 5-8 July. Reaction was generally favorable and suggested changes were few. Since OSD had recently assigned Atlas Complex 66-1 at Vandenberg to the Nike-Zeus program, the Air Staff proposed construction of an additional two-pad Samos launching complex adjacent to the existing complex at Pt. Arguello, to allow flexibility in flight scheduling and safe-guard plans for more frequent launchings. A second change would involve the conversion and use of an existing SAC data processing unit at Westover AFB in developing and distributing Samos photographic "take." [illegible]

AFBMD presented the formal development plan, dated 12 July 1960, to [illegible] on 14 July. The latter approved it with some alterations, based on discussions with OSD and Administration scientific officials. The committee directed the plan be changed to include a three-pad launching complex (in lieu of the two-pad proposal), deletion of Thor/Sergeant boosters and addition, as possible, of Thor/Agena and Titan boosters, and utilization to the maximum extent of AMR facilities. AFBMD also readjusted the objectives of a number of flight tests, again increasing the emphasis from readout to recovery.[illegible]

Dr. York heard a presentation on the plan during 13 - 14 July, [illegible] he did not immediately approve the plan in its entirety, York permitted the start of construction on the new launching complex and allowed other actions necessary to protect objectives and schedules. He planned no

decision on the elimination or transfer of Subsystem I and the use of the Westover squadron until an OSD ad hoc group studied the processing and dissemination subject.[47]

On 22 July, the Air Staff again directed AFSSO to revise the development plan in line with the latest AFSSC and DDR&E changes. The revised version was ready on 11 August and revised by AFSSC on 15 August. The committee approved the plan without change, including a fund request of [redacted] over the July plan and a [redacted] more than York had tentatively allowed in April 1960. Pending OSD and Presidential approval, AFSSC authorized AFSSO to take all measures necessary to protect the integrity and schedule of the latest plan.[48]

At the time (18-19 July) York had received a briefing on the 12 July development plan from the Air Force, the DDR & E [redacted]/COMSEC/ELINT Advisory Group* headed by Dr. William O. Baker of Bell Telephone Laboratories had presented comments and recommendations on all aspects of the Samos program — political, technical, managerial and operational. The advisors were quite critical of Air Force technical progress to date, claiming that it had been "overstated and underdone." Specific criticisms were leveled at the readout versus recovery problem, the proper role of ferret reconnaissance, the prematurity and sophistication of Subsystem I, the efforts for concurrency, and other such technical areas. Fortunately, the seriousness of these charges was mitigated in great degree by the technical

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*Director of Defense Research and Engineering Communications Intelligence/Communications Security/Electronic Intelligence Advisory Group

reorientation exercise under way since May under the close supervision of Charyk and York. As already noted, much of this reorientation was aimed directly at the same points raised by the Baker Group.

The advisory group also discussed at length the question of program management. In its opinion, political facts of life, initially, on a national basis and later on an international basis, dictated "operational and/or executive control [of the Samos program] by an organization capable of sponsoring both military and civilian peacetime utilization, and of expeditiously and effectively exploiting the results." The advisory group therefore proposed that executive responsibility — overall direction, operational policies and plans, and priorities — for both civilian and military applications of Samos be vested in a new OSD office or under an existing one, such as the Office of the Assistant to the Secretary of Defense for Special Operations. The Air Force could continue to manage the research and development effort, but the advisory group was critical of the current AFSC organization for Samos and proposed an expansion to include the use of highly knowledgeable persons already available elsewhere in the Air Force.[49]

The advisory group's recommendations on executive responsibility was but the latest of a rash of proposals on this particular subject. Other agencies within and outside DOD had made similar suggestions in past weeks, and the Air Force viewed them with concern. Basically, dissatisfaction seemed to stem from the fact that Samos would be a major national resource indispensable to the nation's security and perhaps play a significant

international role in the quest for world peace; yet, to many interested officials outside the Air Force it appeared that the Air Force was intent on developing and operating Samos primarily for its own requirements and purposes. Others questioned Air Force competency in photographic intelligence matters and some feared that the Air Force wanted to become the national intelligence center.[49]

It was for these reasons the Gen. White early in the current re-orientation period emphasized the utter necessity of establishing a plan that both recognized and corrected the widespread views of suspicion. For example, when the Air Staff learned about the 1 July discussions among high Administration, CIA, and OSD officials on the matter of new Samos management procedures, the Assistant Vice Chief of Staff cryptically noted to Gen. LeMay: "Here we go again — more Gillette procedures."* He quickly added, "However, I feel sure the Chief of Staff will agree to this in order to assure that the Air Force gets the operational Samos program."[51]

The Air Staff spent July and much of August resisting and countering the numerous management proposals which were put forth. These ranged from the establishment of an OSD office to creation of an interdepartmental agency to placement of executive authority with a special NSC committee. In the end, OSD presented to NSC and the President a proposal that was satisfactory to OSAF but most undesirable to the Air Staff.[52]

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*The Gillette committee late in 1955 recommended the use of special management procedures in DOD's accelerated efforts to develop and operationally deploy ballistic missiles.

The long-pending comprehensive Presidential and NSC review of the Samos program occurred on 25 August 1960. The President approved the latest (11 August) development plan and directed that certain portions of it be conducted on "a very high priority." These concerned the photographic recovery mode and would involve the use of several different cameras and films for purposes of identifying "with certainty" missile sites under construction and completed and of revealing the state of readiness, type of activity, and type of missiles at each site. For the immediate, the Air Force was to rely on recovery at sea but develop as quickly as possible advanced land recovery techniques. Photographic readout development would continue but at a lower priority than recovery; the extensive ground-based readout system originally planned by the Air Force was to be cut back "very substantially and promptly." Ferret reconnaissance work could also continue but at a still lower priority than photographic readout.[53] In effect, NSC and the President had endorsed the technical position espoused by Kistiakowsky, York, Charyk, and other top Administration scientists.

The President also specifically approved the launching of the first Samos experimental satellite, scheduled for September 1960. In previous directives dealing with Samos, he had always reserved decision on this particular action. This had caused some Air Force officials to fear that the President would withhold permission to launch Samos satellites for reasons of undesirable political repercussions. His latest decision in the wake of the U-2 controversy dissipated this fear.[54]

The President agreed to the Samos management realignment and ordered that the program "be managed with the directness that the Air Force has used on occasion, with great success, for projects of overriding priority." This could best be done by a line of command directly from the Secretary of the Air Force to a general officer in operational charge of the whole program. Appropriate boards of technical experts at the OSA and field levels would serve as advisors, and military organizations would render administrative and logistical support, as required.[55]

Secretary Sharp wasted little time in installing the new structure and procedures. On 31 August, Sharp established the Office of Missile and Satellite Systems within his own office to assist "in discharging his responsibility for the direction, supervision and control of the Samos Project." The Secretary also designated Brig. Gen. Robert L. Greer, recently Assistant Chief of Staff for Guided Missiles and currently assigned to AFBMD, as Director of the Samos Project. Greer was to organize the Samos Project Office at AFBMD's California complex as a field extension of OSAF and carry out development of the satellite.

Sharp established two advisory bodies. The first, the Satellite Reconnaissance Advisory Group, would consist of a standing committee of four — leaders in the field of electronics, photography, and data handling — augmented as occasion demanded by an assembly of technical experts to consider specific matters and make recommendations. The second advisory group — the Satellite Reconnaissance Advisory Council — would include Sharp's top four civilian aides, the newly created Director of the Office of Missile and Satellite Systems and three Air Staff members: The Vice

Chief of Staff, the Deputy Chief of Staff for Development, and the Assistant Chief of Staff for Intelligence. The role of the council was to "provide assistance, advice, and recommendations as required."[56]

Under this pattern of management, the Air Force through its departmental head had retained executive control of Samos. USAF headquarters and the field commands, however, were virtually isolated from all phases of planning and conducting the program. The Gillette procedures had at least permitted USAF headquarters to insure a small degree of participation and cognizance over the ballistic missile program through retention of the AFBMC-AFSWC point of contact— the Assistant Chief of Staff for Guided Missiles —within the Air Staff. With the new Samos procedures, this was not to be the case. The intermediate review or approval channels would exist between the Samos field office and USAF. Moreover, "briefings" would only be given on a strict need-to-know basis to Air Staff and other USAF representatives as required for Samos support purposes or in the coordination of related matters. From a formal standpoint, the only regular contact between the Samos organization and the Air Staff would be through the latter's three individual representatives on the advisory council.

Although immediate prospects for USAF participation in the Samos program were not particularly bright, the outlook for the future was not entirely bleak. The special organization and procedures were directly related to the research and development effort and the exploitation of flight test data for intelligence purposes. USAF hopes rested with the post-development period. The Air Staff emphasized this point to the field

commands in notifying them about Samos program changes:[77]

> "The nature and character of an ultimate operational system is completely conditioned upon the success of the methods which will be exploited in the R & D program. Therefore, as soon as sufficient R & D progress is made to justify effective operational planning, specific instructions will be issued to insure timely integration of this system in Air Force operational inventory."

Despite the long-held highest national priority rating, Samos development for months had floundered in a sea of continuous technical indecision and reorientation and of inadequate financial support. The results of the U-2 affair were most unfortunate but they served the cause of centering urgently required high-level attention and definitive decision-making on the Samos program, now the leading candidate for obtaining intelligence data so essential to the nation's future well-being. The outcome was most salubrious to Air Force objectives in the research and development area, even though Air Force military participation was severely limited in the process. Air Force efforts to gain acceptance of concurrency measures were basically unavailing, but this difficulty had been present long before the U-2 affair and lessened in no way during the following months. The question of Samos operational responsibility remained unsettled. The urgency of the question, however, decreased with the new program direction of the May - August 1961 period.

Operational Responsibility and Navy Relationships

Almost from the time of ARPA's establishment early in 1958 and its assumption of responsibility over all space projects, the Air Force sought the return of Samos management, development, and operational responsibilities. By early in December 1958, the Air Force had obtained an OSD-ARPA agreement

"to the assignment by the Air Force of the operational responsibility for the SENTRY program to the ARDC for the next several years and until final objectives are obtained."[58] This was reminiscent of the plan employed through 1957 with ballistic missiles, where a development agency rather than an operational unit had the job of building up and operating the initial operational capability.

Several months later, Under Secretary of the Air Force McIntyre proposed reassignment of all Samos responsibilities from ARPA to the Air Force. McElroy noted his willingness to consider a formal request, which was subsequently submitted on 5 May 1959. McIntyre explained that Samos had reached the point where several elements of the Air Force would soon be involved in obtaining an operational capability, and this would require a close integration of effort. Therefore, early transfer of responsibility, on 1 July 1959 if possible, appeared advantageous.[59]

ARPA had also been studying the question of operational responsibility. By 1 May, it had drafted documents for four space projects and proposed that McElroy send these to JCS for comment. The Secretary of Defense did this on 29 May and shortly after notified the Air Force that his decision on the 5 May request would follow receipt of JCS recommendations.[60]

McElroy informed JCS of ARPA's belief that Samos had progressed sufficiently to require early assignment of operational responsibility and so allow timely action on personnel, training, and budgetary matters. Accordingly, the Secretary wanted JCS recommendations on three pertinent

points: selection of the operational command, designation of agencies other than the operation to use Samos-derived data and a proposed arrangement for operator-user relationships, and indication of the service to furnish logistical and product-improvement support to the operating command.[61]

Meanwhile, Adm. Burke had opened up within JCS the more fundamental question of the creation of a joint military command to conduct all space operations. Determination of Samos responsibility therefore became an integral part of the broader question. As noted earlier, on 24 July 1959, JCS sent divergent views to OSD. The Army and Navy members proposed a joint command as the operator of all space systems and the designation of specific services on a purely equitable apportionment basis to furnish logistical and product-improvement support to the operator. They suggested the Army for the Samos support role.

General White argued that space systems only represented a more effective means of accomplishing current missions and should be assigned to an appropriate existing unified or specified command. He suggested that SAC in its "specified command" role should operate Samos but be responsive to the requirements of all intelligence agencies. The Air Force would administratively and logically support Samos.[62]

McElroy generally agreed with the Air Force position and on 18 September 1959 declared his intent to shift responsibility for Samos to the Air Force. Prior to this step, however, the Secretary wanted an operational plan, to include details on operator-user relationships, submitted to him. The plan would then be reviewed by JCS before he took action on it.[63]

In obvious anticipation of the transfer, SAC headquarters on 5 August 1959

had designated SAC to undertake Samos operational planning and subsequently directed the preparation of a preliminary operational plan. Following the issuance of McElroy's 18 September decision, the Air Force on 19 October restated the call for the plan, with a submission deadline of [illegible] November, and noted that its contents would be considered for the plan [illegible] drawn up within the Air Staff. In drafting its version, SAC was to reflect the earliest logical date of shifting Samos operational responsibility and forces from ARDC to SAC.[64]

Large scale, impending program changes and intercommand discord marked the next few weeks. Since the technical and financial reorientation was expected to be lengthy and time-consuming, Secretary Douglas on [illegible] November asked for a complete and immediate transfer of Samos, promising to furnish [illegible] with the requisite plans by 15 January 1960. Gates approved this step [illegible]. Meanwhile, the field commands preparing the several plans [illegible] at Inglewood, California, but initially could not agree on a date for [illegible] of Samos operational responsibility to SAC. The Air Staff [illegible] that no specific date was valid at this point, that much depended on the pending reorientation decisions. The field conferees then agreed to use [illegible] July 1962 as the tentative turnover date.[65]

After receiving SAC's operational plan in December 1959, the Directorate of Operations completed its version and obtained Air Staff coordination during January. AFBMC reviewed and approved the plan on 1[illegible] February 1960 and forwarded it to DOD on [illegible] February. It was in a sense more a concept [illegible] plan, containing the contemplated operational organization and pro[illegible] [illegible] actuated

at some indefinite point in time, after the developers had obtained a proven capability.

Under provisions of the plan, SAC as an Air Force unit would organize, train, and equip Samos operational forces and provide administrative and logistic support. Operational command would also rest with SAC, but in its specified-command role taking direction from JCS. Recognizing that Samos constituted a prize national resource, the Air Force stated its intention to obtain data to fulfil the needs listed by the Satellite Intelligence Requirements Committee of the United States Intelligence Board. The Air Force also proposed that each participating agency (user) assign a working group to the data processing center— to assure equitable treatment in the distribution of raw data and to allow each agency complete independence in its intelligence production activity. In effect, the processing center would treat all interested agencies in the same way, and the Air Force intelligence units would receive their data in the same fashion as the Army, Navy, FBI, State Department, and others.[66]

DDR on 24 March 1960 sent the operational plan to JCS. Mr. Douglas, recently elevated to the position of Deputy Secretary of Defense, asked for an early reply, since JCS comments might materially affect the expected decisions on the Samos development plan. Air Staff representatives outlined the main features of the plan to JCS on 23 March, after which the Joint Staff began its study.[67]

When almost a month elapsed with no report from the Joint Staff, several Air Staff officials recommended the use of Secretarial channels to exert pressure on JCS. Others felt this to be an unnecessary action, stating that

the Joint Staff was readying its views under rather controversial circumstances inasmuch as it had previously supported the ill-fated joint military space command. The Joint Staff's issuance of its findings on 25 April eliminated the question on rising OSAF pressure.[68]

The Joint Staff could do little else but concur in the fundamentals of the Samos operational plan but hopefully left the door open for the establishment of the desired joint military command at some future date. The staff stated that assignment of operational command to SAC should not prejudice future reassignment and carefully omitted reference to current JCS directives on force assignment policies and procedures.[69]

The Army and Navy reacted in what Air Force officials believed was a prearranged, collaborative attack. As noted earlier, Adm. Burke on [illegible] 1959 proposed within JCS the broad question of a joint military space operations organization. Then, on 7 May, Navy planners stated that the Joint Staff report on Samos was unacceptable. They emphasized that the proposed assignment to SAC set precedents and prejudiced any future attempts at joint space operations. Indeed, Samos operations would be so integrated into other SAC activities that separation in the future would be impossible. The proper solution lay in the establishment of a joint command, as proposed by Adm. Burke, and the operational assignment of Samos there. Army planners on 9 May echoed this nonconcurrence in terms strikingly similar to those of the Navy. Moreover, they quoted extensively from Burke's proposal, even though it had not yet been officially distributed by the JCS secretariat.[70]

The Air Force realized that JCS acceptance of the Samos plan hinged largely on disposing once again the matter of a joint command. The Air Force planners therefore deliberately stalled further action on the plan by withholding comment on the Joint Staff report until JCS and OSD settled Burke's proposal.[71] Secretary Gates on 16 June reaffirmed the previous decision to integrate space systems into existing commands rather than establish a new organization.*

With the basic question settled and out of the way, the Joint Staff on 21 June re-issued its report on the Samos plan, making only minor changes as necessary in the light of the 16 June decision. The Air Force planners generally concurred, proposing only minor revisions. The Army and Navy planners, having lost their main point of contention, shifted to two others. First, they argued that approval for the operator-user arrangement was premature. Much development on the satellite system still remained and CIA was currently reviewing its requirements on Samos. Therefore, establishment of unique processing procedures and user concepts in that the broadest terms was unnecessary at this time. Second, the Army-Navy planners claimed that the "national intelligence community at the seat of government" should receive and process all Samos-derived raw data, since such activity

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* See pages

was not a SAC function, would make other unified and specified commands dependent on SAC, and would duplicate in part the functions of the Air Force Intelligence Center.[72]

The Army and Navy withdrew their first objection on 5 July, the day that the USIB restated its intelligence requirements on the Samos system. They persisted, however, in their efforts to cut SAC entirely out of the processing and distribution work. To the earlier list of reasons, they added the claim that construction of Samos processing facilities essentially duplicating those already in existence in and about Washington, D.C., would constitute a wasteful expenditure of hundreds of millions of dollars. These planners also suggested that the Joint Staff should obtain USIB views on the subject before proceeding further.[73]

Air Force officials regarded the objections to the operational plans as delaying tactics in the resolution of a more serious problem. It appeared to them that the Army and Navy feared the plan as a means for the Air Force (and SAC) to become the national intelligence center. Moreover, it was apparent that the other services distrusted Air Force promises to share Samos products equitably. Finally, they appeared greatly concerned over the fact that a national resource of the character of Samos would be controlled by SAC — the major deterrent force.[74]

From an overall view, the specific area in dispute was quite small but exceedingly important. General White had pointed this out on 29 June:[75]

> "I feel that it is essential that the Air Force "operate" the Samos, although this does not make the Air Force sole exploiter of the resulting material. In my view, "operate"

consists of launch, injection, command and control on orbit, data retrieval, data reproduction as required, and dissemination of this data to designated users. "Operate" does not include exploitation except as required to satisfy the Air Force needs....the Air Force must operate this system as a national asset responsive to all participating agencies."

The dispute had sifted down to the matter of data reproduction and dissemination, but no solution appeared close at hand. However, the Presidential directive of 25 August served to dissipate much of the problem's urgency and provide a temporary answer. In addition to directing the creation of a special management and organizational structure for developing Samos and exploiting any data obtained during the flight test period, the President authorized the Westover AFB unit previously employed in processing U-2 film to do the same with the Samos "R& D take." Since there would be little application of concurrency to the program, OSD and CSAF subsequently agreed to defer operational planning until Samos was a power system.[76]

Although these actions eased the necessity of an immediate decision on Samos operational responsibility and procedures, JCS intermittently grappled with the few disputed points during September and October 1960. A discussion with Secretary Gates on 31 October finally closed the matter. The Secretary noted that in view of recent actions and the current objectives of the Samos program JCS should discontinue consideration of the plan at this time.[77]