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**Interagency Security Classification Appeals Panel**

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William A. Cira,
Acting Director
**INFORMATION SECURITY OVERSIGHT OFFICE**

September 19, 2016

Please be advised that the Interagency Security Classification Appeals Panel (ISCAP) has concluded its consideration of the fourth part of mandatory declassification review appeal 2002-0049 filed by you and that the 60-day period during which an agency head may appeal an ISCAP decision to the President has expired. Enclosed is a chart that outlines the ISCAP decisions on the documents under appeal and details the information declassified by the ISCAP. With the exception of any information that is otherwise authorized and warranted for withholding under applicable law, we are releasing all information declassified by the ISCAP to you. If you have questions about this appeal, please contact William Carpenter of my staff at (202) 357-5250.

Sincerely,

William A. Cira

WILLIAM A. CIRA
Executive Secretary

Enclosures

cc: Mr. Joseph Lambert
Director, Information Management Services
Central Intelligence Agency Member of the ISCAP

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DDS&T Historical Paper
No. OSA-1
Vol. XIII of XVI

# DIRECTORATE

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(PERIOD)
From Inception to 1969

# DO NOT DESTROY

**DECLASSIFIED UNDER AUTHORITY OF THE INTERAGENCY SECURITY CLASSIFICATION APPEALS PANEL, E.O. 13526, SECTION 5.3(b)(3)**

**ISCAP APPEAL NO. 2002-0049, document no. 13**
**DECLASSIFICATION DATE: September 19, 2016**

Controlled by : DDS&T
Date prepared : 1 April 1969
Written by : Helen Kleyla
Robert O'Hern

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DDS&T Historical Paper
No. OSA-1
Vol. XIII of XVI

# DIRECTORATE OF SCIENCE & TECHNOLOGY HISTORY

(TITLE OF PAPER)
History of the Office of Special Activities
Chapter XX

(PERIOD)
From Inception to 1969

## DO NOT DESTROY

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[redacted]

## Chapter XX. OXCART Program

Xeroxed copies of the following documents forwarded through SS/OSA to DDS&T Management Staff for Mr. Colby's review re Victor L. Marchetti book on 14 January 1974:

1. Comparison of SR 71 and A-12 Aircraft; COMIREX-D-12.1/1, dated 26 Sep 67, (BYE-5658-67)
2. DCI Briefing for Rivers Subcommittee. 20 Jul 67.
3. DCI Briefing for Russell Subcommittee. 17 Nov 67.
4. DCI Briefing for Mahon Subcommittee. 19 Sep 67.
5. 303 Minutes; 13 Mar 69, (BYE-12,126-69).
6. 303 Minutes dated 20 Dec 67 (BYE-82,190/67 Series B).
7. Exerpt from 303 Minutes dated 17 Nov 67 (BYE-82,189/67 Series B).
8. Exerpt from 303 Minutes dated 6 Oct 67.
9. Exerpt from 303 Minutes dated 31 May 67 (BYE 66738/67 Series C).
10. 303 Minutes dated 18 May 67 (BYE-66,736/67 Series C).
11. 303 Minutes dated 27 Jun 66 (BYE-67,018/66 Series B).
12. 303 Minutes dated 12 May 66 (BYE-66,704 Series C).
13. 303 Minutes dated 29 Mar 66 (BYE-66,703/66 Series C).
14. 303 Minutes dated 21 Feb 66 (BYE-66,701/66 Series C).
15. 303 Minutes dated 25 Jan 66 (BYE-63,003/66 Series C).

**Withheld under statutory authority of the Central Intelligence Agency Act of 1949 (50 U.S.C., section 403g)**

[redacted]

COPY OF FIRST OFFICIAL FLIGHT PICTURE

OF THE A-12 INCLUDED IN COPY 1

OF HISTORY.

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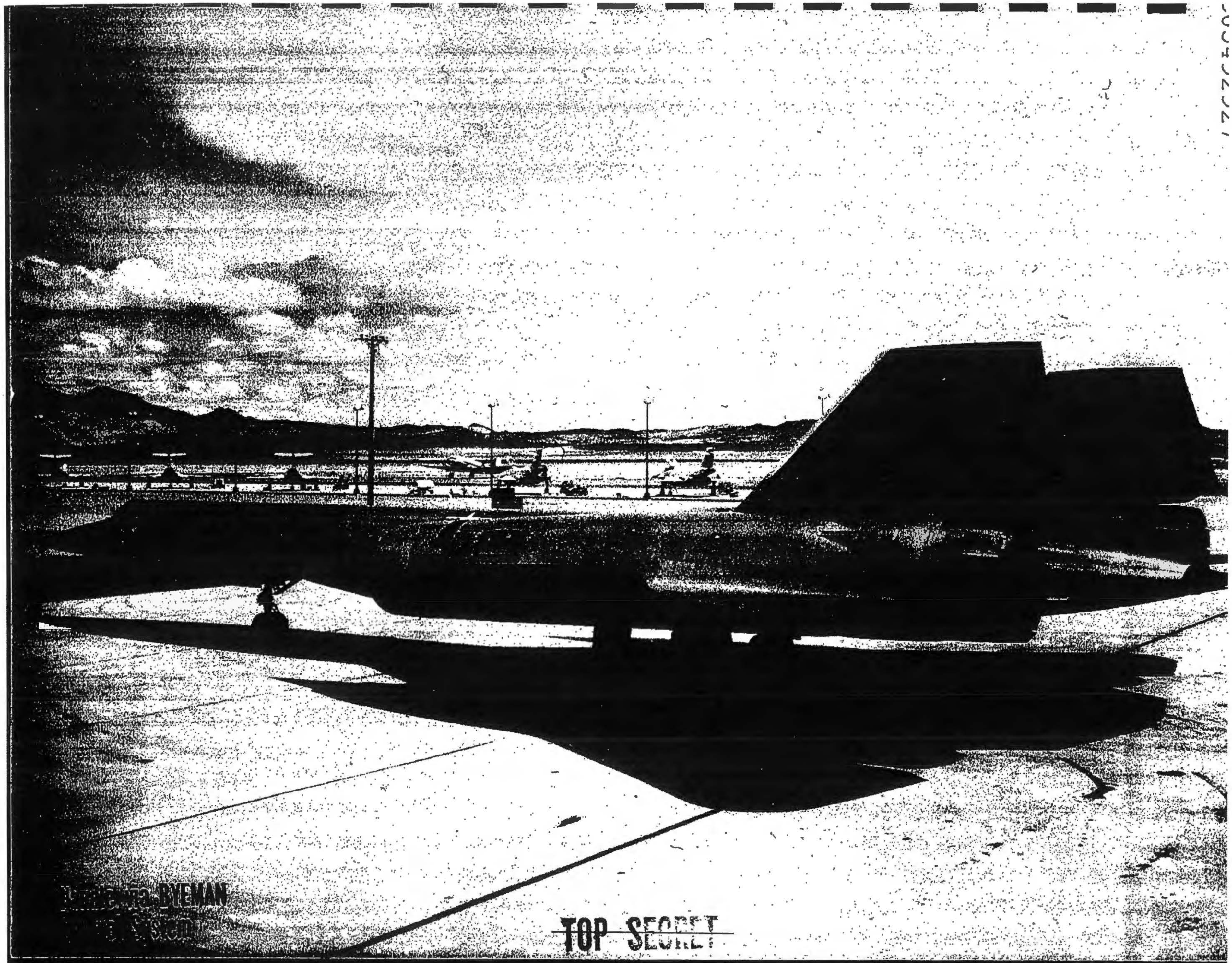

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## CHAPTER XX. PROJECT OXCART

### Introduction to U-2 Follow-on Vehicle

Shortly after the operational commitment of the U-2 in June 1956, research was begun to improve its survivability and extend the program's lifetime. The outgrowth of the early studies became a sub-project of AQUATONE and was called Project RAINBOW. Early estimates of a high probability of success in U-2 overflights were based on the U-2's operating altitude. Its high penetration and operating altitude was expected to diminish the possibility of detection and accurate tracking by hostile defense systems. Unfortunately, the Soviet air defense warning system proved up to the challenge. The U-2 was not only detected by radar as it penetrated denied territory, but was tracked quite accurately in its earliest flights over Satellite and Soviet areas. This state of affairs could only lead to intensification of Soviet defensive efforts, and the consequent shortening of the U-2's usefulness as a reconnaissance aircraft.

Thus in July 1956, attention turned to anti-radar research. Dr. Edward M. Purcell of Harvard University had discovered a possible means of countering or absorbing radar emanations. His discovery led to laboratory work in techniques to blanket portions of the aircraft with radar absorptive materials in order to reduce radar detection. If fruitful, the technique would greatly enhance the U-2's prospects of continuing its reconnaissance role beyond the current predictions which were from eighteen months to two years.

Project RAINBOW laboratory research and testing was conducted under the auspices of the Scientific Engineering Institute (SEI), Cambridge, Massachusetts, a CIA proprietary research organization. Field testing was performed by the firm of Edgerton, Germershausen and Greer, Inc., (EG&G), at Indian Springs Air Force Base, Nevada. Flight testing results proved more promising than originally anticipated. Several RAINBOW-configured aircraft were deployed to Detachment B at Adana, Turkey, in 1957 and flown on operational missions with some degree of success in disrupting Soviet tracking of the missions.

It became apparent, however, in mid-1957 that radar camouflage of a conventionally-designed and structured aircraft had its limitations. The weight and bulk of absorptive material imposed performance penalties on the aircraft. The narrow-band limitations of the camouflage technique could not cope with the frequency spread employed by the Soviet air defense warning system. Laboratory testing and measurement continued, but operational employment terminated. The next step was taken in August 1957. Since a satisfactory solution to the radar problem could not be obtained using conventional design aircraft, a new approach appeared necessary. Focus turned to the feasibility of a reconnaissance aircraft designed to a greatly reduced radar cross-section specification as the primary objective. Exploratory work in this direction, and subsequent efforts, came to be known within the Agency as Project GUSTO.

The course of action proposed for Project GUSTO is quoted from a position paper prepared by Mr. Bissell for a meeting with the Deputy Secretary of Defense, Mr. Donald A. Quarles:

> "a. The program of studies, measurement and experimentation will be carried forward with all possible speed, in conjunction with further work on the RAINBOW camouflage, looking toward the choice of a design approach for a possible new aircraft within three months' time. The work will be under the technical direction of the above-described scientific staff in Cambridge with actual systems responsibility remaining in the AQUATONE Project Headquarters in Washington, D. C.
>
> "b. During this phase, contact will be made with certain manufacturers as appropriate in order to explore the possibilities of unconventional materials and structures and receive the benefit of their views on the general design problem.
>
> "c. It is proposed to maintain more continuous and more intimate contact than hitherto with appropriate components in the Air Force and the Navy.

"d. Appropriate steps should be taken to control discussion with manufacturers in the aviation and electronics industries and actions such as the issuance of formal requirements which might stimulate unusual interest in the concept of a non-radar reflective aircraft.

"e. As soon as it is possible to select the optimum design approach for a low reflectivity reconnaissance aircraft and to evaluate with reasonable reliability both its feasibility and its performance, a Governmental decision should be made as to the advisability of a crash program to produce eight to twelve such vehicles." 1/

In a memorandum to the DCI, 26 November 1957, Mr. Quarles wrote that the Defense Department was in agreement with the purpose of the activities at Gambridge, and expressed a desire to participate in a definite design project decision at the appropriate time. 2/ Thereafter, joint Agency-DOD sponsorship characterized policy and decision-making leading to the development of a follow-on reconnaissance system.

In early 1958, the President's Scientific Adviser, Dr. James R. Killian, recommended that feasibility studies get underway on an advanced manned reconnaissance vehicle.

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1/ ~~TS~~-164671, 19 November 1957, Proposed Advanced Reconnaissance System. See Annex 121.

2/ ~~TS~~-164678, 26 November 1957, Memorandum for Mr. Allen Dulles from Deputy Secretary of Defense, Donald A. Quarles. See Annex 122.

The President concurred in the recommendation, laying emphasis on the security requirements such an undertaking would impose. Mr. Bissell was requested to take action. In May 1958, Mr. Bissell formed an advisory panel composed of Dr. Edwin H. Land, Chairman, and Drs. Purcell, H. Guyford Stever, Courtland D. Perkins, and Mr. Allen F. Donovan, Mr. Richard Horner, Assistant Secretary of the Air Force for Research and Development; Mr. Garrison Norton, Assistant Secretary of the Navy for Research and Development; General Ralph P. Swofford, USAF; Colonel Norman C. Appold, ARDC; and Mr. Bissell completed the Advisory Panel membership. A series of meetings were scheduled for 1958 to consider the technical features that must be achieved in order to provide an adequate successor to the U-2. The panel was to report its findings to Dr. Killian upon completion of its examinations and make recommendations as to the type design it determined would meet the requirements for the next generation reconnaissance aircraft.

As noted earlier, technical direction of the new thrust in combating the Soviet electronic threat remained with the Cambridge facility. Principals in the redirected effort were SEI, EG&G and Lockheed Aircraft Corporation (LAC). SEI turned its energies to theoretical aerodynamic models having minimum radar cross-section characteristics. It engaged in wide-ranging experiments in shape control, model design analysis, and unconventional materials. Laboratory calibration and measurements were conducted on radical and exotic model designs to assess their effectiveness in radar cross-section reduction. EG&G continued to operate the radar testing range at Indian Springs Air Force Base, Nevada. Project Headquarters had earlier, in support of Project RAINBOW, installed a hydraulic lift, radars, antennae and associated equipment at Indian Springs. Measurements were made on scale models raised on the hydraulic lift. Lockheed proceeded to preliminary design work on a number of aircraft configurations and shapes, did wind tunnel testing, tested the effect of materials and shapes for reflective characteristics, and investigated substitute, non-metallic structures for portions of the airframe. Lockheed subcontracted to Narmco, Inc., San Diego, California, for studies of the feasibility of certain types of plastic and high-modulus fiberglass materials for possible use in the construction of the GUSTO vehicle. In addition, Lockheed was proceeding on an independent configuration design study for a new aerial reconnaissance aircraft as a replacement for the U-2.

The Convair Division, General Dynamics Corporation, Fort Worth, Texas, was approached for a proposal that would employ the B-58 as a mother aircraft capable of launching a small, manned reconnaissance aircraft.

There emerged in mid-1958 two general proposals, one from Convair and one from Lockheed. The former consisted of a high-Mach, high-altitude, small, manned vehicle, ram-jet powered, which would be launched from a B-58 aircraft. Lockheed proposed a pilot-launched, high-Mach, high-altitude, turbo-jet-powered, larger, manned aircraft. Both appeared capable of achieving desired operational specifications and within the desired development time frame.

The Land Advisory Panel met for the first time in Cambridge on 31 July 1958 to obtain preliminary views on possible successor vehicles. The group was briefed on the approaches undertaken by Project Headquarters, as well as on other advanced proposals submitted by the USAF. All military aerial reconnaissance projects in being or in study were reviewed. It was too early to make judgments on the merits of the various ideas, and no firm recommendation resulted from the first meeting. A second session was set for September 1958.

At the second meeting of the Panel no design approach decision was made because it was felt there was need for still further investigation. One decision made by the Panel at its September 1958 meeting was to eliminate for the present any further consideration of Project CHAMPION, which was a joint Agency-Navy feasibility study (paralleling GUSTO) of a possible high performance reconnaissance aircraft. This radical departure from the conventional aircraft design proposed an inflated vehicle, ramjet-powered to Mach 3, possibly reaching 125,000 feet altitude. The study got underway after NACA strongly recommended to the Navy that it be pursued. Studies in connection with CHAMPION had been conducted by Convair, Boeing, Hughes, Marquardt, and Goodyear Aircraft Corporations. While the proposal appeared feasible, the five years estimated to develop the system made it least attractive to the Panel.

A final meeting of the Panel was held in Boston on 12 November 1958 and its findings were reported to Dr. Killian on 15 November substantially as follows:

a. The successor reconnaissance aircraft would have to achieve a substantial increase in altitude and speed; be of reduced radar detectibility; suffer no loss in range to that of the U-2; and be of minimum size and weight.

b. The Panel concluded that the small, lightweight aircraft launched from the B-58 appeared to be the most satisfactory design approach. It foresaw possible problems only in aerodynamic heating and in the air inlet system. As second and less desirable choice, the Panel selected a similar small, reasonably lightweight aircraft capable of unassisted take-off, but with slightly less speed and less than desired range.

c. The Panel recommended that system development be begun at once on an expedited and secure basis. It requested the prerogative of reviewing alternative systems should the Panel's choice prove to be unacceptable. 1/

Preliminary Presidential approval was then obtained to proceed with Project GUSTO investigations. Primary interest now centered on the supersonic, high altitude unstaged design proposal by Lockheed and the Convair design proposal parasited to the B-58 aircraft. The Convair design was especially configured to minimize radar return. The Lockheed design made no concessions in this direction which tended to compromise aerodynamic performance.

In December, 1958, Convair began work on a contract which called for initial studies, tests and preliminary design of a high altitude, supersonic reconnaissance vehicle to replace the U-2. It was to be a four-and-one-half months engineering effort and was funded in the

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1/ GUS-0070, 15 November 1958. Memorandum for Dr. James R. Killian. See Annex 123.

amount of $1,200,000. Concurrently, a contract was let with Lockheed for similar studies in the amount of $1,000,000.

The Marquardt Aircraft Company, Van Nuys, California, began preliminary engineering design studies and tests necessary to develop a ramjet engine which would be compatible with the airframe design proposed by Convair. It, too, was to be a four-and-one-half months endeavor which would result in model specifications of the engine and engine controls. The estimated cost of the contract was $2,500,000. Lockheed designing to this point had considered only turbo-jet propulsion systems, which were either in being or under development by the Air Force or Navy.

Additional studies were solicited from manufacturers of camera equipment, electronic equipment, and pilot protective assembly systems (pressure suits, oxygen sources, etc.). EG&G work at the range was extended in order to provide a testing capability for the cross-section models provided by the two airframe contractors. Continued consultant services were maintained with Narmco and SEI. This phase of Project GUSTO was expected to terminate at the end of June, 1959, and the total estimated cost was to be $5,420,000.

A comparison of the major design features of the two competing aircraft systems at this point in time follows:

| | Lockheed | Convair |
|---|---|---|
| Aircraft designation | A-3 | FISH |
| Speed | Mach 3.2 | Mach 4.2 |
| Range | 3200 n.m. | 3900 n.m. |
| Altitude | 90,000 ft. | 90,000 ft. |
| Launch system | Pilot-launch | From B-58 |
| Propulsion system | 2 turbojets | 2 ramjets |
| Weight | 95,000 lbs. | 38,500 lbs. |
| Predicted first flight | January 1961 | January 1961 |

It was difficult to compare the two vehicles from a logistics view since little was known at the time of the requirements for ground handling equipment, fuels, retrieval procedures, etc. In general, the A-3 appeared to be easier to handle on the ground; the Convair design appeared superior in meeting performance criteria.

Throughout the spring of 1959, Lockheed and Pratt & Whitney (P&W), as one team, and Convair and Marquardt as the other, continued their design, model construction and testing, structural investigations and other testing. Progress of both systems was closely monitored and reviewed by a joint Agency-USAF evaluation team. Both teams revised plans and designs frequently. By May, 1959, a summary comparison could be made of the two systems.

The Convair FISH design was a relatively small vehicle with a gross weight of roughly 40,000 pounds. The aircraft was to be staged from a B-58 mother aircraft, would fly a 4,000 mile range at a 90,000 foot altitude. It was powered by two 40-inch diameter Marquardt ramjets using JP type fuel. It was roughly 50 feet in length and 35 feet in wing span. It attempted to minimize radar reflectivity by configuration and special materials. Two small turbojets had been incorporated for the subsonic portion of flight following the ramjet powered supersonic flight segment. Its most serious deficiency was the inability of the current B-58A model to get through the transonic region of flight to get the required Mach speed for efficient ramjet operation (2.7 Mach). The next model, the B-58B, would be powered sufficiently to accomplish the task. Inlet and engine testing had not proceeded far enough at this point to surface major problems.

The Lockheed design (now designated the A-11) was powered by two J-58 P&W turbojet engines. It was 100 feet long, had a wing span of 50 feet, and would weigh 92,000 pounds at take-off. It was designed to fly 4,100 miles at 85,000 to 95,000 feet altitude. Its size made it more susceptible to radar detection, and its sonic boom effect was predicted to be more serious than the smaller Convair design. No serious aerodynamic problems were anticipated with the engine installation. There was need, however, to up-rate the J-58 engine to a Mach 3.2 performance and to develop the necessary afterburner. Lockheed by this time was proceeding to fabricate and test structural components using titanium.

On 18 May 1959, there was a CIA/USAF meeting to discuss the status and future planning with regard to Project GUSTO. General Thomas D. White, Chief of Staff, USAF; General Jacob E. Smart, Assistant Vice Chief of Staff, USAF; and Colonel Leo P. Geary sat for the Air Force, and Mr. Dulles, General Cabell, Mr. Bissell and Colonel William Burke comprised CIA representation. Mr. Bissell reviewed the status of both proposals, pointing out advantages and disadvantages of each. Mr. Bissell noted that there would be an Advisory Panel meeting in Dr. Land's office in Boston in early June, and that it would make recommendations regarding the proper course to take. The Panel's recommendations would be reviewed by the DOD, and a final system selection would result which would be taken to the

President for approval. At General White's request, a joint USAF-CIA working-level technical panel was formed. Its purpose was to provide the technical expertise in final system selection.

The Boston meeting did not result in a decision regarding the two vehicles. It was agreed that from an operational viewpoint, the A-11 with its 4100 mile range and increased altitude capability was highly desirable. It also had the advantage of conventional take-off and the ability to use a short runway. Its major design deficiency was that it would be tracked constantly. The Convair FISH, being a staged vehicle, was a much more complicated system to operate. On the other hand, the possibility of it's flying missions undetected was greater than that of the A-11. The technical experts on the Land Panel were concerned chiefly with aircraft design and radar cross section, not operational problems. The meeting ended with the conclusion that sporadic detection and tracking by radar must be expected regardless of vehicle. The Panel made no recommendations as to choice of aircraft, and the Agency/USAF briefing team returned to Washington to prepare a presentation for the President. Presidential approval was necessary to continue the GUSTO program.

The tempo of GUSTO activity quickened during the month of June, 1959. Systems selection meetings occurred with increasing frequency as the contractors submitted design changes and new approach concepts. Convair experienced a severe setback when procurement of the B-58B was cancelled by the Air Force. The small Convair design, staged from the B-58, had demonstrated success in aerodynamic testing and structural development. Radar testing had also shown good results. The cost and operational complexity of reconfiguring the older B-58A model mother aircraft now ruled out the FISH design. It would have been necessary to augment the B-58 with two additional engines in order for it to achieve the speeds for efficient ramjet engine ignition on the FISH vehicle. The small inventory of existing B-58A's further complicated matters, since the USAF was now extremely reluctant to give up any of its most advanced bomber aircraft for modification to a drone mother ship.

At a meeting in Mr. Dulles' office on 14 July 1959, attended by General Cabell, Mr. Bissell, Drs. Killian, George B. Kistiakowsky, Purcell, Land, Bruce Billings, and Franklin A. Rodgers, Project GUSTO was given a thorough review. It was decided that neither the Convair FISH design nor the Lockheed A-11 design met the criteria established for a successor system to U-2 reconnaissance. The group was advised that both Convair and Lockheed were interested in submitting new design proposals. Both designs were powered by Navy P&W J-58 turbojet engines and incorporated reduced radar return characteristics. It was accepted that a compromise was necessary between radar reduction attempts and maintaining good aerodynamic design. The group recommended that GUSTO be continued, but in the direction of the new design proposals by the two manufacturers. It was further recommended that the concurrence of the Secretaries of Defense and of the Air Force be obtained, and the joint view be communicated to the President.

On 15 July 1959, General Cabell and Mr. Bissell reported on GUSTO status, first to Air Force Secretary Douglas and General White, and then to Secretary of Defense McElroy and Under-Secretary Gates. Reaction was unanimous to go to the President and urge continuation of the program.

The President was briefed on 20 July 1959. Attending were Mr. Dulles, General Cabell, Mr. Bissell, General White, Secretary McElroy, Drs. Killian, Land and Kistiakowsky. The President approved the direction the study had taken, and he instructed Mr. Bissell, in consort with personnel of the Bureau of the Budget, to determine if the necessary funding arrangements could be made. Continuation now hinged on the availability of funds. A choice of contractors had yet to be made, but that would await final design proposal submissions.

Mr. Bissell reported to his staff on 21 July that a clear-cut go-ahead now awaited solution of the money problem, and that he would approach the Bureau of the Budget immediately. He also charged that highest security standards had to continue and that knowledge of future activities had to be restricted to a very limited number.

Mr. Bissell met with Bureau of the Budget personnel on 22 July 1959 to discuss financial arrangements. He indicated that approximately 90 million dollars might be needed in FY 1960 for obligation against the program. There existed 75 million dollars buried in the DOD budget which had been specifically reserved in the FY 1960 budget for continuance of Project GUSTO. Very wisely this proviso had been stipulated in a memorandum of understanding with the Bureau of the Budget on 16 December 1958.[1/] Mr. Bissell also gave estimates

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[1/] GUS-0073, 12 December 1958. Memorandum of Understanding, Funding of Project GUSTO, etc. See Annex 124.

of FY 1961-1962 requirements. The meeting ended with the understanding that necessary financial arrangements would be forthcoming to carry on the program.

One major step now remained before a full-scale development program could be entered. A choice had to be made as to which design proposal would be pursued. By mid-August 1959, the latest proposals from Lockheed and Convair were in hand. They were both unstaged aircraft proposals, differing only in external configuration. Both would reach an altitude of 90,000 feet, fly at Mach 3.2 and have ranges of approximately 4,000 miles. Their size, weight, and aerodynamic performance were very similar. Both had selected the P&W J-58 engine over the General Electric Corporation J-93 because the latter could not provide the high cruise altitude of the J-58. A comparison of their general characteristics follows below (data as of 17 August 1959).

| | Lockheed | Convair |
|---|---|---|
| Aircraft designation | A-12* | KINGFISH |
| Speed | Mach 3.2 | Mach 3.2 |
| Range (total) | 4120 n.m. | 4000 n.m. |
| Range (at altitude) | 3800 n.m. | 3400 n.m. |

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* Designation changed to A-12 to distinguish it from the A-11 designator for the all-metal version proposed initially.

| | Lockheed | Convair |
|---|---|---|
| Cruise Altitudes | | |
| Start | 84,500 ft. | 85,000 ft. |
| Mid-range | 91,000 ft. | 88,000 ft. |
| End | 97,600 ft. | 94,000 ft. |
| Dimensions | | |
| Length | 102 ft. | 79.5 ft. |
| Span | 57 ft. | 56.0 ft. |
| Gross Weight | 110,000 lbs. | 101,700 lbs. |
| Fuel Weight | 64,600 lbs. | 62,000 lbs. |

Radar Performance: Only limited small model testing had been conducted to this point. Predicted goals were similar with Convair appearing to be slightly better at S-Band frequencies.

| Cost Summary* | Lockheed | Convair |
|---|---|---|
| 12 Aircraft Program | 96.6 million | 121.6 million |
| First flight | 22 months | 22 months |

On 20 August 1959, the joint DOD/USAF/CIA source selection group, upon recommendation of its technical advisers, chose the Lockheed design. Approval to proceed with initial development was

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* Exclusive of engine costs.

given to Project Headquarters under the direction of Mr. Bissell. Continuation of the Lockheed arrangement beyond initial development would depend on the success of design changes in the A-12 to reduce the radar cross-section to a satisfactory level. Two factors favored the choice of Lockheed. There was a substantial difference in costs of the two programs, Lockheed being the lower. The other was a confidence or experience factor. The experience Lockheed had gained in the "skunk works" type of operation in the U-2 program equipped it to launch into another highly classified program without attracting undue attention in the industry. Lockheed possessed a reservoir of labor that had been given security clearances and was readily available. Lastly, due to his success in developing the U-2 aircraft, much confidence reposed in Mr. Clarence L. (Kelly) Johnson and his ability to produce a new vehicle.

Notification was circulated to all persons associated with GUSTO that, effective 31 August 1959, all activities performed under that title had been terminated. This was to minimize the possibility of speculation about the creation of a follow-on program.

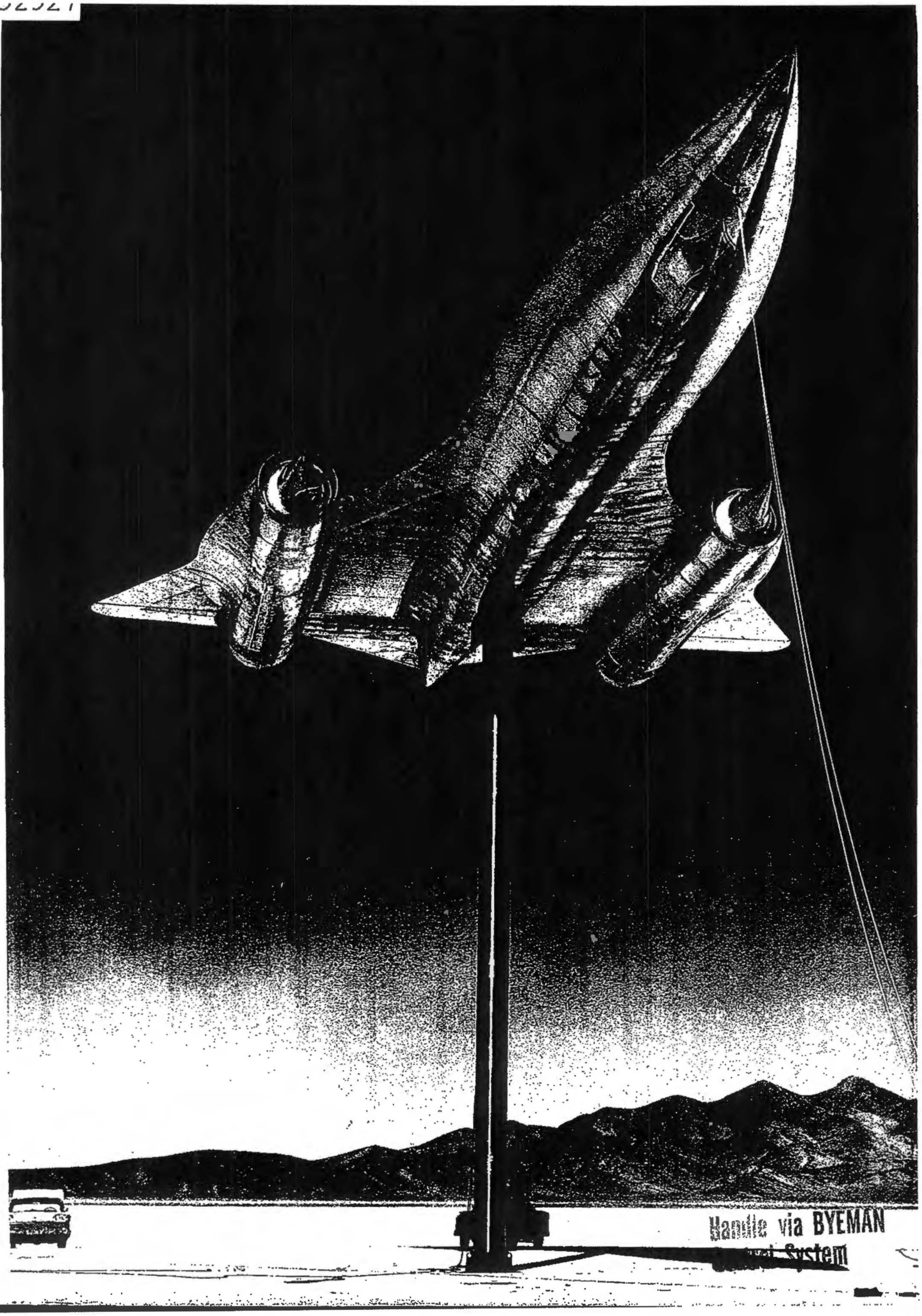
## Early OXCART Development

Action on the decision to proceed on a conditional basis with the Lockheed design proposal was taken at once. A new operational security clearance category was established in a manner very similar to that which covered the U-2 program. The new project was called "OXCART". A demonstrated "need-to-know" requirement had to be established in order to obtain an OXCART clearance. Authority to approve clearances for military and civilian personnel was retained by the Project Director, Mr. Bissell. Clearance of industrial and supplier personnel was handled by the Project Security Staff in coordination with the technical management group. Only very highest ranking and key personnel from the Agency, DOD and elsewhere in Government who could make a direct and needed contribution were cleared and briefed in the early days of the program.

On 3 September 1959 a letter contract was issued to Lockheed Aircraft Corporation to proceed with anti-radar studies, aerodynamic structural tests, and engineering designs for the proposed A-12 aircraft. Four and one-half million dollars was obligated against FY 1960 funds. The contract called for construction of a one-eighth scale model for immediate anti-radar (AR) testing at the Indian

Springs facility; construction of required test facilities; construction of a full-scale model for follow-on AR testing; construction of an aircraft section of titanium; wind tunnel testing and so forth. Production of twelve aircraft was called for. This last item, however, was conditioned on the contractor's ability to reduce radar reflectivity, prove construction methods, and generally affirm that the design would meet the specifications desired for an advanced reconnaissance system. Production of aircraft would be subject to negotiation at a later date.

The requirement to conduct radar tests on a full-scale model raised problems. The hydraulic lift installed at Indian Springs was not capable of raising and lowering the full-scale model. Indian Springs did not afford the necessary security to prevent the model being seen by unauthorized persons. It was decided, therefore, to move the AR testing equipments from Indian Springs to another site where a heavier hydraulic lift and pole device would be installed to accommodate a full-scale model and, eventually, the aircraft itself. (See picture overleaf.) For reasons of security, access and accommodations, Watertown was selected (former U-2 training base). Since deactivation of the Watertown base in May 1957, it had remained in caretaker status.



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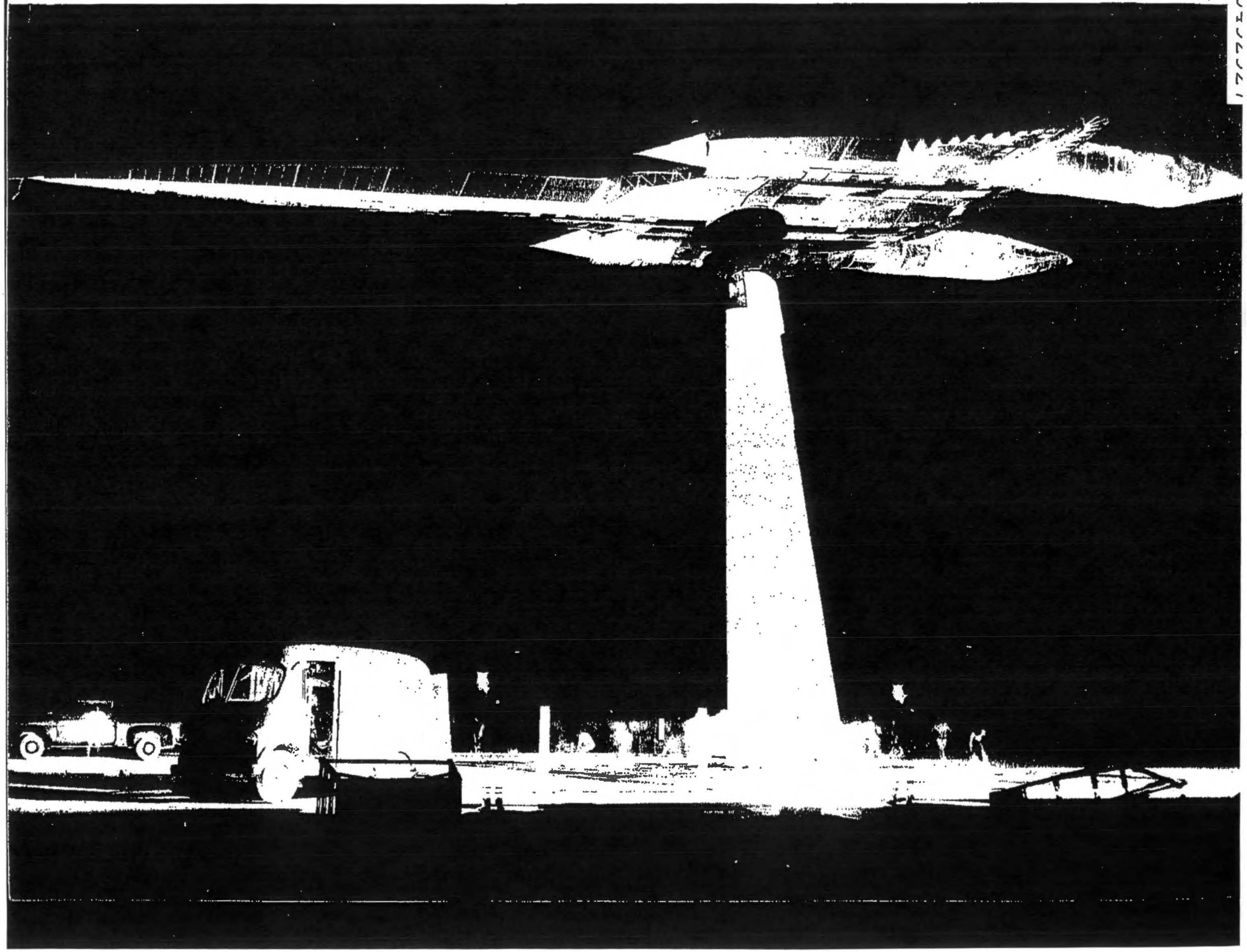

As scale-model testing continued at Indian Springs, preparations were underway to reopen Watertown. Appropriate arrangements were made with the AEC to reactivate the facility and necessary rehabilitation and construction got underway in October 1959. By late November the EG&G test range equipment had been moved from Indian Springs and the Watertown site was ready for AR tests of the full scale A-12 mock-up. The population of Watertown base approximated 75 persons, the majority being contractor personnel. The operation, under the command of an Agency staff employee, was begun on a crash basis and under austere conditions.

As the events described above were taking place, the Development Projects Division (DPD) moved forward in other areas. In addition to establishing a system of security, it was necessary to develop cover stories. The latter was no easy task as plausible stories had to be prepared, for example, to explain the new activity at Lockheed (as well as at other contractors' plants), and the reactivation of Watertown. This venture into beyond-the-state-of-the-art in aircraft development, if known in the aerospace industry, would quickly lead to speculation as to its true purpose and certain compromise of the concept.

A new memorandum of understanding was necessary with the Air Force to delineate areas of responsibility between the Agency and the USAF. In a letter to the DCI on 18 September 1959, General White, Chief of Staff, USAF, had written as follows:

> "1. In view of recent events leading up to the final determination of a successor aircraft for the U-2, I am taking this opportunity to assure you of the Air Force's continuing interest in the project on the same joint basis as our participation in the U-2 program.
>
> "2. In this regard, I refer to the original agreement of August 1955 which outlined and defined in rather broad terms the areas of responsibility of your Agency and the Air Force. I believe the intent of the basic concepts and organizational structure agreed to in this document continue to be valid. I feel, however, that after four years' experience and the somewhat altered circumstances in terms of time to the production of a suitable article and the November 1957 memorandum from Defense in terms of Air Force responsibility, that a review of this document would be profitable and insure an orderly continuation of the joint functions of the Air Force and Central Intelligence.
>
> "3. I have directed Col. Geary to meet as soon as possible with your designated representatives to review our original document and suggest such changes or additions as would be mutually agreeable and beneficial." [1]

A classified contract was written with the Pratt & Whitney Division of United Aircraft Corporation to provide the propulsion

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[1] ~~TS~~-155247, 18 September 1959. Letter to DCI from Chief of Staff, USAF, Subject: U-2 Follow-on Program.

system for the aircraft. Development of the J-58 engine had been sponsored originally by the U.S. Navy for its own purposes. Navy interest in the J-58 development, however, was subsiding and a decision had been made by the Secretary of Defense to withdraw from the program at the end of 1959. At this point, the USAF agreed to assume sponsorship for continuing overt development, since the engine had application to certain proposed advanced USAF weapon systems. The covert contract was a necessary device under which the J-58 engine capabilities would be extended to the highly classified Mach 3.2, possibly Mach 3.5, performance at extremely high altitudes. Contract terms called for the assembly of three advanced experimental engines for durability and reliability testing, and provision of three engines for experimental flight testing in early 1961. Due to the long lead time involved in the manufacture of jet engine components, the contract with P&W actually called for delivery of hardware, whereas no decision had yet been made to proceed with the manufacture of airframes. The decision to build engines had to be made at this early date in order to meet Lockheed's projected airframe delivery schedule should a decision be made to proceed with production of A-12 aircraft.

During the GUSTO program, requests for camera systems proposals had been solicited from several camera manufacturers. Fairchild Camera, Hycon, Perkin-Elmer (P-E), and Itek had responded with design engineering proposals. An evaluation team from Project Headquarters and the Agency's Photographic Interpretation Center reviewed these and concluded in early 1959 that the P-E design was the best, and recommended it be chosen for the successor reconnaissance system. The Land Panel affirmed this view after reviewing proposals. P-E was given a new contract in October 1959 to begin engineering and design work for a photographic system for the OXCART program. The Firewel Corporation was asked to continue its studies in pilot environment requirements as was Narmco its work in plastics and other radar-absorbent materials. Eastman Kodak agreed to a feasibility study for a camera designed to OXCART operational characteristics. EG&G was performing the AR testing on the OXCART model, and SEI was providing consultant services pertaining to the radar cross-section reduction features of the A-12 system.

As the new year approached, developments in the OXCART program were reaching a stage when a final decision was required to engage in production. At an OXCART Suppliers' Meeting on 16 December 1959, Mr. Johnson stated that Lockheed needed a configuration freeze and go-ahead on a specific production figure in order to plan and implement tooling requirements effectively. Mr. Bissell agreed that such would be the principal subject, along with the radar cross-section problem, at the next such meeting in mid-January 1960.

On 20 January 1960, Mr. Bissell, in company with Agency and USAF representatives, met the Land Panel consultants to review the status of the radar cross-section of the A-12. The Panel was impressed with the progress made in the radar cross-section areas. It was predicted by Dr. Frank Rodgers of SEI that continued testing would achieve further improvement in reducing radar returns, a condition necessary to proceed toward the final design production decision.

However, at the OXCART Suppliers' progress review meeting the next day, Mr. Bissell focused on an increasing weight problem creeping into the A-12 design and the resultant altitude and range degradation. Mr. Johnson was directed to investigate the weight problem in order to provide a specified minimum range and altitude profile of the A-12. He was also asked to provide estimates of A-12 performance at Mach 3.5. He was advised that a decision concerning go-ahead would not be made until the information was in hand and evaluated. The weight reduction and minimum mission profile reported by Mr. Johnson several days later was considered acceptable. The Lockheed estimate of A-12 performance at a speed of Mach 3.5 indicated a slightly improved range and an extra 3,000 feet of altitude. On 30 January 1960 a firm go-ahead to produce 12 aircraft was communicated to Lockheed. The search for a manned vehicle successor to the U-2 reconnaissance system, begun in August of 1957, was now complete.

To this point OXCART Program Funding Approvals totaled $49,497,366 for FY 1960 ($44 million for engine development and initial production by P&W). Additional work and services resulting from the decision to build the A-12 was estimated to be approximately $44 million more for a total FY 1960 program approval of $93,780,000. When a request for the release of funds was submitted to the Bureau of the Budget, the question was raised by Budget personnel of further Presidential approval being necessary to continue the program. They were assured such was not the case. At the 20 July 1959 meeting with the President, the President had said substantially that the Agency had set itself certain technical goals which it was not sure it could attain. He further stated if these goals could be reached the project could proceed. Mr. Bissell had determined, at the time of the last technical reviews, that the President's guideline had been complied with, and that it would not be necessary for the Agency to return to the White House for further approval. Mr. Robert M. Macy, Chief of the International Division of the Bureau of the Budget, appeared satisfied with the information but requested a memorandum from the DCI to confirm the record. On 8 March 1960 the Director signed such a memorandum to the Director of the Budget.[1/]

Lockheed's forecast schedule for delivery of A-12's called for first airframe delivery in April 1961 and the last in August of 1962. As prime contractor, Lockheed was given as much latitude as possible to insure the schedule would be met. The prime contractor was authorized, for reasons of security, timeliness in procurement, and over-all systems compatibility, to dispense with competitive bidding for airframe subsystems procurement, provided reasonable and prudent judgment was exercised in awarding such contracts. However, detailed records were to be maintained by

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[1/] Attachment to OXC-0323-60, 24 February 1960. Bureau of the Budget Request for DCI Memorandum Concerning OXCART Presidential Approval. See Annex 125.

the contractor regarding selections and evaluations. The rationale and authority for this procedure is contained in Annex 126.

The philosophy of management, developed and employed successfully in the U-2 program, was retained for the new program. The philosophy had been to select contractors carefully and to grant them maximum technical responsibility and authority to get the job done in accordance with contract terms and functional specifications. When faced with significant technical choices or changes having impact on funding, schedules or performance, the contractor would refer the matter to the Project Director for advice and/or decision. Technical progress of the contractors would be monitored by Headquarters by means of periodic reporting, supplier conferences and visits to contractor facilities. The monitoring responsibility rested in the hands of the Development Branch, DPD, who in turn reported to the Project Director, Mr. Bissell. The advantages of such a relationship between customer and contractor were several. Decisions could be made more quickly; direct channel relationship saved valuable time, and direct contacts stimulated greater effort and desire to achieve goals on the part of the contractors.

It is appropriate at this time to summarize the situation at the outset of the new program. Lockheed Aircraft Corporation (LAC) was the prime contractor for the airframe. Pratt & Whitney Aircraft Division, United Aircraft Corporation, was responsible for engine development and production. Direct contracting for certain auxiliary systems was reserved to Project Headquarters, DPD/DDP. In due course suppliers of cameras and other sensors, navigation and flight control systems, life support and pilot environment equipment, and other services were selected. The primary camera manufacturer chosen was Perkin-Elmer. Because of the extreme complexity of the design, a decision was soon made that a back-up camera system might be necessary in the event the P-E design ran into production problems. Eastman Kodak was asked to build a camera. The Minneapolis-Honeywell Corporation was selected to provide both the inertial navigation system and an automatic flight control system. The Firewel Corporation and David Clark Corporation became the prime source of pilot equipment and associated life support hardware.

The attention of the Development Branch, DPD, for the next two years would be mainly on the development, engineering and manufacturing of the airframe, engine and associated systems. It is quite impossible to detail here the many difficulties that beset the early stages of the program. The experiences of Lockheed and of Pratt & Whitney illustrate the magnitude of these problems in terms both of dollars and of effort.

Lockheed had designed an aircraft system that represented a major milestone in the field of aeronautical technology. When Lockheed turned to production, it ran into many challenges. The Mach 3.0 flight regime in which the A-12 aircraft would operate was expected to generate extremely high temperatures on the surfaces of the airframe. During the design phase, the contractor had evaluated such materials as steel honeycomb, high heat treated steel, high temperature aluminum and magnesium alloys, and titanium. A titanium alloy was chosen because of its high strength to weight ratio; it retained its strength at elevated temperatures; and tooling costs appeared to be less than for steel honeycomb, which was the nearest material to it in characteristics.

It was soon learned that tooling for titanium was considerably more sophisticated than for conventional airframe fabrication. Special furnaces and treatments had to be developed and employed to handle the metal. The supply of high quality titanium metal was limited and costly in early 1960, and the capacity of the few available suppliers to fill orders was marginal from time to time. Titanium was estimated to average cost about $21 per pound in January 1960.

During the first year, the contractor reported many problem areas, particularly in the supply of titanium. He experienced a high rejection rate of stock due to poor quality control standards of the metal suppliers. Much time was lost due to lengthy delivery delays. There was also a high waste factor, due to not only the rejection rate, but also to machining methods. An example of this occurred in the case where a 1,000 pound billet was required for machining down to an odd-shaped 66-pound fitting. Machining costs ran three to four times higher than initial estimates. In the course of overcoming these deficiencies, Lockheed had no choice but to develop its own techniques to handle the metal. Consequently, costs and time involved increased considerably. On 14 September 1960 the contractor revised his delivery schedule to the extent that the first aircraft's delivery slipped four months, and the twelfth by one month. The first flight date for Aircraft No. 1 was now 30 August 1961 instead of 1 May 1961.

As a consequence of forecasting deficiencies and technical problems encountered along the way, prices also changed. Lockheed had originally quoted a 12-aircraft production price of $96, 000, 000 in August 1959. Increased material prices and program changes caused an upward revision to $103, 784, 000 in January 1960.

The prime contractor had to select subcontractors for various aircraft systems, components, parts, and materials. The subcontractors experienced countless problems as design and production encountered the inflexible demands imposed by the environment within which their product was expected to operate.

What had hitherto been satisfactory design for parts and fittings now proved unsatisfactory in this new aircraft. Subcontractor research and development programs had to be initiated to find new materials and methods to meet the rigid specifications imposed. The result was much closer than usual contractor relationships and sharing of technical know-how. The costs increased on the one hand, but incalculable benefits were derived on the other. The OXCART program was destined to bear the financial brunt for many advances in the science of supersonic aerodynamics which Government and industry would profitably employ in future programs.

It is recalled here that a low radar cross-section was a requirement that the follow-on reconnaissance aircraft had to meet. The choice of manufacturer had been made with assurances that his design could achieve a satisfactory goal in this respect. Since final A-12 configuration and design was not firmly established when Lockheed was chosen, anti-radar testing continued at the Watertown base on the full-scale mock-up. The airframe areas giving the greatest radar return were the vertical tail, the inlet, and the forward side of the engine nacelles. An improvement in the chine and wing regions was also being looked at. Research in ferrites, high-temperature absorbing materials and high-temperature plastic structures was going on to find methods to reduce the return. It was proposed to construct the vertical tail section fins of laminated plastic, and Narmco was subcontracted to build the fins. The work in ferrites was expected to be helpful in reducing the reflectivity of the inlet and engine nacelle surfaces. A metal and plastic surface arrangement was proposed for the chine and wing edges. In combination, it was hoped that a significant reduction in radar return could be accomplished. While Lockheed and its subcontractors came to grips with airframe fabrication, the engine manufacturer was experiencing problems of his own.

The final designs submitted by both Lockheed and Convair in the summer of 1959 incorporated a Pratt & Whitney Mach 3.2 J-58 engine. A first run had been made in December 1957 as a Mach 3.0 design test-stand engine and it had enjoyed impressive development progress during the following two years. In its presentation of cost estimates in the fall of 1959, P&W forecast a total of $80 million would be required through 31 December 1962 for further development, production of 36 engines, and maintenance, overhaul, and spare parts support. Company representatives felt it would not be too difficult to take the J-58 engine from its current stage of development (the 26,000 pound thrust P-2 model) and incorporate the features necessary for Mach 3.2 flight (in the 32,500 pounds thrust JT11D-20 model). So confident were they that they priced the engine at $750,000 per unit. The figure was one P&W had been using for other jet engine sales, and they estimated it to be a valid figure for the J-58.

In August 1960 P&W informed Project Headquarters it was experiencing considerable increases in cost, particularly in materials in the development and production portions of the contract. Development costs increased by $12 million and the production costs for 36 engines by $10+ million. Project Headquarters, while greatly disturbed, agreed to fund the additional development costs within limits. It was forced to reduce the order for engines from 36 to 30 because of the limitation on funds available. Pratt & Whitney gave assurances that the J-58 program could be accomplished within the revised dollar estimates.

The rapidly increasing costs in the engine program were due to varied problems that surfaced as the development phase proceeded. The high-Mach performance design introduced temperature environments that were never previously experienced or anticipated. For example, the engine thrust requirement dictated a turbine designed for an average 1900° F. inlet temperature. Early tests on the stand revealed extremely hot areas in the turbine where temperatures peaked at 2500° F. The materials used in combustion section and turbine fabrication could not sustain such an extreme condition. Many costly engineering man-hours went into redesign of the combustion section and turbine. New materials and alloys were selected for the turbine vanes and blades. Each change that was incorporated had to be verified on the test stand. A change or modification in one area of the engine would quite possibly necessitate redesign, rework, experiment, and test on other engine parts. Burner cans and diffuser cases were redesigned to even out the temperature profile and at the same time to endure the extreme heats. Choice of adequate new materials introduced fabrication difficulties. New and very expensive machining and welding processes had to be devised. The afterburner liners were found to be too light and sections would buckle during test runs. The buckled sections would tear loose and be blown out the engine tailpipe. The compressor rotor design was found to be inadequate structurally and it required reconfiguration. Major engine components such as the Hamilton Standard main and afterburner fuel controls and the Vickers hydraulic pumps were breaking down far ahead of their expected operating times. Again heat was the major contributor to the lack of materials durability and to equipment malfunctions. These engine component suppliers found themselves having to go into crash engineering development and testing to find satisfactory designs and materials with which to modify and retrofit their hardware which was already on production lines.

With each new fix to the engine or a component, there was an accompanying penalty in the form of added weight. Concurrently, then, a weight reduction campaign was necessary to remain within the original weight estimate that had been provided to the airframe manufacturer. A vicious cycle had developed. For each problem that arose, a domino effect resulted which was costly and time-consuming.

It should be noted here that consideration of developing the J-58 from a Mach 3.2 engine to a Mach 3.5 capability was dropped in December 1960. Weight and fuel trade-off's resulted in no appreciable improved performance for the A-12 mission.

## Continuing Development:

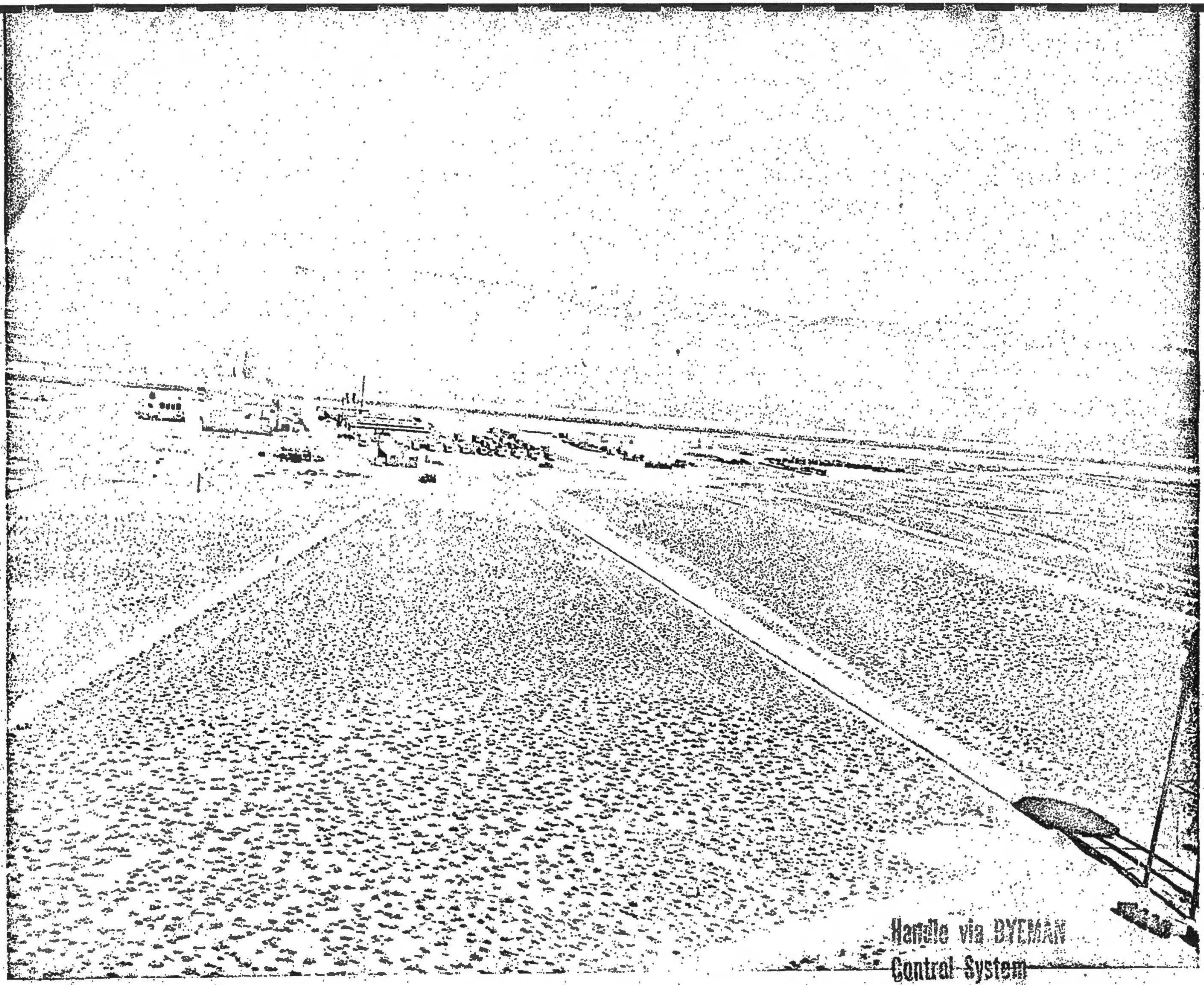
### Selection of Test Site

In the fall of 1959, the matter of selecting a domestic flight test and operational site was taken up by the Development Projects Division. The OXCARToperational concept envisioned that missions would be flown from and return to a domestic base with range extension accomplished by aerial refuelings enroute. For security reasons the project could not be located at an active military base where it would be subject to widespread scrutiny. The criteria for site selection required that the base be remote from metropolitan areas; remote from civil and military airways to preclude aerial observation or collision; be easily accessible by air; have good year-round weather; be capable of accommodating large numbers of personnel; have POL storage facilities; be fairly close to an Air Force installation; be near a source of labor; and have an 8,000 foot runway.

A total of ten Air Force bases that were programmed for closure were inspected during this period. All ten were evaluated for possible use. None met the remoteness test, and at most of them the annual operating costs would be unacceptable. Only Edwards Air Force Base and the Watertown site were considered worthy of serious consideration, and the security at the former base was subject to question. Watertown was deficient in personnel accommodations, POL storage and its runway was inadequate. However, the security it provided by virtue of its location within the restricted AEC reservation, made it ideal for clandestine aircraft testing and operations. What it lacked in physical plant could be rectified with a relatively moderate construction program. On 23 December 1959 the DDP approved a decision to establish Watertown as the primary domestic base for Project OXCART, subject to the concurrence of the USAF and the AEC. His decision, however, did not imply that a large program of base improvements and new construction be started. Until a final go-ahead to build aircraft was given, expenditures to improve Watertown facilities were to be limited only to those necessary to sustain the AR test program. (See overleaf for view of Watertown during early OXCART period.)

With the January 1960 approval for the full-scale program, the advance planning in selecting an operating base paid off. Early identification of the Watertown base permitted Headquarters engineers to develop an orderly plan to ready the base for the aircraft and associated ground equipment on schedule. Lockheed was consulted from the very beginning on what facilities would be required to support the flight test program. Lockheed estimated major items such as runway loading weights, monthly fuel consumption, hangars and shop space, and numbers of people necessary to conduct the flight test. Other contractors were consulted on their needs. Armed with the major requirements, Headquarters was able to come up with a preliminary construction engineering plan.

Since the Watertown base was within the AEC nuclear test site, it was necessary to obtain AEC approval to reactivate the base. An agreement drawn up in 1955 between the Agency and AEC allowed the Agency to use the Watertown site for the U-2 flight testing and training.



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To preserve cover and security, the AEC ostensibly managed the facility. All construction, maintenance and housekeeping had been performed by an AEC proprietary concern, the Reynolds Electric and Engineering Company (REECO). The same type arrangement was renewed with the AEC and REECO. There was considerable advantage to having REECO perform the work. It was a qualified construction organization, equipped to handle the job and was on the scene. Its relation to AEC provided the cover essential to the security of the operation. Its employees possessed security clearances to work on the Nuclear Test Site.

A cover story for the reactivation of Watertown was prepared in the form of a public information release to use in reply to press or other inquiries. It stated that the AEC facilities at the site had been made available to EG&G to conduct various and sundry radar studies with support from the USAF. The remote site was chosen to reduce the likelihood of outside interference affecting instrument calibration and ultimate test results. Use of AEC facilities did not affiliate the AEC or any of its programs with the work going on at Watertown. The AEC and EG&G were furnished the text of the press statement to use as required. They were also instructed to pass further requests for information to Headquarters, USAF, Office of Information Service, who would in turn seek replies from Project Headquarters.

In order for the reader to appreciate the task of preparing the base for occupancy, certain facts are necessary. Due to its location, 120 miles from the nearest metropolitan area (Las Vegas), personnel were required to live at the site during the work week. In 1960 the numbers were low, beginning with 75 and growing to 150 by the year's end. This number represented chiefly contractor personnel engaged in the AR testing and base construction. Except for contractors based in Las Vegas (EG&G and REECO) no contractor personnel were allowed to maintain residences in Las Vegas. Lockheed supplied a C-47 shuttle service between Burbank and Watertown for its freight and passenger needs. A chartered D-18 (Lodestar) was provided for transportation between Las Vegas and the base, chiefly to support the EG&G contingent. Surface access to Watertown was quite difficult because of distance and the fact that the only road leading into the site had deteriorated since 1957.

Immediate needs at Watertown were fulfilled on an as-needed basis during 1960. Surplus housing in the form of trailers was procured to billet construction workers as they arrived. A new well was dug. Limited recreational facilities were provided. An Agency staff civil engineer was assigned to the base. He provided the necessary engineering guidance to the Chief of Base, and performed liaison for Project Headquarters with the construction contractor,

By May 1960 the Operations Branch, DPD, estimated a requirement for 500,000 gallons of aircraft fuel per month. Neither storage facilities at, nor means of transport to, Watertown existed. Fuel would be rail-transported to Las Vegas from the refinery. After examining airlift, pipeline, railroad, highway and combinations of these modes of transport, it was determined that truck transport was most economical. Eighteen miles of highway leading into the base needed resurfacing to bear truck weights, but this was cheaper than to construct rail or pipeline systems.

Initial estimates of A-12 runway requirements called for an 8,500 foot length. The existing runway was a 5,000 foot asphalt strip incapable of supporting the weights of the A-12. Plans for a new concrete runway were drawn up and preliminary engineering begun.

The section of the AEC Nevada Test Site on which Watertown base was located was officially designated "Area 51" on AEC maps.

As such, it was afforded the normal security protection the rest of the AEC reservation enjoyed. There were some 14,000 acres of land immediately adjacent to and overlooking the Watertown facility that were not part of the AEC complex. Unrestricted access to the adjoining property would permit unauthorized viewing of the base's activities. Legal measures were instituted to have the land withdrawn from public use in an attempt to provide a protective screen.

In October 1960 a USAF cover organization was established to give the activities at Watertown a legitimate character. This organization was designated Detachment 1, 1129th (USAF) Special Activity Squadron, Mercury, Nevada. Its parent unit was a fictitious unit at Fort Myer, Virginia. All Agency staff and contract personnel were given USAF documentation upon assignment to the field activity.

## CIA/USAF Agreement on OXCART

On 14 October 1960 the final version of the joint CIA/USAF agreement on organization and delineation of responsibilities for Project OXCART was completed. The document was signed in February 1961 by Mr. Dulles and General White, Chief of Staff, USAF.[1/]

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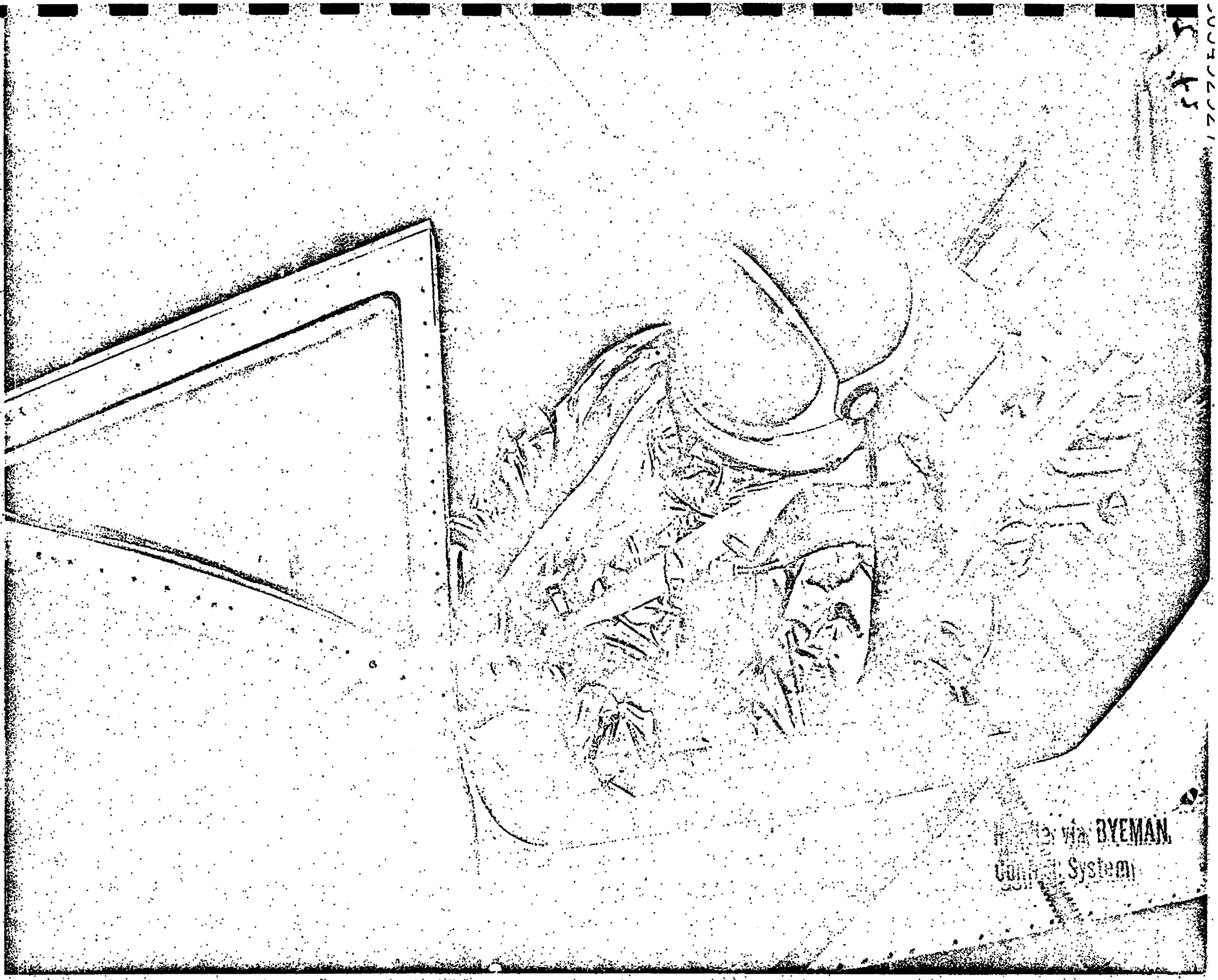
[1/] OXC-0321 (BYE 2608-66), 14 October 1960. Organization and Delineation of Responsibilities Project OXCART. See Annex 127.

### USAF Procurement: LRI Version of A-12

In October 1960 the USAF decided to buy a long range interceptor version of the A-12. The Contracts Staff of DPD was asked to write the contracts. A twofold purpose was served by having contracting performed outside normal military channels. The security of the A-12 program would be preserved by keeping the AF-12 purchase classified. Secondly, the order for three AF-12 aircraft made easier a decision to reduce the 12 A-12 aircraft order to 10. The cost estimates being submitted by Lockheed were exceeding available funds. A reduction in the numbers of A-12's to be procured was the only practical step that could keep the program budget in balance. Adding three AF-12's to the production contract therefore lessened the impact of a two A-12 aircraft reduction on Lockheed, and eased the strains on the OXCART budget. Included in the USAF AF-12 procurement was an order for 10 J-58 engines as a follow-on to the 30 engines previously ordered for the OXCART program. Extension of the engine order also gave some relief to the pressing financial problems of Pratt & Whitney. The total AF-12 program (Project KEDLOCK) was estimated to cost over $111 million, one-half of which was for the Hughes Aircraft Company to design and build the fire control and



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missile system for the AF-12. The contracts were the first of many the Agency would write for the USAF in follow-on or associated programs to preserve the security of A-12 development and production.

## Area 51 Designated

The scope of DPD activities in the OXCART program widened in 1961 as the program picked up momentum. Action was expedited to ready the operating site for occupancy by the aircraft and test personnel. Security considerations called for a new name by which the site would be identified. Some association of the CIA and the U-2 with the base had become known in uncleared USAF and industry circles as a result of the Powers incident in May 1960. To minimize possible speculation by unwitting persons, all earlier terms of reference to the base, such as "Watertown", "Groom Lake", "The Ranch", etc., were ordered eliminated from the vocabulary of OXCART-cleared personnel. Henceforth it was to be referred to simply as "Area 51", the official AEC designator for that portion of the Nevada Test Site. Every effort would be made throughout the program to disassociate Agency interest in the base.

Tables of organization were drawn up by the Operations and Materiel Staffs of DPD for initial manning. The first T/O for the operating detachment called for 70 personnel. Personnel levies were made on the USAF for the various military specialties necessary to man the detachment. A phasing schedule for USAF detailees was worked out, timed to the estimated arrival times of the A-12 aircraft. It was planned to have people identified by 1 May 1961; necessary clearance and processing by 1 August; in place at Area 51 by October, and ready to begin training on 15 March 1962.

The Air Force personnel were carefully selected prior to nomination for duty with CIA, as in the case of the U-2 program. Because of close working relationships with SAC in the U-2 program, a request was sent to that Command for guidance in the procurement of a detachment commander. SAC responded with nominations for a commander and key members of his staff, screened from the ranks of the Strategic Air Command.

## OXCART Pilot Selection

Great emphasis was put on the choice of pilots for the program. General Don Flickinger was tasked to coordinate the medical and physiological criteria. Operational requirements were established by the DPD operations staff. The pilots had to demonstrate outstanding proficiency and professional competency. They had to be jet fighter pilots with certain mandatory experience qualifications in the latest jet fighter aircraft. They had to be emotionally stable, well motivated, enthusiastic and possessed of good personal habits. It was desired that they be between 25 and 40 years of age, under six feet tall and 175 pounds or less in weight. The size qualification was dictated by the size of the A-12 cockpit. (See overleaf for view of pilot in cockpit.) Air Force pilot files were screened quite carefully for possible candidates and a list of pilots was obtained. Background investigations and security assessments eliminated some. Psychological assessments and physical examinations eliminated others. All remaining nominees were given a final review by the Agency Medical and Psychological Staffs prior to final candidate selection.

Pre-evaluation processing resulted in sixteen potential pilot nominees. This group underwent an intensive security and medical scrutiny by the Agency. Those who remained were then approached to take employment with the Agency on a very highly classified project involving a very advanced aircraft. In November, 1961, commitments were obtained from five of the group. The small number recruited required that a second selection process be undertaken. Qualifying standards were not relaxed, but administrative procedures were revised to tighten up pre-evaluation processing and speed up pilot candidate identification.

Pilot selection was conducted under the cover legend of "establishing selection criteria for space crews". Arrangements were made with the USAF to effect appropriate transfers and assignments to cover their training, and lay the basis for their transition from military to civilian status. Pilot compensation and insurance arrangements were similar to that for the U-2 pilots.

Only one further step remained before a pilot would be brought into the operational phase of the program. Following the Powers incident, an Overflight Panel had been established under the Director of Security to grant the Agency's final approval or disapproval on each individual from a risk-of-capture and associated considerations standpoint. The panel had representation from the Office of Security, CI Staff, Medical Staff, TSD, OTR, and Project Headquarters. The Panel met periodically the next two years until the initial pilot complement was complete.

## Build-up, Area 51

The Area 51 physical build-up in 1961 saw completion of the 8,500-foot concrete runway, 100 feet wide for cost saving purposes versus 200 feet for military runways. Three surplus Navy hangars were obtained, dismantled and erected on the north side of the base. Surplus Babbitt housing was located on an old Navy installation. Slightly over 100 of these buildings were transported to Area 51 and made ready for occupancy. The 18 miles of road paving was also completed in 1961. Since commercial power was not available, additional generators were brought in to provide the electrical power required by the growing installation. The fuel tank farm was begun in 1961, and construction was completed in early 1962 with a capacity for 1,320,000 gallons of fuel. Warehousing and shop space was provided, either by new construction or rehabilitation of older buildings. Essential facilities were ready in time for the forecast delivery date of Aircraft No. 1 in August 1961.

## Delivery Schedule Delays

Lockheed reported in January 1961 that tooling problems were being solved, but that the material delivery situation was a dismal picture. In particular, titanium wing extrusions were far behind delivery schedule. Without material, Lockheed was unable to work to a programmed manpower level. At one point, in March 1961, only 20% of the labor force was able to work on fabrication due to material shortage. In one of his progress reports, Mr. Johnson wrote as follows to Mr. Bissell:

> "Schedules are in jeopardy on two fronts. One is in the assembly of the wing and the other is in satisfactory development of the engine. Our evaluation shows that each of these programs is from 3 to 4 months behind the current schedule. While every effort is being expended to make up much of this time, I would be greatly amiss not to state these facts, so that excessive overtime is not applied at great cost in such areas as development of facilities at the test area. And there may be other important vendors in trouble trying to make the initial schedule." 1/

Mr. Bissell responded with the following sharp message:

> "Johnson from Bissell.
>
> "1. I have learned of your expected additional delay in first flight from 30 August to 1 December 1961. This news is extremely shocking on top of our previous slippage from May to August and my understanding as of our meeting 19 December that the titanium extrusion problems were essentially overcome.
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> "2. In addition to the problems in overweight and effects on performance uncertainties in the A.R. field,

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1/ OXC-1433, 7 March 1961. LAC Progress Report #18 (filed in D/R&D/OSA files).

and the extreme difficulties being encountered by other contractors, these delays cause me to question the desirability of continuing the reconnaissance version of this aircraft.

"3. I trust this is the last of such disappointments short of a severe earthquake in Burbank. On that assumption I presume you are working round the clock to complete the wing assembly and will employ all reasonable short cuts to expedite completion of the first several aircraft and recovery of delivery schedules ASAP.

"4. I should welcome your remarks on measures you are taking to prevent skyrocketing costs due to this delay both in Burbank and other suppliers on the subjects of build-up at the test site, personnel acquisition, overtime, etc.

"5. I am anxious also to explore the impact of the highly accelerated flight test program of this additional delay. This has become an item of major expense and perhaps need be replanned on less costly basis." 1/

It was imperative at this point that Project Headquarters improve its capability to monitor airframe development against the fiscal and timing requirements. It was decided to employ a top-level aeronautical engineer, to be resident at the contractor's facilities, who could monitor program progress and submit technical reports. In May 1961 an experienced in-plant representative of the Agency was installed and his independent reports kept the program technical staff abreast of developments at Lockheed on a more timely basis.

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1/ ADIC 8511, 7 March 1961. ADIC to BEIGE.

To improve delivery of titanium a Headquarters team visited Titanium Metals Corporation (TMC) directly to impress on its President the high national objectives and priority of the OXCART program. Fuller cooperation was promised by the titanium supplier. In May Lockheed reported that sufficient sheet metal was on hand for capacity production, but that extrusions were still giving trouble. The first flight for Aircraft No. 1 was now set for 5 December 1961. Concern was again expressed with the status of engine development and possible late deliveries.

By mid-year, fabrication of the first airframe was in hand. On 11 September, Pratt & Whitney informed Lockheed of their continuing difficulties with the J-58 in terms of weight, delivery and performance. Completion date for Aircraft No. 1 by now had slipped to 22 December 1961, and first flight 27 February 1962. In order to meet even this last date, a substitute engine would be necessary since the J-58 would not be ready. It was proposed that a P&W J-75 engine, designed for the F-105 and flown in the U-2, be used for early flights. The engine, along with other components, could be fitted to the A-12 airframe, and it could power the aircraft safely to altitudes up to 50,000 feet and at speeds up to Mach 1.6.

Adding to the anguish that each slip in delivery caused at Project Headquarters was the accompanying increase in cost. On 13 November 1961 the total proposed target price for 10 A-12 aircraft submitted by the contractor had risen to $165, 000, 000.

The J-58 engine development problems of Pratt & Whitney were discussed in the preceding pages of this chapter. These technical problems were to persist on into 1961 and beyond, with progress slow in solving them. The spiraling costs attending the engine development program was also causing concern at Project Headquarters. Pratt & Whitney, in submitting its original cost estimates, had sadly estimated on the low side.

In January 1961 the Navy and the Air Force entered into negotiation for direct funding of the J-58 development program. This, in effect, reduced Project Headquarters' funding requirements. However, by May 1961, the costs had again risen. The production cost of the 30 engines was now estimated at over $45 million, and by September 1961, the costs had increased to over $51 million.

The Air Force accepted a greater financial responsibility in engine procurement because of its involvement in the AF-12 program. It was also deriving many technological benefits in other Air Force programs. The Navy continued to provide funds for similar reasons. Despite the magnitude of its development problems and the consequent cost increase, the J-58 engine was still considered the only properly sized propulsion system for the A-12 family of aircraft.

If the contractor were to be held to the terms of the contract, the company would have indeed been in serious financial jeopardy. It was as much to the interest of the Government as to the company that such did not occur. The additional 10 engines required for the AF-12 program afforded the opportunity to renegotiate the existing engine procurement contract. The contract was amended to permit repricing the 40 engines at a higher unit level. The revised ceiling price would guarantee ultimate recovery to Pratt & Whitney of all the projected overrun. The net result was that Pratt & Whitney would not run the risk of defaulting on the delivery of engines. It would also result in P&W delivering the 40 engines without a penny profit. An account of the negotiations and contract action is contained in Annex 128.[1/]

Project Headquarters was not gentle in its relations with the engine contractor during these trying days, and in one instance

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[1/] OXC-2401, 17 October 1961. Price Overrun on Pratt & Whitney Engines, Contract No. TT-1002.

strongly recommended to Pratt & Whitney management that reorganization was necessary. Pratt & Whitney production facilities were in East Hartford, Connecticut, and its research and development facility was in West Palm Beach, Florida. In view of the apparent stagnation of the program, particularly in accumulating meaningful engine test time, Mr. Bissell, as part of his strategy, recommended that primary development work be co-located with production in Connecticut. He concluded his letter of 29 November 1961 to Pratt & Whitney's General Manager, Mr. L. C. Mallet, with the following:

> "In view of increasing national and international emphasis on high Mach number manned flight, it must be clearly understood that this customer as part of the defense community is obligated to examine and re-examine all avenues leading toward the expeditious and economic realization of this goal. In this regard, the contractor's progress and performance must be and is reappraised continuously in relation to the progress achieved by competitive programs." 1/

Pratt & Whitney was already responding with shifts in managerial personnel to and within the Florida facility rather than relocation to Hartford. Definite improvement began to appear in the engine development management picture and the tactic of relocation to Hartford was not pressed further.

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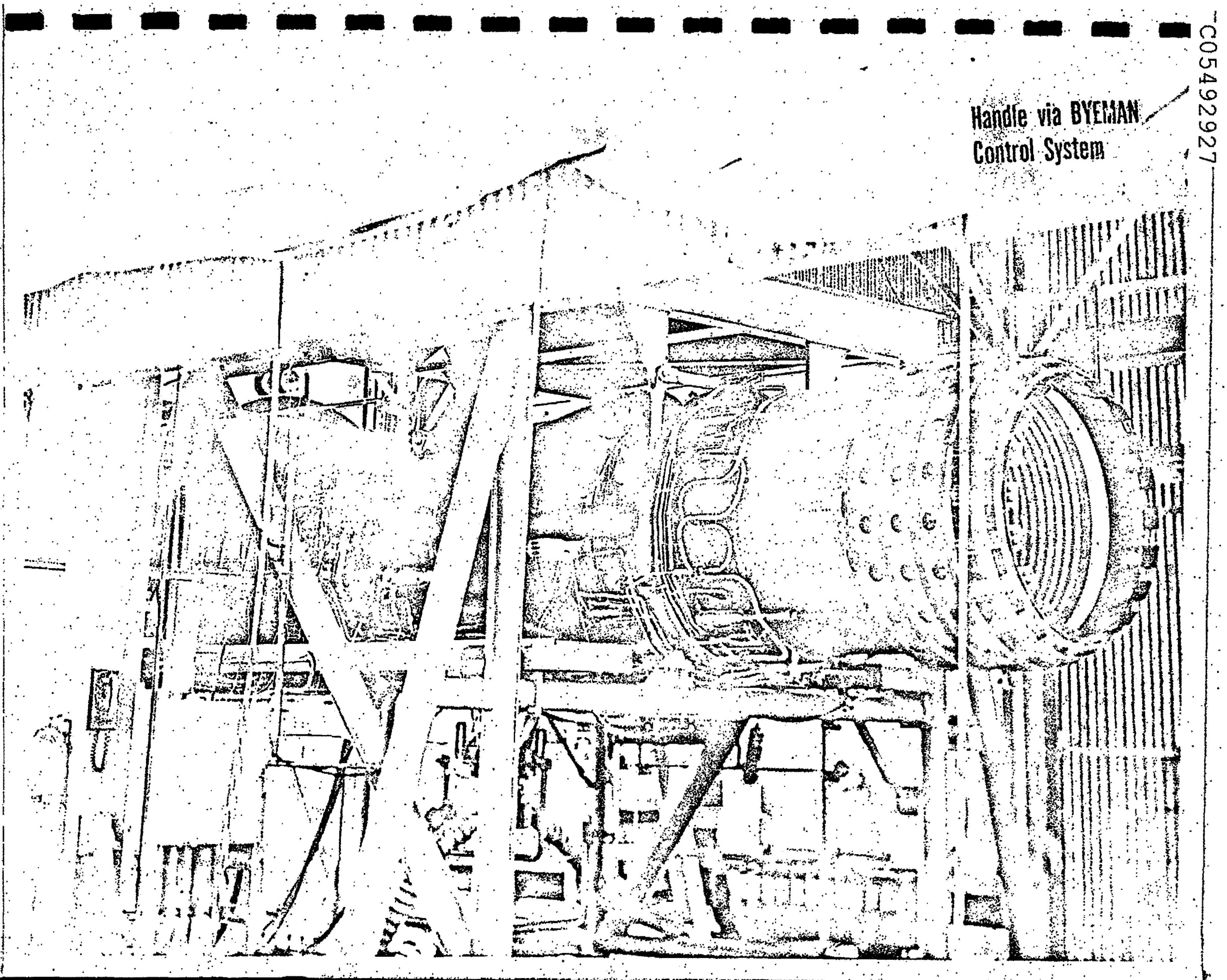
1/ OXC-2661, 29 November 1961. Relocation JT11D-20 Engine Development Program. See Annex 129.

In addition, and as a result of Headquarters continued pressure to get the program moving, two other contractor reorganizations were implemented. Substantial increases in engineering manpower and test facilities availability were undertaken by Hamilton Standard Division (fuel controls) and Vickers Inc. (hydraulic pumps), both subcontractors to Pratt & Whitney. These actions were implemented in the Fall of 1961 and in January 1962 respectively. By December 1962 these efforts had resulted in substantial improvement. Fuel control, hydraulic pump, and engine turbine durability had each increased to the point of acceptable operation at their extreme temperature environments for fifty hours. After integration of these improved components into the engine as a whole, the engine satisfactorily completed its fifty hour preliminary flight rating test in January 1963. (See overleaf for picture of J-58 engine on test stand.)

## Events of 1962-1964

### Detachment 1, 1129th (USAF) Special Activities Squadron Established

While awaiting the Lockheed flight test phase to begin in early 1962, the operational detachment was taking form under the command of Colonel Robert J. Holbury, USAF. Colonel Holbury had been recommended as the Commander by Headquarters, SAC. In



Handle via BYEMAN
Control System

Withheld under statutory authority of the Central Intelligence Agency Act of 1949 (50 U.S.C., section 403g)

November 1961, he and his staff had been given several days' briefing at Project Headquarters. His charter is appended as Annex 130. The previous Chief of Base, [redacted] a staff employee, continued at the site as Deputy Commander for Support.

Key staff personnel were first sent to A-12 ground school at Burbank and to F-101 training. The F-101 most closely approximated the A-12 in flying characteristics and was equipped with two afterburning engines. As unit training would develop, the F-101 was to serve primarily as a trainer for the A-12 pilots, and secondly as a chase aircraft to monitor A-12 take-offs, refuelings, and landings.

Headquarters' planning for detachment training called for several types of support aircraft to be supplied by the USAF. These included eight F-101's for training, two T-33's for proficiency flying, a C-130 for cargo transport, a U-3A for administrative purposes, a helicopter for search and rescue and a Cessna-180 for liaison use. In addition, Lockheed provided an F-104 to act as chase aircraft during the A-12 flight test period. The support aircraft began arriving in the Spring of 1962.

Maintenance of the support aircraft was to be accomplished at Area 51. Additional personnel were required, and in July the staffing complement at Area 51 (also referred to as Station D within DPD to distinguish it from the U-2 detachments) increased to 144 positions. Most of the new positions reflected the needs to maintain the support aircraft.

In January 1962, an agreement was reached with the Federal Aviation Agency that expanded the restricted air space in the vicinity of Area 51. The purpose of the restriction was to prevent unauthorized aircraft from overflying Area 51. Certain FAA air traffic controllers were cleared for the OXCART Project. Their function was to insure that the unauthorized aircraft did not violate the order. The restricted air space was expanded in subsequent years as the A-12 began flying longer training routes over the continental United States. The expanded air space restriction was necessary to allow the A-12 to climb out to operating altitudes unobserved by other aircraft. This subject will be treated later in more detail.

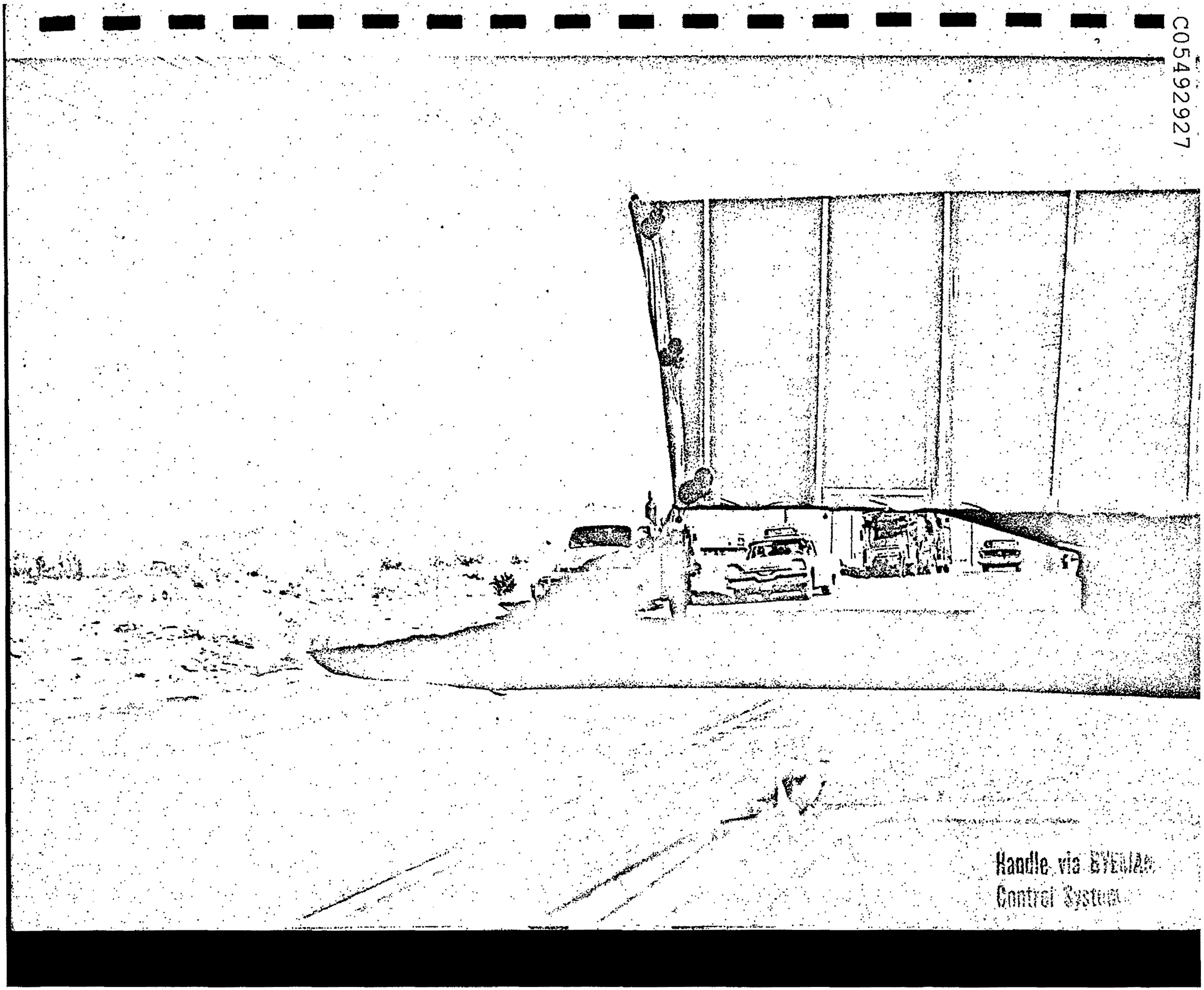
Briefings were given to the North American Air Defense Command to prepare them for the flights of the A-12. The briefings and clearances were necessary to preclude air defense fighters reacting to the appearance of high-speed, high-flying unidentified aircraft. Procedures were established with NORAD whereby A-12 flights would not excite air defense alerts and air defense system radar stations would not report or discuss the appearance of this high performance aircraft on their radar scopes.

Refueling concepts required prepositioning of vast quantities of fuel at certain points outside the United States. Special tank farms were programmed at Beale Air Force Base, California; Eielson Air Force Base, Alaska; Thule Air Base, Greenland; Kadena Air Base, Okinawa; and at Adana, Turkey. Since the A-12 used specially refined fuel, these tank farms were reserved exclusively for use by the OXCART program. Very small detachments of technicians were installed at these locations to maintain the fuel storage facility and arrange for periodic quality control fuel tests.

## First Flight of the A-12

At the Lockheed Burbank plant, Aircraft No. 1 (serially numbered 121) had completed assembly. It was given its final tests and checkout during January and February, 1962. When the engineering tests were completed, the aircraft was partially disassembled for shipment to Area 51. It had been established very early in OXCART planning that for practical reasons, i. e., inadequate runway, the A-12 could not fly from the Burbank manufacturing facility to the test site. The movement of the full-scale AR test model had been successfully accomplished via a specially-designed trailer truck over 453 miles of highway in November 1959. A thorough survey of the route was made in June 1961, to determine the hazards and problems of moving the actual aircraft. It was found possible to move a package, which measured 35 feet wide and 105 feet long, without major difficulty. Obstructing road signs had to be removed, trees needed trimming and some roadside earth banks required leveling. Appropriate arrangements were made with police authorities and local officials to accomplish the safe transport of the aircraft. The entire fuselage, minus wings, was crated and covered, loaded on the special-design trailer and moved out of the Burbank plant on 26 February 1962. It arrived at Area 51 two days later. (See overleaf for enroute picture.)

Reassembly of the aircraft was accomplished and the J-75 engines installed in preparation for ground runs and taxi checkouts prior to flight test. When fuel was placed in the tanks, numerous leaks developed, many of a dangerous nature. The tank sealing compounds had failed in large areas due to non-adherence to the metal. It was necessary to strip the tanks of the faulty sealing compounds and reline them with new materials. First flight was again delayed.



Handle via BYEMAN
Control System

Lockheed turned to a fuel tank sealing compound that would be satisfactory for early stage flight testing and repaired the aircraft's fuel tanks. On 26 April 1962, Aircraft 121 made its maiden flight of some 40 minutes, and it performed satisfactorily.

On 30 April 1962, the official first flight of the OXCART aircraft occurred, witnessed by Project personnel led by Dr. Herbert Scoville, Deputy Director for Research,* representatives from cooperating government agencies, and participating contractors. The aircraft, piloted by Lockheed test pilot, Mr. Louis Chalk, took off at 170 knots, at a gross weight of 72,000 pounds, and climbed to 30,000 feet altitude. Top speed of 340 knots was attained. After 59 minutes of flight, the aircraft landed. The pilot reported the aircraft responded well and was extremely stable. Mr. Johnson of Lockheed reported it to be the smoothest official first flight of any aircraft he had designed or tested. On its second flight, 4 May 1962, Aircraft 121 reached Mach 1.1. On both flights, only minor problems were reported. (See overleaf for first official flight picture.)

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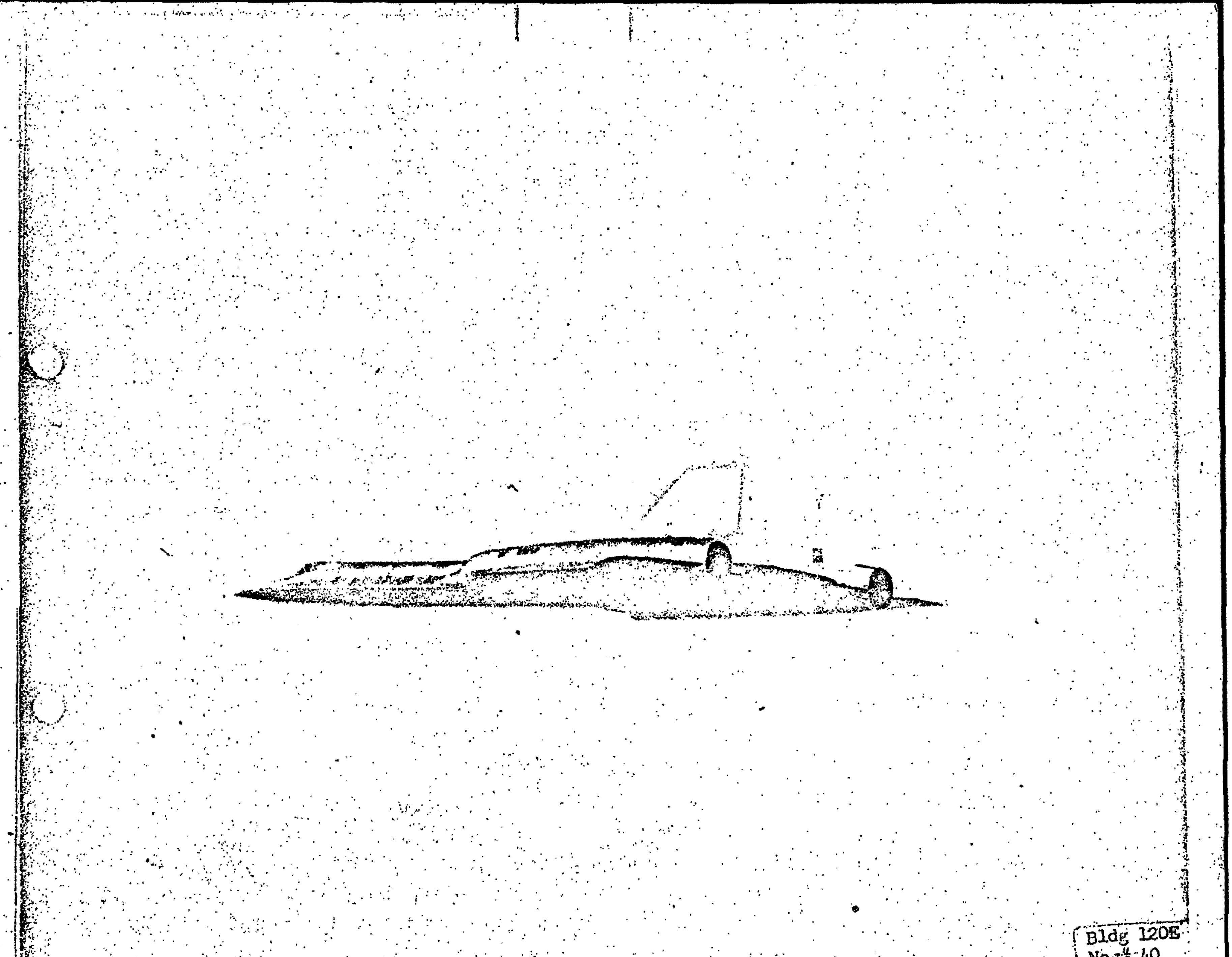
* Project Headquarters, formerly Development Projects Division in DDP, was now the Office of Special Activities under the Deputy Director for Research.

[redacted]



First Official Flight A-12. 30 Apr '62

Bldg 120E
Neg# 40
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Mr. John A. McCone (who had succeeded Mr. Dulles as DCI in November 1961) sent the following message of congratulations:

> "To Mr. Johnson from Mr. McCone:
>
> "Have been briefed by Dr. Scoville on the events of last Monday. Wish to extend my best wishes for continued success. Now that we have the initial flight accomplished, I am directing every effort be made by this Headquarters to expedite all aspects of program in order to attain an operational posture as soon as possible. Please pass to those who assisted you in this accomplishment my personal appreciation for a job well done." 1/

By now, the Pratt & Whitney J-58 (JT11D-20 model) engine development program was in an intensive ground endurance testing phase preparatory to flight qualification. Four 50-hour preliminary endurance engine tests had been completed. Test time accumulation reflected the following figures:

| | | |
|---|---|---|
| Total Engine Time (Various J-58 configurations) | 3,883 | hours |
| Afterburner Time | 548 | " |
| JT11D-20 Configuration Time | 1,030 | " |
| Mach 1.5 Temperature Time | 398 | " |
| Mach 2.0 Temperature Time | 243 | " |
| Mach 3.0 Temperature Time | 23 | " |
| Maximum Turbine Temperature Time | 276 | " |
| Engine Time with Automatic Controls | 295 | " |

Significant progress was being made in problem areas such as hydraulic pump durability, combustion temperature distribution as

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1/ ADIC 0737, 7 May 1962, Hqs to Lockheed Aircraft Corporation.

it affected turbine durability, and engine controls development. Additional facilities were authorized to accelerate development and endurance testing. Production engines appeared to be on a firm schedule, and the first production engine was delivered in August.

Aircraft No. 122 was delivered to Area 51 on 26 June. It spent three months in AR testing before engine installation and final assembly. Aircraft No. 123 arrived in August and flew in October. The two-seat trainer A-12 was delivered in November 1962. It was to be used to train OXCART Project pilots. It had been intended that it also be powered by the J-58 engines. However, J-58 engine delivery delays and a desire to begin pilot training concurrently with flight test prompted a decision to install the smaller J-75 engines. The trainer flew initially in January, 1963. Aircraft No. 124 has remained the only A-12 to be powered by the J-75. The fifth aircraft to be delivered in 1962, No. 125, arrived at the Area 17 December 1962.

The year 1962 witnessed the establishment of the Soviet presence in Cuba. The U-2's were maintaining a regular reconnaissance vigil over the island, and it was on one of these missions in October that the presence of offensive missiles was discovered. Thereafter, U-2 reconnaissance increased and on 27 October 1962 an Agency U-2 (flown by a SAC pilot on a SAC-directed reconnaissance mission over Cuba) was shot down by a surface-to-air missile. The prospect of possibly being denied continued manned, high-altitude reconnaissance of Cuba suddenly appeared very real. The OXCART program assumed greater significance than ever, and its achieving an operational status became one of the highest national priorities.

At the close of 1962, the program had two aircraft in flight test status, one powered by two J-75 engines and the other with one J-75 and one J-58. A speed of Mach 2.16 and altitude of 60,00 feet had been reached. Auxiliary components and payloads had been flown at low speeds, but their performance could not be assessed further until the aircraft reached design speed and altitude.

The primary causes for the slow start in the flight test program were the slow delivery of engines and poor engine performance at altitude. Instead of 14 engines promised for delivery, 9 had been delivered in late November 1962. Of the 9, only 4 could be considered for use in the flight test program. At a time of greatest need to reach an operating capability, the program appeared to be at its lowest ebb.

At the initiative of the DPD Project Officer, the following message was prepared to send to the President of United Aircraft Corporation in order to place pressure on UAC top management:

> "Mr. Horner from Mr. McCone:
>
> "I have been advised that J-58 engine deliveries have been delayed again due to engine control production problems. At this moment, we have four engines with satisfactory controls and one with a questionable control to operate two aircraft. By the end of the year it appears we will have barely enough J-58 engines to support the flight test program adequately. Furthermore we have been forced to use J-75 engines in airplanes one, three and four.
>
> "Furthermore due to various engine difficulties we have not yet reached design speed and altitude. Engine thrust and fuel consumption deficiencies at present prevent sustained flight at design conditions which is so necessary to complete development of the complete system.
>
> "This situation gives me the greatest of concern because of the critical importance of the program. It is necessary that the United Aircraft Corporation, Pratt & Whitney, particularly the Hamilton Standard Division, place highest priority on the solution of all technical and production problems and assign to them the most senior and competent men within your combined organizations.
>
> "The OXCART program has been designated of the very highest national priority and I cannot emphasize enough the necessity of its reaching operational status as quickly as possible. Would appreciate your informing me personally of your actions taken to correct these difficulties." 1/

By the end of January 1963, ten engines were available at Area 51.

The first flight with J-58 engines occurred on 15 January 1963.

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1/ ADIC 9838, 3 December 1962, Hqs to United Aircraft Corp.

Thereafter, all A-12 aircraft were fitted with the J-58 engines upon delivery to Area 51. Flight testing was accelerated and contractor personnel went to a three-shift work day. With each succeeding step into the higher Mach regime, new problems were uncovered. The single most important problem that paced flight development of the A-12 was the air inlet and its control system. A supersonic inlet or air induction system is designed to provide best possible aerodynamic performance over a range of supersonic Mach numbers with a stable and steady flow of air to the engine. As flight testing moved into Mach 2.4 to 2.8 regions, the aircraft was experiencing severe inlet duct roughness. An improper airflow match was occurring between the inlet and the engine. It was also determined that improper aerodynamic contouring of the inlet duct was a contributor to the roughness. Redesign corrected the latter. Investigation revealed that the primary cause of the improper airflow to the engine was the controls system which activated movement of the inlet spike. Two control designs had been developed, one hydromechanical and the other, a back-up approach, electronic. Resolution of this problem was extremely difficult and considerably prolonged the date when the A-12 would be declared operationally ready.

Another practical problem developed in the spring of 1963 which caused concern. Costly damage was occurring to engines due to foreign objects being ingested in the engines. The foreign objects were primarily nuts, bolts, clamps and other debris left behind in the manufacturing process. They were sucked out of inner nooks and crannies of the nacelle during ground run-up or take-off, and entered the intake duct. A thorough investigation, including the possibility of sabotage, concluded the principal cause to be carelessness and poor housekeeping. Rigorous inspections and controls corrected the situation, and subsequent occurrences were infrequent.

## First A-12 Loss

The first aircraft loss occurred in the spring of 1963. While on a routine training flight, 24 May 1963, one of the detachment pilots obtained an erroneous indication of air speed and elected to eject from the aircraft. The aircraft crashed 14 miles south of Wendover, Utah. The pilot was unhurt. For public consumption, the aircraft was identified as an F-105. The complete wreckage was removed from the scene and returned to Area 51 by 26 May. All individuals at the crash scene were identified and requested to sign secrecy agreements. Press inquiries concerning the pilot's identity were forthcoming, and the following story was issued by Air Force sources:

> "The F-105 aircraft was on bailment to Hughes Aircraft Company from Air Force Logistics Command, Wright-Patterson Air Force Base, Ohio. The aircraft piloted by Mr. Collins originated from Wright-Patterson Air Force Base on Friday. After a brief stop at Nellis AFB, Mr. Collins, early Friday afternoon while testing a classified system, experienced aircraft difficulties and bailed out from his aircraft in the vicinity of Wendover, Utah..." 1/

All A-12 aircraft were grounded for a week pending accident investigation. A plugged pitot static tube during icing conditions was found to be the cause of the faulty cockpit instrument indications. The accident was listed as an F-105 crash on official records.

### USAF A-12 Procurement

Closely interwoven with the chronicle of OXCART development were the events occurring on its periphery. We recall that in December 1960 the USAF, using Project procurement channels, contracted for three long-range interceptor (LRI) versions of the A-12. This program was given the cryptonym KEDLOCK. In January 1962, the USAF added another five A-12 buy to the existing A-12 production contract, and it was termed the WEDLOCK program.

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1/ See Annex 131 for newspaper stories on the crash.

In 1962, another reconnaissance concept was proposed by the Deputy Director for Research and Engineering, Department of Defense, which would offer an alternate to the manned supersonic reconnaissance system. It was a Mach 3.3 ramjet drone aircraft to be launched from an A-12 mother aircraft. After feasibility studies were completed by Lockheed and evaluated, a go-ahead was authorized by the Pentagon (NRO). Management and technical monitoring of development was assigned to CIA (Project Headquarters, now OSA) on 17 October 1962 by the Director of NRO. On 4 June 1963, for political reasons (during a USAF-CIA tug-of-war on the NRO), the responsibility was shifted from CIA to the USAF. The program became known as TAGBOARD. Two of the five WEDLOCK A-12 aircraft were scheduled for conversion to a TAGBOARD drone launch configuration. On 6 November 1963 the remaining three were transferred to the OXCART program.

On 29 January 1963, the Secretary of Defense approved purchase of six additional aircraft for Air Force use as a general purpose reconnaissance vehicle configured to carry a variety of intelligence collection systems. An additional procurement of 25 was approved by the Secretary of Defense in August, 1963. This new configuration

LOS ANGELES TIMES

Monday morning, March 2, 1964

Page 1.

# U.S. Has Dozen A-11 Jets Already Flying

WASHINGTON (AP) — Sen. Richard B. Russell (D-Ga.) said Sunday there are 11 or 12 of the newly-unveiled U.S. "manned missile" jet fighter planes already flying and that they have successfully passed numerous tests.

Russell, chairman of the Senate Armed Services Committee, said he had known about the 2,000-mile-an-hour A-11 since work first began on it in 1959, although President Johnson just announced its existence Saturday.

In a television interview ("Face the Nation"—CBS), Russell indicated the plane is far advanced in required tests.

"It's been put through all kinds of tests," he said, and noted that others are continuing. He said it is virtually in shape to be accepted formally by the Air Force. This hasn't taken place yet.

President Johnson told his news conference Saturday that the plane's performance "far exceeds that of any other aircraft in the world today."

Russell said his knowledge of the plane's existence was the reason he recently knocked out of an appropriations bill a $40 million request for funds to develop an improved manned interceptor.

He said he does not know why the Air Force asked for the money when it also knew of the A-11.

LAS VEGAS SUN

Wednesday, March 4, 1964

Picture p. 1, story page 2.

# Secret of Sizzling New Plane Probably History's Best Kept

WASHINGTON (UPI)— America's revolutionary A11 aircraft, secretly developed with such success that the government still is congratulating itself, has been test flown for about two years in remote regions of the west.

The 2,000-mile-per-hour jet's unheralded flights over the wide open, sparsely populated areas recall the secret drills over Utah 20 years ago when the Air Force was turning the B29 into history's first atomic bomber.

About a dozen of the Titanium A11s have been built so far and flights now are beginning at the test center at Edwards Air Force Base, in more populous California.

## FASTEST IN WORLD

President Johnson revealed the A11 program at his news conference last Saturday, saying that the plane's performance "exceeds that of any other aircraft in the world today." Besides its ability to fly more than three times the speed of sound, the President said the plane could fly over distances of thousands of miles and at altitudes above 70,000 feet.

Johnson said there would be extensive tests at Edwards to learn the A11's capabilities as a long-range interceptor.

It is understood that the super-secret airplane, started in 1959, began and may continue chiefly as a reconnaissance aircraft—a successor to the slow but high-flying U2 design which was then five years old.

## SECRECY KEPT

Secrecy surrounding the plane, over six years, was remarkably well kept. Editors of Aviation Week magazine said that they learned of the A11 program one and a half years ago and yielded to Air Force entreaties to publish nothing about it. Ironically, they were scooped when Johnson revealed the project too late for their weekly deadline.

How was the secrecy maintained so well? It is a testimony to the discipline of hundreds, perhaps thousands, of persons in the military and civilian ranks of government and in the aircraft industry.

The story began on Lockheed Aircraft's sprawling acres in Burbank, Calif., where apart from the main plant, there is a hangar nicknamed the "Skunk Works."

This hangar is the domain of Lockheed Vice President Clarence L. (Kelly) Johnson, one of the great aircraft designers. Whenever the government wants something revolutionary, it is likely to turn to Johnson. He came up with the F104 fighter, a 1,400-mile-per-hour plane at a time when most other fighters were flying about half that speed. He designed the U2, probably the highest flying airplane before the A11.

## 'SKUNK WORKS'

Designer Johnson went to work in his "Skunk Works" with the building surrounded by guards and employes admitted only after careful security screening. Very few people at Lockheed not working on the project knew anything about it, even some of its top officials.

Possibly hundreds of people in the Pentagon and elsewhere in the military knew something about the A11 but there is no evidence that anyone talked.

The airplane had a classification higher than "top secret"—a classification which itself was secret.

Within the hangar, planes were custom-made by the carefully chosen employes. There was no semblance of a production line as in other plants.

was designated the R-12 (later redesignated as the SR-71). CIA again acted as procurement agent.

### A-11 Aircraft Program Surfaced by White House

As the numbers of A-12 family of aircraft on order or proposed for order grew, so did the problem of preserving the covert character of the OXCART program. Serious consideration was being given by the Secretary of Defense to issuing a press release announcing the existence of an X-21 development (actually the AF version of the A-12) in January 1963. Since the action was tied directly to the B-70 controversy, it was feared that there would be more political controversy and critical examination which could possibly expose the A-12. When the situation was reviewed by the President's Foreign Intelligence Advisory Board, it was the Board's conviction that it would be best not to make any statements which would possibly result in exposing A-12 development, or any military version thereof. The President decided not to surface the R-12. No statement was made at that time, but it was apparent that as the delivery date of the first R-12 approached, public disclosure of Lockheed's work in Mach 3.0 aircraft manufacture was inevitable.

The Agency's chief concern with surfacing was to protect the AR aspects and capabilities of the A-12, and to protect the scope and nature of the activities at Area 51. The OXCART program had progressed through development, construction, and a year of flight testing and training without attracting public attention. It now appeared advantageous to surface some version of the A-12 type aircraft to serve as cover for the OXCART program in the event of incident or inadvertent exposure. The loss of Aircraft No. 123 in May 1963 became a case in point.

The matter continued under review during 1963. The Department of Defense was having difficulty in concealing its participation in the program due to the increasingly high rate of expenditures as the SAC R-12 aircraft came into production. Political pressures increased in the DOD/Congressional controversy involving appropriations for the improved manned interceptor and the manned bomber. In addition, the Administration desired to make Mach 3.0 aircraft technology data available to participants and evaluators of the SST program.

There was growing awareness in industry and in the press of the existence of the program. See Annexes 132 and 133. Operational activity, both in numbers of aircraft and extended flight profiles, was increasing the probability of accidental sightings and incidents. All parties were in agreement that an announcement to the public was necessary.

President Johnson was apprised of the matter on 29 November 1963, a week after taking office. He decided that surfacing was in order and directed a paper be prepared for announcement in the spring of 1964. At his 29 February 1964 press conference, the President made the following statement:

> "The United States has successfully developed an advanced experimental jet aircraft, the A-11, which has been tested in sustained flight at more than 2,000 miles per hour and at altitudes in excess of 70,000 feet. The performance of the A-11 far exceeds that of any other aircraft in the world today. The development of this aircraft has been made possible by major advances in aircraft technology of great significance for both military and commercial applications. Several A-11 aircraft are now being flight tested at Edwards Air Force Base in California. The existence of this program is being disclosed today to permit the orderly exploitation of this advanced technology in our military and commercial program.
>
> "This advanced experimental aircraft, capable of high speed and high altitude and long-range performance of thousands of miles constitutes a technical accomplishment that will facilitate the achievement of a number of important military and commercial requirements. The A-11 aircraft now at Edwards Air Force Base are undergoing extensive tests to determine their capabilities as long-range interceptors.

The development of supersonic commercial transport aircraft will also be greatly assisted by the lessons learned from this A-11 program. For example, one of the important technical achievements of this project has been the mastery of the metallurgy and fabrication of titanium metal which is required for the high temperatures experienced by aircraft travelling at more than three times the speed of sound. Arrangements are being made to make this and other important technical developments available under appropriate safeguards to those directly engaged in the Supersonic Transport Program.

"This project was first started in 1959. Appropriate members of the Senate and the House have been kept fully informed on the program since the day of its inception.

"The Lockheed Aircraft Corporation of Burbank, California, is the manufacturer of the aircraft. The aircraft engine, the J-58, was designed and built by the Pratt & Whitney Aircraft Division of the United Aircraft Corporation. The experimental fire control and air-to-air missile system for the A-11 was developed by the Hughes Aircraft Company.

"In view of the continuing importance of these developments to our national security, the detailed performance of the A-11 will remain strictly classified and all individuals associated with the program have been directed to refrain from making any further disclosure concerning this program. I do not expect to discuss this important matter further with you today, but certain additional information will be made available to all of you after this meeting. If you care, Mr. Salinger will make the appropriate arrangements." 1/

The reference in his announcement to the "A-11" was deliberate. To announce the aircraft as being one of the "X" series would not

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1/ Text of statement to the press by President Lyndon B. Johnson read at his press conference on Saturday, 29 February 1964.

have been completely true, whereas the "A-11" had been the original designation of the all-metal aircraft first proposed by Lockheed. The surfaced "A-11" was subsequently redesignated the YF-12A. (See overleaf for press treatment of the announcement.)

In order to preserve the distinction between the "A-11" and the A-12, Project Security had briefed practically all witting personnel in government and industry on the impending announcement. This was to preclude relaxation of the OXCART security standards. There was considerable press speculation on an Agency role in the A-11 development but it was never acknowledged by the Government.

Timed to the President's announcement, the A-11's were flown from Area 51 to Edwards Air Force Base, California. All subsequent A-11/YF-12A activity was done at Edwards AFB. On 24 July 1964, the President announced the SR-71 (R-12) development. The existence of Area 51, its activities,and the role of CIA in its operation, was preserved and has never become public information.

## OXCART Pilots

In November 1962, the first group of four A-12 pilots were separated from the Air Force with the understanding that they could upon satisfactory termination of their services with Project OXCART, be reinstated to active military service should they so desire. Cover arrangements were made for them to be employed as "independent contractors" to the Hughes Aircraft Company.

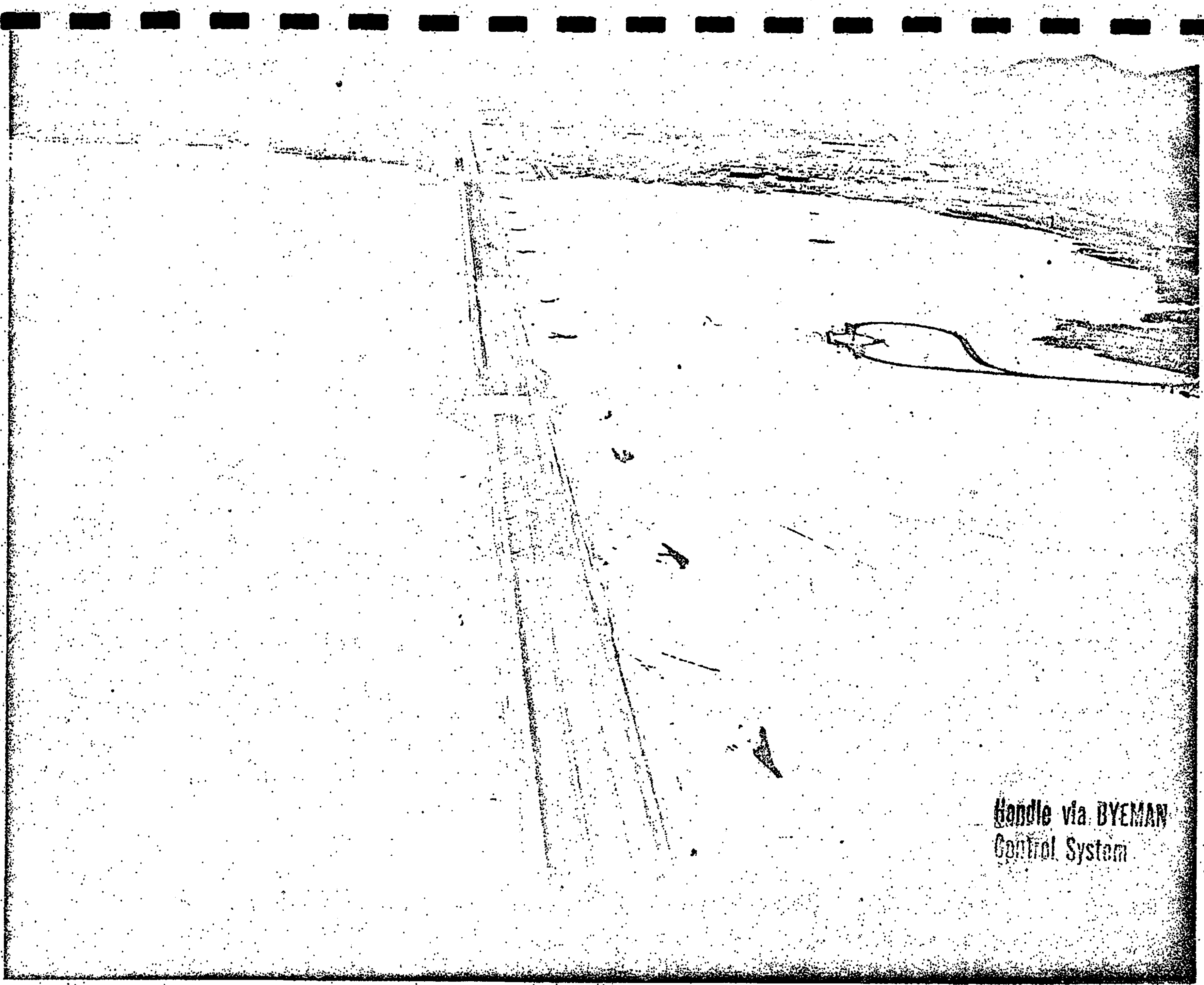
The pilots had arrived at Area 51 in mid-November 1962, and began training in the A-12 in January, 1963, when the two-seater trainer, Aircraft 124, became available to the detachment. As J-58 equipped aircraft were made available by Lockheed, the pilots began flying them. Training flights were limited to developing proficiency, aerial refueling training, navigation training, camera systems operation, and so on. Altitude and speed restrictions applied until Lockheed flight test validated a particular flight profile, whereupon detachment aircraft were allowed to extend to the same limit. The OXCART program was a first in the manner it moved forward after delivery of aircraft. Development breakthroughs were very quickly validated or rejected by flight test and the results were passed on to the detachment for incorporation in training procedures. A standard Air Force weapons system programming cycle divides development, flight test, and operational training into three distinct phases, one following the other. This sequence results in a longer time span to achieve operational readiness. By comparison, concurrent development, flight test, and operational training greatly foreshortened the time when the A-12 could be declared operationally ready.

## Further Construction at Area 51

To accommodate the additional aircraft which had been ordered (three YF-12's and five more A-12's), facilities at Area 51 were further expanded in 1963. An additional hangar, an administration building, new mess hall and a special handling building for the camera systems were constructed. Base population reached 1423 in November 1963. Additional BOQ facilities were installed. From experience gained in operation of the aircraft, it was decided to extend the runway. The extension was necessary to provide an acceptable margin of safety in the event of rejected take-off. The aircraft would use the additional length to come to a stop rather than run out on the lakebed where structural damage might occur due to surface roughness. The runway was extended by 11,000 feet of load-bearing asphalt with additional 5,000 feet of graded over-runs on each end. (See overleaf)

## Continued Flight Testing

It was reported at the end of 1963 that there had been 573 flights, totaling 765 hours since first flight in April 1962. Nine aircraft were in the inventory and the three more would be available by the end of



Handle via BYEMAN
Control System

March 1964. On 20 July, the first Mach 3.0 flight had been achieved by flight test aircraft. In November, Mach 3.2 had been reached at 78,000 feet altitude. The inlet duct roughness problem appeared to be solved, but the inlet performance was still below design requirements. The entire aircraft system was operating reasonably well within the limits of testing thus far. A jamming device to work against the guidance link of the SA-2 missile system was in development and was expected shortly for testing. The two camera systems were also performing satisfactorily within the limits of airspeed and altitude flown to date. A third camera system, built by Hycon, was inherited with the three WEDLOCK aircraft and was part of the OXCART sensor inventory.

Maximum effort for the next few months was to be directed toward optimizing the inlet to a firm production configuration, improving aircraft transonic performance, and operating at high temperatures and altitudes to provide the proper environment in which to test equipment and sensors.

The longest sustained flight at design conditions was conducted on 3 February 1964, and it lasted for 10 minutes at Mach 3.2 and 83,000 feet. Flight test data continued to show inlet performance to be deficient between Mach 1.8 and 3.2, resulting in excessive fuel consumption. In May 1964, a special task force was formed to focus exclusively on the aircraft inlet/propulsion interface problems. It was comprised of senior performance personnel from the contractors involved, and it stayed in residence at Burbank until a comprehensive inlet/engine improvement program was developed. By May 1964 a limited Mach 2.35 operational capability had been reached, but the basic inlet/propulsion interface problems still remained.

## Project SKYLARK

About this time, Project OXCART operational planners embarked on a program to develop flight planning as performance data could be documented. Operational planning was developing apace with flight test and detachment training. As each new performance plateau was reached and proven, it became a flight planning factor. Project Headquarters, foreseeing a possible contingency whereby the A-12 might be needed to overfly Cuba, began an in-house operations plan for that purpose. It was designated Operation SKYLARK.

Flight testing and detachment training suffered a serious interruption in mid-year of 1964. On a shakedown flight on 9 July

Aircraft No. 133 crashed just short of the runway on its final approach. At an altitude of 500 feet and airspeed of 200 knots, the aircraft began a smooth steady roll to the left. The Lockheed test pilot could not overcome the roll, and at an approximate 45 degree bank angle and 200 feet altitude he ejected safely. The primary cause of the accident was that the right outboard elevron servo valve stuck in a partially open position. The fleet was grounded for a month for incorporation of fixes. The fleet now stood at eleven aircraft. *

Having occurred within the Area 51 reservation, this accident received no publicity. All Area 51 personnel were admonished against discussing the crash, and it was quietly investigated by an accident investigation board. Neither the press nor the public were ever made aware that the accident had occurred.

On 11 August, SKYLARK became a directed project with the imposition of an emergency operational readiness date of 5 November.[1]

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* The delivery of the three USAF A-12's had been completed in March for a total of 13. The loss of Aircrafts 123 and 133 reduced that total to eleven.

1/ BYE-4631-68, 22 August 1964. DDCI Memorandum to DD/S&T, Subject: SKYLARK. (See Annex 134.)

A strenuous effort was begun to prepare the aircraft, pilots, and supporting elements for a reliable capability. The goal was a Mach 2.8 and 80,000 feet altitude capability. Sixteen mandatory changes or additions to the aircraft were necessary. Only one of the electronic countermeasures equipments would be available by the readiness date, camera performance would have to be validated at the SKYLARK level, pilots would have to be Mach 2.8 qualified, and necessary coordination with supporting elements would have to be accomplished. A senior intra-governmental committee, including representation from the President's Scientific Advisory Committee (PSAC), had examined the problem of operating over Cuba without the full complement of defensive systems. It was its assessment that the first few overflights could be conducted without them. Thereafter, countermeasures would be necessary. The delivery schedule of ECM equipment was compatible with this course of action.

Four of the six detachment aircraft were turned back to Lockheed technicians for modification and update. By 19 October the mandatory hardware modifications were complete and the aircraft returned to the detachment. This was more than two weeks behind the scheduled date because of various aircraft systems integration problems. A multitude of unrelated malfunctions had made the aircraft unacceptable from an operational reliability standpoint and required correction. This in turn delayed Detachment pilot training, systems and payload validation, and over-all reliability determination. In fact, due to the delayed delivery of aircraft, only three pilots were being qualified for the contingency. The Detachment simulated SKYLARK missions on training flights, practicing multiple aerial refuelings and operating systems and payloads. On 5 November 1964, a limited emergency SKYLARK capability was announced. With two weeks' notice, the OXCART detachment could accomplish a Cuban overflight, but with fewer ready aircraft and pilots than had been originally planned.

Primary detachment emphasis in the ensuing weeks was devoted to developing the SKYLARK capability into a sustained capability, with five ready pilots and five operational aircraft. The main tasks were to determine aircraft range and fuel consumption, attain repeatable reliable operation, complete pilot training, prepare a family of SKYLARK missions, complete coordination of routes with NORAD, CONAD and FAA, and exercise command and control through operational readiness inspection and command post exercises.

## Flight Test Achievements

Primary emphasis in the Lockheed flight test program in the weeks following was devoted to accelerated testing of defensive systems and attainment of the original Mach 3.2 performance specification, and improvement of equipment and component reliability. The highest speed flown at this point had been Mach 3.27, the highest altitude attained was 83,000 feet, and a sustained flight of 32 minutes over Mach 3.0 at 82,000 feet had been reached.

Three years' experience in high altitude, high speed flight testing had proven that achieving a reliable capability at design specification was an extremely difficult and frustrating task. Mach 2 had been reached after six months of flying, and Mach 3 after 15 months. Two years after first flight, Mach 2 time totaled 38 hours, Mach 2.6 time, three hours and Mach 3 time less than one hour. After three years, Mach 2 time had increased to 60 hours, Mach 2.6 time to 33 hours, and Mach 3.0 time to 9 hours. However, all Mach 3.0 time was confined to flight test aircraft, and Detachment aircraft were restricted to Mach 2.9.

## Events of 1965

### OXCART Develops Operational Capability

Since the first flight on 26 April 1962 through 31 December 1964 there had been 1160 flights, totalling 1616 hours, by all thirteen aircraft built (eleven of which remained). Twin J-58 engines had powered 743 flights and had accumulated 928 hours. Seven aircraft, including the trainer, were now assigned to the detachment and four remained in flight test. SKYLARK aircraft operational performance had reached a speed of Mach 2.9, a range of 1700 nautical miles, and an altitude of 76,000 feet. Inlet modifications and a faster climb schedule would allow a Mach 3.05 speed and increase range to 2500 nautical miles.

On 27 January 1965 one of the flight test aircraft flew a SILVER JAVELIN mission. It was the first in a series of long-range, high-speed flights designed to demonstrate the maximum range capability. The total flight time was 1:40 hours with 1:15 hours above Mach 3.1. Total range was 2580 nautical miles at cruise altitudes between 75,600 and 80,800 feet. It represented the longest sustained flight closely approximating design conditions.

On 28 January 1965 "Exercise Echo" was conducted with joint Project Headquarters, SAC, Detachment and FAA participation. It was a simulated SKYLARK mission and served to exercise all elements that would be involved in an actual overflight. All phases of the exercise were successful. It was significant because it inaugurated operational mission type training by the Detachment.

Two modification programs were embarked upon at Area 51 in 1965. The objectives were to increase speed, improve reliability, improve range, increase mission duration and to incorporate electronic countermeasures. The first, or Phase II SKYLARK modification, was to improve the SKYLARK capability to a Mach 3.05 level and was begun in the spring of 1965. The second, or minimum major modification (MMM), represented the minimum actions necessary to achieve the design Mach 3.0 performance on a repeatable and reliable basis. SKYLARK II modifications included: further improvements in the inlet system; strengthening the structure of plastic panels; increasing the aircraft's supply of nitrogen (nitrogen is used as the inert fuel tank pressurizing medium, and an increased supply would provide for more refuelings on a mission); strengthening the rudder pose; and incorporating minor equipment changes. The MMM program included changes to allow a faster climb schedule; provided space in the chines to install the ECM equipment; strengthened fuselage station joint 715 (this was necessary because of the increased bending movement being introduced by the weight of the ECM gear, heavier payloads, and to provide a better safety margin); and increased the liquid oxygen supply for longer missions. The MMM program also converted the inlet control system. Flight Mach number extensions had been paced by the air inlet system and its interaction with the engine. Key to proper inlet performance was the control system. The performance of the primary inlet control system had not been considered satisfactory. Inlet roughness and shock expulsion had permitted speed extensions only in small increments to Mach 2.8. After extended flight test and instrumentation the contractor opted for the back-up electronic inlet control system over the hydro-mechanical system. The MMM program also standardized the configuration of the aircraft. The numerous approaches to solving A-12 problems had resulted in non-standard configurations for several of the aircraft. At completion, the modification programs would provide a uniform operating fleet of A-12's, equipped and capable of performing the design mission.

The modification programs were phased in such a way that at least five aircraft were available to the detachment at all times for training and proficiency flying. As aircraft were completed and accepted by the Detachment, the pilots began to acquire experience in the higher Mach numbers that the modifications permitted. On 25 March 1965 a Detachment pilot flew a Detachment aircraft at Mach 3.0 for the first time. Thereafter, accumulation of time at the high speeds became routine, and all the Detachment pilots were Mach 3.0 qualified by mid-1965.

The year 1965 can be considered the high point in level of activity in the history of the program. The base at Area 51 reached full physical growth with the completion of construction. Eight Butler shelter-type hangars now housed the Detachment aircraft. Commercial power finally reached the site. Area 51 was now comparable to a normal USAF installation, though on a reduced level. Its population reached a high of 1835 during the year. This large number is attributed chiefly to the fact that the prime contractors were working three shifts a day on the modification programs. Other increases in the Area 51 personnel totals were results of an increase in the Detachment T/O to 280, the TAGBOARD activity which had begun in August 1964, and the base construction and support activities.

Three Constellation aircraft now made daily scheduled workday flights between Burbank and Area 51 to transport contractor personnel and vital freight. Two daily C-47 shuttle flights were made from Las Vegas to transport EG&G personnel to operate the radar range. Range activities now included operation of a surplus USAF radar which had been procured from Fort Fisher, North Carolina, and moved to Area 51. It was a FAN SONG radar simulator, and it was employed in the OXCART ECM systems flight testing program which was beginning to get underway.

In the spring of 1965, Project Headquarters and the Detachment began contingency planning for possible A-12 overflights in the Far East. Since the aircraft was not yet capable of reaching its design range, it was not feasible to mount such operations from Area 51. It was now necessary to plan for an overseas A-12 operating base in the Far East. A forward detachment did exist at Kadena Air Base, Okinawa, but it was capable of supporting only the KC-135 refueling tankers. Under the original OXCART concept of operations, the A-12 operated from Area 51, and the supporting tankers operated from the forward overseas bases.

## Project BLACK SHIELD Initiated

On 18 March 1965 the DCI (Mr. McCone) and Secretaries McNamara and Vance had a conversation on the increasing hazards to U-2 and drone reconnaissance of Communist China. Of the meeting he wrote as follows:

> "It was further agreed that we should proceed immediately with all preparatory steps necessary to operate the OXCART over Communist China, flying out of Okinawa. It was agreed that we should proceed with all construction and related arrangements. However, this decision did not authorize the deployment of the OXCART to Okinawa nor the decision to fly the OXCART over Communist China. The decision would authorize all preparatory steps and the expenditure of such funds as might be involved." 1/

The DDCI (Gen. Carter) transmitted Mr. McCone's memorandum to the DD/S&T for action. Annex 135 contains the text of the DDCI's memorandum. On 22 March, Gen. Ledford, AD/SA, briefed Mr. Vance on the operational concept of a Far East OXCART operation. The plan was called Project BLACK SHIELD. Mr. Vance advised he had directed the D/NRO, Dr. McMillan, to provide the facilities and necessary support to implement the plan.

A joint CIA/USAF team went to Kadena to survey the facilities and construction requirements. The existing special fuel storage and communications facility, plus the adequate runway, made Kadena the logical choice of bases on which to locate an OXCART operating detachment. It was also centrally located relevant to potential target areas. After construction and other support requirements were determined,

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1/ Memorandum for the Record, 18 March 1965, Discussion with Secretary McNamara and Secretary Vance concerning Aerial Reconnaissance over Communist China. See Annex 135.

Secretary Vance made available $3.7 million to assure that the necessary support capability would be available by early fall of 1965. (See Annex 136.) OXCART planning for BLACK SHIELD called for staging three A-12's to Okinawa for 60-day TDY periods twice a year with about 225 personnel involved. A second phase BLACK SHIELD capability would be to establish a permanent detachment.

On 3 June 1965, the Secretary of Defense noted to the D/NRO that the Soviets were deploying SAM's around Hanoi. He queried the practicability of substituting OXCART aircraft for U-2's and drones. [1] The D/NRO replied on 8 June 1965 that the controlling factor on the use of OXCART was the question of performance, operational readiness, and aircraft reliability, and secondly, the question of vulnerability. He advised that a program was being developed to "make statistically valid determinations of the range, fuel consumption, and other operating parameters of the airplane in its final configuration." [2]

The D/NRO stated he would report again (circa 1 July) to include an analysis of vulnerability and aircraft performance verification by operational aircraft.

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1/ BYE-5451-65, 3 June 1965. Memorandum from the Secretary of Defense to the Under Secretary of the Air Force (see Annex 137).

2/ BYE-31530-65, 8 June 1965. Use of OXCART over China and Southeast Asia (see Annex 138).

With a possible deployment overseas in the fall, the Detachment began a comprehensive aircraft and aircraft systems reliability validation program. As aircraft completed the modification program, the Detachment set out to demonstrate complete systems reliability at Mach 3.05, 2300 NM range, and penetration altitudes of 76,000 feet. A demonstrated capability for three aerial refuelings was also part of the validation process.

Considerable improvement in aircraft performance and in the operation of ancillary systems was observed in the post-modification test and evaluation program. The inlet, camera, hydraulic, navigation and flight control systems all demonstrated acceptable reliability. However, due to the sustained time being flown at the high Mach, high temperature environment, new problems surfaced. Most serious among them was with the electrical wiring system. Electrical wiring connectors and components had to withstand temperatures over 800° F along with structural flexing, vibration and shock. Repeated malfunctions were occurring in the inlet control, communications equipment, ECM systems, and cockpit instrumentation which were attributable to wiring failures. There was disturbing evidence that careless maintenance was also contributing to electrical connector failures. There were continued fuel tank sealant problems. A compound had still not been found that withstood the range of temperatures and structural flexing. There were air conditioning failures, transducer and indicator failures, oscillations in the inlet system, and a host of miscellaneous bugs appearing during aircraft operation. Frequent inspections were necessary to assure the durability of the engine. Flight and ground test development was still required to improve the durability of engine components, such as the combustion section, and the accuracy of the engine control systems.

Project Headquarters and detachment maintenance supervisors very carefully observed Lockheed procedures and progress in solving the new problems. There were indications of lessening interest in the program, and a lack of aggressive interpretation of flight test results. There was mounting concern that the BLACK SHIELD readiness date schedule would not be met. Prompt corrective action on the part of Lockheed was in order. The quality of maintenance needed drastic improvement. The responsibility for delivering an aircraft system with acceptable reliability to meet an operational commitment lay squarely upon Lockheed.

Mr. Parangosky, Deputy for Technology, OSA, met with Mr. Johnson at the Lockheed plant on 3 August 1965. A frank session ensued concerning the measures necessary to insure that BLACK SHIELD and OXCART commitments were made. Mr. Johnson concluded that he should go to Area 51 on a full-time basis to get the job done expeditiously. Mr. Daniel Haughton, President of Lockheed, concurred with the proposal. He offered the full support of the corporation in terms of senior people or any other assistance to achieve BLACK SHIELD readiness. Mr. Johnson began full-time duty at Area 51 the next day. In addition, he augmented the Lockheed contingent at Area 51 with senior inspectors, electrical technicians and manufacturing people.

The assignment of top-level supervisors resulted in improvement in maintenance crew performance, better inspection procedures, and a general tightening-up of Lockheed management at Area 51. The end result of the contractor reorganization was to get Project BLACK SHIELD back on schedule. Four primary BLACK SHIELD aircraft were identified and, upon completion of modifications, went into a flight program to validate BLACK SHIELD operational profile sorties. Flight test aircraft established the following performance milestones during 1965:

| | |
|---|---|
| Maximum Speed | Mach 3.29 |
| Maximum Altitude | 90,000 feet |
| Maximum Sustained Time | |
| At or above Mach 3.0 | 1:17 hours |
| At or above Mach 3.2 | 1:14 hours |

During the course of BLACK SHIELD validation flights, Detachment aircraft, flown by Detachment pilots, recorded a maximum endurance flight of 6:20 hours duration and another on which 3:50 hours of Mach 3.0 or above time was logged.

On 14 August, a flight test aircraft flew from Area 51 to Orlando, Florida, and return, thence to Kansas City and return. It simulated, exactly as planned, an operational mission with two air refuelings and three cruise legs. The flight covered 6500 nautical miles in 5:27 hours, including air refueling time. Between 4 and 15 August, an aircraft was deployed to McCoy AFB, Florida, for a series of climatic tests to determine vehicle performance in areas of high humidity. Cockpit fogging, hot-air deicing, and windshield rain removal were items which required environmental testing. Data obtained from the flight testing at McCoy indicated that descents into moist, warm climates presented no flight safety problems, and that it was feasible to operate in such a climate, one which was very similar to that of Okinawa.

On 20 November 1965, BLACK SHIELD validation was completed. The aircraft system was performing with acceptable reliability and repeatability. The detachment was manned, equipped and trained. The two primary camera systems were performing according to specification. A considerable amount of material had been shipped by surface, and was in place at Kadena to support a deployment. Kadena facilities were essentially completed. A deployment schedule called for an operating capability in being at Kadena Air Base on 15 January 1966. To strengthen the declaration of operational readiness he was soon to make, General Ledford called the principal contractors to a meeting at Headquarters on 23 November 1965. There he asked for, and received from each one, a written statement that each contractor felt his system was ready for successful BLACK SHIELD operation. Statements were received from Lockheed (aircraft and over-all systems); Pratt & Whitney (engines); Minneapolis-Honeywell (INS and Flight Control System); Perkin-Elmer and Eastman Kodak (Cameras). (See Annex 139 for statements provided by the contractors.)

On 1 December 1965, a proposal was forwarded to the 303 Committee via the D/NRO that the OXCART Far East deployment be approved. It was indorsed to the 303 Committee by the D/NRO on

2 December 1965 (see Annex 140). The 303 Committee examined the matter the next day. It did not approve an actual deployment as requested. It did agree that all steps be taken, short of moving aircraft, to develop and maintain a quick reaction deployment capability, ready to deploy within a 21-day period any time after 1 January 1966. (See Annex 141.)

## OXCART Accomplishments in 1965

A review of operational activity for 1965 reveals that 600 A-12 flights had been made for a total of approximately 1000 flying hours. There had been a sharp increase in Mach 3.0 flight time (108 hours accumulated as compared to only 8 hours total Mach 3.0 time acquired prior to 1965), and detachment sortie effectiveness rose from a low of 25% in 1964 to 65% in December 1965. A sortie is rated effective only if all subsystems performed properly and all planned objectives of the sortie were satisfactorily accomplished. The OXCART Program had reached the stage where it was capable of conducting reconnaissance of Cuba and deploying to the Far East, simultaneously if required. The year's accomplishments, however, were clouded by the third aircraft loss.

On 28 December 1965, Aircraft No. 126 crashed immediately after take-off at Area 51 and was totally destroyed. The pilot ejected safely at an altitude of 150 feet. The accident investigation board determined the cause involved human error wherein a flight line electrician had connected the yaw and pitch gyros of the aircraft stability system in reverse. This resulted in complete uncontrollability of the aircraft when it began a series of violent yawing and pitching gyrations immediately after lift-off.

The Office of Security was directed by the DCI to conduct an inquiry into the accident. It was concluded that the accident occurred as the result of unintentional errors on the part of the workers directly involved. There was no indication or evidence of sabotage, malicious intent or wanton disregard of proper procedures. There was no publicity connected with the accident. Corrective actions included closer technical supervision of maintenance personnel, increased emphasis on formal training courses and higher maintenance standards.

Assignment of responsibility for reconnaissance of targets in the Far East solidified employment concepts and tactical training. Training programs and requirements were focused upon BLACK SHIELD planning. Training for three AR missions, over-water rendezvous, single-engine refueling proficiency, subsonic missions and ECM procedures received heavy emphasis. Pilot fatigue studies were conducted to verify pilot capability to perform the missions of duration expected in deploying subsonic to overseas locations.

Subsonic deployment to the Far East was revised with the validation of a reliable over-water air-refueling rendezvous system. This development made supersonic deployments feasible and materially reduced the staging logistics requirement and pilot fatigue factors.

Basic inflight and photo flight line tactics evolved from the U-2 operational experience. While the A-12 speed, altitude, and ECM made the aircraft virtually invulnerable to enemy air defense reactions, special techniques had to be developed in planning camera flight lines due to the high speed and turn characteristics (86 mile turn radius) of the aircraft. Although stable flight lines were planned over primary target areas, bonus photography could be planned on during a coordinated turn.

In-Flight Refueling (IFR) Techniques

Perhaps the most singular and certainly a first in tactics was the development and establishment of the air refueling rendezvous and the accompanying air refueling techniques. The basic problem to be solved encompassed getting the A-12 from very high cruise altitudes

(80,000 plus) and high supersonic speed (Mach 3.2) to the comparatively low (30,000 feet) air refueling altitude and speed (Mach .80), directly behind the tanker in position for a hookup. The complete rendezvous and refueling operation from cruise altitude back to cruise altitude encompasses some 700 nautical miles; the rendezvous is accomplished by means of the A-12's navigation system plus a UHF, discrete radio system which provides range and azimuth information. An airborne beacon and TACAN are used as additional rendezvous equipment. After considerable test and evaluation, today's A-12 refueling tactic consists of a 240 NM descent to a 30,000 foot level refueling profile. The receiver pilot utilizes one engine in afterburner during actual refueling. After refueling, the A-12 climbs back up to cruise Mach (3.1/3.2) and continues mission.

In the early days of the pre-operational period, considerable coordination effort was expended in the establishment of air refueling tracks and attendant procedures for operating the A-12 into the Polar areas. Some initial training routes were conceived and planned along these lines and included the procedures necessary for overflight of Canada. The cooperation of the Canadian Government to use Canadian airspace was obtained in 1963.[1]

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[1] BYE-3194-63, 4 September 1963 (see Annex 142).

The foregoing, of course, was consistent with the initial OXCART concept which envisioned the Sino-Soviet Bloc as the primary area of interest. Subsequently, as political interest and emphasis shifted to the China/Southeast Asia area, training routes were concentrated over the southern United States land mass and some Pacific Ocean areas.

Mission Planning

The formulation of operational tactics has been a continuing effort designed to optimize mission capability consistent with requirements and safety. The A-12 Tactical Doctrine Manual was developed and formalized to govern all A-12 operations. This manual prescribes in detail A-12 operational planning factors, tactics and procedures for the employment of the A-12 reconnaissance system.

OXCART program mission planners began working up a dossier of BLACK SHIELD missions, using the computerized techniques developed in the two prior years. Until late fall of 1964 OXCART mission planning was in the primitive state of manual manipulations and computations utilizing data subscribed by contractor specifications. By November 1964 enough graphs, charts, and benchmark data had been gathered to begin a computer program which was to eventually afford an automated flight plan.

With this limited capability, mission planners began eliminating each manual function of planning. Prior to the summer of 1965, automated magnetic variation, minimum fuel required to designated bases, along with a flight plan format had emerged. The need for more definitive-type systems capabilities and vehicle performance mission planning factors became apparent. Significant progress was made in automated mission planning during the A-12 validation period, including the following major accomplishments:

(1) Automated plotting capability.

(2) Post-mission plot to inertial navigation system tape.

(3) Distance to "go" information.

(4) Extraction of certain data in flight plans for NPIC's use in correlating mission "take".

(5) Sun relative bearing with its change rate per minute.

(6) A defense analysis program to give probability of mission success.

(7) Inertial navigation systems program.

This validation period, which ended in November 1965, saw the advent of worldwide capability of the INS system, testing and validation of all weapons systems and repeatable performance information.

With data gleaned from this validation period, mission planners were able to incorporate into the computerized flight plan the A-12 turn radius, automated weather data and fuel curves for the different types of cruise profiles. Additionally a KC-135 automated flight plan was developed which has been declared the most advanced system ever affordeda supporting organization. At this time, all camera programming data was also included in the automated program.

In summary, with a minimum number of specific computer inputs such as departure coordinates and time, target coordinates and destination coordinates, the computer program could output a complete flight plan depicting all necessary information for planning and employment. A customized planning concept with a mission generation countdown of 24 hours was tried and proved.

The computer program is capable of planning missions at either subsonic or supersonic speeds, varying power settings, maximum altitude or long-range cruise profiles and varying gross weights, and will automatically compute fuel consumption utilizing the correct parameters.

## Events of 1966

The 1966 training program included a mission plan exercise in April to familiarize new mission planners with flight planning preparation and timing. Film handling and movement procedures, stimulating both SKYLARK and BLACK SHIELD operations, were exercised. A command post exercise in May checked out the special procedures to be followed by supporting commands in the Far East for BLACK SHIELD. Forward base exercises were conducted at Adana, Turkey, and Kadena, Okinawa. New procedures, schedules, and priorities were developed with the SAC KC-135 aerial refueling tanker support unit. By mid-year, liaison and coordination with appropriate U.S. Navy and USAF commands had compressed to seven days the response time to launch an overflight of Cuba. Experience gained from BLACK SHIELD training exercises resulted in a revised operations plan that reduced from 21 to 15 days the response time to deploy and commence operations at Kadena.

## ZI Air Traffic Control Procedures

In April 1966 the problem of air traffic control at altitudes above 60,000 feet was the subject of a meeting between Project Headquarters, USAF and FAA. The increase of flying activity by YF-12's and SR-71's from both Edwards Air Force Base and Palmdale, California, made it necessary to establish procedures which would provide for air traffic control at altitudes above 60,000 feet without compromise of project security. The OXCART operations personnel contributed substantially to the development and establishment of flight separation criteria for this previously uncontrolled airspace, and the establishment of coded altitude reporting to protect the classified aspect of operations above 60,000 feet.

As mentioned earlier, control of airspace in the environs of Area 51 was mandatory to preserve security of the base and the flying activity. The task of safely and securely operating a supersonic aircraft which publicly did not exist, from an air base which also did not exist, required the establishment of unusual, specialized procedures. The following are examples:

(1) <u>Yuletide Approach Control:</u>

This approach control was established in January 1962, ostensibly as the airspace controlling agency for all of the Nevada AEC Test Site, but in fact did not control the airspace surrounding Area 51. A separate covert approach control was established at Area 51 which managed and controlled all flight activity there.

(2) Yuletide Special Operations Area:

As flight test and training progressed and performance envelope of the aircraft increased, access to additional secure Airspace was required. The Yuletide Special Operating Area (SOA) was established in early 1963 restricting use of designated airspace north of Area 51 specifically for Area 51 aircraft's use between altitudes of 24,000 feet and 60,000 feet. This SOA has been revised periodically due to changing requirements and is presently approximately 150 NM by 350 NM in area on an East-West orientation.

(3) Arrival/Departure Corridors:

Covert procedures utilizing covert arrival/departure corridors for support aircraft operating from Area 51 were also established in coordination with FAA. These procedures provided for filing of aircraft clearances ostensibly from Nellis Air Force Base, Nevada, though in fact the aircraft were flying from Area 51.

(4) Mode X - IFF/SIF:

This discrete, selective identification feature was developed and installed in A-12 aircraft for secure flight following.

In this system, the airborne transponder responds only to ground radars specifically modified to be compatible with the airborne equipment. Installation was made only in selected ground radars. This feature was necessary to insure adequate flight following since all A-12 flying from Area 51 through July 1965 was flown black, i.e., no flight clearance was filed. The covert aspect of this type of flying required extensive coordination and the establishment of specialized procedures with FAA and NORAD to assure no compromise of A-12 aircraft existence or performance should the aircraft be tracked by their radars.

(5) Clearance Filing Procedures:

A-12 clearance filing procedures begun in July 1965 included ostensibly departing VFR from Edwards AFB as an SR-71 to a fix within the Yuletide SOA; there picking up an IFR clearance for a route of flight above 60,000 feet, returning to a fix within the SOA, cancelling the IFR flight plan and ostensibly proceeding to Edwards VFR for a landing.

## OXCART Pilot Training

Individual pilot flight activity in 1966 was geared to maintaining proficiency and operational readiness. Most training flights included at least one aerial refueling and averaged 45 minutes of Mach 3.0 time. The pilots were checked out in night flying and refueling. Escape, evasion and survival training continued with emphasis on tropical and seacoast areas. Para-sail training was instituted as part of the water survival training program.

Average A-12 flying time for the six pilots who were Mach 3.2 qualified increased to 353 hours. Two new pilots came into the program in the fall of 1966.[1/] Their training followed the same general pattern of the earlier groups of pilots. All A-12 pilots completed the Lockheed A-12 ground training course. This course consisted of academic instruction on normal and emergency procedures for the aircraft, propulsion system and aircraft systems. Academic training accomplished concurrently with the A-12 transition flight program consisted of extensive instruction on the navigation, sensor and ECM systems.

Concurrently with operational readiness flight training, additional academic instruction was devoted to aircraft systems, plus tactical doctrine study. The objective was to reach peak proficiency

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[1/] For a recapitulation of pilot selection and recruitment phasing, see Annex 143.

in all areas during the period. Standardization (ground phase) required the pilot to successfully pass a comprehensive examination on all aspects of aircraft operations and tactics. Integrated into the formal pilot training program are specialized courses of instruction as follows:

(1) Pressure suit fitting and physiological training.

(2) Security and resistance to interrogation training.

(3) Escape and evasion training.

Once declared operationally ready, each pilot continued to receive extensive ground and flying training to assure optimum proficiency.

To the maximum extent possible and consistent with flying safety, OXCART project pilot training was conducted concurrently with the manufacturer's developmental flight testing. As an example, Lockheed cleared detachment pilots incrementally for training at speed regimes beginning at Mach 2.35 and ultimately to Mach 3.2, the aircraft design operating speed. This unique training philosophy proved advantageous in that the detachment attained operationally ready status far more quickly than had the normal Air Force Category I, II and III approach been followed.

Prior to A-12 flight training, all OXCART pilot candidates were qualified in the F-101 aircraft to include aerial refueling. The

F-101 was used as the companion trainer aircraft to the A-12 to augment pilot proficiency.

The basic A-12 flying training program consisted of 21 training missions and approximately 52+30 flying hours. The program required eight transition missions and a standardization check in the J-75-equipped two-seated A-12 trainer. A total of twelve training flights were required in the J-58-equipped A-12 during the operational readiness phase. Training included day and night transition flying, instrument flying, aerial refueling, navigation, photographic procedures, ECM training, plus normal and emergency procedures for all systems. The final three training missions were simulated operational missions with multiple aerial refuelings.

## Deployment and Use of OXCART Opposed

While the OXCART Detachment trained for its operational role, attempts were made to commit the capability to operational use. At the 17 February 1966 meeting of the 303 Committee, the question of deploying the OXCART to the Far East was again raised. Mr. Vance advised that Mr. McNamara still opposed deployment on the basis that the situation remained unchanged since December 1965 (see Annex 144). On 22 March 1966 the Director (Admiral Raborn) expressed his deep concern over the lack of adequate photography to detect a possible Chinese Communist strategic build-up in South China and direct involvement in the Vietnam war. The inherent limitations of satellite coverage and the defensive threat to U-2's and drones was seriously inhibiting timely acquisition of high resolution photography. He therefore recommended that the OXCART aircraft be deployed immediately to Okinawa, fly missions over North Vietnam as soon as possible, and be ready to back up the U-2 and satellite capability in South China should they prove incapable of fulfilling the intelligence requirements. The JCS supported this view. At the 28 March 1966 meeting of the 303 Committee, Mr. Vance stated that he and Mr. McNamara were still against deployment despite the JCS views. They felt that existing systems could provide sufficient coverage of North Vietnam. Since the Department of Defense was the principal customer and was willing to live with lesser coverage, the Committee concluded not to deploy at that time. It was recommended, however, that after further study of certain aspects, the views of the DOD and CIA be brought to the attention of the President. (See Annex 145.)

Subsequent discussions of the matter occurred on 11 May 1966 and 27 June 1966. The minutes of these meetings reflect that the

CIA favored immediate deployment and use; the State Department was against; the DOD was split, with Messrs. McNamara and Vance opposed and the Joint Chiefs of Staff in favor of deployment. The PFIAB was on record as favoring deployment and use. The time had come to present the divergent views to the President. (See Annexes 146 and 147.) This was done and on 12 August 1966, Mr. Walt Rostow advised the DCI (Mr. Helms) that the President had decided for the time being not to deploy the OXCART (see Annex 148).

On 6 September 1966 a proposal was submitted to the 303 Committee to conduct OXCART reconnaissance missions over Cuba. The Director had recommended, and the Secretary of Defense had concurred (see Annex 149) that the OXCART capability be exercised over Cuba to confirm the reliability of the basic aircraft system, to test the EWS against the Cuban SA-2 defenses if they responded, and to evaluate a Soviet-type defensive environment reaction and capability to a low cross section, Mach 3.0 aircraft. While it would provide higher resolution photography than the SAC U-2 was currently obtaining, it was not proposed that the OXCART replace that capability. The main objective was to establish and validate the operational capability of the OXCART system to perform reconnaissance of a defended area.

The 303 Committee considered the proposal on 15 September 1966. In general, the attitude was negative. In spite of advantages which might accrue from testing in a hostile environment, the opinion prevailed that introduction of OXCART over Cuba would disturb the existing calm prevailing in that area of our foreign affairs. Until an overriding requirement could be presented, the majority decision was not to commit the A-12 to a Cuban operation.

## Further Development and Testing of A-12 System

Although A-12 performance had been validated at the high Mach and high altitude, there were still problems to be worked out. Until the real world of the A-12's flight regime was actually experienced, its effects on aircraft performance had been unknown. Vibrations, aero-elastic effects, thermal and mechanical shock during transients, systems interactions, control accuracies and environmental conditions make up this real world. The interaction of these variables affect range, for example, as follows:

a. Inlet spike 4% inaccuracy penalizes inlet performance by 3%.

b. 1% inlet leakage penalizes inlet performance by 1%.

c. Inlet bypass one-tenth inch inaccuracy penalizes inlet performance by 1%.

d. Inlet performance off 5% increases fuel consumption by 5 % to 10%.

e. Fuel consumption 5% to 10% higher penalizes aircraft range by 5% to 10%.

f. Engine turbine temperature 40°C low penalizes aircraft range by 5%.

g. Flight path environment 10° C hotter than standard penalizes aircraft range by 7%.

h. Environmental temperature shears cause unscheduled control surface movements resulting in additional drag.

i. Fuel temperature and density variations can reduce fuel onload by 1,000 to 2,000 lbs.

j. Less than precise center of gravity management causes control surface movements resulting in additional drag.

k. Deviations from optimum climb schedule reduces fuel available for cruise.

Engineering development and flight testing concentrated on further improving the air inlet control system, main and afterburner controls, bypass door schedules, Mach hold, autopilot and stability augmentation systems. A performance optimization flight program was run in conjunction with hardware improvements. A reliable cruise capability was established which reflected an approximate 200 mile increase in operational tanker-to-tanker range. Cruise range, with 6000 pounds of fuel reserve, reached 2870 nautical miles at altitudes ranging between 75,000-84,000 feet at Mach 3.1. On 21 December 1966, a flight test aircraft flew a two-aerial-refuelings mission of 6:09 hours' duration of which three hours and thirty minutes were flown at or above Mach 3.2 One leg of the mission covered a distance of 3067 NM. Operational aircraft were never to attain that range because the program termination ground rules restricted the necessary hardware improvements in the fleet. While it is doubtful that the original 4000 NM range figure would have been achieved, there were prospects of improving range performance beyond those demonstrated.

On 5 January 1967 the fourth A-12 was lost. Aircraft No. 125's accident occurred during descent about 70 miles from Area 51, near Leith, Nevada. It involved a fuel system gaging malfunction which resulted in a higher than actual fuel quantity reading. Because of this, the aircraft's fuel supply depleted before reaching the base. The aircraft was totally destroyed. The pilot was ejected but was killed when he failed to separate from the ejection seat prior to its impact.

A search was initiated for the wreckage and pilot by Area 51 personnel and aircraft. The wreckage was discovered on 6 January, and the pilot's body was recovered on 7 January. A week was spent retrieving pieces of the wreckage. The cover story for the accident was that an SR-71 aircraft out of Edwards AFB was missing and presumed down in Nevada. The aircraft was on a routine testflight and the pilot was missing. This story was released via USAF channels on 6 January, and the pilot was identified the next day as a civilian test pilot. Although his employer was not disclosed, the newspapers identified him as a Lockheed employee. This story was never refuted by USAF Public Information Officers. See Annex 150 for samples of press reporting.

Flying activity was suspended pending investigation of causes both for the crash and the seat separation failure. Upon determination of causes, precautionary action in the form of inspections and calibration checks was taken to preclude recurrence of similar malfunctions.

Of interest is the fact that none of the four A-12 accidents involved the high Mach number, high temperature, regime of flight. All the accidents involved traditional problems inherent in any aircraft. In fact, the A-12 by now was performing with a high degree of reliability at the high Mach environment. Detachment flight sortie effectiveness was near 80%. Major subsystem reliability was also good. A detailed examination of OXCART experience data and systems reliability is contained in a final report on that subject dated 15 January 1968 (BYE-8725-68), a copy of which is appended hereto as Appendix I. This document provides a comprehensive and detailed record of the levels of reliability of major aircraft systems, cameras, and electronic warfare systems.

Detachment training in the spring of 1967 consisted of routine flying for pilot proficiency and systems checkout, with emphasis on two aerial refueling missions. Such profiles were similar to those that would be flown on operational missions should either the SKYLARK or BLACK SHIELD contingencies be activated. Construction at Kadena was near completion except for new hangars. Provision had been made to use other hangar facilities on a temporary basis should the need arise. Final BLACK SHIELD deployment planning was complete, appropriate operations orders were issued, and the Detachment was capable of being in position ready to fly an operational mission fifteen days after notification to go. The plan called for flying the A-12's non-stop from Area 51 to Kadena with three aerial refuelings enroute. Supporting tankers would operate from Beale Air Force Base, California; from Hickam Air Force Base, Hawaii; and from Kadena Air Force Base, Okinawa. In a crisis situation, the deployment route could be extended to include photographic coverage of North Vietnam and recovery at Kadena.

OXCART Deployment, Operations and Termination

During May 1967, concern was growing over the possible introduction of offensive surface-to-surface missiles into North Vietnam. The problem of detecting such missiles was discussed with the President on 11 May. He requested a proposal on how best to monitor the situation. The Agency responded the next day with a briefing to the 303 Committee on the photographic coverage required for missile search and the extent of existing coverage, which was inadequate. CIA presented a proposal to use the A-12's. The State and Defense members of the 303 Committee decided to further examine the requirement and the political risks. While they conducted their examination, a formal proposal to deploy the OXCART was submitted to the 303 Committee by Mr. Helms on 15 May 1967.[1] On 16 May Mr. Rostow reported that the President had given his approval for immediate deployment and use of the OXCART over North Vietnam. (See Annex 152 for an account of events leading to the deployment decision.) The BLACK SHIELD contingency plan was immediately placed in effect. On 17, 18 and

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[1] BYE-2369-67, 15 May 1967, Memorandum for 303 Committee, Subject: OXCART Reconnaissance of North Vietnam, Annex 151.

19 May, logistical airlift to Kadena was accomplished. Six C-141 aircraft transported approximately 120,000 pounds of cargo and equipment and the task force personnel from Area 51. Communications and support teams were positioned at Hickam AB and at Wake Island to assist in recovery of the aircraft in case of emergency landings at either site. Arrangements were confirmed to fully brief the Ambassador 50X1, E.O.13526 The Prime Ministers of Japan and Thailand were advised, as were the President and Defense Minister of the Republic of China. The Chiefs of the Air Force of Thailand and the Republic of China were also briefed. The reactions were favorable. On 22 May the first A-12 (Serial No. 131) flew to Kadena from Area 51, non-stop in 6:06 hours for a distance of 6874 nautical miles. Refuelings were accomplished west of San Francisco, near Hawaii and near Wake Island. There were no major aircraft malfunctions, and the flight was completed as planned without difficulty.

Aircraft No. 127 departed Area 51 on 24 May and arrived at Kadena 5:55 hours later. Again the flight, including three refuelings, was accomplished without difficulty. Average speed from take-off to landing, including refueling time, was Mach 2.03. The third A-12, No. 129, was launched as planned on 26 May 1967. The flight proceeded normally until the pilot experienced an Inertial Navigation System problem and communications difficulties in the vicinity of Wake Island. Under the circumstances, he elected to make a precautionary landing at Wake Island. The prepositioned emergency recovery team secured the aircraft without incident and continuation of the flight to Kadena was accomplished the next day.

On 29 May 1967, the deployed unit at Kadena was ready to fly an operational mission. Under the command of Col. Hugh C. Slater, (who had become Area 51 Commander in September, 1966), two hundred and sixty personnel had deployed to the prepared BLACK SHIELD facility at Kadena. Except for hangars, which were a month short of completion, the facility was ready for sustained operations. On 30 May 1967 the Kadena Detachment was alerted for a mission for the 31st. The first BLACK SHIELD mission was flown on 31 May 1967. Two photographic flight lines were flown, one over North Vietnam and the second over the DMZ with good results. The mission was for a duration of 3:39 hours, and the cruise legs were flown at

Mach 3.1 and 80,000 feet. An analysis of the mission is contained on pages 3 and 4 of Annex 153.[1] Seventy of the 190 known SAM sites in North Vietnam were photographed as were 9 of the 27 COMIREX priority one targets. Three more missions were flown in June 1967.

All operational missions were planned, directed and controlled by Project Headquarters against targets identified by USIB and approved by higher authority. A constant watch was maintained on the weather in the target areas. Each day at a specified hour (1600 hours local) a mission alert briefing occurred. If the forecast weather appeared favorable, the field was alerted to a mission and provided a route to be flown. This alert preceded actual mission take-off by 28 to 30 hours. Twelve hours (H-12) prior to take-off, a second review of target weather was made. If it continued favorable, the mission generation sequence continued. At H-2 hours, a "go-no-go" decision was made and communicated to the field. The final decision, it should be noted, was not just based on the target area weather factor. Weather had to be adequate also in the refueling areas and at the launch and recovery base for safety of flight reasons.

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[1] BYE-44232/67, 22 September 1967. "BLACK SHIELD Reconnaissance Missions, 31 May-15 August 1967". (Annexes 154 and 155 cover BLACK SHIELD missions from August 1967 through March 1968.)

In the field, operations and maintenance generation began with the receipt of alert notification. A primary aircraft and pilot, as well as a back-up aircraft and pilot, was selected. The aircraft were given thorough pre-mission inspection and servicing, all systems were checked, and the camera was loaded into the aircraft. The pilots were given a detailed mission route briefing in the early evening prior to the day of flight. On the morning of the flight, a final briefing occurred at which time the aircraft and systems status was reported, last minute weather and intelligence was briefed, and any flight plan amendments or changes were provided the pilots. Two hours prior to take-off, the primary pilot was given a medical examination, was suited, and transported to the aircraft. In the event of equipment malfunction or for other reasons the primary aircraft could not take off, the spare or back-up was prepared to execute the mission one hour later.

A typical route profile for a BLACK SHIELD mission over North Vietnam included a refueling shortly after take-off, south of Okinawa, accomplishing planned photographic pass(es), withdrawing to a second aerial refueling in the Thailand area, and returning to Kadena. Mission timing, tactics and routes were varied, consistent with photographic requirements and threat analyses.

Following recovery at Kadena, the camera film was removed from the aircraft, boxed, and couriered by special aircraft to the processing facilities. Processing of early missions was done at the Eastman Kodak plant in Rochester, New York, and photo interpretation at the NPIC. In late summer, the responsibility for processing and exploitation of BLACK SHIELD material was placed on the Pacific Theater photo interpretation center at Yokota, Japan. The time saved permitted the photo intelligence to be in the hands of the American commanders in Vietnam within 24 hours of the completion of a BLACK SHIELD mission.

During the course of the BLACK SHIELD operations, 29 missions were flown, 24 over North Vietnam, 2 over Cambodia, and 3 over North Korea. Fifty-eight photographic flight lines were accomplished. All missions were launched and recovered from Kadena, except for one precautionary landing at Ban Takhli, Thailand. That aircraft returned to Kadena the next day. Annexes 153, 154 and 155 contain maps and routes of all BLACK SHIELD missions.

Enemy radar tracking was reported on all but four missions. It ranged from very brief reflections of the A-12's presence on early missions to extended and accurate tracking. On three missions, SA-2 missiles were unsuccessfully launched at the A-12. Post-flight inspection of the mission aircraft of 30 October 1967 revealed that a piece of metal had penetrated the lower wing surface of the aircraft. It was not an SA-2 warhead pellet, but possibly a part of the debris from one of the missile detonations. Eight missiles were reported launched during the mission. Resumés of BLACK SHIELD missions are contained in Annexes 153, 154 and 155. They include a route description, enemy radar tracking, hostile reaction, extent of coverage, and target statistics.

In early March 1968 the USAF's SR-71 aircraft arrived at Kadena to relieve the OXCART Detachment of its BLACK SHIELD commitment for North Vietnam coverage. The OXCART Detachment went on standby status to back up the SR-71 capability. The last A-12 operational mission was flown on 8 May 1968 over North Korea.

The cover plan for BLACK SHIELD explained the presence of the aircraft at Kadena as experimental test bed versions of the YF-12A and SR-71 family, undergoing environmental and field tests. (See Annex 156 for text of the contingency and cover plan.) The OXCART vehicle had been on Kadena for over a month before the the first local newspapers reported their presence. The USAF PIO news release, in response to an Okinawan press inquiry, was in accordance with the cover story. After the initial articles in Far East newspapers, nothing significant was reported when reference was made to the presence of the aircraft on Okinawa and they were always termed USAF YF-12A/SR-71 aircraft.

With reaffirmation of the OXCART phase-out decision, the Kadena Detachment was advised to prepare for redeployment to Area 51. Project Headquarters selected 8 June 1968 as the earliest possible redeployment date. Flights of A-12 aircraft were to be limited to those essential for flying safety and to maintain necessary pilot proficiency to redeploy from Kadena and ferry the aircraft to Palmdale, California, for storage. All Area 51 aircraft (Nos. 121, 124, 128, 130, and 132) were placed in storage at Palmdale by 7 June 1968.

On 4 June 1968, Aircraft 129 departed Kadena Air Base on a functional check flight which was required due to an engine change. It did not return. The last known position of the aircraft was 520 nautical miles east of Manila. Search and rescue operations were begun shortly after the mishap. No visual or radar sightings were reported. The primary cause of the loss is undetermined. The most probable cause was catastrophic failure of an engine. (See Annex 157 for press coverage.)

In addition to the five A-12's lost during the course of the OXCART Program, two F-101 aircraft were lost. Both accidents were fatal to the pilots. On 1 June 1967, Lt. Col. Welton King was killed when the aircraft tail section separated in flight shortly after take-off at Kadena. On 26 September 1967, Lt. Col. James S. Simon, Jr., was killed when he inadvertently flew his aircraft into the ground at Area 51. A recapitulation of aircraft losses is attached as Annex 158.

The two remaining A-12's redeployed to Area 51 in June 1968. After post-flight maintenance, both were ferried to Palmdale where they joined the rest of the OXCART fleet in storage. The Kadena operation was closed out as of 30 June 1968. Of the total thirteen A-12's procured, eight remain. Aircraft installed and ground equipments (with appropriate spare systems) will be retained at Palmdale to support all A-12's in storage. Spare parts and equipment will be stored at Palmdale to support at least a 90-day level for the five operational A-12 aircraft stored. It will be possible to remove the aircraft from storage at some future date and prepare them for operation. This will be accomplished only at great cost in money and time.

## Summary of OXCART Accomplishments

The OXCART Program lasted nine years. The total cost, including development, production, maintenance and operation, and support amounted to approximately $950 million. From concept to operation, it pioneered the way in the aerospace industry to reach the plateau of Mach 3.2 flight. The technical data accumulated over the nine years have made, and will continue to make, significant contributions to developments in supersonic aircraft, high Mach turbine engines, aerial reconnaissance, electronic countermeasures, life support and ancillary systems.

It was particularly responsive to priority intelligence requirements when it was maintaining surveillance of North Vietnam. It did not detect the introduction of offensive missiles, but it did provide bomb damage assessments and over-all military logistics estimates to the field commanders. It located the Pueblo in Wonsan harbor and provided valuable information relative to the size and disposition of North Korean forces.

A summary of activities at Area 51 during the BLACK SHIELD deployment is contained in the Commander's Monthly Activities Report for August, 1967, which is attached as Annex 159.

Postscript

In a ceremony at Area 51 on 26 June 1968, Adm. Rufus L. Taylor, Deputy Director of Central Intelligence, presented the CIA Intelligence Star for Valor to the following pilots in recognition of their participation in the BLACK SHIELD Operation:

Mr. Kenneth S. Collins
Mr. Ronald L. Layton
Mr. Francis J. Murray
Mr. Dennis B. Sullivan
Mr. Mele Vojvodich

The posthumous award to Mr. Jack W. Weeks was accepted by his widow.

The USAF Legion of Merit was presented to Col. Slater and his deputy, Col. Maynard N. Amundson. The Air Force Outstanding Unit Award was presented to the members of the OXCART Detachment (1129th Special Activities Squadron, Detachment 1) and the USAF supporting units.

OXCART Phase-Out

On 10 November 1965, Mr. W. R. Thomas, Chief of the International Division, and Mr. S. B. Leach, Chief of the Military Division, Bureau of the Budget, submitted a memorandum to the Budget Director in which they expressed concern at the total costs of the A-12 and SR-71 programs, both past and projected. They stated that 2.5 billion dollars would have been spent on both programs through FY 1966, and expected 2.1 billions more would be spent through 1971. They questioned the requirement, first for the total number of aircraft represented in the combined fleets, and second, the requirement for a separate CIA (OXCART) fleet. Several alternatives were posed to achieve a substantial reduction in forecast spending. They recommended that the A-12 program be phased out by September 1966 and that there be no further procurement of SR-71 aircraft. Copies of this memorandum (see Annex 160) were distributed to the DOD, D/NRO and DCI with the suggestion that these agencies explore the alternatives set out in the paper. The Secretary of Defense declined considering the proposal, presumably because the SR-71 would not be operational by September 1966.

The matter rested until July 1966 when Mr. Schultze, Director of the Budget, reopened the subject. He proposed that a study of the relationship between the OXCART and SR-71 programs be made by the DOD/CIA/BOB in time for FY 1968 budget deliberations. He suggested possible alternatives that the study group might examine:

1. Retention of separate A-12 and SR-71 fleets, i.e. status quo.
2. Co-location of the two fleets.
3. Transfer the OXCART mission and aircraft to SAC.
4. Transfer the OXCART mission to SAC and store the A-12's as attrition replacements for the SR-71's.
5. Transfer OXCART mission to SAC and dispose of the A-12 aircraft.

Mr. C. W. Fischer was designated as the BOB representative on the study group.

The DCI (Mr. Helms) appointed Mr. Carl Duckett, Assistant Deputy Director for Science and Technology, as the Agency member, and the DOD appointed Mr. Herbert D. Bennington. Mr. Duckett shortly thereafter became the Acting DD/S&T and was unable to devote the time required to the study. He appointed Mr. John Parangosky, who was then the AD/OSA, as the Agency's member of the study group. Throughout the summer and fall of 1966 the panel conducted a detailed appraisal of the two fleets, examining the relative technologies, operational capabilities, support facilities and costs. The capabilities of advanced aircraft were balanced against those of satellites and drones. The special covert and civilian characteristics of the OXCART fleet were reviewed for the effect that termination of the OXCART project would have on U.S. relations in matters of clandestine reconnaissance. The study group identified three principal alternatives for decision. They were:

1. Maintain the status quo and continue both fleets at the currently approved levels. Estimated costs through FY 1972 would total $1.377 billion.

2. Mothball all A-12 aircraft, but maintain the OXCART capability by sharing SR-71 aircraft between SAC and CIA. This would save $252 million over the first alternative.

3. Terminate the OXCART fleet in January 1968 (assuming an operational readiness date of September 1967 for the SR-71) and assign all missions to the SR-71 fleet. A cost savings of $365 million would be realized by adopting this alternative.

The report made no recommendations *per se*. Its purpose was to provide information upon which higher level judgments could be made.

A copy of the Fischer-Bennington-Parangosky report is attached as Appendix II.

On 12 December 1966 there was a meeting at the Bureau of the Budget attended by Mr. Helms, Mr. Schultze, Mr. Vance, and Dr. Hornig, Scientific Advisor to the President. A vote was taken on the alternatives posed in the Fischer-Bennington-Parangosky report. Messrs. Vance, Schultze and Hornig voted to terminate the OXCART fleet, and Mr. Helms voted for eventual sharing of the SR-71 fleet between CIA and SAC. The BOB immediately prepared a letter to the President conveying the course of action recommended by the majority. Mr. Helms, having dissented from the majority, requested a letter be prepared by the DD/S&T to the President stating the case for CIA remaining in the reconnaissance business, and his reasons for voting as he did.

On 16 December 1966, Mr. Schultze handed Mr. Helms a draft memorandum to the President which requested a decision either to share the SR-71 fleet between CIA and SAC, or to terminate the CIA capability entirely. On 20 December Mr. Helms wrote Mr. Schultze that new information of considerable significance had been brought to his attention concerning SR-71 performance. He requested another meeting after 1 January to review pertinent facts, and also requested that the memorandum to the President be withheld pending that meeting's outcome. Specifically, evidence and data had been obtained that the SR-71 program was having serious technical problems and there was real doubt that it would achieve an operational capability by the time the A-12 program was scheduled for termination. So concerned was he with SR-71 capabilities, Mr. Helms changed his position from sharing the SR-71 aircraft with SAC to a firm recommendation to retain the OXCART fleet under civilian sponsorship and separate basing. Other eleventh hour attempts to review the subject were in vain. On 28 December 1966, the President accepted the recommendations of Messrs. Vance, Hornig and Schultze, and directed the termination of the OXCART program by 1 January 1968.

The decision to terminate the OXCART program required the development of an orderly phase-down procedure. After consultation with Project Headquarters, the D/NRO advised the Deputy Secretary of Defense on 10 January 1967 of the phase-out schedule of aircraft. Four A-12's would be placed in storage in July 1967, two more by December, and the last four by the end of January 1968.

Until 1 July 1967, the OXCART Detachment was to maintain a worldwide capability to conduct operational missions from a prepared overseas location and simultaneously from Area 51 in Nevada. The operational readiness posture was to include maintenance of a 15-day quick reaction capability for deployment to the Far East and a 7-day quick reaction for deployment over Cuba. Between 1 July and 31 December 1967, the capability would be maintained to conduct operational missions from either a prepared overseas base or from Area 51, but not simultaneously. The quick reaction capability for either Cuban overflights or deployment to the Far East would also be maintained. On 9 May 1967, Secretary Vance directed that the SR-71 assume the responsibility to conduct Cuban overflights as of 1 July 1967, and the dual capability of Southeast Asia and Cuban overflights by 1 December 1967.

A joint CIA/USAF working group was established by the D/NRO to coordinate planning actions incident to the OXCART phase-out. The group was responsible for identifying decisions and problem areas, recommending courses of action, and advising the NRO, CIA and USAF of progress in the phase-out. The code name SCOPE COTTON was given to the over-all phase-out schedule.

Basic assumptions to guide the phase-out were made. There would be no further major up-dating of the A-12 aircraft. Only those engineering change proposals, retrofits, and modifications which affected safety of flight or were absolutely essential to maintain an operational capability would be authorized. All aircraft would be mothballed and stored by 31 January 1968. No new construction would be authorized at Area 51 and it would be closed upon removal of aircraft and other assets. No new equipment procurements would be made, and spares and supplies would be maintained at levels sufficient only to sustain the operational commitment through 1967. The OXCART engine inventory would be reduced, and overhauls and improvements would be accomplished only as necessary. Procurement actions for USAF detailee personnel would be suspended.

As action items were identified, the D/NRO issued a series of SCOPE COTTON decisions. The TAGBOARD program would remain at Area 51 through 1967. OXCART assets at Kadena and deployment flyaway kits were to be maintained through 1967. Twenty engines would be stored with the aircraft. Repairable items, excess to OXCART requirements, would be redistributed to other programs. No airframes would be cannibalized. Guidance equipment, cameras, EWS and pilot equipment would be retained in minimum quantities and types to support the stored aircraft. Residual stocks of A-12 spares common to the SR-71 would be used by the latter program. Responsibility for follow-on contracting and funding for J-58 engine product improvement would transfer to the USAF, as well as for the YF-12A, beginning in FY 1968. Excess support assets would be redistributed to other NRO programs. Overseas facilities, except at Kadena, would be transferred to the base at which they were located effective 1 January 1968. A gradual transfer of SR-71 contracting responsibilities would be made to the USAF. The radar range at Area 51 would be dismantled and transferred to USAF installations. Research and development would be suspended for countermeasures as they applied to OXCART.

Project Headquarters moved quickly to advise the contractors of the phase-out decision. At the same time they, along with all witting personnel, were cautioned to observe the same standards of security during termination as were observedduring the development and operational readiness stages of the program. The security precaution was necessary to protect CIA's role in the program, CIA procurement and contracting methods, and, most importantly, the mission posture for the year. Dissemination of the information was held down even in the cleared community until orderly phase-out plans could be worked out. Premature release of the information among contractor employees could have had a serious effect on the operational posture. Realizing the short term prospects of the OXCART program, technicians might seek employment elsewhere. The delicacy of the situation was not lost on contractor management; but by careful planning, they were able to maintain their capabilities and program excess personnel into other activities at the appropriate time.

With the program committed to a definite time-table, certain specific actions were taken by Project Headquarters. Systems in, or scheduled for, flight test, unless very near operational acceptance, were removed and placed in storage or made available to other NRO programs. These included second generation ECM systems, the side-looking radar, the infra-red sensor, and the System XVII Elint collection gear. An aircraft standard operational-ready configuration was adopted. Any equipments surplus to the standard configuration were removed from stock and returned to depot storage. Two of the Perkin-Elmer cameras, which were scheduled for overhaul and up-date were removed from the inventory and stored.

On 16 May 1967, the President directed the deployment of OXCART to Kadena, Okinawa, for reconnaissance of North Vietnam for the primary purpose of detecting surprise introduction of offensive missiles. Three aircraft were deployed, and the first mission was flown on 31 May 1967. The deployment had the effect of slowing actions to phase-out OXCART, but the 31 December 1967 termination date still abided at the time of the deployment. In June the Agency proposed two options to modify the phase-out in view of the Kadena deployment. One was to defer mothballing of any aircraft until 31 December 1967 to insure a back-up capability for the deployed aircraft. The second option was to continue the entire OXCART fleet through FY 1968. The D/NRO was amenable to the first option, influenced by the fact that the SR-71 had not yet achieved an operational ECM capability; October was the earliest date it would be ready. The Deputy Secretary of Defense modified the delay in mothballing aircraft by recommending one test aircraft be put down in July and the remaining eight in December 1967. He further directed that SAC would be responsible for Kadena operations on 1 December 1967, using SR-71's.

At the 12 September 1967 meeting of the NRP Executive Committee (ExCom), Admiral Taylor stated that the OXCART aircraft would be withdrawn from Kadena by mid-November to make way for the SR-71 operation. He pointed out that beginning 1 December experienced contractor personnel would be reassigned from the program, and spare parts supply would be depleted to a point where it would be most difficult to sustain an operational posture. October 1 was emphasized as the deadline by which any meaningful change in the phase-out schedule could be effective. Dr. Hornig stressed the importance of the SR-71 being operationally ready before the point of no return had been reached in the phase-out of the OXCART. He requested a current comparison of the OXCART and SR-71. Dr. Flax, D/NRO, said he would provide such a paper prior to 1 October for review by the ExCom.

The minutes of the ExCom meeting of 29 September, which best reflect the situation vis-a-vis the SR-71 deployment for BLACK SHIELD, are quoted herewith:

> "Mr. Nitze stated that the purpose of this meeting was to review the status of the SR-71, to determine what problems may have arisen from SR-71 Category III Tests, and to recommend actions for the future on OXCART phasedown and SR-71 deployment.
>
> "Dr. Flax referred briefly to the papers he had distributed to the members, pointing out that they summarized about two-thirds of the information available from the SR-71 Category III Tests (which would be officially concluded about

October 1, 1968). He stated that, in general, the SR-71 was in a satisfactory state and it was the judgment of operational experts that the Air Force could assume the North Vietnam missions on December 1, 1967. This judgment was also reflected in a Joint Chiefs of Staff statement that the SR-71 is ready for operational employment.

"Dr. Hornig referred to the documents furnished to the ExCom and, in particular, to data dealing with the vulnerability of both the OXCART and SR-71 aircraft. He pointed out that, from his assessment of the data, the SR-71 appeared to be two to four times more vulnerable than the OXCART, based on the listed equipments, statistical factors, and performance curves. There followed a detailed discussion on vulnerability studies, operational techniques and impact, ECM systems and capabilities, the present activity of the enemy, his intentions in the future, and the outlook for future operations. Dr. Hornig then compared the payload volumes of the aircraft and the photographic swath widths of their sensors. He believed the committee should not be too hasty in reaching a decision to deploy the SR-71.

"Dr. Flax stated that a simple comparison of sensor swath widths was not, in his view, a valid way to compare the mission coverage capabilities of the aircraft and that a factor of two in vulnerability which might be assumed on this basis did not reflect mission requirements in any event, since complete area coverage of North Vietnam was not being sought or achieved.

"Mr. Nitze outlined the following options for consideration: (1) delay the transition from OXCART to the SR-71, (2) recommend a reversal of the December 1966 decision, or (3) adhere to that decision. The discussion turned to the first option. Asked the desirability of this option, Dr. Flax stated that if there were no economic restraints whatever he would prefer to retain the total force. However, economic constraints were very real and he believed a firm decision

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was called for at this time. A six-months' delay, in making the transition, he pointed out, could cost $32.0 million. A question was raised as to the cost of reclaiming OXCART aircraft from storage, if required. [redacted] stated that this would involve approximately $300 to $500 thousand per aircraft, if done within the first year. [redacted] also pointed out that the present financial plan provides some OXCART overlap by providing for continued operation at Area 51 during December.

"Mr. Nitze observed that the additional $32.0 million required for a delay in transition from the OXCART to the SR-71 was extremely critical in today's budgetary environment. Dr. Hornig favored a delay of six months. Dr. Foster agreed with the concept of delay but recommended a shorter period: somewhere between three and six months. Mr. Hoffman stated that the original decision of last December should be followed unchanged. Mr. Helms favored a delay. Dr. Flax agreed that a delay would provide a higher degree of confidence in assuring continued operational effectiveness in the face of possible improvement of North Vietnamese defenses, which were just now beginning to be brought to bear on the OXCART aircraft. The cost of this insurance would of course be related to the length of delay in phase-out. He believed that the SR-71 deployment should not be held until the very last day of any agreed-to delay period; if a three-month delay were recommended, the SR-71 deployment should be scheduled for mid-February 1968.

"Mr. Nitze asked for a memorandum spelling out (1) what the decision for a three-month delay would do for the program, (2) the associated costs, and (3) what is intended for the interim. Dr. Flax was asked to prepare such a paper. Mr. Nitze stated he would confer with the Secretary of Defense on this matter early in the following week." 1/

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1/ BYE-52712-67, 29 September 1967. Minutes of NRP Executive Committee Meeting. (See Annex 161.)

The deliberations which followed resulted in a decision to retain the three OXCART aircraft at Kadena through 1 February 1968. SAC would assume BLACK SHIELD operations by 15 February. All operational aircraft would remain flying until 31 March 1968, at which time they would be mothballed. The details of the extension and the revised phase-out plan are contained in a D/NRO memorandum of 3 October 1967 to the Deputy Secretary of Defense (see Annex 162).

On 29 December 1967, the Deputy Secretary of Defense advised the D/NRO that the OXCART program was extended through 30 June 1968. The SR-71 was to assume North Vietnamese reconnaissance by 15 March 1968. OXCART aircraft were directed to remain at Kadena for 30 days thereafter to provide a contingency overlap.

The original decision to terminate the program, made in December 1966, tended now to be obscured by the BLACK SHIELD deployment and the two extensions of the termination date. That decision now appeared open to question and the feeling prevailed that Presidential reaffirmation was required. The President's Special Assistant, Mr. Walt Whitman Rostow, had expressed the opinion that removal of the OXCART capability from the Far East should not be undertaken unless the President specifically approved. Key

Congressional figures and members of the President's Foreign Intelligence Advisory Board and the President's Scientific Advisory Committee were also concerned with the loss of OXCART. Consequently the ExCom decided to reopen the matter and once again examine alternatives to outright phase-out of the program. Again the arguments were marshalled in defense of retaining the OXCART capability, buttressed now by its demonstrated operational performance.

(In March the SR-71 unit deployed to Kadena with three aircraft and on 15 March assumed the BLACK SHIELD mission. The OXCART aircraft remained in place to provide a contingency back-up capability, and to provide coverage of North Korea as a result of the Pueblo affair.)

A study of the feasibility and cost of continuing the OXCART program beyond its phase-out date was completed in the spring of 1968 by the D/NRO. Four alternatives were considered:

1. Transfer all OXCART aircraft to SAC by 31 October 1968; substitute Air Force for contractor support where possible; turn the test A-12 aircraft over to the SR-71 test facility. FY 1969 costs would be $62,160,000.

2. Transfer OXCART as in alternative 1, above, and store eight SR-71's. FY 1969 costs would be $40,960,000.

3. Close Area 51 and co-locate OXCART fleet with SR-71's at Beale Air Force Base, California, but with CIA retaining control and management. FY 1969 cost would be $72, 240, 000.

4. Continue OXCART operations at Area 51 under CIA control and management. FY 1969 costs would be $72, 000, 000. [1]

Mr. Helms expressed his reactions to the alternatives considered by the NRO in a memorandum to Messrs. Nitze, Hornig, and Flax dated 18 April 1968. In it he questioned why, if eight SR-71's could be stored in one option, they could not be stored in all the options, with the resultant savings applied in each case. He questioned the lower cost figures of combining the A-12's with the SR-71's and disagreed, for security reasons, with co-locating the two fleets. Above all, however, he felt the key question was the desirability of retaining a covert civilian capability. It was his judgment that such a requirement continued. In conclusion, he flatly recommended maintenance of the OXCART capability at Area 51 under CIA management. [2]

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[1] BYE-12721-68, 7 March 1968. D/NRO Memorandum to the Deputy Secretary of Defense, Subject: Study of Options for Continuing Operation of the OXCART Aircraft in FY 1969. See Annex 163.

[2] BYE-6441-68, 18 April 1968. Memorandum from DCI to Messrs. Nitze and Hornig. Subject: Considerations Affecting OXCART Program Phaseout. See Annex 164.

Time, however, was fast running out for the OXCART program. The prime consideration in every phase of discussions concerning the OXCART was budgetary. This was made very clear in the penultimate paragraph of the minutes of the ExCom meeting of 29 April 1968.[1] Despite the very cogent reasoning of the DCI, supported by the President's Scientific Adviser, the Deputy Secretary of Defense felt the central issue was budgetary. Since in the FY 1969 budget it had been assumed that the OXCART program was terminated, there simply was no money available to sustain the program. On 16 May 1968 the Secretary of Defense reaffirmed the original decision to terminate the OXCART program and store the aircraft. At his weekly luncheon with his principal advisers on 21 May 1968, the President confirmed the Secretary's decision.

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[1] BYE-13013-68, 29 April 1968. Minutes of NRP Executive Committee. (Annex 165).

## OXCART Auxiliary System Development:

## Electronic Warfare Systems

One of the original design goals in the OXCART program was to produce an aircraft with a radar cross-section sufficiently reduced to make it difficult to be detected and/or tracked with accuracy. The anti-radar testing program was pursued to provide data necessary for optimum aerodynamic shaping and choice of materials to minimize radar reflectivity. No provision was made to equip the OXCART aircraft with defensive electronic systems in its original design. Its safety was assumed to lie in its low level of detectability, and in its speed and altitude.

The cross-section levels that the designers achieved were, in fact, quite low. However, the advances the Soviets were making in their radar defense network were equally impressive. It became apparent , as more became known about the Soviet air defense system, that the OXCART aircraft would be unable to overfly hostile territory without penetration aids. The early-warning TALL KING radar, which was replacing older equipments throughout the Soviet Bloc, was estimated to be capable of detecting and accurately tracking the A-12 during an overflight. Improved performance was being evidenced in missile associated radars. A much more threatening environment existed by the end of 1961 than had been planned against in 1959. The new threat environment assessment spurred an already intensive collection program to measure the parameters and sensitivities of new generation Soviet radars. Vulnerability assessments indicated that the SA-2 threat was sufficient to warrant employment of ECM equipment and camouflage techniques. The resultant data and conclusions provided the base on which countermeasures were developed.

The conclusions were expressed in an OSI report as follows:

> "The principal conclusions of this study are as follows: (1) The OXCART vehicle can be detected and tracked by the Soviet TALL KING radar network at significant ranges (essentially line-of-sight); (2) Soviet interceptors can be scrambled in time to attempt an intercept, however, in view of limited speed and altitude performance, as well as insufficient AI radar and AA missile capability, the probability of a successful engagement is exceedingly small; (3) the SA-2 missile system must be considered as a definite threat to the OXCART vehicle on the basis of the capability of the FAN SONG radar to achieve detection at a range that is adequate to permit launch of at least one and probably three GUIDELINE missiles.
>
> "These statements lead quite naturally to the requirement that all possible means of reducing vehicle vulnerability be explored. In addition to penetration aids described in Chapter V, feasibility studies related to the following equipment concepts are being actively pursued: (1) FAN SONG radar detection and track indicator; (2) strange signal detector whose purpose is to detect and identify radar signals that may

> emanate from missile guidance radars whose characteristics are presently unknown; (3) barrage and/or deception jamming of the FAN SONG radar; and (4) a missile launch indication radar. It can be seen that these equipments, properly integrated, should provide the capability of the OXCART vehicle to monitor and react to the Soviet ABS in such a manner as to reduce vulnerability to an acceptable level.
>
> "Investigations of the various elements of the Soviet ABS elements are continuing in order to permit refinement of the present performance estimates. In addition, typical missions are being examined critically to provide information relative to optimum techniques and tactics for successful penetration. The results of these studies will be given in a forthcoming report." 1/

In the development of OXCART countermeasures a conscious effort was made to avoid techniques and equipments which duplicated, or adapted, military hardware. This was to prevent possible compromise of military systems should an A-12 loss occur during overflight. A family of novel warning and jamming devices emerged under what was called the SUPERMARKET approach to the problem. It consists of a number of electronic systems, passive and active, to warn the pilot of missile activity and to initiate jamming and confusion signals. A redundancy was designed into the total package to give a lower degree of vulnerability and to assure a high degree of

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1/ SC-04312-64, 19 February 1964. OSI Report, Subject: OXCART Vehicle Vulnerability Study. (On file in D/O/OSA/INTEL.)

total system reliability. A number of combinations of systems was made available for use on a given mission. Judicious employment of the combinations would prolong the A-12's freedom of operation over denied areas. The defensive electronic warfare systems that were developed and employed in the OXCART aircraft, with a brief functional description of each, are listed below:

BIG BLAST - (Active Jammer) - Denies target range from the SA-2 radar to force the missile into a three point guidance mode and early arming of the fuze.

BLUE DOG - (Active Jammer) - Recognizes missile guidance activity and actively transmits false commands to the SA-2 missile guidance systems.

PIN PEG - (Passive DF System) - Passively intercepts SA-2 radar frequency signal. Locates and positions SA-2 radar site in azimuth within vulnerable zone.

MAD MOTH - (Active Jammer) - Denies SA-2 tracking radar accurate angle information resulting in large missile miss distances. 1/

A Signal Intercept Package was also developed to collect Elint data. It was succeeded by System 6S, an advanced Elint collection system, which monitors the frequency range of 50 to 12,500 MH$_Z$ and provides analog recording of the signals.

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1/ For a more detailed description of the ECM systems developed for the OXCART program, see Electronic Warfare Systems Data Book, October 1967 (BYE-44246-67), published by the Air Systems Division, Office of Elint, DD/S&T.

Second generation ECM equipments that were in development and/or test stage when the OXCART program was closed out were:

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## A-12 Camera Development

A funded study by Perkin-Elmer in 1959 explored the feasibility of developing a precision photographic reconnaissance sensor for use in a Mach 3.5, 80,000-foot-altitude vehicle, having a photographic range of 2500 nautical miles. The principal problem areas identified in the study were:

a. Control of the camera environment, i.e., thermal, pressure and motion.

b. Effects of turbulence and shock wave on the optical wave front entering the camera.

c. Optimizing the components of the sensor system to provide photographic range, swath width and resolution within the confines of the available space.

d. Providing a window for the camera to look through that is 550° F on the outside and less than 150°F on the inside that will not distort the imagery to an unacceptable extent.

During the ensuing development and test phases of the Type I system, these identified areas proved to be the most troublesome. They still limit system performance.

The design philosophy employed by Perkin-Elmer reflected a need for controlling the camera operating environment and in some areas extending the state of the art to achieve the maximum performance. This resulted in a complex design that would give excellent results if it could be adequately maintained and serviced in the field; however, concern about reliability resulted in letting a contract to Eastman Kodak for the development of an alternate system that would be easy to service and have high reliability, but would not have as good a resolution potential. Both cameras were flight-tested in other vehicles prior to the availability of the A-12, and both essentially achieved their design goals. When the delivery schedule of the vehicles forced a decision in favor of the production quantities of one or the other, the Perkin-Elmer camera was selected on the basis of its demonstrated reliability and better ground resolution. The Land Panel concurred in this decision. Eight P-E cameras were eventually procured. Eastman Kodak built two cameras.

The third camera system developed by Hycon for the USAF A-12 program was introduced to the OXCART inventory to serve as a back-up for the P-E camera in the event the Eastman camera was phased out. It is a framing camera as contrasted with the panoramic design of the other two, and basically follows the design philosophy so successfully used for many years with the Hycon B camera in the U-2; that is, large scale, large format and long focal length. These characteristics limit the amount of photographic coverage, and require an amount of thermal control of the optical system that so far has not been available in the A-12.

Significant Developments:

a. An air bar system of supporting the film during its passage through the camera results in extremely low friction and tension on the film, reduces abrasion and permits right angle direction changes in the film travel.

b. Vacuum windows with dual glazings inhibit the transfer of high temperatures from the outside to the inside of the vehicle without distorting the camera's view of the ground. Studies and development in photographic window technology for supersonic airborne vehicles have established manufacturing techniques and the effects of thermal transients on windows that have proved extremely valuable in reconnaissance vehicles and sensor design.

c. A technique for synchronizing film velocity with optical system scan rate permits continuous photography at vehicle rate and reduces camera dynamic motions. This technique has been applied to other sensors in recent years.

Over 200 test flights of the Perkin-Elmer system in the years 1964 through 1966 established a degree of reliability and performance that culminated in 29 successful operational reconnaissance missions in Southeast Asia during the period from May 1967 to May 1968. No failures were encountered. Each of these missions covered approximately 100,000 square miles of denied territory. The Eastman Kodak cameras were removed from the inventory in July 1967 as part of the OXCART phaseout program. The Hycon camera, having entered the program later, continued testing through 1967 and was validated as being operationally ready. It was not employed on operational missions due to the satisfactory performance of the Perkin-Elmer camera.

## Inertial Navigation System

The Minneapolis-Honeywell Corporation (M-H) was selected to provide the inertial navigation system. It is a self-contained system and operates without the use of electromagnetic radiation or external references. In operation it displays present position, ground speed, and the direction and distance to go to any of 42 preselected positions. When operated in the appropriate mode the aircraft will be steered automatically to each point in the flight plan sequentially with no pilot action required. The INS has demonstrated a high degree of reliability. The specification error ratio for the system is 1. 5 nautical miles per hour of flight. The system consistently demonstrated less than one nautical mile per hour error.

## Automatic Flight Control

The automatic flight control system for the OXCART, also built by M-H, includes stability augmentation, autopilot and air data systems. The three axis stability augmentation system is a combination of electronic and hydraulic equipment which augments the natural stability of the aircraft. The system was designed to take corrective action rapidly when its sensors detect pitch, yaw or roll motion which change the proper attitude of the aircraft. The resultant dampening effect is essential to maintaining the stable platform necessary for high quality photography. While the stability augmentation system, autopilot and air data computers were not unique to the A-12, the aeroelastic and thermal problems associated with A-12 flight increased the system complexity in terms of required response rates, cooling requirements, etc.

Side-Looking Radar

The side-looking radar designed for the OXCART vehicle is a high resolution synthetic aperture radar using optical recording of the doppler signal and using ground-based optical correlation techniques. Two flight units and one engineering breadboard were procured. In addition, a strip correlator and two detailed correlators were procured for support.

The radar operates at a frequency of 9.432 gigahertz with a pulse width of 20 nanoseconds. Peak power is one megawatt. Pulse repetition rate is 4,000 pulses per second. The receiver noise figure is 6-1/2 db. System resolution is approximately 15 feet in range and 8 feet in azimuth (a long track) over a swath 20 nautical miles wide centered about 30 nautical miles off track. The 500 feet of thin based film used for original recording will cover approximately 1,000 miles of track. The system weight is about 950 pounds with an antenna length of 10 feet.

The system was first proposed in April of 1960 by the Scientific Engineering Institute. Development of the equipment was initiated in August 1960 with Westinghouse being the prime contractor for development of radar equipment and Itek developing the airborne recorder and the optical correlators. Initial flight test was started in March 1962 in an especially modified F-101 aircraft. In 1964 the system was delivered to Area 51 and underwent extensive ground checks. Subsequently, in early 1965, the system was returned to the factory and F-101 tests continued as OXCART aircraft were not available for this test program because of other higher priority activities. Over 200 flights were made in the F-101.

In late 1965 a review was made of the requirement and useage of the OXCART radar and a decision was made to reinstitute the flight test program. Equipment was therefore returned to the field in the fall of 1966 and flight test work initiated. Initial flights were unsuccessful in that the antenna suffered breakdown when operated at altitude. This problem was apparently solved in December 1966 and flight tests were programmed for early 1967. However, as only one aircraft was configured for accepting the radar, it was an early victim of the phasedown decision, as operational capability would not have been available without extended down time of additional aircraft for outfitting with modifications.

The radar was designated the AN/APQ-93 (XA-1) and was developed under the guise of an Air Force secret procurement. The program was also known as INVAR.

Additional work was done on the F-101 in support of Navy radar programs. The capability of the APQ-93 is better than most of the existing side-looking radars but is somewhat lower in performance than some test and development models now in existence.

### OXCART Life Support Equipment

*Introduction.* At the time the A-12 aircraft was being developed, there were no operational aircraft in the USAF inventory that had an equivalent performance envelope. Aircraft that were in existence in 1959 that presented similar problems, in terms of life support requirements, were the F-104, B-58, F-106, U-2 and X-15. Life support equipment used in such aircraft provided a basic foundation upon which the life support equipment for the A-12 was developed.

Life support equipment has, in general, two basic functions: (1) to enable the pilot to fly the aircraft and complete the mission throughout the entire performance envelope of the vehicle, under both normal and emergency operating conditions, and (2) to enable the pilot to safely escape from the aircraft throughout its performance envelope in the event of catastrophic emergencies. In order to provide these functions, A-12 life support equipment had to include a safe and reliable pressurization, air conditioning, and oxygen system with adequate redundancy and duration to meet any operational requirements. In addition the equipment had to provide the pilot with back-up pressurization and an emergency oxygen supply, and protection from windblast, high temperatures, deceleration and spinning in the event of emergency escape from a disabled aircraft.

Specific Problem Areas. The specific parameters and problem areas presented by the A-12, around which the life support equipment had to be developed, were as follows:

(1) Pressure altitude. The A-12 would operate up to a maximum altitude of 100, 000 feet above sea level.

(2) Speed. The A-12 would operate up to a maximum speed of Mach 3. 5 at maximum altitude, or a maximum equivalent airspeed of 450 KEAS.

(3) Range/Duration. The A-12 would have, because of aerial refueling, a worldwide range with flight durations in excess of 8 to 10 hours.

(4) Windblast/Deceleration. The worst windblast/ deceleration conditions under which a pilot could eject would be at Mach 3.2 at 74,000 feet, which would expose the pilot, at the moment of ejection, to an instantaneous maximum dynamic pressure (windblast) of 950 lbs. per square foot and a maximum linear deceleration of 9 G's.

(5) Temperatures. Under normal A-12 operating conditions the pilot would require protection from radiant heating due to aircraft skin and windshield temperatures approaching 400° F. Upon ejection at 100,000 feet and Mach 3.2, the pilot would be exposed to an instantaneous stagnation temperature of 800° F. Upon deceleration and free fall from high altitudes, the pilot would be exposed to temperatures of -67° F or lower.

(6) Spinning. If a pilot ejected at maximum altitude, where it is unsafe to open a normal parachute, he would enter a flat spin which would be uncontrollable. Such a spin, which could exceed 200 RPM would produce serious to fatal injuries and

would likely result in parachute failure when it was automatically opened at a lower altitude.

A-12 Life Support Equipment Development. Life support equipment falls into two categories: (1) aircraft systems, and (2) personal equipment. The following paragraphs describe the A-12 equipment and briefly cover the development of each item.

Aircraft systems were developed by the prime contractor, Lockheed Aircraft Corporation, and included the following items:

a. Pressurization and air conditioning systems. The cockpit pressurization schedule for the A-12 was unique as compared to existing high performance aircraft. The cockpit remains essentially unpressurized from ground level up to a flight altitude of 26, 000 feet. At flight levels from 26, 000 to 100, 000 feet, the cockpit remains isobaric at 26, 000 feet (5.25 psia). This schedule was chosen to give (1) optimum temperatures and airflows to the cockpit air conditioning system especially during climb and descent; (2) lowest oxygen consumption consistent with adequate physiological protection; (3) safest pressure differential across the cockpit glass during critical refueling maneuvers.

The air conditioning system chosen was also unique in that a completely dual system was chosen. The unique problem of aerodynamic heating of this vehicle dictated that, for mission completion and adequate pilot protection, a complete redundancy of air conditioning had to be provided. The system was therefore constructed with one system providing cockpit/pilot cooling and the second system providing Q and E bay cooling. In the event of failure of the system providing cockpit/pilot cooling, the pilot would operate a crossover selector to divert the Q and E bay cooling to the cockpit/pilot.

Changes and modifications were made to the air conditioning system over the years until peak efficiency and maximum pilot comfort were achieved in 1966-67.

b. Oxygen System. Because of the critical nature of operational concepts, a completely redundant oxygen supply and delivery system was provided in the A-12. The initial system consisted of two high pressure oxygen cylinders and associated plumbing, reducers and regulators. A failure of one system would have no effect on the pilot because the second system would continue to provide the pilot with his life-sustaining oxygen. Only the duration of supply would be affected with such a failure. The calculated duration for both systems being used was 15-3/4 hours while failure of one system after 5-1/4 hours of flight would reduce the total oxygen duration to 10-1/2 hours available. In the period 1964-65 the oxygen systems were converted to liquid oxygen (LOX), using two 10-liter converters, either one of which would provide in excess of 14 hours oxygen availability at altitude. In addition to the added safety margin, this change increased reliability and reduced weight and volume occupied by the oxygen system.

c. Ejection System. In 1959 LAC analyzed the possible escape systems for the A-12 including fuselage nose capsules, encapsulated seats, and rocket-catapult seats. It was determined that, because a pressure suit was required in any case, due to potential loss of cockpit pressure, the most reliable, lightest, smallest and safest escape system which would satisfy the high and low level escape problems for the A-12 consisted of a full pressure suit and a rocket-catapult ejection seat. The pressure suit proposed was that developed for the X-15, because of its demonstrated capability for resistance to windblast and elevated temperatures which exceeded the resistance required for use in the A-12. The ejection seat proposed was the upward ejection C-2 seat as used in the F-104. The C-2 ejection seat pyrotechnics were modified for use in the A-12 to qualify them for service use at the elevated temperatures encountered with the A-12 (i.e., qualified for use at 300° F versus 160° F for the F-104 pyrotechnics).

The escape system was qualified through testing including component tests, system functional (breadboard) tests, static tests, Edwards AFB track tests, aircraft drop tests at El Centro, California, and finally by inflight ejection tests using a specially equipped F-106 at El Centro. The test period covered a span from 1960 through final inflight ejection tests in August 1964. The A-12 ejection seat was equipped with a rocket catapult mounted on the rear of the seat, which propels the seat upward on vertical guide-rails during ejection. During ejection, seat to aircraft attachments and pilot to seat attachments are disconnected by quick-disconnect fittings; one for all electrical leads, one for the suit vent hose, one for the normal aircraft oxygen supply and one for actuating the emergency oxygen supply. The seat incorporated the following features:

(1) A headrest for support and positioning of the pilot's head during ejection.

(2) A centrally located ejection D-ring which initiates the entire ejection sequence and precludes arm flailing after ejection.

(3) A shoulder harness and inertial reel lock assembly, which locks the harness automatically during ejection, whenever a 2 to 3 G force is exerted in a forward direction, or manually when desired by the pilot.

(4) A pyrotechnic operated automatic opening seat belt and man-seat separator. An airspeed sensor is attached to the aircraft pilot static system and senses aircraft airspeed at ejection. If aircraft airspeed is below 250 KIAS (later changed to 290 KIAS), a 0.6 second delay is selected between seat ejection and seat belt/separator actuation. If airspeed is above 250 KIAS (later changed to 290-300 KIAS), a 4.0 second delay is selected by the sensor. This variable delay assures that the pilot is automatically separated from the seat as soon as possible, and within the limits of tolerable G forces for deceleration and parachute deployment.

(5) Knee guards which erect forward to protect the pilot's legs.

(6) An automatic foot-retraction and retention system which pulls the pilot's feet into stirrups and holds them

until automatically released at man/seat separation. The foot-retention cables are automatically cut at man/seat separation or may be manually released by pulling a head-rest mounted D-ring for firing the cable cutters in the event of rapid ground egress.

(7) A canopy removal system tied, pyrotechnically to the ejection seat D-ring, and also removable by alternate internal and external canopy jettison handles.

Personal Equipment:

a. Pressure Suit/Oxygen System. The David Clark Co., working with the Firewel Co., developed a new pressure suit for use in the A-12 which represented a state-of-the-art improvement over the then existing X-15 pressure suit and the USAF standard A/P-225-2 full pressure suit. The major improvements and changes from previous suits were a dual oxygen regulator and dual suit pressure controller for increased reliability and safety, increased helmet visor thickness to prevent deformation or failure from the high temperatures which could be encountered in the A-12, a flotation vest for water survival which was incorporated into the outer cover of the pressure suit, and an aluminized flame resistant fabric outer cover for protection from high cockpit temperatures or high stagnation temperatures which would be encountered upon ejection at maximum altitude and airspeed.

b. Parachute/Emergency Oxygen System. Standard ejection seats, pressure suits and aircraft systems (oxygen, pressurization, and air conditioning) had to be upgraded and improved for use in the A-12, and the efforts involved represented product improvement. However, the personal parachute required to complete the A-12 life support system was an entirely new concept and required considerable development and testing efforts. The development and testing program started with a complete review of parachute systems in existence in early 1960 and an initial manned parachute jump in September 1960, and ended with final configuration full system testing (parachute and ejection seat) by inflight ejection from an F-106 during August 1964. The initial parachute jump in September 1960 made by Capt. Harry Collins, who was the program manager and primary test subject throughout the development, established the requirement for an entirely new parachute concept. In this jump the subject wore a full pressure suit, a packed survival (seat) kit, and a standard parachute. The jump was programmed for a 50 second free fall to determine the body position that would be encountered. After only 40 seconds of free fall the subject was spinning at a rate of 140 to

152 RPM in a head and back down position. The jumper overrode the automatic timer and pulled the parachute ripcord and sustained high opening forces. Upon parachute opening, the spinning caused the parachute suspension lines to wind up approximately 28 times creating the danger of chute collapse. This jump indicated that an A-12 pilot ejecting at maximum altitude would require a stabilization parachute to keep him in an upright and stable position during free fall to an altitude where the main parachute could be deployed (approximately 15,000 feet). There were a total of 5 model configurations developed and tested during the complete period. Models A, B, and C were purely developmental and Model D was the first operational configuration. A total of 281 tests were made on these model parachutes and their sub-systems and covered the period from January 1961 through August 1963. During 1964 the fifth and current parachute configuration (Model E) was developed and tested. This configuration was developed to improve comfort, reliability, and maintenance of the parachute. An additional 37 tests were required to qualify this model, testing being completed in August 1964.

The personal parachute developed for and used in the A-12 has the following major features: (1) A 78-inch diameter, automatically deployed, ribbon-type, hemisflo stabilization parachute for maintaining the pilot in an upright position during descent from maximum altitude to 15,000 feet, (2) a 35-foot diameter, main parachute canopy that is automatically deployed at 15,000 feet, and (3) an emergency oxygen system that is automatically activated upon ejection consisting of two 45-cubic inch high pressure oxygen cylinders integrated into the parachute back pan containing the automatic parachute actuators. (See overleaf for picture of pilot, suited up and ready for flight.)

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DDS&T Historical Paper
No. OSA-1
Vol. XIV of XVI

# DIRECTORATE
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# SCIENCE & TECHNOLOGY
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E.O. 13526, SECTION 5.3(b)(3)

ISCAP APPEAL NO. 2002-0049, document no. 14
DECLASSIFICATION DATE: September 19, 2016

Controlled by : DDS&T
Date prepared : 1 April 1969
Written by : Helen Kleyla
Robert O'Hern

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DDS&T Historical Paper
No. OSA-1
Vol. XIV of XVI

# DIRECTORATE OF SCIENCE & TECHNOLOGY HISTORY

(TITLE OF PAPER)
History of the Office of Special Activities
Annexes 121 through 153

(PERIOD)
From Inception to 1969

DO NOT DESTROY

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ISCAP APPEAL NO. 2002-0049, document no. 14
DECLASSIFICATION DATE: September 19, 2016

Controlled by : DDS&T
Date prepared : 1 April 1969
Written by : Helen Kleyla
Robert O'Hern

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ANNEX 121

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19 November 1957

## PROPOSED ADVANCED RECONNAISSANCE SYSTEM

### 1. Background:

a. The President's Board of Consultants on Foreign Intelligence Activities included in its latest semi-annual report the recommendation "that an early review be made of new developments in advanced reconnaissance systems". In the text of its report, the Board states that it is aware of two proposed reconnaissance systems. It is known informally that this is intended to refer, on the one hand, to the several proposals now under consideration in the Department of Defense for a reconnaissance satellite and, on the other, to a study currently in progress in the Central Intelligence Agency of the feasibility of a manned reconnaissance aircraft designed for greatly reduced radar cross section. This memorandum deals exclusively with the latter of these two proposed systems.

b. The study in question had its origin in the RAINBOW Project, the purpose of which was the development of radar camouflage which would be applicable to the U-2 aircraft without serious impairment of performance and sufficiently effective to permit a small percentage of reconnaissance missions to go undetected and greatly to reduce the accuracy and extent of radar tracking of reconnaissance missions even when detected. Although considerable success has been achieved toward this objective, it began to be apparent by mid-summer 1957 that only limited and temporary success could be hoped for through the application of passive camouflage to an aircraft of conventional structure. Briefly the reason is that (so far as known to the U.S. Government) all camouflage devices in use, under development, or even contemplated, in either the United States or Europe, are either too heavy or too bulky for aircraft application (except at prohibitive cost in performance) or are inherently narrow banded. At the same time, the Russian radar system is already characterized by a very considerable degree of frequency diversification which is rapidly increasing. Any feasible combination of narrow banded solutions can cover only two or three regions in the whole spectrum and can therefore give only limited protection.

c. These circumstances suggest that only a much more radical approach offers the possibility of really satisfactory results. The objective must be to achieve inherently broad banded solutions, which would afford protection not only over all the ranges of frequencies in which Russian radar currently operates, but also against sets operating at new points on the spectrum. Preliminary consideration led to the conclusion that any such radical approach would involve the use of unconventional materials, or unconventional structures, or unconventional configurations of aircraft, or some combination of the three and would, therefore, inevitably require the design of an entirely new aircraft optimized with respect to radar reflectivity. Accordingly, an exploration of possible design approaches was set in motion in August 1957.

2. Study Now in Progress:

a. Unconventional materials, structures, and configurations all have a cost in terms of weight or drag, so any of the radical approaches now under consideration will involve a compromise between the invisibility of the aircraft and its performance. In the present state of knowledge a clear cut choice of the optimum approach is difficult and no one can be certain that even the best compromise will be worthwhile. The familiar techniques of reducing reflectivity are either too heavy and bulky or just not effective enough and the accurate evaluation of the reflectivity of complete aircraft is extraordinarily difficult. Accordingly, in its present phase, the study is focused on the "invention" of new approaches to the electronic objective and upon techniques of measurement and experiment designed to reveal the effectiveness of these approaches. At the same time, recent advances in the state of the art in aerodynamics must be reviewed in an effort to offset as far as possible the inevitable penalties to aircraft performance. In the next phase, it will be necessary, and it should be possible, to weigh the gains to be achieved in the form of reduced reflectivity by each approach against its aerodynamic costs and on this basis to select one (or at most two or three) as the most promising. Once the field has thus been narrowed, it will be possible for an aircraft manufacturer to develop a concrete proposal (or alternative proposals) for an aircraft which will achieve the best performance obtainable within the state of the art employing the approach that has been selected.

b. Especially in its present phase this is more a scientific than an engineering study, though the scientists must have access to competence in airframe design and in structures and materials for their guidance. Accordingly, a temporary technical staff for the Project has been assembled in Cambridge, Massachusetts, in a small separate facility. The core of the staff is the group of scientists from MIT's Lincoln Laboratory who have been working on the RAINBOW Project for the last year. They will be supplemented with two or three additional men in the field of electronics and will be assisted by consultants from several other organizations, including the A. D. Little Company (on certain materials problems), possibly the National Advisory Committee for Aeronautics, and firms on the east and west coasts that are conducting both full-scale and model tests under the direction of the technical staff. In addition, basic research contracts have been concluded with Bell Laboratories and the Farnsworth Electronics Company (a Division of the International Telephone and Telegraph Corporation). Considerable effort has been and is being expended to develop really reliable measurement techniques, including a small range in Cambridge for model tests of low frequency reflection, a large outdoor range at Westinghouse for model tests of high frequency reflection and equipment for full-scale testing (both ground and flight tests) at Indian Springs AFB, Nevada. Most of the personnel and facilities thus assembled had already been employed in the RAINBOW program and the work on the production of camouflage application to conventional airframes is still proceeding.

c. Since the autumn of 1956 when it began to appear that the RAINBOW Project might achieve some degree of success, the Air Force and the Navy have been kept informed of its progress and have provided support. Knowledge of the activity has been closely held but has been available to a sufficient number of officers in each Service to insure that the implications of radar camouflage for military programs could be taken into account. All of the arrangements described in the preceding paragraph were made in the first instance as the means of carrying out the original RAINBOW development of radar camouflage and are believed to be satisfactory to the Air Force and the Navy, at least in connection with that program. When emphasis was shifted to the above-described study of a more radical solution, a very few senior Air Force and Navy officers were so informed and are aware both of the character of the work in progress and of its purpose. The bulk of the work done in this country in aviation and electronics and of the competence available in the Government in these two fields is to be found in the Air Force and the Navy. Since the Central Intelligence Agency neither does nor should possess any parallel capability, the most intimate cooperation is required if the above-described program is to have a chance of success.

3. Preliminary Conclusions:

a. Although, as stated above, it is too soon to judge the technical feasibility of an extremely low reflectivity reconnaissance aircraft, such a system, if feasible, would have notable advantages as a complement to a reconnaissance satellite. Operating at seventy to eighty thousand feet, extremely high resolution photography and excellent electronic intelligence is available. Since radar reflectivity would be exceptionally low in the X-band the aircraft would have a high degree of immunity to both aircraft and missile interception. If not susceptible to more than sporadic detection and tracking, its immunity to interception would be further enhanced and the political obstacles in the way of its employment would be reduced to a minimum. In particular, it is believed that (if feasible) such a reconnaissance vehicle is more promising than a manned aircraft designed for greater performance but without benefit of radar camouflage. Although it would be entirely within the state of the art to build an aircraft with a ceiling of ninety thousand feet (or even higher), it might well be subject to interception by ground-to-air missiles by the time it could be operational. In brief, it is submitted that any reconnaissance vehicle can achieve reasonable immunity from physical interception and political frustration only by going far higher than manned aircraft or achieving effective invisibility to radar.

b. If, on the basis of a favorable outcome to the study now in progress, the decision should be made to proceed with the reconnaissance system herein discussed, this project should be carried out with maximum speed and security. There is no slightest possibility that a successor aircraft could be operational sooner than the spring of 1959, yet by that date it seems highly likely both that the U-2 will be obsolete and that the urgency of the need for photographic reconnaissance will be even greater than it is today. The management and organization of this later phase of the project, if it is undertaken, should be chosen with these objectives in view.

c. An appreciable part of the possible benefit of the present study and of any project that grows out of it will be lost if the tightest security is not maintained around it. It must be emphasized that in the fields of radar and of passive and active countermeasures there are not likely to be a few crucial secrets, the safeguarding of which can protect the security of the whole system in which they are used. Most or all of what is known to us in these fields is known to the Russians and they are as capable as we of devising and understanding the design approaches now under study. The only way to achieve a decisive lead over their radar defense is to develop a system and have it operational before they have discovered that an intensive effort is being made in this area.

4. Proposed Course of Action:

a. The program of studies, measurement and experimentation will be carried forward with all possible speed, in conjunction with further work on the RAINBOW camouflage, looking toward the choice of a design approach for a possible new aircraft within three months' time. The work will be under the technical direction of the above-described scientific staff in Cambridge with actual systems responsibility remaining in the AQUATONE Project Headquarters in Washington, D. C.

b. During this phase, contact will be made with certain manufacturers as appropriate in order to explore the possibilities of unconventional materials and structures and receive the benefit of their views on the general design problem.

c. It is proposed to maintain more continuous and more intimate contact than hitherto with appropriate components in the Air Force and the Navy.

d. Appropriate steps should be taken to control discussion with manufacturers in the aviation and electronics industries and actions such as the issuance of formal requirements which might stimulate unusual interest in the concept of a non-radar reflective aircraft.

e. As soon as it is possible to select the optimum design approach for a low reflectivity reconnaissance aircraft and to evaluate with reasonable reliability both its feasibility and its performance, a Governmental decision should be made as to the advisability of a crash program to produce eight to twelve such vehicles.

5. If the above-outlined conclusions and course of action are generally satisfactory, the joint report by the Secretary of Defense and the Director of Central Intelligence, although it should avoid any description of the concept and study herein discussed, could respond to this part of the Foreign Intelligence Board's recommendation with the statement (a) that one of the possible advanced reconnaissance systems known to the Board is being studied, (b) that for the present at least questions of funding and management are in hand, (c) that the study is proceeding with the utmost sense of urgency, and (d) that joint recommendations for action will be submitted if and when the feasibility of the system is established.

ANNEX 122

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THE DEPUTY SECRETARY OF DEFENSE
Washington, D. C.

November 26, 1957

MEMORANDUM FOR MR. ALLEN DULLES

On November 19th, you and Mr. Bissell discussed with General Twining, General LeMay, Admiral Burke and me the subject matter of ~~Top Secret~~ 164671. I wanted to let you know we are in agreement with the exploratory work that is now going on in Cambridge and elsewhere. Noting that you expect this to reach a definitive stage about three months hence, we will be glad to consider with you at that time the feasibility and desirability of proceeding with a definite design project.

While the Navy, as well as the Air Force, is very much interested in this project, we are looking to the Air Force to carry the Defense responsibility for it and particularly to be the agency to undertake any follow-on project of the kind proposed in Paragraph 4. e. of your ~~Top Secret~~ 164671.

With reference to Paragraph 5 of ~~Top Secret~~ 164671, we concur in the proposed joint report in response to the FIB recommendation.

(Signed)

Donald A. Quarles

~~TS~~-164678

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ANNEX 123

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~~S E C R E T~~

15 November 1958

MEMORANDUM FOR: Dr. James R. Killian

An advisory group composed of the undersigned, together with the Assistant Secretaries for Research & Development of the Air Force and the Navy, have considered over the past several months the technical features which must be achieved in order to provide an adequate successor to the presently operational special reconnaissance aircraft. These features are:

Substantial increase in operational ceiling and probably also in speed to avoid interception;

Low susceptibility to detection by radar and other modes of observation;

No sacrifice in operational range;

Minimum size and weight.

The group has evaluated a number of proposed special reconnaissance aircraft concepts. These various concepts have included the use of unique engines, special fuels, launching by rocketry or mother aircraft, new structural materials and design methods, unusual design configurations and other features. The advisory group has had access, it is understood, to all design proposals that have been made to the Military Services that might be of interest in the reconnaissance application and have considered the technical characteristics of certain aircraft now under military development.

It is our conclusion that the most satisfactory design approach is one based upon a new, small and reasonably lightweight aircraft carried aloft to supersonic speed by the B-58 as a mother aircraft. The special reconnaissance aircraft would cruise by itself at substantially higher altitudes but over the same distances as now achieved and would be powered by dual ram-jet engines using conventional fuel. By reason of its high supersonic speed, cruise altitude, and design features, this aircraft would be much less susceptible to radar detection and tracking than current aircraft. There appear to be no unusually difficult problems in terms of facilities or techniques in the development of this aircraft and its engines except perhaps those of aerodynamic heating and of achieving

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satisfactory ram recovery with a complex air inlet to buried engines.

A second and technically somewhat less desirable choice is a similarly small and reasonably lightweight aircraft capable of unassisted take-off, flight at the same high altitudes but at slightly less supersonic speed, and over about three-fourths the desired range when using conventional fuels. This alternate design would be powered by twin ram-jets quite similar to the preceding case in addition to a pair of currently developmental small turbo-jets adapted to supersonic speed. This alternate design could achieve full range by either refueling at supersonic speed or by use of special fuels suspected of posing certain operational problems. This alternate design would be more susceptible to detection and tracking by radar. The development of the alternate aircraft would pose somewhat less of a problem in aerodynamic heating but the flight performance is predicated on extremely close control of all weights including somewhat reduced payload. While this alternate design may be available sooner than the other, the ram-jet development could be a governing factor in either case.

We recommend that the development of a new aircraft be undertaken at once on a highly expedited and sensitive basis in order to retain our ability to conduct special reconnaissance. We recommend further that the former proposal utilizing the B-58 to launch a newly designed reconnaissance vehicle be selected for this purpose since this aircraft appears to best meet all of the desired technical features. Although a more detailed comparison may reveal that the latter proposal could be developed at somewhat less cost, this unstaged system does not appear able to meet all of the desired technical features with the same success. In case the system we recommend is not acceptable, we would wish to review other alternatives before recommending firmly a second choice.

/s/ Edwin H. Land
Chairman
/s/ Edward M. Purcell
/s/ H. Guyford Stever
/s/ Courtland D. Perkins
/s/ Allen F. Donovan

[redacted]

ANNEX 124

16 December 1958

## MEMORANDUM OF UNDERSTANDING

### FUNDING OF PROJECT GUSTO
### FY 1959 AND FY 1960

1. For the past fourteen months feasibility studies have been in progress looking toward the development of a new intelligence collection system. In May 1958 a panel of consultants was established by the Scientific Advisor to the President, who acted also on behalf of the Secretary of Defense and the Director of Central Intelligence. In a report rendered in late November, this panel indicated its choice between competing design proposals and recommended that the development of the intelligence collection system be undertaken immediately on an expedited and highly secure basis. Although considerable further work will have to be done before the optimum configuration for the proposed system can be determined in detail, there is agreed to be a strong presumption that substantially the desired performance can be achieved.

2. With the feasibility studies completed the next phase of this project, if it is to go forward, will involve extensive tests, development of detailed design, final determination of configuration, and (in order to achieve a capability at the earliest possible date) some fabrication or procurement of long lead items. This phase of the project will require four to six months for its completion and will not involve a major financial commitment. At the completion of this phase, a much more solid estimate of the performance of the system and of its total cost will be available and a final decision can then be made to abandon the undertaking or carry it through to completion. It is planned in the near future to seek approval for this next phase. Presumably, such approval will be granted only if the development of the proposed intelligence collection system is considered worth while subject to a more firm demonstration of its performance and a satisfactory hard estimate of its cost.

3. Partly because many of the details of the optimum configuration remain to be determined and partly because it is believed that cost estimates submitted by the contractors under consideration will be subject to considerable change in the course of negotiation, firm and reliable estimates of total funding required cannot be made at this time. It seems clear, however, that the minimum cost of the system may be in

the neighborhood of $100,000,000 and could well turn out to be higher. It has been firmly estimated however, that the next phase will cost between $4,000,000 and $5,000,000, depending in considerable part on whether two competing designs are carried along through this phase or a final choice of design approach and source is made at this time.

4. It is understood that if approval is obtained (on the terms outlined in paragraph 2, above) to proceed with the next phase of the project, this activity will be financed by release of funds from the CIA Reserve in the amount of $4,000,000 to $5,000,000. This sum will be obligated almost immediately and will be wholly expended during FY 1959.

5. It is understood that if, after completion of the next phase, approval is received to proceed with the development of the proposed system, $75,000,000 of FY 1959 and/or FY 1960 Department of Defense funds will be made available for this purpose but these funds are not a part of the FY 1960 CIA budget and will not in any way affect the Agency Reserve.

6. With respect to the management of the $75,000,000 to be made available to the Agency in the event of final project approval, it is understood:

a. That these funds will be available for no purpose other than the project herein referred to, and

b. That CIA will have the same degree of effective control over their use that it would have if they were obtained as a release from the CIA Reserve.

CENTRAL INTELLIGENCE AGENCY
(Signed)
L. K White
Deputy Director (Support)
16 Dec 1958

BUREAU OF THE BUDGET
(Signed)
Robert M Macy
Chief, Internat'l Div.
16 Dec 1958

(Signed)
Richard M. Bissell, Jr
Special Asst to the Director
for Planning and Development

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ANNEX 125

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OXC-0323-60

24 February 1960

MEMORANDUM FOR: Director of Central Intelligence

THROUGH: Deputy Director (Plans)

SUBJECT: Bureau of the Budget Request for DCI Memorandum Concerning OXCART Presidential Approval

1. This memorandum contains a recommendation for DCI approval. Said recommendation is contained in paragraph 3.

2. At a 15 February meeting attended by Messrs. Saunders and Mason of the Agency's Office of the Comptroller and the undersigned, Mr. Robert M. Macy of the Bureau of the Budget stated that it was his impression that further Presidential approval was required beyond that given OXCART on 20 July 1959, prior to implementing the full scope of the program. Mr. Macy was informed that it is the consensus of opinion of the DCI, Deputy DCI and Deputy Director (Plans), who is the Project Director, that no further Presidential approval is required. Further, he was advised that the technical radar objectives of the program remaining to be achieved, and discussed with the President at the 20 July 1959 meeting, were reviewed on 20 January 1960 by the Project Director, certain Agency and USAF personnel, contractor representatives and special consultants, who determined that technical radar objectives were being achieved satisfactorily; the Agency then initiated appropriate action to implement the full scope of the Project. Mr. Macy appeared to be satisfied with this information but requested that a memorandum for the record to this effect be forwarded to the Bureau of the Budget by the DCI.

3. In accordance with the foregoing request of Mr. Macy for a memorandum from the DCI to the Bureau of the Budget, it is recommended that the Director approve and sign the attached memorandum. The memorandum may then be returned to the undersigned for transmittal to the Bureau of the Budget.

(Signed)
WILLIAM BURKE
Colonel, USAF
Acting Chief, DPD-DD/P

Attachment

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8 March 1960

MEMORANDUM FOR: Director of the Budget

ATTENTION: Mr. Robert M. Macy
Chief, International Division

SUBJECT: Project VULGARIAN

When the Project known to the Bureau of the Budget as VULGARIAN was discussed with the President and approved by him on 20 July 1959, the presentation included a statement of technical objectives believed to be attainable. These expectations of accomplishment, including both technical radar characteristics and vehicle performance, were based on extensive feasibility studies undertaken prior to that date, the results of which had been reviewed by a panel of external consultants. The approval then granted obviously presupposed that the anticipated results would be achieved, so it was felt desirable six months after full-scale initiation of the Project to review the work so far accomplished in order to determine whether, in the light of the additional information acquired in extensive tests and measurements, the original objectives still appeared to be valid. Such a review was undertaken in a series of meetings on 20 and 21 January 1960 by: the CIA Project Director, USAF technical representatives, and Drs. Edwin H. Land, Edward Purcell and H. Guyford Steever acting as special consultants. The result was favorable in that the evidence presented, which was far more definitive than that available at the time of the original decision, strongly supported the conclusion that the objectives discussed with the President could be substantially achieved. Accordingly, the Agency is proceeding with the Project.

(Signed)
ALLEN W. DULLES
Director

/Initialed:
CPC
Deputy Director/

/Originator:
(Signed)
Richard M. Bissell, Jr.
DD/P/

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ANNEX 126

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OXC-0152

8 December 1959

MEMORANDUM FOR: Deputy Director (Plans)

THROUGH: Deputy Director (Support)
General Counsel

SUBJECT: Competitive Bidding on Certain OXCART Components

1. This paper contains a recommendation for the Deputy Director (Plans). Such recommendation is contained in paragraph 7.

2. PROBLEM:

A decision is required to permit or disallow competitive bidding for certain OXCART components for which Lockheed Aircraft Corporation is the immediate consumer.

3. ASSUMPTIONS:

a. In the CHALICE Program, which in many respects serves as a model for OXCART in the fields of administration, contracting, security and finance, time deadlines, security considerations, and the relatively more simple equipments involved dictated that normal open competitive bidding for prime and subsystems not be followed. Adequate justification for sole source contracts was therefore available, and no major shortcomings in the sole source system occurred in CHALICE, since no contractor defaulted in performance.

b. The OXCART Program, on the other hand, can be said to represent a more significant forward step in the state of the art in many fields: aerodynamics, thermodynamics, propulsion, optics, etc. It is therefore, reasonable to assume that the element of risk is proportionately larger along with an obviously greater dollar requirement for the equipments needed. Thus a major failure, such as the selection of a manufacturer whose product might not prove adequate to the difficult task, would be not only more costly but more difficult to explain. Were it possible to connect such a failure with the sole source mechanism, in which competition had been ruled out, the error would become even more conspicuous in the light of

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hindsight. Consequently, it appears that any recourse to sole source bidding, undertaken either by ourselves as the prime customer or by our prime contractor in the form of subcontracts, should be amply justified before such a decision is made.

4. FACTS BEARING ON THE PROBLEM:

a. One area in OXCART serves as an illustration of the problem, and that is in the procurement by Lockheed as the prime of three major integral components: (1) air conditioning equipment, (2) inertial guidance gear, and (3) automatic pilot equipment.

b. An as yet undesignated number of dollars, estimated as running into the millions for each of the three equipments, is involved. It is not possible to estimate the probable dollar differences between bids of the competitors in each field, since they are being asked for state of the art equipments in each instance, though all competitors have had experience at the advanced and sophisticated level in their special areas. The principal subsystems and major competitors are as follows:

| | |
|---|---|
| Air conditioning installation: | Hamilton Standard Mfg. Co.<br>Airesearch |
| Inertial guidance gear: | Minneapolis-Honeywell Manufacturing Co.<br>North American Aviation Corporation<br>Nortronics (Div. of Northrop Aircraft Corp.) |
| Automatic pilot: | Sperry-Rand Corporation<br>Bendix Aviation Corporation |

c. In the view of Mr. C. L. Johnson, Engineering and Research Vice-President of Lockheed, each of the above concerns stands as a recognized leader in the special fields enumerated. Were OXCART not ringed with the highest security considerations, and were the same system of principal prime contractor subbing out aircraft components employed, Lockheed would invite design competition between these competitors followed by competitive bidding. This would add a minimum of thirty days to the procurement process (and to eventual delivery date), when contrasted with the sole source mechanism.

5. DISCUSSION:

a. Open competitive bidding has the undeniable advantage of creating a permanent record to show that the Government's interests were "adequately protected" and that all possible savings consistent with the nature of the requirement were made.

b. The greatest potential problem encountered in employing competitive design and bidding on OXCART stems from the truism that only one competitor can finally get the order. Since the orders cited as examples above will be for dollar amounts running into the millions, the acquisition of the final order can and would become a matter of considerable concern to all bidders. The loss of the final order might well occasion active disappointment on the part of the loser, leading either to an overt inquiry of the military regarding the program for which the components were sought, or possibly to a request for interested Congressmen or legislative committees to investigate the validity of the final decision. Either of these actions could be potentially destructive of the security we are attempting to ensure for OXCART.

c. Another area of potential damage would arise from surfacing these exotic and sophisticated requirements among more than the required minimum of industrial concerns, simply because definitizing the specifications would in effect give away much of the performance of the basic vehicle. This can be justified within a single company, but it becomes questionable when it is known in advance that the information will go to more people than will eventually have to use it. Even though substantive briefings could be given to top officials in each bidding concern, with a view to holding them responsible for containment of information, the working level engineering force in each company would come into possession of enough information to permit at least speculation on aircraft performance characteristics. In addition, competitive bidding would surface numbers of components required, which would tip off production objectives.

d. The basic fact is that we are attempting clandestinely to construct a manned, high-performance aircraft costing huge sums of money in a domestic political climate unfriendly if not hostile to such programs. The magnitude of the costs of major items under OXCART precludes reliance upon the protective coloration of "proprietary in-house research and development." There are today, in contrast to CHALICE in 1955, no other USAF or U.S. military airframe procurement programs in existence to which we could attribute activity on the part of a supplier of major components were questions to be raised at any level outside the witting circle. The cancellation of the F-108 program and the recent reduction of the B-70 effort to prototype status are but two examples.

e. While it is true that there has been limited competition in the basic airframe design phase, it would have been possible if challenged, to attribute this activity to advanced feasibility studies since no actual production was involved, and the dollar amounts were modest in comparison to actual production costs once design is fixed.

f. We have been assured by the airframe manufacturer that in the event sole source procurement on subsystem components needed by him is authorized, he will exercise the greatest care possible in picking competent concerns and obtaining from them all available evidence to substantiate their design decisions. It is, of course, in his interests to ensure this sort of compliance as much as in our own.

g. The conduct of a program of the scope and character of OXCART requires a delicate balance between many forces to achieve success. Too much conservatism, either in planning or execution, may be as damaging as an overdose of liberalism in these same fields. What must be demonstrated is that all aspects of major decisions have received thorough and prudent consideration, and that all reasonable precautions consistent with the priority of the mission have been taken to ensure proper performance with maximum technical gain for the funds committed to our trust.

6. CONCLUSIONS:

a. The adoption of a system of competitive bidding for major OXCART components, either wholly open or carefully controlled and limited to not more than say two participants at most, contains the ingredients of possible unexpected surfacing of the OXCART program as a major aircraft procurement effort under United States Government, if not CIA-USAF auspices at a time when such programs have been largely eliminated. The risk of such exposure must be assumed to be a calculated one.

b. Dollar savings possible through limited competitive bidding cannot accurately be estimated, since few knowns are available where new and advanced components are required. That such savings could occur, as between bids of competitors in a specific field, cannot be ruled out.

c. Because of the magnitude of the dollars involved in even such component procurements as were outlined under paragraph 4 of this paper, the device of "proprietary development at company expense" is not available for concealment purposes.

d. Competitive bidding for component or subsystem procurement of necessity will reveal by extrapolation much of true aircraft performance and scope of program to companies who will have no requirement to possess such information if they are not successful bidders.

e. Even limited competitive bidding will add an increment of time, estimated at a minimum of thirty days, to first flight of prototype date. Slippage of this date cannot but lead to a like delay in operational readiness date, and delay in bringing the OXCART capability into being cannot be considered as in the national interest.

f. Lastly, additional Security manpower would be required to clear, record, and maintain concern over principals and employees in concerns ultimately eliminated from competition as unsuccessful bidders. This concern would have to be maintained throughout the life of the project with at best no positive result.

7. ACTION RECOMMENDED:

a. In the light of the considerations discussed and weighed above, and for the reasons set forth herein, it is recommended that you approve the adoption of sole source procurement for those components, systems, or subsystems whose performance, configuration, characteristics, materials, major expense, or specifications could be assumed to be indicative of the existence of a major effort in the field of manned propelled supersonic flight, provided that reasonable and prudent care be exercised by all concerned, not only in the initial selection of a source but in all managerial and substantive areas possible.

b. That wherever limited competitive bidding is possible without interference with the execution of the basic mission, each case of this sort will be considered individually upon recommendation of the prime contractor. Approval to conduct limited competitive bidding will in each instance come from the Deputy Director (Plans).

(Signed)
WILLIAM BURKE
Colonel, USAF
Acting Chief, DPD

CONCURRENCE:

(Signed)
Lawrence K. White
Deputy Director (Support)

(Signed)
Lawrence R. Houston
General Counsel

Recommendation in paragraph 7 APPROVED:

(Signed)
Richard M. Bissell, Jr.
Deputy Director (Plans)

ANNEX 127

BYE 2608-66

OXC-0321

14 October 1960

# ORGANIZATION AND DELINEATION OF RESPONSIBILITIES

## PROJECT OXCART

1. General direction and control of the Project shall be exercised jointly by the Director of Central Intelligence and the Chief of Staff, USAF, subject to guidance from higher authority and coordination with other departments of the Government as appropriate. They shall furnish policy guidance to lower echelons, ensure the conformity of operations under the Project with national policy, and make recommendations to higher authority on matters transcending their own authority. Further, it shall be their joint responsibility to resolve differences that may arise at lower staff and operating levels.

2. The following are the organizational elements which shall be responsible for the conduct of the Project:

a. CIA

(1) There is in existence a Project Headquarters headed by a CIA Project Director. An Air Force officer is assigned as Deputy Project Director. Project Headquarters will establish an operational unit presently planned to be stationed in the Zone of Interior. This unit will be manned by USAF and CIA personnel in numbers, proportions, and skills as agreed between the Project Director and the Air Force Project Officer.

(2) All military personnel assigned to Central Intelligence for full-time duty on this Project will be carried on CIA rolls, chargeable to CIA for a projected minimum of three years.

b. Headquarters USAF

(1) Chief of Staff, USAF, has assigned supervisory responsibility to the Deputy Chief of Staff, Operations.

(2) The Deputy Chief of Staff, Operations has designated an Air Force Project Officer who, under the guidance and direction of the Deputy Chief of Staff, Operations, will be the action officer and point of contact for all functions related to USAF interests in the project.

(3) In addition to the DCS/O Project Officer there has been established a Project Staff. This Staff includes selected officers designated by other interested Air Force staff agencies who will act as points of contact for the Project Officer within their several offices.

3. The functions and responsibilities of these elements will be as follows:

a. The CIA Project Director and the Air Force Project Officer shall have primary responsibility for the development and execution of all activities concerning the Project within their own organizations; the resolution of differences that may arise at lower echelons; and the reporting of progress and the making of recommendations to their respective chiefs.

b. The Project Headquarters will be responsible for any continued research and development, operational planning, and the direction and control of activities in the final operational phase of the Project when overflights are being launched.

c. The Air Force Project Staff shall be responsible for implementing plans approved by the CIA Project Director and the Air Force Project Officer, and arranging for Air Force support of Project activities which can appropriately be furnished through staff channels or by other Air Force commands.

d. Security of this project within the DOD will be the responsibility of the Air Force Project Officer. All clearances for personnel within the DOD will be approved in advance and monitored by the Air Force Project Officer.

4. Activities under this Project fall into three phases. These overlap one another in time but may be distinguished on the basis of the kinds of activities involved in each. The following are the specific authorities and responsibilities of the several organizational elements in the successive phases of the Project:

a. The first phase is that in which the major activities are: research and development, procurement, the construction and activation of a test and training base, the testing of equipment, and operational planning. The Project Director shall have control of these activities. The Air Force Project Officer will provide and coordinate necessary Air Force support. This will be a matter for informal agreement between the CIA Project Director and the Air Force Project Officer. Full and complete coordination of all Air Force elements during this phase is essential.

b. The second phase will be devoted to flight test and training. These activities will be conducted at the test and training base. The operational flight training will be conducted in accordance with syllabi and standards as mutually agreed between the CIA and the Air Force. Phase II terminates with the decision that crews and equipment are operationally ready.

c. The third phase will be that of active operations. This phase follows the decision as to operational readiness. The final decision as to execution and timing of actual overflight missions shall rest jointly with the CIA and the USAF, subject to such guidance as may be received from higher authority, and in accordance with notification, coordination, and support procedures currently employed in Project OILSTONE. The line of command shall be direct between operational units and the CIA.

5. Responsibility for the overall security of the program shall rest with CIA. In view of the security aspects of this project, it is important that maximum practicable compartmentation be maintained in both CIA and Air Force Headquarters. Compartmentation should include provision for logical, innocent explanation of the activities involved.

| | |
|---|---|
| APPROVED FOR USAF: | APPROVED FOR CIA: |
| /s/ Thomas D. White | /s/ A. W. Dulles |
| Date 15 February 1961 | Date 18 February 1961 |

[redacted]

ANNEX 128

~~SECRET~~

OXC-2401
17 October 1961

MEMORANDUM FOR: Deputy Director (Plans)

SUBJECT: Price Overrun on Pratt & Whitney Engines, Contract No. TT-1002

1. This memorandum constitutes a status report on negotiations to date relative to subject price overrun on the first 30 engines. It also contains a recommendation in Paragraph 10 for requested concurrence of the DD/P

2. Background facts:

| | | |
|---|---|---|
| a. | September 1960, Estimated Cost to Complete | $31.5 M |
| | September 1960, Contract Ceiling Price Established | 29.7 |
| | September 1960, Potential Cost Overrun Agreed to be absorbed by Pratt & Whitney | $ 1.8 M |
| b. | June 1961, Estimated Cost to Complete | $46,065,000 |
| | Contract Ceiling Price | 29,700,000 |
| | Contractor's Claimed Overrun (June 1961) | $16,365,000 |
| c. | September 1961, Pratt & Whitney Estimate to Complete | $49,768,515 |
| | Contract Ceiling Price | 29,700,000 |
| | Pratt & Whitney Projected Overrun (September 1961) | $20,068,515 |
| | Hamilton-Standard (subcontractor) Projected Overrun | 1,500,000 |
| | Contractor's Claimed Overrun (Sept 1961) | $21,568,515 |
| d. | Contractor now proposes a contract amendment adding 10 addtl AF-12 engines and repricing 40 engines at | $64,768,515* |
| * | Broken down as follows: | |
| | Contract Ceiling Price for 30 engines | $29,700,000 |
| | Cost Overrun on 30 engines | 21,568,515 |
| | 10 additional (AF-12) engines | 13,500,000 |
| | | $64,768,515 |

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Control System

3. Exploratory negotiations were held with Pratt & Whitney on 29 September to determine what percentage of this claimed overrun should legally and equitably be borne by the Government at this time (that is, concurrent with the procurement of 10 additional engines).

4. Pratt & Whitney's first, and final, position was that they should now have 100% coverage or assurance of future complete coverage of this overrun. Further, they argued that if legal consideration exists for 50% relief, it must also exist for 100% relief.

5. The Contracting Officer's position was as follows. The amount of projected overrun was not seriously questioned (there being no profit component included, and the contract being redeterminable downward to actual costs). It was, rather, assumed that the projected overrun and perhaps even additional costs would materialize. It was further recognized that Pratt & Whitney should be able within a "reasonable time" to recover 100% of this overrun— spread over this 40-engine procurement and subsequent engine procurement. The practical question, therefore, was as to whether it was reasonable, equitable, and legal for Pratt & Whitney to recover 100% of overrun in consideration of its assuming an obligation to furnish 10 additional engines. With considerable cogency, Pratt & Whitney pointed out that it could not be assured of future engine procurement.

6. Culminating several suggested compromise formulae, the Contracting Officer proposed tentatively, and for discussion purposes only, that the Government at this time pick up $12.8 M of this $21.5 M overrun as an increase in ceiling price, the balance ($8.6M) thereof to be left open for final negotiations after delivery of the 30th engine (April 1963), with the understanding that if Pratt & Whitney had not by that time been able to make prorata recovery on additional engine procurement that the present contract would then pick up the unrecovered balance. Even this proposal did not at first appeal to Pratt & Whitney. However, by subsequent telephone conversations, they have indicated general acceptance of this formula. The $12.8 M increase in price was arrived at as follows:

| | |
|---|---|
| Projected overrun | $21,568,515 |
| Less 1.8 M previously agreed as being absorbable by Contractor | 1,800,000 ** |
| | $19,768,515 |

| | |
|---|---|
| Bal. Fwd. | $19,768,515 |
| Less 6.0 M bonafide changes | 6,000,000* |
| Materials increase | $13,768,515 |
| 50% Materials increase | 6,884,257* |
| | $ 6,884,258* |

* To be accepted by Govt as ceiling increase:

| | |
|---|---|
| Scope changes | $ 6,000,000 |
| 1/2 Material Cost Increase | 6,884,257 |
| | $12,884,257 |

** Final negotiations to be postponed until delivery of 30th engine:

| | |
|---|---|
| Initial projected overrun | $ 1,800,000 |
| 1/2 Material Cost Increase | 6,884,258 |
| | $ 8,684,258 |

7. The above formula actually would guarantee ultimate recovery of the entire overrun. Its only virtue from the Government's standpoint is that it defers final acceptance of this overrun balance until approximately April 1963, in the hope that such balance can in the meantime be absorbed on additional engine procurements.

8. Essentially, this same result could be achieved by the following contract action. Within the framework of the present contract the present target and ceiling prices (27.0 M and 29.7 M, respectively) could by amendment be increased (to include 10 additional engines) and the 40-engines repriced at a new target price of 56.0 M and a new ceiling price of 64.7 M, with a proviso clause to the effect that Pratt & Whitney will use every effort to price each future production engine to include 1/40th of the 8.7 M overrun— such revised target and ceiling prices arrived at as follows:

| | | |
|---|---|---|
| Present Contract Ceiling | | $29,700,000 |
| Additional 10-engine Cost | | 13,500,000 |
| Bonafide Changes to Date | | 6,000,000 |
| 50% of Materials Increase | | 6,884,257 |
| Revised Target Price | | $56,084,257 |
| Balance of presently projected Overrun: | | |
| Initially projected Overrun | 1,800,000 | |
| 50% of Materials Increase | 6,884,258 | |
| | | 8,684,258 |
| Revised Ceiling Price | | $64,768,515 |

9. From a program management standpoint, there is the necessity to consider that there could be additional overruns before delivery of these 40 engines. Subsequent relief, similar to that now being granted by repricing, would be extremely difficult to justify under the present form of contract.

10. On the basis of the above facts and alternate solutions, the Contracting Officer recommends that the contract be amended to (1) procure an additional 10 engines, and (2) to establish (reprice) 40 engines at a new target price of $56,084,257 and a new ceiling price of $62,968,515, with a proviso clause requiring the Contractor to use its best efforts to price each of the next 40 future engines inclusive of 1/40th of the $6,884,258 portion of the present overrun not now included in the new target price of $56,084,257— it being understood that upon determination of final price under this contract, the Government will reimburse such portion of the $6,884,258 as has not been recovered on future (interim) engine sales. This would guarantee ultimate recovery to Pratt & Whitney of all presently projected overrun except the $1,800,000 which the Company originally agreed to absorb. Pratt & Whitney has not yet agreed to relinquish its claim to this $1,800,000, but it is believed that through further negotiations they will do so.

(Signed)
STANLEY W. BEERLI
Colonel, USAF
Acting Chief, DPD-DD/P

Paragraph 10 recommendation
APPROVED, subject to
availability of funds for the purpose:

(Signed)
RICHARD M. BISSELL, JR. DD/P

31 Oct 1961

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ANNEX 129

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OXC-2661

29 November 1961

MEMORANDUM FOR : Mr. L. C. Mallet
General Manager
Pratt & Whitney Aircraft Division
United Aircraft Corporation
Hartford, Connecticut

SUBJECT: Relocation - JT11D-20 Engine Development Program

With the advent of the first J58 engine run in December 1957, impressive development progress was made during the subsequent two year period. It is our understanding that:

The first 50 hour endurance test was completed in 1958.

The first Mach 3 sea level demonstration run was made in July 1958.

The first Mach 3 sea level afterburner run was made in October 1958.

The first P-2 engine rating sea level 150 hour endurance test was made in November 1958.

The first heated inlet test stand run was made in December 1958.

The second P-2 engine rating sea level 150 hour endurance test was made in January 1959.

As of December 1959 over 1750 hours of full-scale running time had been accumulated, establishing an average of 73 hours per month.

Since February 1961, it has been apparent that the JT11D-20 engine development program has and continues to suffer from the inability to accumulate sufficient meaningful engine test time. Time accumulation for the 10-1/2 month period from December 1960 to 15 November 1961 is as follows:

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Total engine time: 727 hours at 70 hours per month (55 hours from 16 October to 15 November)

Afterburner time: 230 hours at 22 hours per month

Hot inlet time: 69 hours at 6.6 hours per month

Hot turbine time: 25 hours at 2.4 hours per month

Time at Mach 3 inlet conditions: 0 hours

While it is acknowledged that engine controls problems have contributed to this inability and notwithstanding the recognized magnitude of the effort, the customer has concluded that this situation is due in part at least to certain inherent shortcomings attributed to the remoteness of the Florida Research and Development Center. It is felt that these shortcomings by their inherent and chronic nature have and will continue to contribute to this deficiency and have and will contribute to increased development and prototype costs. Since the contractor's original estimate of September 1959, requests for substantial amounts of additional funding were made in August 1960 and again in May 1961. Initial engine deliveries recently were delayed several months because of insufficient development progress. In addition, the recent reorganization of the Florida Research and Development Center undertaken by the contractor attests to the existence of these and other shortcomings. It is the customer's impression, stemming from the apparent inability to accumulate meaningful engine test time, that these shortcomings are:

Factory personnel inexperience particularly in the area of experimental engine assembly.

Questionable quality and/or quantity of first line assembly supervision.

Deficiency in numbers particularly of experimental engine assembly personnel for handling periods of unanticipated peak load. Manpower flexibility for handling these peak loads is apparently lacking due to the size and geography of the Florida facility.

Difficulty experienced in moving appropriate factory personnel to Florida from Hartford because of personal inconvenience, incentive, and union restrictions.

Geographical remoteness of the effort relative to monitoring and control of vendor technical problems.

Geographic remoteness from much small shop vendor capacity centered in New England useful in affording flexibility in manufacturing operations.

Geographical decentralization of procurement relative to vendor costs and incentive for cost reduction.

Geographical remoteness of the effort relative to top management communication and control.

During early discussions in 1959 concerning implementation of the JT11D-20 engine development effort, this customer was advised by the contractor of the desirability of utilizing the Florida Research and Development Center for development and manufacture of prototype engines. During 1960, however, it became apparent to the contractor that the undertaking of both development and production efforts under the same basically experimental organization and at the Florida location was not feasible. A decision, therefore, was made and implemented by the contractor that the production effort be returned to Hartford in order to eliminate some or all of the shortcomings cited above.

In order that the present engine development situation be improved, it is felt in keeping with the best interest of the United States Government, that careful consideration by the contractor must be given to the feasibility of moving the primary development effort in addition to the prototype program to Hartford at some optimum date in the not far distant future. It is the customer's feeling that Hartford is the centralized focal point of Pratt & Whitney's and the United Aircraft's activity in terms of engineering and production experience, facilities, experienced manpower, and manpower flexibility and therefore is in position to overcome the existing deficiencies of the remote Florida development effort. Further, since the overhaul of prototype engines will be concentrated in the Hartford area, it would appear desirable in terms of communication to have the development effort nearby. Concerning the contingency of existing Florida test facility capacity, consideration might be given to the retention of this capacity utilizing engine airlift commutation between Hartford and Florida. The fact that the JT11D-20 engine development is believed to reflect a continuing effort points up the advisability of a timely decision to relocate in order to utilize most efficiently the contractor's capability at Hartford, which it is believed will become more available as existing programs are completed or reduced in scope. As an interim measure, it is expected that every effort is being and will be made to correct the current assembly floor situation in Florida.

The contractor's timely comments concerning the feasibility of relocating the primary D-20 development effort to Hartford in view of the foregoing are specifically requested.

In view of increasing national and international emphasis on high Mach number manned flight, it must be clearly understood that this customer as part of the defense community is obligated to examine and re-examine all avenues leading toward the expeditious and economic realization of this goal. In this regard, the contractor's progress and performance must be and is reappraised continuously in relation to the progress achieved by competitive programs.

(Signed)
RICHARD M. BISSELL, JR.

cc: W. L. Gorton

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Control System

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ANNEX 130

OXC-2623

25 November 1961

MEMORANDUM FOR: Colonel Robert J. Holbury

SUBJECT : Instructions

1. Assumption of Duties

You will proceed on/about 15 November 1961 to assume your duties as Chief of Base, representing the Central Intelligence Agency at Watertown, Nevada, referred to hereinafter as your area.

2. Status

a. Your status is that of Commanding Officer, Detachment 1, 1129th (USAF) Special Activities Squadron.

b. Your status as Chief of Base will be made known to those U.S. officials and industry personnel whose cooperation in furtherance of your mission will be solicited.

3. Mission

You will develop, as soon as possible, and maintain an operationally ready unit capable of executing missions as directed by Project Headquarters.

4. Operational Duties and Responsibilities

a. Within your area, your assignment is that of Chief of all CIA operations with authority over all CIA staff and detailed personnel and responsibility for the supervision of any CIA-directed activities phased through or at your area.

b. Within the framework of the program for your area, and under the directives you will receive from Headquarters, you will utilize personnel, materiel, facilities, and funds so as to ensure the most effective use of these assets toward the accomplishment of the over-all mission.

c. You will maintain compartmentation of activities and personnel to the extent required by security and as necessary to preserve the long-term effectiveness of the program.

d. You will consolidate administrative and support facilities to the extent and in the manner you deem best to carry out your mission.

e. You will develop and maintain up-to-date emergency plans for your installation and will be familiar with applicable war plans as developed by Headquarters.

5. <u>Line of Command</u>

As Chief of Base in your area, you will be responsible to the Chief, Development Projects Division, the Deputy Director (Plans) and the Director of Central Intelligence.

6. <u>Finance</u>

You will review, supervise and approve all financial and budgetary matters, plans, estimates and expenditures relating to your operation. Current authorizations to expend funds will be made known to you; it will be your responsibility to ensure that these authorizations are not exceeded, and that policies and procedures in appropriate CIA regulatory issuances are observed.

7. Communications

You will utilize the established communications system and procedures between your base and Headquarters. All communications, both cable and dispatch, to and from your base, will be accessible to you to the extent and in the manner you desire. You will refer any matter of particularly sensitive nature to the Chief, DPD, on an Eyes Only basis, or to the Deputy Director (Plans).

8. Security

You are specifically charged with the maintenance of physical and operational security in accordance with CIA security directives as applied to your area. You will report any unusual problems to Headquarters.

9. Records

You will maintain, as prescribed in reports directives, records of activity currently in progress, status to date and projected adherence to programmed completion dates. Delays and amendments to programmed activities will be reported to Project Headquarters as discrepancies are ascertained.

/s/

RICHARD M. BISSELL, JR.

CONCUR:

/s/

Stanley W. Beerli, AC/DPD

ANNEX 131

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TAKEN FROM
SALT LAKE TRIBUNE
SALT LAKE CITY, UTAH
SATURDAY 25 May 63
ASSOCIATED PRESS RELEASE
PAGE 19

# A.F. Jet Crashes Near Wendover

By Associated Press

LAS VEGAS, NEV., May 24—A jet trainer on a flight out of Nellis Air Force Base crashed Friday 14 miles south of Wendover, Utah, the Air Force announced. The pilot ejected from his plane safely.

**THE CRASH** was near the Nevada-Utah line.

Nellis officials said the plane is normally based at Wright-Patterson Air Force Base, Ohio.

The pilot's name was not immediately released.

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FINAL

Las Vegas
REVIEW-JOURNAL
NEVADA'S LARGEST AND MOST COMPLETE NEWSPAPER

LAS VEGAS, NEVADA, SATURDAY, MAY 25, 1963

PHONI

# New Jet Crash Forces Pilot Bailout

An F-105 Thunderchief, apparently on a classified mission, crashed and burned near the Nevada-Utah state line Friday, officials at Nellis Air Force base announced.

The pilot, who was unidentified, had taken off earlier in the day at Nellis, and parachuted to safety from his disabled craft 14 miles southeast of Wendover, Utah.

Nellis officials said the supersonic plane was attached to the Air Research and Development Center at Wright - Patterson AFB, Ohio.

Apparently the brief announcement was all that was authorized by high Air Force officials.

It was the second bail out for an AF pilot in the Nevada-Utah area in as many days.

Thursday an Air Force pilot on a refueling mission had to bail out of his F-105 Thunderbird jet after trouble developed near Kanab. The pilot Major Thomas T. Williams, 46, training at Nellis AFB was unharmed.

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Las Vegas

VIEW-JOURNAL

Tuesday, May 28, 1963

Final Edition

Page 13

# AF Names Crash Pilot

The Air Force identified Monday the pilot who bailed out of his stricken F-105 Thunderchief jet fighter near the Nevada-Utah borer Friday.

Officials at Nellis Air Force Base said he is Ken Collins, civilian employe of Hughes Aircraft Co.

The $2.5 million craft crashed and burned near Wendover, Utah. The Air Force refused for two days to name the pilot. When it did identify him, the Air Force did not give Collins' age, home town or city of employment. Hughes Aircraft, however, has a major plant at Santa Monica, Calif.

Nellis officials said Collins was operating the fighter plane on loan to Hughes during electronic development.

The plane took off from Nellis. It is ordinarily assigned to the Wright - Patterson Air Force Base in Ohio. A research and development center.

"The delay in announcing the name of the pilot resulted from querrying not only with the military, but with the Hughes Aircraft Co., over the weekend, and making certain that the relatives of the pilot were properly reassured of his safety," the Air Force said.

Names of pilots who bail out safely are usually made public immediately.

The bail-out and subsequent crash were the second in two days. An Air Force pilot on a refueling mission had to bail out of his Thunderchief Thursday when the single-engine jet developed trouble.

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ANNEX 132

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# CHRONOLOGY OF PRESS AND INDUSTRY AWARENESS OF A-12 PROGRAM

| | |
|---|---|
| 1 Nov 63 | News article in Herald-News, Fontana, California, speculating about "super secret project site". |
| 1 Nov 63 | Mr. Marvin Miles, Aviation Editor, Los Angeles Times, telephonically contacted Westinghouse Corp., Pittsburgh, attempting to confirm if employees of that firm were travelling covertly to "the desert" each week in connection with top secret project which he suspects may have CIA association. |
| Oct 63 | Dr. James B. Rea, independent consultant to several aircraft firms presented briefings at Hughes Aircraft Company and Telecomputing Corporation during which he accurately and openly speculated about recent LAC developments. |
| Oct 63 | A contractor employee from P&W enroute from Los Angeles International Airport via taxi to the Project Terminal at Lockheed was queried by the driver as to "whether he was enroute to Nevada". |
| July 63 & Sept 63 | Mr. Robert Hotz, Editor, Aviation Week, indicated his awareness of developments at Burbank. |
| 5 Sept 63 | The Hartford Courant, Hartford, Conn., referred to the "secret" development of the J-58 engine in an article on the SST. |
| Apr-Oct 63 | Several sightings of the Project OXCART vehicle by commercial airline crews. |
| June 63 | Convair Techrep at Norton AFB, Calif., wrote to his home plant at Fort Worth advising that LAC has secretly developed a Mach 3. aircraft, using titanium alloy. |

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Control System

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|---|---|
| March 63 | Col. John J. Smith, USAF, Ret., and his Requirements Staff at North American Aviation (NAA) deducted from various indications in industry that Kelly Johnson has a Mach 3 aircraft in flight test. |
| Feb 63 | Mr. Robert Widmer, Vice President, Convair, Fort Worth (cleared OXCART), advised that it was common knowledge in the aircraft industry that Kelly Johnson was involved in the manufacture of an advanced U-2 follow on. |
| Jan 63 | Mr. William Clegern, Assistant to Director, Advanced Technology, Martin, Co., Denver, informed a group of people at his firm that "Lockheed was working on a super U-2 that would fly in excess of 100,000 feet at a speed of 3.2 Mach." His statement was based on hearsay and his personal speculations. |
| Apr 62 | Admiral John B. Pearson, USN, Ret., Vice President, Development and Planning, NAA, accurately concluded from his speculations and industrial indications that Kelly Johnson was developing a Mach 3 reconnaissance aircraft which would operate at 80,000 to 85,000 feet. |

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ANNEX 13~~3~~4

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BYE-4631-68

22 August 1964

MEMORANDUM FOR: Deputy Director for Science and Technology

SUBJECT : SKYLARK

1. It is essential as a matter of the highest national interest that we have an operational capability to conduct reconnaissance flights over Cuba with the OXCART vehicle as soon as possible and in any event no later than the first week in November, with characteristics on the order of Mach 2.8, altitude 80,000 feet, with a range of 2,500 nautical miles, or better as feasible, with four of this type aircraft.

2. You are to take all appropriate actions to insure that this highest priority objective of your program is not in any way hindered by competing requirements of any kind. You should insure that the contractors, the field commanders, and anyone else having a direct impact upon the program are aware of this highest priority objective, and you should bring to my attention at the earliest possible moment any proposal or directed course of action which might in any way interfere with our meeting this objective.

3. We seek in Project SKYLARK an urgent operational readiness and we must be careful to introduce into the program during the next several months only those modifications, procedures, and additional equipment, as are necessary to attain this objective.

Marshall S. Carter
Lieutenant General, USA
Acting Director

[redacted]

ANNEX 13~~4~~3

[redacted]

# EXAMPLES OF INDUSTRY AWARENESS OF PROJECT OXCART

1. North American Aviation, Los Angeles, California

Admiral John B. Pearson, USN (Ret.) VP (Development and Planning) North American Aviation, Los Angeles, California, advised in April 1962: Incidental to his responsibilities with NAA (monitoring all military activities within aircraft industry) he concluded a full year before that Kelly Johnson, LAC, was developing a supersonic Mach 2.4 - Mach 3, long-range, high-altitude (80,000 - 85,000 feet) aircraft which would probably be twin engine and have a dual mission, reconnaissance and intercept.

Basis for conclusion:

a. Evaluation of United States Government's defense needs.

b. Recognizing the need and realizing that the F-108 program has been cancelled, he noted that no overt mention of a replacement was being made.

c. The infrequent appearances of Kelly Johnson during the past two years was an indication that he was actively engaged in a new program.

d. After the cancellation of the F-108, he determined that several of the people who were working on the GAR-9/

ASG-18 in Hughes Aircraft were working on a hush, hush program. When he speculated to an old friend at Hughes that there was probably no current use of the GAR-9 unless Kelly Johnson was building something at Lockheed, the old friend was noticeably startled and changed the subject which Pearson took as another clue.

e. It was common knowledge that the J-58 program at Pratt & Whitney was continuing as a production effort, with no published customer or use.

f. A budget analyst at North American advised that the previous year's budget failed to identify uses for $150 million.

Admiral Pearson at the conclusion of the discussion observed that the primary need in his opinion to preclude further disclosures of confirmation of the Lockheed program would be the publication of a cover story for Kelly Johnson. He also suggested the possibility of considering briefing some aviation editors such as Marvin Miles of the Los Angeles Times.

2. Cross Country News, Forth Worth, Texas

Cross Country News, article of 31 January 1963 (aeronautical newspaper published at Forth Worth, Texas):

"LOCKHEED SST SAID IN X STAGE. A HIGHLY GUARDED SECRET MAY BE REVEALED WITHIN THE NEXT FEW DAYS. LOCKHEED

AIRCRAFT, BURBANK IS EXPECTED TO ANNOUNCE A NEW SUPERSONIC TRANSPORT OFF THE DRAWING BOARDS, EVEN IN THE X STAGE LOCKHEED OFFICIALS SAY NOTHING. NO DETAILS CAME WITH THIS TIP, FROM SOURCES CONSIDERED VERY RELIABLE."

"HOWEVER, IF THE LOCKHEED SST IS FLYING, OR ALREADY FOR FLIGHT TESTS, IT MAY EXPLAIN WHY NAJEEB HALABY, CHIEF OF THE FAA, ASKED THE SUPERSONIC TRANSPORT ADVISORY GROUP, TO SLOW DOWN ON THEIR $1 BILLION DOLLAR PROJECT. GOAL HAS BEEN TO HAVE A U.S. SST FLYING BY 1972. FRANCE AND BRITAIN ARE IN A JOINT VENTURE, EXPECTED HAVE A 1,450 MPH PASSENGER PLANE OPERATING BY 1970. THE U.S. IS EXPECTING TO TEST THE 2,000 MPH RS-70, THIS SPRING."

"LOCKHEED MAY INDEED REPEAT THEIR SLOGAN "LOOK TO LOCKHEED FOR LEADERSHIP", IF THEY BREAK THE WORLD MARKET WIDE OPEN WITH THE SST IN 1963."

3. Martin Co., Denver, Colorado

William Clegern, Assistant to Director, Advanced Technology, Martin Co., Denver, Colorado. During the week of 28 January 1963, Mr. Clegern in discussions before a group pointed out several areas in the design field in which his company had no particular interest. He observed that it might interest the group to know that Lockheed was working on a follow-on vehicle, a "super U-2" that would fly in excess of 100,000 feet at a speed of 3.2 Mach.

In an interview on 11 February 1963, he observed that he recalled a reference made to Kelly Johnson's plane by an unrecalled source during a visit to the Los Angeles area in November 1962. He indicated that his position with the Martin Company includes future planning. He reasoned:

a. The United States needed a follow-on to the U-2 since satellites could not provide the photographic resolution possible with manned reconnaissance aircraft.

b. That the new plane would have to reach a speed of Mach 5 and fly at 100,000 feet.

c. By studying the Government budget he came to the conclusion that the project budget for the next fiscal year would approximate $340 million.

4. Convair, Fort Worth, Texas

Mr. Robert Widmer, Vice-President of Convair, Fort Worth, was interviewed on 19 February 1963. He observed that it is his opinion that it is generally known in the aircraft industry and particularly on the West Coast that Kelly Johnson is involved in the manufacture of an advanced aircraft probably designed for the same purpose as the U-2. He stated further he has heard from many individuals that the aircraft is flying. He believes he heard speculation that it was flying at Edwards Air

Force Base. Mr. Widmer further stated that representatives of Systems Vendors who travel considerably spread rumors, speculation, etc., throughout the industry as to what other aircraft companies are doing. He indicated that this type of individual was the prime source of his awareness.

He mentioned that the advanced state of development of the J-58 is another item which has caused considerable speculation in the industry.

He mentioned that it was significant to him that when all of the officials of Lockheed took up their stock options recently (published information) that Lockheed was indeed in a healthy financial position.

5. <u>North American Aviation, Los Angeles, California</u>

Colonel John J. Smith, (AF Retired), Chief of Requirements, and members of his staff Messrs. Julius Braun, ex-Army Colonel, Fenn Taylor, ex-AF Colonel, Jamie Wallace, ex-AF Colonel and Thomas Collins, ex-Navy, North American Aviation, advised on 15 March 1963 that they had deduced that Kelly Johnson had a plane using two J-58 engines, with a range of about 4000 miles with an altitude of 150 to 160 thousand feet; point design ram jet were employed, or 90 to 100 thousand feet if accelerated ram jets were used. They speculated that the wings are made of stainless steel about 65 feet long and the plane has been flying since the fall of 1962. It was the opinion of this group that the plane was started about the fall of 1959, and the Hughes ASG-18 is tied in with the plane. According to this group the plane is probably a two seater and the program has a budget of about $200 million.

The process of their deductions was as follows:

a. Colonel Smith had experience in the early U-2 project; it was apparent for him that the need for an advanced version was existent. While in the Air Force, he had tried to kill the ASG-18 and due to the dropping of the F-108, he figured that the ASG-18 must have some other application or it would have been similarly dropped.

b. They observed that the funds allotted to developing the J-58 engine did not seem to them justified unless there was some high altitude airplane available in which to utilize the J-58.

c. They also were aware Hughes Aircraft personnel were on a special clearance list which supported their conclusion that the ASG-18 was involved.

d. They concluded that it appeared to be about $200 million not specifically accounted for in the Government's budget, and such an amount would not normally be made up of a large number of small items, but had to include a major project.

Some of the better LAC engineers are known to have left their normal work and gone into a hush, hush project.

e. Usage of liquid hydrogen and oxygen is published in secret documents available to NAA including destination of shipments, quantities, etc. It was observed that a considerable amount was going to Jackass Flats (AEC test flight area) which they knew did not use much, if any. Consequently, they concluded it must be going to the site where the U-2 was tested, supporting the opinion that a flight test program must be underway.

f. They observed that flight test personnel were leaving Edwards Air Force Base indicating another flight test program somewhere else.

g. Indications of subcontracting for precision valves for apparently LAC front organizations and such valves would have no other application than for this type plane.

6. North American Aviation, Los Angeles, California

A weekly information summary for the week ending 15 March 1963 prepared by the NAA Programs Staff for distribution to NAA executives. The summary included the following paragraph:

"XII-STUDY OF HIGH ALTITUDE RECON AIRCRAFT (S) AFSC HAS BEEN DIRECTED BY HQS USAF TO IMMEDIATELY PREPARE A DEVELOPMENT PLAN FOR A HIGH ALTITUDE RECONNAISSANCE AIRCRAFT. THIS EFFORT WAS INITIATED AT HIGH LEVEL AND IS REPORTEDLY BEING PUSHED BY GENERAL LEMAY. WE UNDERSTAND $2.5 MILLION HAS ALREADY BEEN ALLOCATED TO THIS PROGRAM. PERFORMANCE REQUIREMENTS ARE NOT KNOWN AS YET, BUT WE BELIEVE THIS AIRCRAFT STUDY WILL CALL FOR LONGER RANGE AND GREATER SPEED AND ALTITUDE THAN THE CURRENT FLYING LOCKHEED RECON AIRCRAFT. LOS ANGELES DIVISION HAS BEEN DOING IR&D WORK IN THEIR HYPERSONIC RESEARCH PROGRAM APPLICABLE TO THIS REQUIREMENT AND IS NOW FOLLOWING UP ON THIS NEW PLANNING STUDY. IN ADDITION TO LOCKHEED, BOTH BOEING AND REPUBLIC ARE REPORTED TO HAVE CURRENT STUDY EFFORTS AIMED AT THIS REQUIREMENT."

Officials of NAA involved were interviewed on 18 March and produced a file entitled, "Lockheed Project". It contained notes dated May 1961 indicating that Lockheed is reported to be developing a very high altitude, 130-140 thousand feet aircraft, utilizing the ASG-18/GAR-9 for AEW Picket Patrol and high-altitude reconnaissance. It was pointed out that the above type of information was pieced together by bits picked up by the staff. It was also concluded that the J-58 engine had some new use for a high altitude plane to justify the funds put into it. The same was true of some existing purpose of the ASG-18 at Hughes Aircraft.

[redacted]

ANNEX 135

22 March 1965

**MEMORANDUM FOR:** Deputy Director for Science and Technology

**SUBJECT** : Aerial Reconnaissance of Communist China

1. Attached is copy of Memorandum for the Record of a discussion Mr. McCone had with Secretary McNamara and Secretary Vance on 18 March. Also attached is a memorandum for me forwarding the prior reference for necessary action.

2. After informal discussion of this matter with Colonel Ledford I telephoned Colonel Geary who stated that he had been called on to prepare a briefing on this subject for Secretary Vance and that he was in the process of discussing the matter with Dr. McMillan. Geary said he intended to stick entirely to the support phase of the activity and if operational considerations came up would suggest that Secretary Vance be briefed by Colonel Ledford. Geary said that already available on Okinawa was fuel, communications an operations building and an adequate runway. Not available was a hangar or any other means of putting the birds under cover. Geary felt that a 1 October readiness date would be the earliest that could be met. Geary said he had also been asked to look into the matter of putting the drivers back into blue suits but allowing them to keep the same rate of compensation. We both agreed that the pilots would not accept any such rigged-up deal like this even if it were possible. Geary said that going into this whole operation on a temporary basis should be looked upon as only the initial move and that we should make the facility permanent. He said we are talking about several million dollars of facilities. Geary also said it is a fallacy to think the pilots have more protection if they are in uniform.

3. I then placed a call for Secretary Vance but was unable to get through. Later in the day, Geary informed me that he too had been unable to see Vance so he had written a memorandum to him which covered the following general points:

The operation is feasible from Okinawa. Three aircraft could be moved in and be operational in 60 days, but this would be on a crash basis and would result in a virtual shutdown of the ranch area. October 15th would be the earliest possible operation date under the present extensive modification program. Modification and testing of the entire facility to assure necessary range and operational readiness would take this length of time. During this period, the Okinawa Base would be resurveyed. Geary would want to add a new hangar, increase size of the fuel farm, start processing and move the additional support personnel required, military or otherwise, adjust SAC tanker assets to provide the 7-11 figure for three refuelings and add to the aids as necessary. Geary estimates the initial airlift cost would be approximately $1-1/2 million for essential equipment to set up the program and there would be a continual annual airlift cost of $2 million. Air Force support of M & O funds would be about $200,000 a month. The additional hangar would cost a million dollars.

That was the gist of Geary's memorandum to Vance as reported to me by Geary. Geary also reported that the Air Force Judge Advocate General said it was legally impossible to reimburse the pilots over and above normal military pay if they returned to their blue suit status. It took two pages for this Judge to say that, but the answer was an unequivocal "no, it cannot be done."

4. I subsequently talked to Secretary Vance and offered to give him a briefing on the operational aspects of making these flights from Okinawa.

> ACTION to DD/S&T: Please arrange with Secretary Vance's office to give this briefing as soon as possible.

5. In going into this matter and taking all the various actions necessary and indicated by this memorandum and by Mr. McCone's memorandum of conversation, the following should be borne in mind:

(a) A decision has been made to take all the necessary preparatory steps to put into Okinawa whatever construction and related arrangements are needed to be able to operate the OXCART in operational flights over Communist China. (If it is considered essential to expand facilities at Taiwan for emergency use of this Base, please come up with statement of requirements.)

(b) No decision has been taken to move any OXCARTS to Okinawa. This decision would probably be made by the President.

(c) No decision has been taken to un-sheepdip or to return to blue suits. CIA pilots. This decision would probably be made by the President.

(d) No decision has been taken to fly the OXCART operationally over Communist China. This decision can only be made by the President.

(e) No decision has been taken as to whether or not the aircraft and pilots would be military with military markings and military pilots, or civilian with deniable characteristics of aircraft and pilot. This decision can only be taken by the President.

(f) No decision has been taken as to whether the operations will be conducted by SAC or CIA. This decision can only be taken by the President in light of the several considerations noted above.

5. There is an anomaly here that beggars analysis. Vance and McNamara have been adamant in opposing the use of military U-2's and U.S. military pilots over Communist China. They have been harder against this than the State Department. Yet, at the same time, they now propose utilizing military aircraft and military pilots in a much less deniable and much more flagrant violation of normal overflight procedures. It should be borne in mind that the President and only the President can make the decision as to whether we will use U.S. military pilots, presumably with Air Force markings, or civilian pilots, presumably with no markings. This obviously is a decision of the greatest importance involving national policy at the highest level.

6. Finally, if the operation is to be conducted secretly, whether or not it is to be denied or deniable, then the Agency position is that only the Agency can properly conduct the operation. If the operation

is to be conducted on a plausibly deniable basis or on a "blank stare--never-heard-of-it" basis even though it is apparent that the Chinese will be aware of the overflights, then it is Agency position that the operation can be conducted in this manner only by the Agency.

7. Until such time that the President has made the conscious and firm decision that the United States Government will admittedly overfly Communist China in military aircraft with military pilots (I am talking here about OXCART) then it is the firm position of the Agency that any other overflights over denied territory will be conducted by the Agency in accordance with past procedures.

8. Please review this memorandum and Mr. McCone's memorandum in great detail and give me a listing of the various actions you propose to take.

(Signed)
Marshall S. Carter
Lieutenant General, USA
Deputy Director

Attachments

Distribution:
Orig (Cy #1 - DD/S&T
Cy #2 AD/OSA
Cy #3 DDCI
Cy #4 O/DCI(Mr. Elder)
Cy #5 D/NIPE
Cy #6 ER via ExDir

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Eyes Only

19 March 1965

MEMORANDUM FOR: General Carter

Attached is a copy of my memorandum for the record on my meeting with Secretaries McNamara and Vance on 18 March, concerning aerial reconnaissance over Communist China.

I call your attention to certain specific actions on the part of CIA and understand you will contact Secretary Vance to make preliminary arrangements for the CIA actions and to discuss the operational actions referred to in the memorandum.

(Signed)

JOHN A. McCONE
Director

Attachment: DCI M/R #17, 18 Mar 65

Dictated but not read.

~~TOP SECRET~~

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Eyes Only

18 March 1965

MEMORANDUM FOR THE RECORD

SUBJECT: Discussion with Secretary McNamara and Secretary Vance concerning Aerial Reconnaissance over Communist China

1. I reported that recent problems with the drones causing the loss of 3 of them and the MIG 21 attack on the March 14th U-2 mission, which apparently (though not absolutely confirmed) involved 3 air-to-air missile firings, led to the conclusion that:

a. The use of U-2's over Communist China is becoming increasingly hazardous because of SAM's and MIG 21 attack techniques;

b. The recent problems with drones may cause an hiatus in the activity which would necessitate use of U-2's for South China coverage of priority targets east of Kunming.

With respect to drones, the cause of the troubles has not as yet been determined but it is felt by Defense, NSA, CIA and the manufacturer that a ChiCom jamming of the drone guidance system is highly unlikely. (In a separate conversation Col. Steakley confirmed this; said 4 or 5 drones were ready; a team was in the field to examine trouble; production of new drones - 1 per week.)

2. USIB, in considering the problem on March 17th, reaffirmed the necessity for continuing aerial reconnaissance of South China. Secretaries McNamara and Vance concurred in this judgment.

3. Therefore it was decided to continue the use of U-2's on priority targets west of Kunming and to extend this coverage to all of South China if drone operations are temporarily stood down. There was no disagreement that the need for intelligence outweighed the risk.

It was further agreed that we should proceed immediately with all preparatory steps necessary to operate the OXCART over Communist China, flying out of Okinawa. It was agreed that we should proceed with all construction and related arrangements.

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However this decision did not authorize the deployment of the OXCART to Okinawa nor the decision to fly the OXCART over Communist China. The decision would authorize all preparatory steps and the expenditure of such funds as might be involved.

> NOTE: After some discussion it was decided that Okinawa was preferable to Formosa and no steps are to be taken in anticipation of deploying the OXCART to Formosa unless it is considered advisable to prepare a runway to provide an alternate emergency landing base.

4. It was recognized that the basic decision involved the penetration of denied air space by an American plane with an American pilot (CIA or Air Force) and this decision was not being made at this time. Related to this decision was the question of whether the planes would be operated by SAC or by CIA. Both McNamara and Vance favor SAC operation and the consolidation of the OXCART planes into the RB-71 SAC unit.

5. The two problems which became immediately apparent are pilot's pay and secrecy. I stated that CIA pilots (former Air Force officers) receive considerably higher pay than that received when in uniform. Also I pointed out the unsatisfactory security of SAC operations as evidenced by unauthorized disclosures of U-2's in Saigon, drones in Danang, etc.

6. With respect to reliability, I expressed grave concern over the reliability of the plane, pointing out that at speeds of Mach 3 - 3.25 and at 80,000 feet, we have encountered a series of unanticipated difficulties and that I did not think that the plane was fully "debugged". I indicated a number of planes would be ready for operations by September, one plane might be ready considerably in advance of that date, but that I would give no positive estimate until I had gone to the site with a number of experts and reviewed the situation carefully myself.

7. These decisions authorize all arrangements and the expenditure of funds necessary in connection with anticipated operations of the OXCART out of Okinawa by either CIA or the Air Force. DDCI should confer with Secretary Vance or his designee concerning these arrangements. Planes themselves should not be deployed and the final decision to fly the planes over Communist China will not be made at this time.

JAM/mfb

[redacted]

ANNEX 136

~~TOP SECRET~~

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OXCART

THE DEPUTY SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301

MEMORANDUM FOR THE UNDER SECRETARY OF THE AIR FORCE

17 JUN
17 JUN 1965

SUBJECT: OXCART Operation Okinawa

It is our desire that the minimum construction be accomplished at Kadena Air Base, Okinawa necessary to provide for operations beginning in the fall of 1965. Based upon a review of the list of items enclosed with your memorandum of May 7, 1965, together with information subsequently furnished by representatives of the Air Force, the construction items set forth on the enclosed list are approved.

The approved construction is premised upon providing for the operation and maintenance of three or four aircraft and about 250 personnel (20 officers, 45 airmen and 185 civilians, including contractor employees).

While the four new butler type hangars are under construction, the enclosed program contemplates that hangar facilities will be provided by the interim use of three corrosion control hangars which will revert to their intended purpose as soon as the butler type hangars are ready for occupancy. Four rather than five butler type BOQ's should provide the required living quarters consistent with the contemplated numbers of officers and civilians. The new mess hall is not included since it is understood that this can be provided through the expansion of a SAC mess facility currently planned for construction at Kadena. It is further understood that the additional fuel required, pending completion of the construction of additional storage facilities, can be temporarily provided by a barge or other arrangement so as to provide the necessary fuel support by the fall of 1965.

The construction of the items set forth on the enclosed list is to be provided from within the $41 million transferred to the Air Force from the appropriation "Emergency Fund, Southeast Asia" for construction. Public Law 89-18 dated May 7, 1965, which provided the appropriation "Emergency Fund, Southeast Asia" may be cited as the authorization for this work.

It is requested that the Air Force proceed with the enclosed construction so as to assure that necessary support capabilities will be available by not later than early fall of 1965.

Cyrus Vance

COPY No. 1 of 8 COPIES

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Enclosure

OXCART ~~TOP SECRET~~

BYE-5461-65

Series C copy 1 of

| Item | Estimated Cost |
|---|---|
| Four new butler type hangars | $ 800,000 |
| Modification of the existing hangars for interim use | 150,000 |
| New butler type BOQ (4 units) | 1,460,000 |
| Butler type airmen's quarters (1 unit) | 223,000 |
| Utilities | 200,000 |
| Enlarge POL-3, 10,000 barrel tanks and piping | 260,000 |
| Enlarge ops building | 100,000 |
| Warehouse | 120,000 |
| Concrete aprons | 275,000 |
| AGE storage | 60,000 |
| Engine test stand | 25,000 |
| Shops | 75,000 |
| Security fence | 15,000 |
| | $3,763,000 |

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ANNEX 137

~~TOP SECRET~~

THE SECRETARY OF DEFENSE
Washington

3 June 1965

MEMORANDUM FOR THE UNDER SECRETARY OF THE AIR FORCE

As you know, the Soviets are deploying surface-to-air missiles around Hanoi. I presume this will prevent us from continuing U-2 flights over the area and that drones would also be vulnerable to such weapons.

Would it be practical to meet our continuing requirement for reconnaissance by substituting A-11's for the U-2's and drones?

RMcN

Robert S McNamara

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BYE 5451-65

~~TOP SECRET~~

[redacted]

ANNEX 138

~~TOP SECRET~~

Department of the Air Force
Washington

Office of the
Under Secretary

June 8, 1965

MEMORANDUM FOR THE SECRETARY OF DEFENSE

SUBJECT: Use of OXCART over China and Southeast Asia

Of the several factors bearing on the use of OXCART aircraft over China and Southeast Asia, the one that now controls is the performance, operational readiness, and reliability of the airplane itself. Second in importance is probably the question of the vulnerability of the airplane to SA-2 missiles.

As a result of our concern about performance and operational readiness, we consider that we must plan for staging from a Western Pacific base such as Kadena. The preparation of the base can keep pace with that of the aircraft.

The use of a foreign base, however, introduces the problem of foreign reaction, since the OXCART closely resembles both the SR-71, which has officially been identified with reconnaissance, and the YF-12A, which has been "exposed" in the trade press as a disguised reconnaissance airplane.

I am not prepared in this memorandum to render a comprehensive report on these issues. A brief account follows of status and of actions under way.

## Readiness

It is believed that the air intake and inlet control problems have been solved. All aircraft are being equipped with the final inlet configuration. As an objective, a readiness date of 15 September has been established. A flying program is being developed, for training, and to make statistically valid determinations of the range, fuel consumption, and other operating parameters of the airplane in its final configuration. Careful statistics will be kept on the reliability of all subsystems. Flight performance as observed in the last few weeks, and the performance of subsystems during the last several months, are encouraging, but validation will require extensive flying under uniform conditions.

## Staging Base

The OXCART airplane is limited, by expendables other than fuel, to three refuelings. Under this limitation, and with the range performance that one can now predict with full confidence (about 2600 miles), one cannot penetrate China and return without using a base in other than U.S. territory. Even at a range of 3500 miles, which is about the best that one can today expect for the future, a Chinese operation is marginal, and China cannot be covered, wholly from U.S. territory. Hence, quite apart from the convenience, operating economy, and better safety that results from eliminating long approach legs and extra refuelings, there is a need to use a foreign base.

The CIA has recommended use of Kadena for temporary detachment operations for periods up to 60 days. I concur. Mr. Vance has recently authorized $3.7 million to provide minimum construction and facilities improvement requirements, and initiating actions are under way at this time.

## Vulnerability

A clear consensus was never reached on the vulnerability of the OXCART to Cuban SA-2 defenses, at the time that this issue was examined. Conditions over China and Southeast Asia will be more favorable than those that were expected over Cuba: the airplane will be operating at higher speed and altitude, and an array of countermeasures will be available. Furthermore, since an atmosphere of war already prevails, loss of an airplane to defensive action may not carry the same political implications as in the case of Cuba.

A technical analysis of vulnerability is being made. It will be reported, along with specific recommendations about the use of countermeasures, well before any operational decisions are necessary.

Analyses will probably not be complete before a decision is necessary to establish facilities at Kadena.

I think it is safe to predict, even now, that the analysis of vulnerability will not conclusively prove that the airplane is safe from SA-2 fire. My judgment, based on my own conclusions from the Cuban case, is that the risk of loss from defensive action can be kept lower than the risk of accidental loss.

Further Consideration

I shall make another report about 1 July. At that time, the success of the new inlet and inlet control configurations may be verified on the mission, rather than simply the flight test, aircraft. It at that time, inlet performance remains a problem, we will attempt to estimate a new readiness date, and to compare this with the readiness we might predict for the SR-71.

(Signed
Brockway McMillan

[redacted]

ANNEX 139

Pratt & Whitney Aircraft DIVISION OF UNITED AIRCRAFT CORPORATION

November 26, 1965

Jack C. Ledford
Brigadier General, USAF
Director of Special Activities

Subject: YJT11D-20 Mission Capability

Reference: November 24, 1965 Meeting

Dear General Ledford:

In response to your request to me for an expression of our opinion on the current level of reliability and readiness of the YJT11D-20 engine for use in the performance of Black Shield type missions, it is our considered judgment that recent flight testing has demonstrated that missions of this type can be reliably performed providing the engine receives the careful attention to maintenance and operational details it currently enjoys. This is not to say that we consider the engine in the A-12 aircraft installation to be fully operational in the normal military sense. Although the engine has been qualified by completion of numerous 150-hour endurance tests on test stands simulating, within our facility capabilities, high altitude-high Mach number missions, it has not demonstrated this same degree of durability when subjected to the effects of the aircraft installation. Flight testing has revealed numerous problems of interaction between the aircraft and engine not heretofore known. Many of these have been defined, simulated and corrected by continued engine development testing after completion of the initial 150-hour qualification test. However, there still remain many such problems to be more fully defined and corrected before, in our judgment, the engine can be considered satisfactory for normal squadron use involving daily flights by many aircraft.

By way of example, five aircraft were operated by the detachment during the time period 15 September through 20 November. During this time, 54 sorties of which 14 were of approximate Black Shield mission duration were completed. These sorties indicated a very high degree of engine reliability, in that no engine related incidents would have resulted in a flight abort in the critical mission leg. However, it should be pointed out that during this time 14 engines were removed from the five aircraft after flights for suspected or real engine discrepancies. In our opinion, this is too high a rate for sustained day-in and day-out squadron operation, although satisfactory for operations requiring only three or four sorties per month.

In summary, it is our judgment based on the record established during Black Shield validation flights and on over-all flight experience to date that Black Shield type missions can be performed using current YJT11D-20 equipment with reasonable assurance that aircraft will not be lost during the critical mission leg because of engine failure or malfunction. Our analysis shows that in the last 300 flights through November 20, 1965, no flight was aborted because of engine trouble once Mach 3 plus cruise was initiated.

Very truly yours,

PRATT & WHITNEY AIRCRAFT

W. H. Brown
Assistant Chief Engineer
Florida Research and Development Center

pk

THE PERKIN-ELMER CORPORATION

KENNETH G. MACLEISH
VICE PRESIDENT AND DIRECTOR OF ENGINEERING
ELECTRO-OPTICAL DIVISION

NORWALK
CONNECTICUT
U.S.A.

November 23, 1965

General Jack Ledford
CIA Headquarters

Dear General Ledford:

Personally and on behalf of Perkin-Elmer, I wish to express our utmost confidence in the readiness of the Type I camera systems for the Black Shield operation.

Prior to the recent resumption of flight testing, the B camera system had undergone over two years of field operation, involving 42 flights and over 1-1/2 million feet of film, with only one in-flight failure. In two and a half years in the field, the A system has made 41 flights and exposed a million feet of film with an unbroken record of reliability. Moreover, since March 1962 no flight has had to be rescheduled because of camera problems.

From my own observation I believe that the difficulties of the last three weeks with the B camera are transient in nature, are associated with the break in flight operations, and will disappear with the resumption of the flight test program and the start of operational missions.

The photographic quality achieved in the recent validation flight of the A system is reported to be the best achieved in the program to date.

Our operating personnel are enthusiastic and confident. Their feelings are shared by Perkin-Elmer management. We stand ready to help you insure that the operation will be a success.

Very truly yours,

K. G. Macleish

K. G. Macleish

KGM/mt

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23 November 1965

MEMORANDUM FOR : Brig. Gen. Jack C. Ledford

SUBJECT : Readiness of WLO Furnished Systems for BLACK SHIELD Operations

In Reply Refer To : WLO-1311-65

As discussed with your personnel this date, the WLO furnished systems are fully satisfactory for use in BLACK SHIELD operations. The WLO furnished systems as well as the supporting logistics and personnel are available and ready to support the program.

Marlowe W. Iverson
MARLOWE W. IVERSON
Project Engineer

~~SECRET~~

Handle via BYEMAN
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23 November 1965

MEMORANDUM FOR : Brig. Gen. Jack C. Ledford

1. As of this date, I am pleased to report that, in my judgment, the Honeywell Inertial Navigation equipment is operationally ready.

2. I have carefully reviewed the performance of the airborne equipment, the readiness of the ground support equipment, and the experience level of our personnel and feel that each area is operationally ready.

G M Falck

G.M. FALCK
Program Manager

22 November 1965

MEMORANDUM FOR: Director of Special Activities

1. In our opinion the two Type II "O" configurations from a standpoint of reliability, consistency and repeatability are operationally ready. We have had 39 flights with one in-flight failure. This occurred in January 1965 and was a faulty fuse-holder. This was immediately replaced with a new design.

2. While we are now achieving 20 to 24 inches of ground resolution on the average, we feel that this is susceptible to improvement as the aircraft achieves a more consistent profile.

3. Our field crew of four (4) people have been with the instruments a minimum of over a year and are considered ready for a staging deployment as is indicated by their record of performance.

E L Green

E. L. GREEN

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Control System

OXC-9575
COPY / OF /

22 November 1965

To: Gen. Jack Ledford

From: C. L. Johnson

Subject: Readiness of Black Shield Aircraft for Deployment

Dear Jack:

We were discussing recently the state of readiness of the Black Shield Oxcart aircraft and their crews for deployment in the Far East. I proposed to put in writing my comments on what I think of the reliability and safety of the operation contemplated. They are as follows:

1. To the present date, we have flown this type of aircraft 2,155 times for a total of 3,132 flight hours. There has been intensive testing of the aircraft and its systems for three and one-half years.

2. The recent Black Shield validation tests have proceeded with excellent reliability of all components, with the exception of a radio and an oil pressure gauge. I believe we know the solution to these problems and within a week or two we will have these devices suitable for operation.

3. During the flight test program we have made over 700 refuelings from the KC-135, including night refuelings. These have been very successful.

4. The P&W J58 engines have had a very good safety record since we started to fly. Like all engines, there are always things that can be improved, and we are working diligently on these matters. But I know of no outstanding problem which should prevent deployment.

5. I am very pleased with and proud of the project pilots, in terms of their proficiency in the aircraft and the amount of training they have undergone. I have no reservations as to the qualifications of the crew.

Handle via BYEMAN
Control System

6. The inertial guidance system now has a record of reliability. In addition to this device, a number of standby navigational aids have been provided, including radio homing. I think the reliability and success of the INS and the aircraft instrumentation are sufficient for the planned deployment.

7. The use of electronic countermeasures gear, combined with the very low radar cross section of the aircraft, will make it a very difficult target to be handled by a surface-to-air missile. Also, I do not know of any aircraft in the world today which can successfully intercept the Oxcart aircraft.

Over-all, my considered opinion is that the aircraft can be successfully deployed for the Black Shield mission with what I would consider to be at least as low a degree of risk as in the early U-2 deployment days. Actually, considering our performance level of more than four times the U-2 speed and three miles more operating altitude, it is probably much less risky than our first U-2 deployments.

I think the time has come when the bird should leave its nest.

Sincerely,

Kelly Johnson

CLJ:vmp

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[redacted]

ANNEX 140

~~TOP SECRET~~

DEPARTMENT OF THE AIR FORCE
WASHINGTON

OFFICE OF THE ASSISTANT SECRETARY

OXCART

BYE 3065-65
2 December 1965

MEMORANDUM FOR: Special Assistant to the President for National Security Affairs

The Deputy Under Secretary of State for Political Affairs

The Deputy Secretary of Defense

Director of Central Intelligence

SUBJECT: OXCART Far East Deployment - CAROUSEL

Justification for OXCART deployment to the Far East was stated in a communication distributed to 303 Committee members on December 1, 1965.

Three aircraft are programmed for movement in January 1966 to Kadena Air Base, Okinawa, where support facilities are in the final stages of preparation. Movement of detachment personnel to Kadena by USAF airlift has been arranged for early January 1966, pending approval of the deployment. Materiel airlift is scheduled for completion by mid-December.

The OXCART aircraft will be committed initially for coverage of highest priority Chinese and Vietnamese targets in areas where missile defense systems prevent high-resolution coverage by the U-2. Missions will be planned at a sortie rate of four per month.

The attached proposal outlines the sequence of events and the time frame in which the three aircraft are to be deployed to Kadena.

RECOMMENDATION:

That the 303 Committee consider the appropriateness of OXCART deployment to Kadena at this time.

/s/

ALEXANDER H. FLAX
Director
National Reconnaissance Office

OXCART

HANDLE VIA BYEMAN
CONTROL SYSTEM

~~TOP SECRET~~

ANNEX 141

[redacted]

6 December 1965

MEMORANDUM FOR THE RECORD

SUBJECT: Minutes of the Meeting of the 303 Committee, 3 December 1965

PRESENT: Mr. Bundy, Ambassador Johnson, Mr. Vance, and Admiral Raborn

Also present were General Jack Ledford, Dr. Albert Wheelon, and Mr. Huntington Sheldon

1. OXCART

a. An extensive and detailed discussion of the status and future use of OXCART took place with considerable emphasis by General Ledford on the tested capabilities of the aircraft and its systems as revealed by the comprehensive statistics on every flight made thus far.

b. The proposed timing of an actual OXCART deployment to Kadena Air Base as requested in the basic paper (BYE 3065/65) was not approved for the month of December. Mr. Bundy stated that other complex national and international problems which were to be sorted out in the month of December pre-empted this. Mr. Vance indicated that Secretary of Defense McNamara was of the same mind. However, the Committee did agree that all steps to ready the forward operating base to the greatest extent possible - short of moving the aircraft - be undertaken with the purpose of a potential quick reaction deployment within 21 days after 1 January 1966.

c. Admiral Raborn emphasized the current lack of intelligence in the face of various indices of increasing aid by the Chinese to North Vietnam. The decreasing reliance (due to mounting vulnerabilities) which can be placed on IDEALIST in this theatre and the decline in the performance of certain random programmed satellites pointed to a need for OXCART with its wide coverage and one foot resolution perhaps sooner, rather than later.

d. The Committee then tackled the problem of the current single base capability and concluded that steps should be taken promptly to develop a simultaneous dual base capability. Dr. Wheelon indicated that this would require an addition to the budget for more technical personnel and more equipment, but the Committee agreed that a dual base capability was fundamental to maximum operational use of the system.

e. Dr. Wheelon pointed out that, in addition to deployment and prior to eventual use, base support rights for recovery would have to be negotiated with governments on Taiwan, Manila, Bangkok, and Seoul. It was apparent that the State Department would take the lead in this field and that special briefings by persons connected with the program might be necessary at that time.

2. NRO Forecast for December 1965

a. The NRO forecast for December was approved by telephonic vote on 2 December 1965.

b. An additional IDEALIST flight for coverage of North Korea for December was approved telephonically by Committee principals on 3 December (see ADIC 0457).

3. Ban Takhli Withdrawal

Committee approval not being obtained for Sino-Indian border coverage from Ban Takhli during the months of October, November, and December, NRO issued on 15 November, "Withdrawal of IDEALIST Detachment at Ban Takhli" (BYE 3000-65), which returned personnel and equipment to Tao Yuan and Edwards Air Force Base.

4. Cambodia

When weather interfered with the accomplishment of the Cambodian coverage approved in special minutes of 8 October 1965 (BYE 58345/65), approval for another mission was obtained from the Department of State on 5 November 1965.

/s/
Peter Jessup

Distribution
- Ambassador Johnson
- Mr. Vance
- Admiral Raborn

ANNEX 142

[redacted]

~~SECRET~~

BYE-3194-63

4 September 1963

MEMORANDUM FOR: Deputy Director of Central Intelligence

SUBJECT: OXCART Briefing for Prime Minister and Defense Minister of Canada

1. This memorandum is for your information only.

2. On 29 August 1963, Air Marshal Slemon, Deputy Commander, NORAD; Col. Leo P. Geary, AFIGO-S; and the undersigned briefed Prime Minister Pearson of Canada on the OXCART/KEDLOCK programs. Air Marshall C. R. Dunlap, CAS, RCAF, was also present at the briefing. Immediately subsequent to the presentation to the Prime Minister, and at the latter's request, a similar briefing was given to the Minister for National Defense, Mr. Paul Hellyer.

3. The briefing was carried out in accordance with instructions contained in your Action Memorandum No. A-280 (BYE 4281-63) dated 1 August 1963. Materials used in the briefing included photographs of the A-12 and AF-12, a map depicting typical training and development phase flight routes affecting Canadian air space, and a 10-minute film clip of the AF-12 and the GAR-9 air-to-air missile.

4. Arrangements were made for the briefing to be given in the Prime Minister's "alternate" office which is located in the East Block of the Parliament buildings. This enabled us to avoid exposure to the reporters and photographers wh o normally frequent access areas leading to the PM's primary office.

5. It was quite apparent, upon being introduced to Mr. Pearson, that his curiosity had been piqued to a considerable degree by the President's personal phone call to arrange for the meeting. His initial query, offered in a jocular vein but not wholly without a discernible trace of concern, was whether he was guilty of some heinous

breach of security. (The Prime Minister possesses a TKH clearance.) We assured him that such was not the case, adding "at least not yet".

6. Air Marshal Slemon then explained the purpose of our visit and stressed the highly sensitive nature of the program. The Prime Minister seemed to be most impressed by the fact that a project of this magnitude could have been brought to its present stage of development without public exposure of some sort and he commented to this effect on several occasions during our approximately one-hour discussion.

7. Although we were completely candid about acknowledging that the A-12 was a follow-on to the U-2, we emphasized that no high-level political decision to utilize it in that role had been made or even, at this point, had been considered. In subsequent discussions we focused attention on the interceptor version, aided and abetted by the film clip which featured the AF-12.

8. Air Marshal Slemon, anticipating the query, took the initiative in emphasizing the necessity for testing the aircraft and navigation system in an environment which would require use of Canadian air space. He assured the Prime Minister that he had personally investigated this aspect of the proposal and was completely satisfied that there was no alternative. If this question had occurred to Mr. Pearson, the Air Marshal's assurances apparently were more than satisfactory and the subject was not broached again during our visit.

9. Col. Geary provided a running commentary for the film clip which Mr. Pearson viewed throughout with obviously keen interest. At the conclusion of the film, we summarized briefly what we desired with regard to overflight approval and support and assistance as it might be required in the event of a mishap or forced landing in Canada.

10. In response, Mr. Pearson stated that he was desirous of providing any and all assistance we might require. Concerning approval for overflight, the Prime Minister granted same with only one minor qualification; i.e. that his approval be brought within the

framework of existing intergovernmental agreements between the U.S. and Canada. He foresaw no difficulty in being able to accomplish this and considered this essential political protection in the event of an incident. Air Marshals Slemon and Dunlap agreed that this would pose no problem. Air Marshal Dunlap was instructed by Mr. Pearson to review the pertinent documents and to report back to him on his findings. It was agreed that when this had been done, the Prime Minister would call the President personally, and advise him that he was approving our requests. (On 3 September at approximately 1500 Air Marshal Slemon called the undersigned and reported that the Prime Minister would call the President that afternoon. This information was passed to the Office of the DDCI which had also been alerted by a call from the Air Marshal.)

11. Before leaving Mr. Pearson we requested his views concerning the need for briefing Mr. Hellyer, the Minister of Defense. The Prime Minister's opinion was that in the event of an incident that would require support and assistance from the defense establishment it would be almost essential that the Defense Minister have advance knowledge of the program if he were to respond with the alacrity and efficiency which would be desired under such circumstances. (Although Air Marshal Dunlap would be our primary contact in a situation of this nature, it is most probable that the Defense Minister would become involved.) It was agreed that Mr. Hellyer should be briefed and the Prime Minister called and made the necessary arrangements.

12. The briefing for the Defense Minister followed the same pattern as that for the Prime Minister and his reaction was essentially the same. He foresaw no problem in meeting the Prime Minister's injunction that the approval be brought under appropriate clauses of existing agreements between the U.S. and Canada, and assured us that he would be happy to provide any assistance that might be required.

13. Although we were prepared, as a last resort, to give assurances that Canadian air space would not be used in conjunction with overflights of denied areas, unless there was prior referral to the Prime Minister, such a commitment was not sought and, consequently, was not made. The Defense Minister did observe at one point that such operations would present a somewhat different situation; but we permitted this observation to pass without comment. In this context it should be recognized, however, that the strong emphasis we

placed on the fact that we were seeking approval only for use of Canadian air space for test and training flights might bring any more exotic use dangerously close to a breach of faith, even in the absence of an explicit commitment not to do so.

14. In conclusion, I would like to note the unstinting support and cooperation provided by Air Marshal Slemon. He is obviously held in high esteem by the hierarchy of the present Canadian administration and his unqualified endorsement and persuasiveness were undoubtedly major factors in influencing the Prime Minister to grant his approval without any crippling restrictions.

(Signed)

[redacted]
Special Assistant for Liaison
OSA

Withheld under statutory authority of the Central Intelligence Agency Act of 1949 (50 U.S.C., section 403g)

ANNEX 143

[redacted]

## PROJECT PILOT SELECTION, PHASING AND TRAINING:

### A. Selection Criteria:

1. During January 1961, Project Headquarters established the following prerequisite qualification criteria for Project pilot candidates:

a. Flying Experience:

(1) A fighter pilot with outstanding professional competency.

(2) Mandatory Qualifications:
  (a) Minimum of 1000 jet flying hours.
  (b) Minimum of 100 hours in Century series a/c.
  (c) Air refueling experience.
  (d) One-half of flying experience accomplished in tactical units.

(3) Desirable Qualifications:
  (a) Multi-jet engine aircraft experience.
  (b) Flight test experience.

(4) Good accident and flying record.

b. Psychological Fitness:

(1) Must possess a high degree of:
  (a) Emotional stability.
  (b) Stability of personal affairs.
  (c) Motivation.
  (d) Acceptance of and enthusiasm for the proposed assignment.

c. Physical Qualifications:

(1) Physical characteristics:
  (a) Age: 25 to 40.
  (b) Height: Under 72 inches.
  (c) Weight: 175 pounds or less.

This criteria remained standard throughout the program except for Century series aircraft experience which was increased to 500 hours in 1966 and aerial refueling experience became a "desirable qualification".

B. Group Phasing:

(1) To insure an orderly input to the programmed training, A-12 pilots were recruited in phased groups to insure efficient use of available flying hours. The following are pilots recruited, date recruited and group phase assigned for training:

Group A:

| | |
|---|---|
| Alonzo J. Walter, Jr. | November 1962 |
| William L. Skliar | November 1962 |
| Walter L. Ray | November 1962 |
| Kenneth S. Collins | November 1962 |

Group B:

| | |
|---|---|
| Ronald L. Layton | February 1963 |
| Jack W. Weeks | February 1963 |
| Mele Vojvodich | February 1963 |

Group C:

| | |
|---|---|
| David D. Young | June 1963 |
| Dennis B. Sullivan | June 1963 |

(2) The following pilots were recruited in 1966 as replacements:

| | |
|---|---|
| Russell J. Scott | November 1966 |
| Francis J. Murray | October 1966 |

(3) Summary of pilot status:

| Name | EOD | Remarks |
|---|---|---|
| Alonzo J. Walter, Jr. | Nov 62 | Returned to USAF Mar 64 |
| William L. Skliar | Nov 62 | Returned to USAF July 67 |
| Walter L. Ray | Nov 62 | Fatality in aircraft accident January 1967 |
| Kenneth S. Collins | Nov 62 | Still on board |
| Ronald L. Layton | Feb 63 | Still on board |
| Jack W. Weeks | Feb 63 | Fatality in aircraft accident June 1968 |
| Mele Vojvodich | Feb 63 | Scheduled to return to USAF July 1968 |
| David D. Young | June 63 | Returned to USAF March 65 |
| Dennis B. Sullivan | June 63 | Still on board |
| Francis J. Murray | Oct 66 | Still on board |
| Russell J. Scott | Nov 66 | Civilianized June 67 |

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ANNEX 144

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21 February 1966

MEMORANDUM FOR THE RECORD

SUBJECT: Minutes of the Meeting of the 303 Committee, 17 Feb 1966

PRESENT: Mr. Bundy, Ambassador Johnson, Mr. Vance, and Mr. Richard Helms.

General Jack Ledford was also present.

1. Resumption of GRC TACKLE Overflights

On the resumption of GRC TACKLE overflights, the arguments were heard and Mr. Bundy said he felt the matter should be resolved by the principals. He directed the Executive Secretary to prepare a summary, and the Secretaries of Defense and State could determine the issue with higher authority at an early date. General Ledford indicated that resumption could be construed to mean a bank of four missions.

2. OXCART

The Executive Secretary raised the question of the decision on the deployment of OXCART. Mr. Vance stated that he could speak for Secretary McNamara, who felt the situation had not changed since earlier discussions and he remained opposed to deployment at this time. Even deployment without a mission would attract undue attention. Mr. Bundy asked for a summary statement on this matter as well and said he planned to bring the status of OXCART to the attention of higher authority.

3. .....

Signed

Peter Jessup

Distribution
- Ambassador Johnson
- Mr. Vance
- Admiral Raborn

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ANNEX 145

29 March 1966

MEMORANDUM FOR THE RECORD

SUBJECT: Minutes of the Meeting of the 303 Committee, 28 March 1966

PRESENT: Ambassador Johnson, Mr. Vance, Admiral Raborn,
Mr. Richard Helms, and Mr. Peter Jessup.

Dr. Albert Wheelon, General Jack Ledford, and
Dr. William Tidwell were also present.

High Resolution Photographic Coverage of South China and North Vietnam (BYE-0064-66).

a. A lengthy discussion took place on the merits of deploying and utilizing OXCART at this time. Admiral Raborn explained the Agency paper which recommended the immediate deployment of OXCART to Kadena to satisfy intelligence community requirements which were not being satisfied at this time through the other available methods, i.e. KH-7 (satellite photography), TROJAN HORSE, BLUE SPRINGS, and IDEALIST/TACKLE flights.

b. Much of the discussion centered around the three principal target areas--the border, the triangle (NVN), and South China--and the relative degree of present coverage. Dr. Tidwell presented a chart which depicted the gaps and weaknesses of present coverage: the earlier limited success of BLUE SPRINGS, the inadequacy of TROJAN HORSE, the increasing difficulties in the use of GRC pilots (due to stepped-up air defenses and Chinat reluctance), and the built-in hindrances in KH-7 coverage (due to weather and the pre-programming limitations which underline its lack of mobility for spot targeting).

c. Ambassador Johnson and Mr. Vance cited the recent marked improvement in BLUE SPRINGS capabilities with the introduction of a decoy system.

d. Admiral Raborn made his main point quite clearly: Being charged with the responsibility of not being caught by surprise, having a major list of requirements, and presently having an inadequate coverage by the aforementioned methods, he could only opt for the introduction of a new vehicle which was ready and gave every indication of being able to improve production.

e. Mr. Vance returned to the nub of the matter and stated there was a split opinion in Defense to the following extent: The JCS was against deployment to Kadena without immediate use and was in favor of deployment and use against South China. However, Mr. Vance said that he and the Secretary of Defense were against deployment at this time largely on the issue that the introduction of OXCART could be seriously misinterpreted by the Chinese. Messrs. Vance and McNamara felt that sufficient coverage of North Vietnam could be obtained at this time by maximum use of existing means.

f. Admiral Raborn felt the coverage was simply inadequate and cited the point that each mission uncovered new SAM sites.

g. There was additional speculation as to what signal the deployment would give to the Chinese. Different viewpoints showed themselves here: Mr. Vance felt the Chinese reaction could be one of fear, i.e. that the USG was preparing more aggressive moves. Ambassador Johnson commented that they could interpret the deployment as a desperate measure.

h. There was additional exchange about using OXCART for North Vietnam alone, but it was apparent that once OXCART was employed in Vietnam it would be but a short time before it was used over South China. Returning to how China would interpret the use of OXCART, two extremes of interpretation came to the surface: One viewpoint was that it could signify USG intent to invade; the other that China would regard it as simply one more in a long list of violations of sovereignty which they have been recording monotonously.

i. Ambassador Johnson summed up by saying that since the Department of Defense was indeed the principal customer and DOD was willing to live with lesser coverage, he could accept that and the committee's conclusion was that we should not deploy at this time. He fully understood Admiral Raborn's dissent and the reasons for it, and he recommended that current opinions on OXCART be brought to the attention of higher authority by the two Secretaries and Admiral Raborn at an early date.

(Signed)

Peter Jessup

[redacted]

ANNEX 146

~~TOP SECRET~~

12 May 1966

MEMORANDUM FOR THE RECORD

SUBJECT: Minutes of the Meeting of 303 Committee, 11 May 1966

PRESENT: Mr. Rostow, Ambassador Johnson, Mr. Vance, and Admiral Raborn

Also present were Gen. Maxwell D. Taylor, Mr. Huntington Sheldon, and Dr. Albert Wheelon.

## OXCART

1. A wide-ranging discussion took place on various aspects of dealing with the possible deployment of OXCART.

2. It became apparent that although the target breakdown for North Vietnam was well summarized statistically, a qualitative analysis of these targets had not been attempted. The acceptability of the fact that 11 targets would remain uncovered had also not been determined.

3. General Taylor felt that a statistical and qualitative analysis should also be done for the South China targets in order to obtain a more complete picture. General Taylor also made the point that we were addressing (in the proposed deployment of OXCART) the question of surprise attack by China rather than tactical improvements in the war in Vietnam.

4. Mr. Rostow raised the question of whether, if the decision were made to bomb POL in North Vietnam, this would have the corollary effect of raising our requirements for observation. Mr. Vance thought the answer was yes*. General Taylor felt that the bombing of POL in North Vietnam was not a consideration in the deployment of OXCART.

5. Admiral Raborn and Dr. Wheelon made a detailed explanation of the withering asset of GRC-piloted U-2's. They pointed to problems of the Chinats wanting "canned routes", the problem of the Chinats themselves becoming their own weather experts, and the Chinats using some of their quota of missions for their own use, i.e. the Straits. Charts depicted a tale of woe in which there was one flight in March for South China, one in April for South China (plus one Straits) and one in May (one Straits). Admiral Raborn called this a

hand-to-mouth existence on a month-to-month basis. Dr. Wheelon pointed out that despite the various obstructions of the Chinats, their pilots had been undertaking missions under difficult conditions.

6. Mr. Rostow asked about the quality of other intelligence such as SIGINT for coverage of South China. Mr. Sheldon pointed out that SIGINT had seriously declined when the Chinese had shifted from radio to landlines in key areas.

7. Ambassador Johnson raised the question: Why do we make the decision now if the recommendation is for a September deployment? Admiral Raborn underlined the fact that he had always stuck to the 30 day stretch as the safest time factor for a deployment. General Taylor raised the question: If we are going to make a covert deployment is there any other better time than right now? Will there ever be a more propitious time?

8. Ambassador Johnson made the point that the principals had not sufficiently addressed themselves to cover and contingency problems. The elaborate cover plans were to a certain extent self delusory. It was one thing for the pilot to have memorized a set story but quite another for the U.S. Government to know exactly how it felt and what it was going to say.

9. The Executive Secretary queried whether the camera complex now available was not far superior to that maintained in existing systems. The retort was, yes, there was a marked improvement in resolution in the OXCART system.

10. The Executive Secretary indicated a major factor in the deployment decision would be the negotiations with foreign governments for emergency landing rights. He particularly cited Japan with its traditional proprietary interest in Okinawa. Ambassador Johnson said this was a puzzler, and he wanted to think and discuss the Japanese aspects with his colleagues.

11. General Taylor reminded the principals that they should not forget to address themselves to the basic question: Is now the best time for deployment?

12. What then, in conclusion, did the meeting decide? First, there would be a qualitative judgment on the target question in regard to North Vietnam and a statistical and qualitative judgment on the target problem in South China. Second, the principals would do their homework on just what posture the USG would take (i.e. contingency statements) in regard to deployment of OXCART and its planned uses. Third, Ambassador Johnson would explore the problems surrounding deployment to Okinawa that might arise with Japan. When the aforementioned problems have been assessed, then the Committee would be in a better position to pose the entire problem to higher authority.

(Signed)

Peter Jessup

* See attached "Expansion of Minutes..."

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17 May 1966

MEMORANDUM FOR THE RECORD

SUBJECT: Expansion of Minutes of Meeting of the
303 Committee, 11 May 1966

At the request of Mr. Vance, sentence two of paragraph four of the minutes of the 303 Committee meeting of 11 May 1966 (BYE 66,704/66) is expanded to read: "Mr. Vance thought the answer was yes but pointed out that you would have to weigh against that need the increased risk discussed in paragraph 5 of SNIE 10-2-66, 'Reactions to a Possible U.S. Course of Action' (BYE 44001/66)."

(Signed)

Peter Jessup

BYE 67016/66

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ANNEX 147

~~TOP SECRET~~

27 June 1966

MEMORANDUM FOR THE RECORD

SUBJECT: Minutes of the Meeting of the 303 Committee, 24 June 1966

PRESENT: Mr. Rostow, Ambassador Johnson, Mr. Vance, and Mr. Helms.

Dr. Albert Wheelon was also present.

OXCART

a. On the question of deployment of OXCART, it was agreed that the time had come to present the divergent views to higher authority. The line-up is approximately as follows: The CIA is in favor of deployment and use at this time. The State Department is against. The Department of Defense is split to the extent that Secretary McNamara and Mr. Vance oppose deployment at this time, whereas the Joint Chiefs of Staff are in favor of deployment and use at this time to satisfy requirements of targets in South China. The President's Foreign Intelligence Advisory Board is on record as favoring deployment and use at this time.

b. Almost all of the necessary homework seems to have been completed except for the area concerning the public stance of the United States government. There seemed to be some ambiguity about where the United States stood officially on overflights of China. At a news conference on 27 May 1966, Secretary Rusk replied in answer to a question that "They (U.S. pilots) have instructions not to intrude into Chinese air space" and later in the same conference, "It is true that we do not instruct our pilots to overfly China."

c. Ambassador Johnson said that we could hope, in response to any hue and outcry, to point to some Chinese violation as a cause for our action. We must avoid questions of basic confidence in the U.S. government as in the case of the U-2.

d. A summary of the reasons for and against deployment of this system was to be prepared at an early date for presentations to higher authority.

(Signed)
Peter Jessup

BYE 67, 018/66

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ANNEX 148

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THE WHITE HOUSE

August 12, 1966

MEMORANDUM FOR: Director of Central Intelligence

The President has decided for the time being that OXCART will not be deployed.

In order to minimize the time lag in bringing OXCART to bear during an emergency, would you be good enough to consider with Secretary McNamara measures that might shorten the present estimated 21-day deployment interval.

(Signed)

W. W. ROSTOW

cc: Secretary Rusk
Secretary McNamara

BYE 27019/66

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ANNEX 149

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The Secretary of Defense
Washington

31 August 1966

MEMORANDUM FOR THE DIRECTOR OF CENTRAL INTELLIGENCE

I concur in your recommendation to propose to the 303 Committee that it approve "test flights" of OXCART over Cuba in addition to the present SAC U-2 coverage.

(Signed)

Bob

Robert S. McNamara

cc: CJCS
Dir., DIA

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OXCART ~~TOP SECRET~~ BYE-5513-66

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ANNEX 150

EVENING OUTLOOK
Santa Monica, California
Saturday, January 7, 1967

# Air Force Spots Lost Spy Plane

## Test Pilot Not In Nevada Wreckage

LAS VEGAS, Nev. (UPI) —The Air Force announced today that the wreckage of the missing SR-71 super spy plane, the world's fastest operational aircraft and successor to the U2 reconnaissance plane, was located from the air late Friday.

A spokesman said the black, javelin-like aircraft crashed approximately four miles southwest of the town of Leith, Nev.

An Air Force helicopter crew who examined the wreckage said there was no evidence that the civilian test pilot who flew the aircraft was still aboard at the time of impact.

An intensive ground and air search was continuing for the pilot.

### Built By Lockheed

The plane, made by Lockheed, was capable of flying 2,000 miles an hour at a top altitude of better than 80,000 feet. It was described in 1964 as the most advanced aircraft of its type in the world.

The Air Force announced Friday the black, javelin-like plane had been missing since Thursday afternoon on a routine test flight from Edwards Air Force Base, Calif.

The SR-71, made by Lock- huge jet engines, is a more sophisticated and advanced spy plane than the U2 model in which American pilot Gary Francis Powers was shot down over Russia in 1960.

### First Flight

In 1965, a year after it made its first flight from Palmdale, Calif., the SR71 became operational with the Strategic Air Command at Beale AFB in Northern California.

As a strategic reconnaissance plane, it has a top speed of Mach 3 (three times the speed of sound), and a top altitude of more than 80,000 feet.

President Johnson an-

Turn To Page 5 Column 8

## Spy Plane

Continued From Page 1

nounced July 24, 1964, that the aircrafit was "capable of worldwide reconnaissance," he said it would be used "during periods of military hostilities and in other situations in which the United States military forces may be confronting foreign military forces."

Flying at maximum capabilities, the SR71 can survey 60,000 square miles of land or ocean in each hour of operation. It is equipped with the latest electronic reconnaissance equipment.

### One Other Crash

One other SR-71 has crashed. In February of last year, two Lockheed crewmen ejected over New Mexico during an undisclosed air emergency.

One of two civilain test pilots, James T. Zwayer of Lancaster, Calif., bailed out and was killed. William A. Weaver, Northridge, Calif., survived the jump.

The SR71 was developed from the YF12A triple-sonic interceptor. The two planes are nearly identical, incorporating a double-delta wing design.

EVENING OUTLOOK

Santa Monica, California

Monday, January 9, 1967

# Test Pilot's Body Found After Desert Jet Crash

EDWARDS AIR FORCE BASE (AP) — The body of the man who piloted the ill-fated SR71 reconnaissance jet last week was found nearly 10 miles from the plane's wreckage.

Walter L. Ray, a civilian test pilot for the Lockheed Aircraft Corp. of Burbank, took the slender, experimental craft on a run Thursday. It crashed some 73 miles northeast of Las Vegas, Nev.

Ray, 33, is survived by his widow, Diane Carole; his mother, Thelma Ray, of Havana, Ill.; a sister, Elmora Cealka, of Elkshart, Ind., and a brother, Vernon O. Ray, Orange, Calif.

PJB

RAK

AOL

file Law Code

AVIATION WEEK : 16 Jan 67

## SR-71 Crash Probe

Los Angeles–Seven-man Air Force team was here last week to investigate the loss of an experimental model of the USAF/Lockheed SR-71 reconnaissance jet Jan. 5 near Leith, Nev.

The aircraft was abandoned in flight and crashed. Lockheed test pilot Walter L. Ray, 33, ejected from the experimental airplane but did not survive the ejection.

The SR-71 has been involved in five accidents or more. It is a two-place aircraft normally manned by a pilot in the front cockpit and a reconnaissance systems officer in the rear. An SR-71B is fitted with an elevated rear cockpit and dual controls for pilot training, but the standard model has no piloting controls in the rear cockpit.

An SR-71 was damaged Jan. 10 at Edwards AFB during a wet runway braking test. The accident occurred after the drag chute failed during a high-speed taxi run to test the brake system.

The aircraft continued to the end of the runway, stopping on the dry lakebed.

The landing gear apparently failed as the aircraft passed over the rough transition area between the lakebed and the runway. The airplane was damaged considerably.

C05492929

ANNEX 151

[redacted]

CENTRAL INTELLIGENCE AGENCY
WASHINGTON 25, D. C.

OFFICE OF THE DIRECTOR

BYE 2369-67
Copy 6 of 8

15 MAY 1967

MEMORANDUM FOR: The Deputy Secretary of Defense

✓Special Assistant to the President
(Mr. Rostow)

The Deputy Under Secretary of State for
Political Affairs

SUBJECT: OXCART Reconnaissance of North Vietnam

1. The attached document is forwarded to the members of the 303 Committee for further consideration and approval as a result of the meeting on Friday, 12 May 1967.

2. Part I delineates the requirement for expanded, repetitive, high resolution photography with particular attention to those priority areas where the emplacement of offensive missile systems is considered most likely.

3. Part II is an operational plan to obtain this photography. The plan proposes the use of the OXCART vehicle, deployed to and operating from a prepared base in Okinawa, to overfly and photograph the priority areas of North Vietnam.

Richard Helms

Richard Helms
Director

Attachment - 1
As stated

~~TOP SECRET~~ RUFF
OXCART

**Withheld under statutory authority of the Central Intelligence Agency Act of 1949 (50 U.S.C., section 403g)**

SAS/O/OSA/[redacted](13 May 67)

Distribution:
1 - Special Assistant to the President (Mr. Rostow)
2 - The Deputy Secretary of Defense (via DIA/TCO)
3 - The Deputy Under Secretary of State for Political Affairs (via State TCO)
4 - Director of Central Intelligence
5 - Office of the Special Assistant to the President (Mr. Jessup)
6 - Deputy Director of Central Intelligence
7 - Deputy Director of Science and Technology
8 - Director, National Reconnaissance Office

OXCART
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HANDLE VIA BYEMAN TALENT
KEYHOLE CONTROL SYSTEMS
JOINTLY

# OXCART RECONNAISSANCE
# OF
# NORTH VIETNAM

## CONTENTS

## I. DETECTION OF OFFENSIVE MISSILES IN NORTH VIETNAM THROUGH PHOTOGRAPHY

### GENERAL

1. Examination of operational limitations, vulnerabilities, swathe widths and other related aspects of present photographic reconnaissance activities in North Vietnam reveals that it would be inadequate to provide timely and positive assurance of detection of offensive medium range missile systems if they are introduced into North Vietnam. (For details see discussion of Current Coverage.) While the remedy suggested in this proposal will still not provide "positive assurance" of detection of such systems, it appears to be the only photo recce plan that will materially increase the likelihood of such detection.

## Coverage Requirements

2. The primary requisite is, of course, nearly complete coverage of North Vietnam with particular attention to those priority areas where the emplacement of offensive missile systems is considered most likely. Ideally it would be desirable to obtain thorough coverage of the important rail transloading yards of Pingshiang and Kung Ming in China in order to detect possible introduction of offensive missiles at the earliest possible date, i.e. while they are in transit. This may be politically undesirable. Therefore this operational proposal confines itself to the likely areas in North Vietnam including marshalling yards and spurs in the North Vietnamese rail system as well as the port of Haiphong. A second requirement is that the coverage be repetitive. This is essential in order that new activity or changes in the nature of previously observed activity, can be detected promptly. A third and equally important requirement is adequate resolution to identify different types of missiles or missile-associated equipment. Resolution on the order of 2-1/2 to 3 feet is needed to distinguish between missiles and missile-associated ground support equipment and other hardware such as armored vehicles and transport equipment.

## Current Coverage

3. Following is a brief review of the limitations of the current photography on North Vietnam.

### a. Satellite Coverage

High-resolution coverage is currently being provided by the KH- and KH-8 satellites. Weather is a limiting factor owing to the difficulties in scheduling satellite coverage to coincide with periods of good weather. Additionally, the width of stereo coverageof these vehicles is limited, however, to nine miles for the KH-7 camera system and five miles for the KH-8 system. Because of the constraints of the high-resolution systems, only a few high-priority targets such as the Pinghsiang rail transshipment point and the Hanoi and Haiphong areas can be photographed on any one mission.

The lower resolution KH-4 missions are capable of providing the necessary overall coverage of North Vietnam because they photograph an area approximately 160 miles wide. Experience has shown, however, that only about one KH-4 mission a year--they are launched about once a month--finds North Vietnam sufficiently cloudless to obtain adequate overall coverage of the country. The quality of KH-4 photography would generally permit the detection of a missile site of standard configuration, but better resolution would be required to identify missiles or missile-associated equipment and to detect a well-camouflaged site or one of a novel configuration. (See Attachment I)

b. <u>High Altitude U-2 Coverage</u>

This reconnaissance aircraft, with any of its camera systems, is capable of providing the required resolution to identify missiles and missile-associated equipment. The vulnerability of the U-2 to multiple launches of SA-2 missiles imposes serious operational limitations on the use of this reconnaissance vehicle in North Vietnam. Therefore, since the introduction of surface-to-air missiles into North Vietnam in 1965, operations of these aircraft have been restricted to areas outside the range limitations of known SAM emplacements. This has generally confined U-2 photography to the northwestern portion of North Vietnam.

Since the beginning of the year, 67 U-2 missions have been flown, 37 of which covered portions of North Vietnam. Much of the photography from these missions, however, had cloud cover. (See Attachment I)

c. <u>Combat Reconnaissance Coverage</u>

These missions range from high level (30,000 feet) to low level (500 feet) with the majority between 5-10,000 feet. The quality of this photographic coverage ranges from excellent to poor. The National Photographic Interpretation Center reports that it received photography from an average of

800-900 of these missions a month during 1966 and 750 a month this year. About 20-25 percent of these, however, are flown to produce infrared or side-looking radar imagery--a product that cannot generally be applied to identifying missiles. Much of the coverage consists of short film strips covering major road and rail segments, point targets such as the Thai Nguyen Iron and Steel Complex, and other strike targets. The shortness of the flight lines and the narrow band of lateral coverage because of the relatively low altitude of the reconnaissance aircraft result in numerous gaps in photo coverage. Moreover, tactical reconnaissance aircraft are prohibited from flying in the sanctuary or buffer area--that part of North Vietnam within 20 miles of the Chinese border. Because this effort is utilized primarily to support strike operations, the over-all photographic coverage of North Vietnam by combat reconnaissance aircraft has been relatively limited. (See Attachment I)

d. <u>Drone Coverage</u>

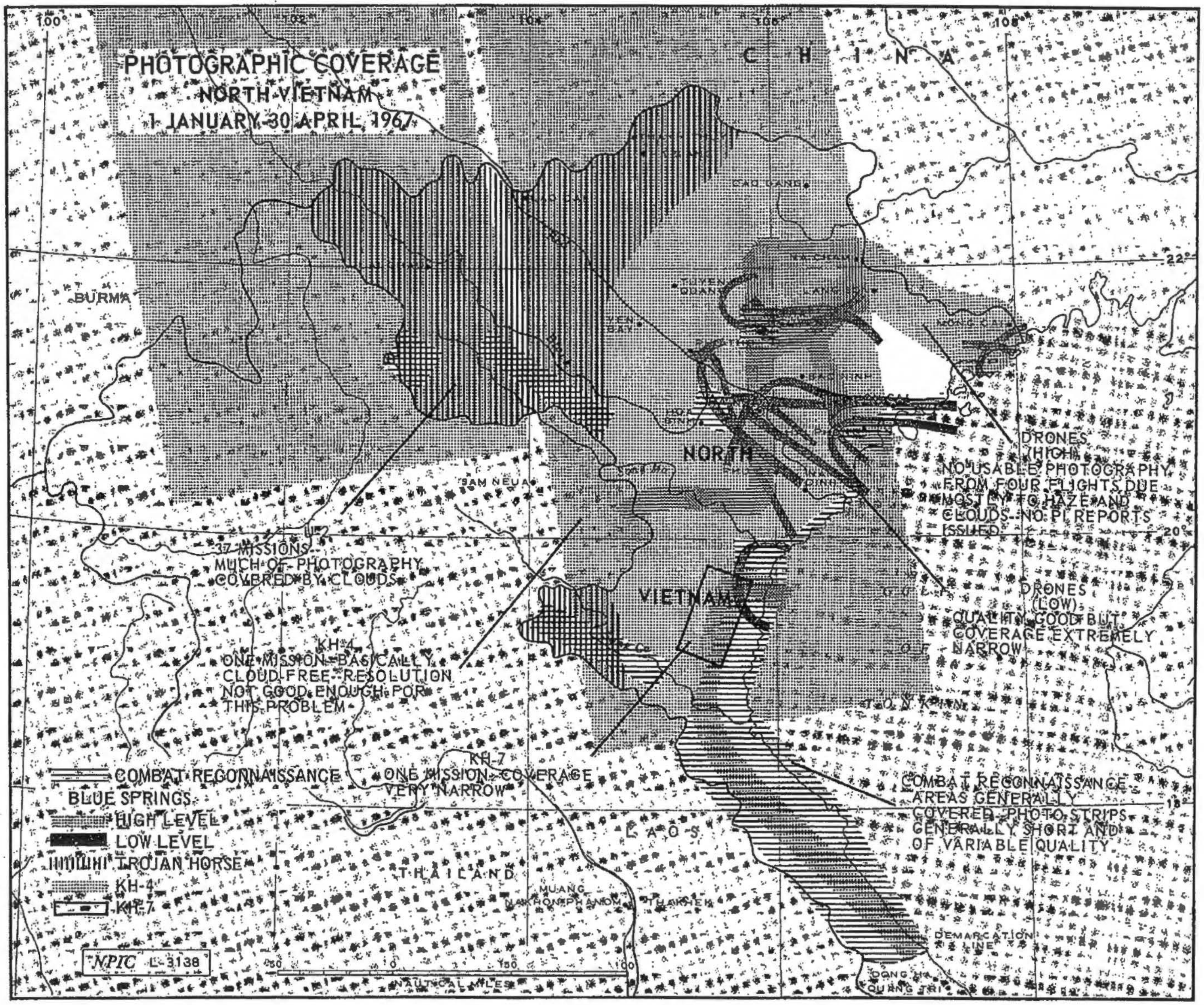
Low-level drones--24 have been recovered thus far in 1967--are flown at 1,500 feet and provide excellent quality photography. The low altitude of the drone, however, restricts the usable photography to approximately one mile on either side of the flight line. These missions are directed primarily against critical targets in the Hanoi and Haiphong areas.

The high-level drone--five out of twelve have been recovered--is flown at an altitude above 60,000 feet but is vulnerable to the SA-2 missile. Most of the high-level drone missions have been programmed over the eastern portion of the China/North Vietnam border where tactical aircraft do not operate, but for missile search purposes they have not provided any usable photography of that area, largely because of unfavorable weather. High-level drone photography is capable, however, of providing identification of missiles or missile-associated equipment under optimum operational and weather conditions. The above notwithstanding, high-level drones have proved to be highly vulnerable. Thus neither the high-level drone with its vulnerability nor the low-level drone with its very narrow coverage, could provide timely repetitive photography necessary for the detection of the type of missile sites in question. (See Attachment I)

Priority Search Areas

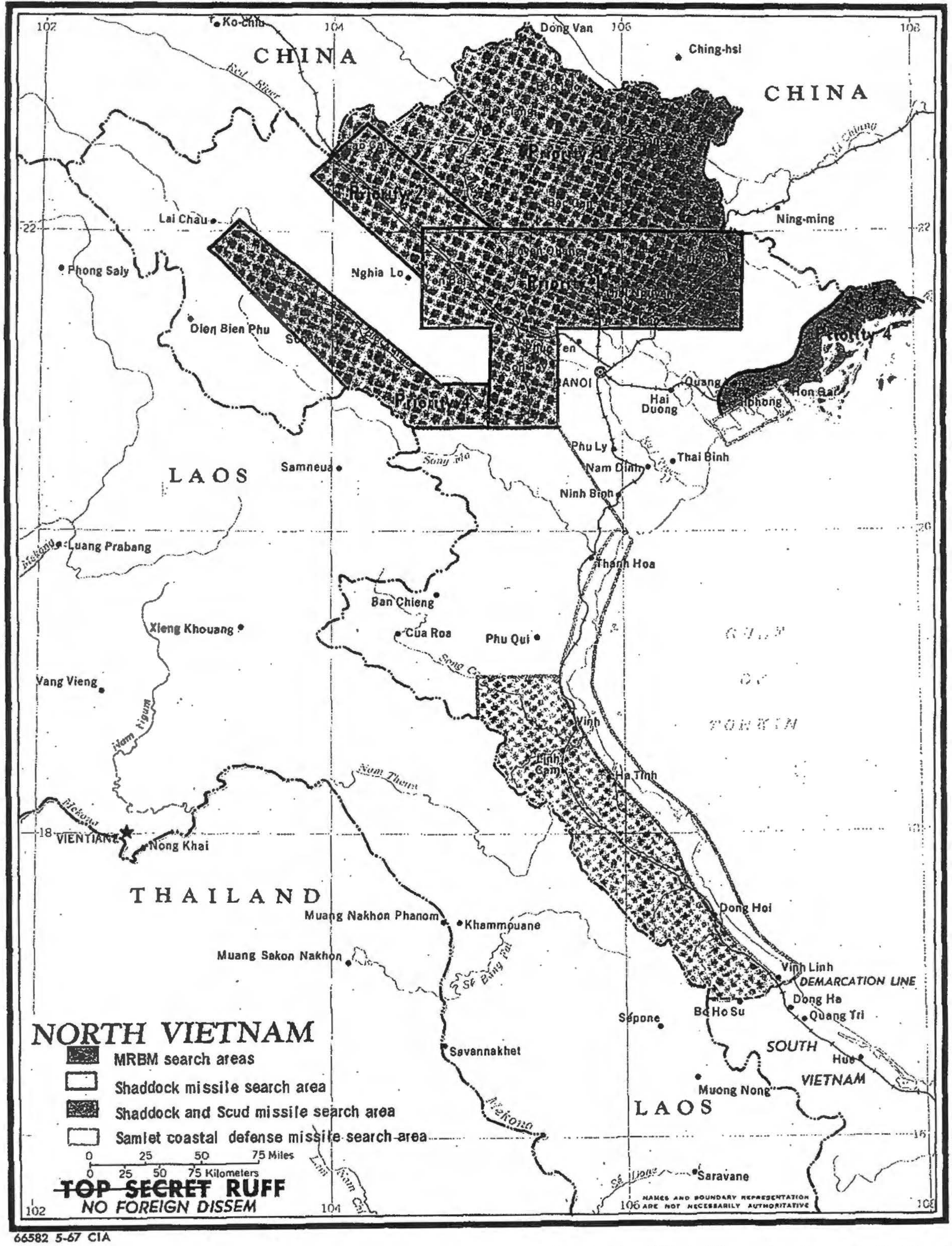
4. The priority missile search areas delineated on the attached map are a slightly modified version of those first established by the LOOKOUT Task Force over a year ago. These areas are receiving additional study. In general, our considerations for establishing priority search areas--particularly for fixed-site medium-range missiles--were the availability of adequate road nets and the suitability of terrain for the emplacement of the site and for masking or camouflaging it. A secondary consideration was the availability of air defense protection with such weapons as the SA-2 surface-to-air missile. (See Attachments II and III)

Attachments: 3
I - Map of Photographic Coverage
II - Map of Priority Missile Search Areas
III - Rationale for Search Area Selection



PHOTOGRAPHIC COVERAGE
NORTH VIETNAM
1 JANUARY-30 APRIL 1967

# PRIORITY SEARCH AREAS FOR SURFACE-TO-SURFACE MISSILES



66582 5-67 CIA

Handle via BYEMAN TALENT
KEYHOLE Control Systems

## Rationale for Selecting Search Areas for MRBMs in North Vietnam

Priority 1: This area--a short distance north and west of Hanoi--is given first priority because it already has excellent SAM and AAA defenses and good interceptor defenses, good rail and road facilities, forested areas for concealment, and suitable plain to hilly terrain.

Priority 2: This area along the rail line from Hanoi to China is given second priority because of the rail transportation available and its location well inland and behind a barrier of SAM, AAA, and interceptor defenses. It also has extensive forests for concealment and large areas of suitable terrain.

Priority 3: This area well north of Hanoi is given third priority because of its rearward position, good roads, extensive forests for concealment, and generally suitable terrain. This is the best area for defense by Hanoi's interceptors. Much of the northwestern part of this area is too mountainous to be suitable.

Priority 4: Two areas have been assigned fourth priority: a strip of hilly country along the Moc Chau - Lai Chau road in the northwest, and a strip along the northeastern coast from Haiphong to the Chinese border. Except for the SAM-defended Haiphong vicinity, these areas would be difficult to defend from air attack. They have good roads, and offer generally suitable terrain and good opportunity for concealment.

Rationale for Selecting Search Areas for Tactical Missiles

The areas for these missiles were selected entirely on the basis of weapons range.

## II. OXCART RECONNAISSANCE OPERATIONS PLAN

1. The required photographic coverage of North Vietnam will be accomplished by the OXCART vehicle operating from Kadena Air Base in Okinawa. This operating location at Kadena has been prepared for OXCART operation for some time.

2. Operational missions will be planned, directed and controlled by the Central Intelligence Agency Operations Center. Three OXCART aircraft and the necessary task force personnel will be deployed from Area 51 to Kadena.

3. With this inventory a minimum of nine (9) successful operational missions per month can be flown consistent with available weather. Overcast skies are a predominate feature associated with the monsoon season and limit the number of days suitable for effective photographic reconnaissance. As the monsoon season wanes, the number of clear days increases permitting more frequent, repetitive reconnaissance coverage. Missions will be launched on a twenty-four hour alert basis. This will permit maximum utilization of the favorable weather available. In addition to the operational missions flown, necessary test and proficiency sorties will be flown from Kadena. OXCART aircraft will be rotated between Area 51 and Kadena to maintain the required number of operationally ready aircraft at Kadena.

4. Project OXCART has been maintaining a capability to deploy to Kadena and to launch the first operational mission fifteen (15) days after approval of implementation of this plan. Dependent upon aircraft condition upon arrival at Kadena the first operational mission could be launched on the thirteenth (13th) day after approval. Three (3) days after approval is received the supporting task force will be in place, necessary logistical support will be airlifted and the supporting tanker aircraft will be deployed. The OXCART aircraft will deploy on alternate days starting with the fifth (5th) day after approval. This deployment schedule is included as Attachment I to this plan.

5. The OXCART aircraft will be flown non-stop from Area 51 to Kadena with three aerial refuelings enroute. These refuelings will be supported by tanker aircraft operating from Beale AFB, California; Hickam AFB, Hawaii; and Kadena AB. The deployment route is planned to provide for adequate fuel reserves at designated recovery bases in the event of a missed aerial refueling or loss of one engine. The deployment route is included as Attachment II.

6. Should a crisis situation dictate, an extension of the deployment route from Kadena for photographic coverage of

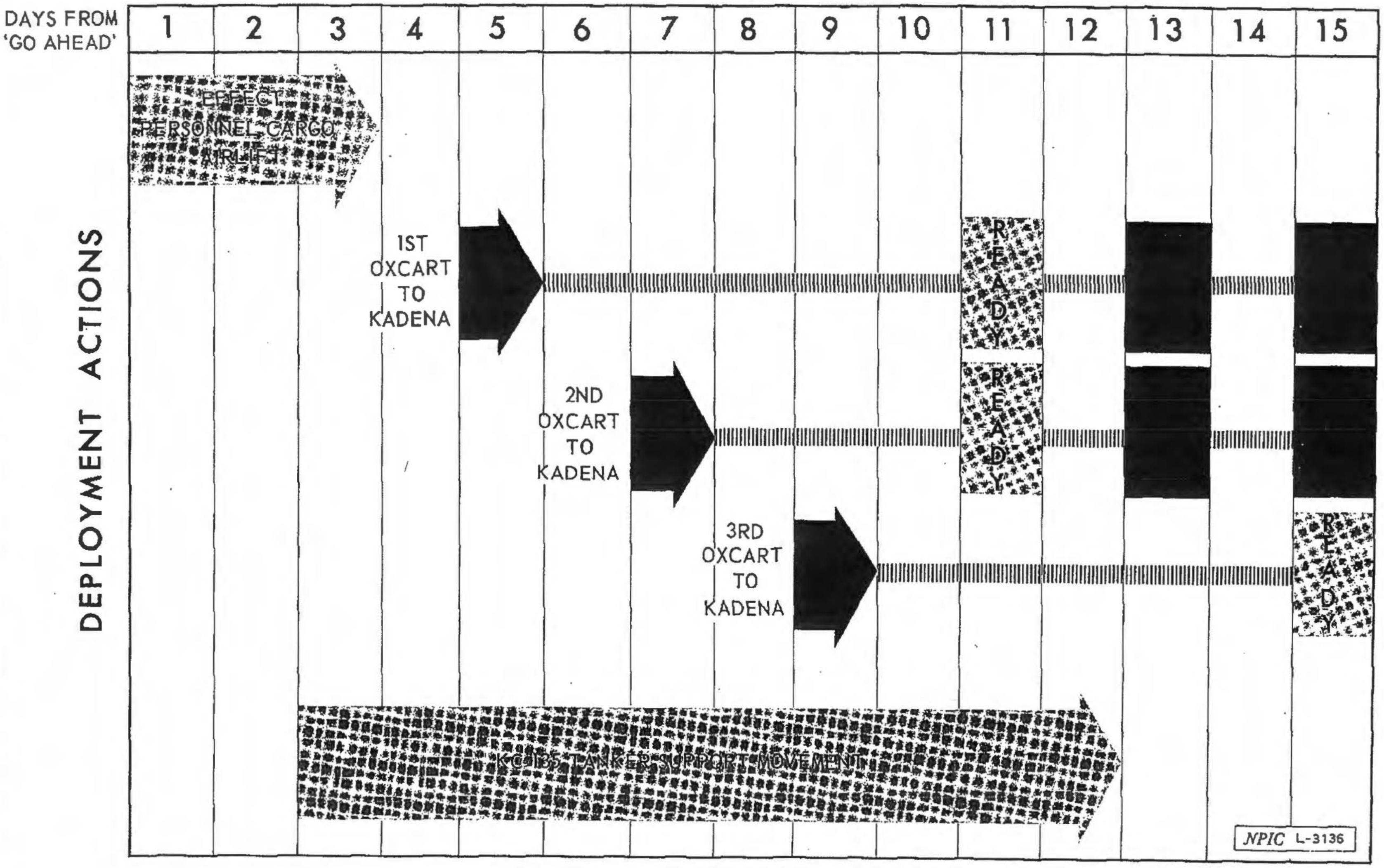
North Vietnam and return to Kadena is possible. This would require two additional aerial refuelings for a total elapsed time of 8 hours and 40 minutes.

7. A typical OXCART operational mission from Kadena with two aerial refuelings enroute is included as Attachment III.

8. Coverage of the majority of the SA-2 defended areas of North Vietnam northward from the Demilitarized Zone is possible on one mission which will provide photographic ground resolutions from 1 foot to 3.5 feet. An enlargement of this typical route is included as Attachment IV. Flexibility of operation will permit several possible variations of this route to provide additional coverage of North Vietnam.

9. The OXCART vehicle is virtually invulnerable to SA-2 and other defensive systems in North Vietnam because of its high operational altitude, high speed and the Electronic Counter Measures systems installed.

# BLACK SHIELD DEPLOYMENT SCHEDULE



ATTACHMENT I/PART II
BYE 2369-67
PAGE 18

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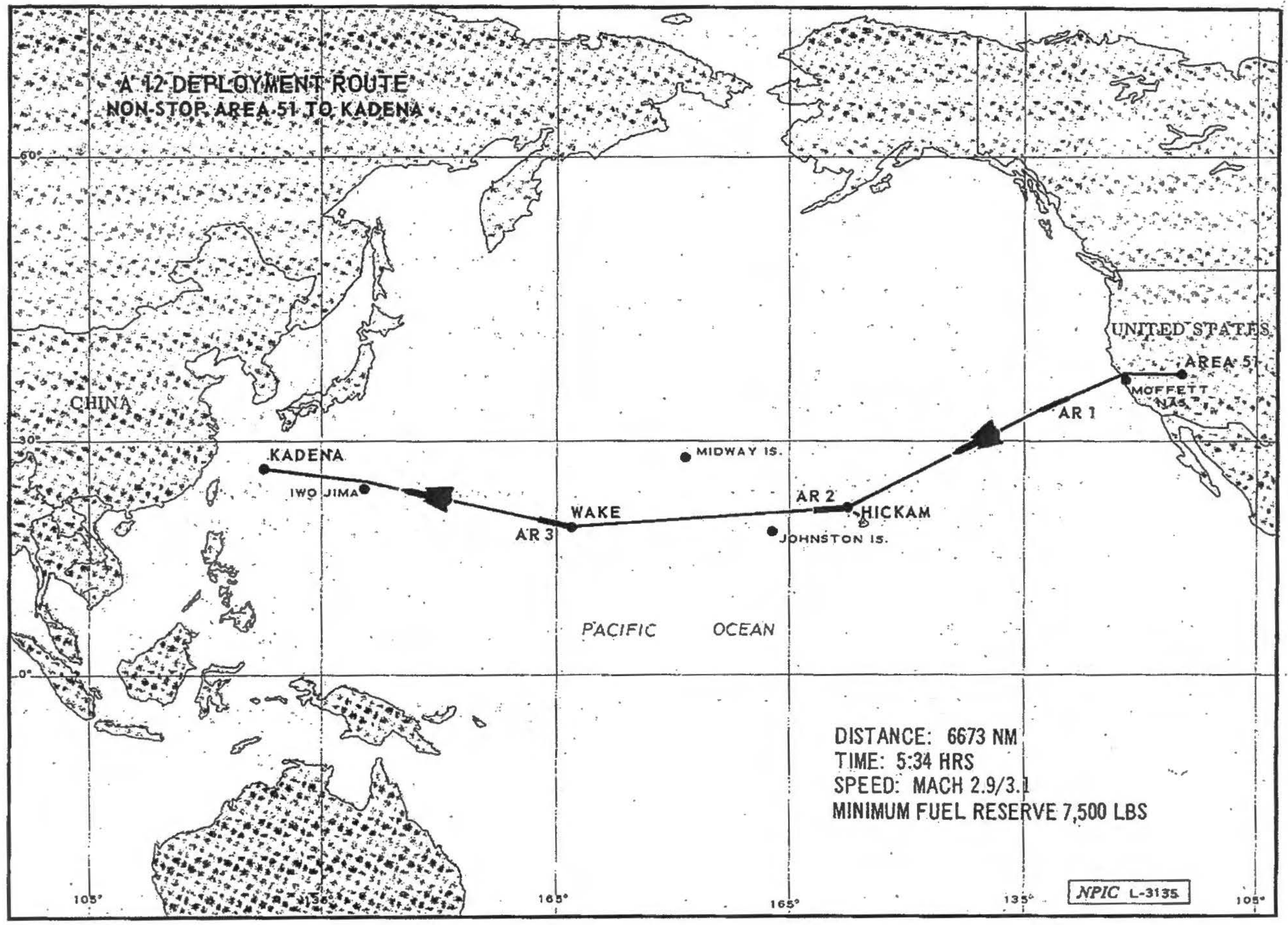
KEYHOLE Control Systems

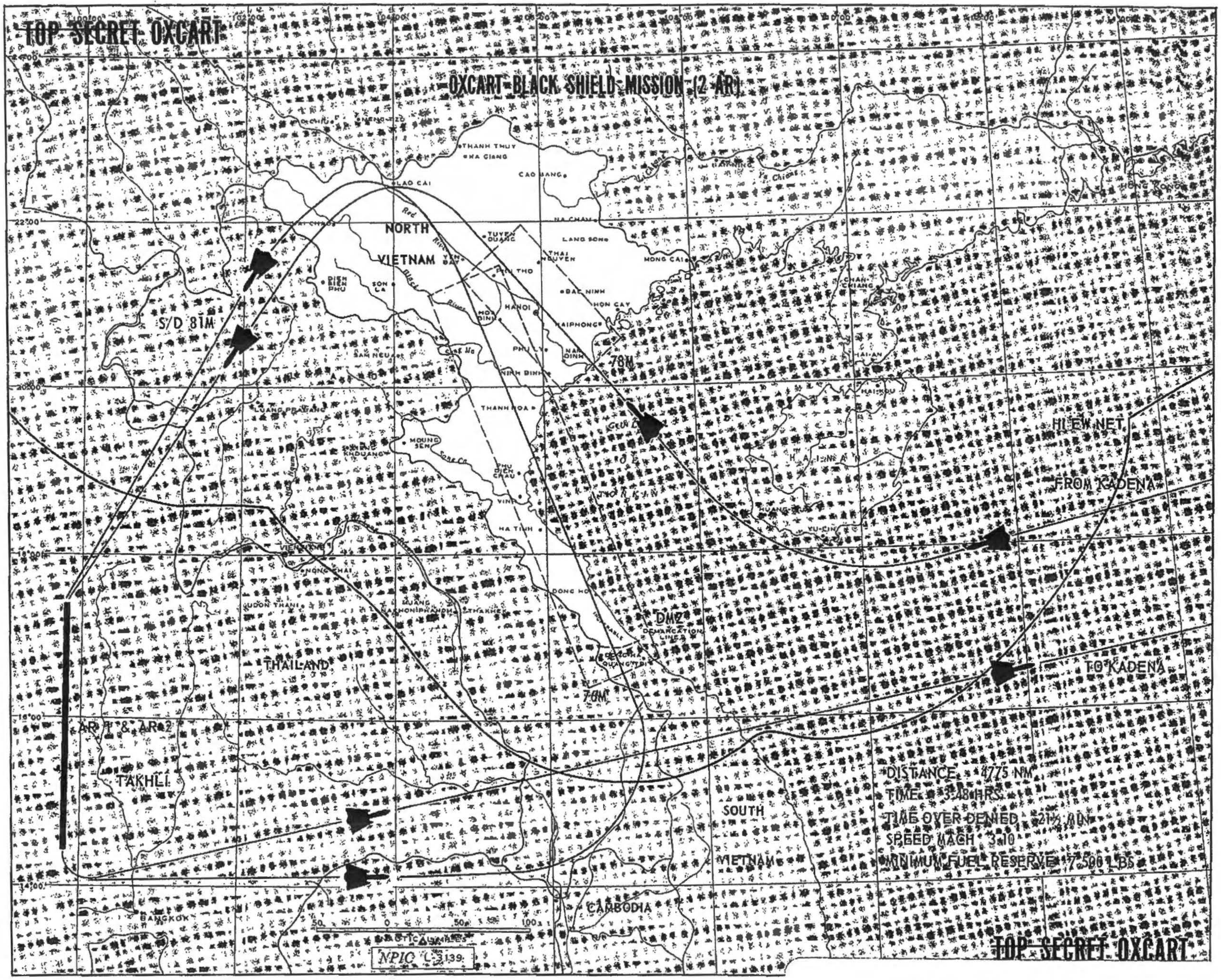


A-12 DEPLOYMENT ROUTE
NON-STOP AREA 51 TO KADENA

DISTANCE: 6673 NM
TIME: 5:34 HRS
SPEED: MACH 2.9/3.1
MINIMUM FUEL RESERVE 7,500 LBS

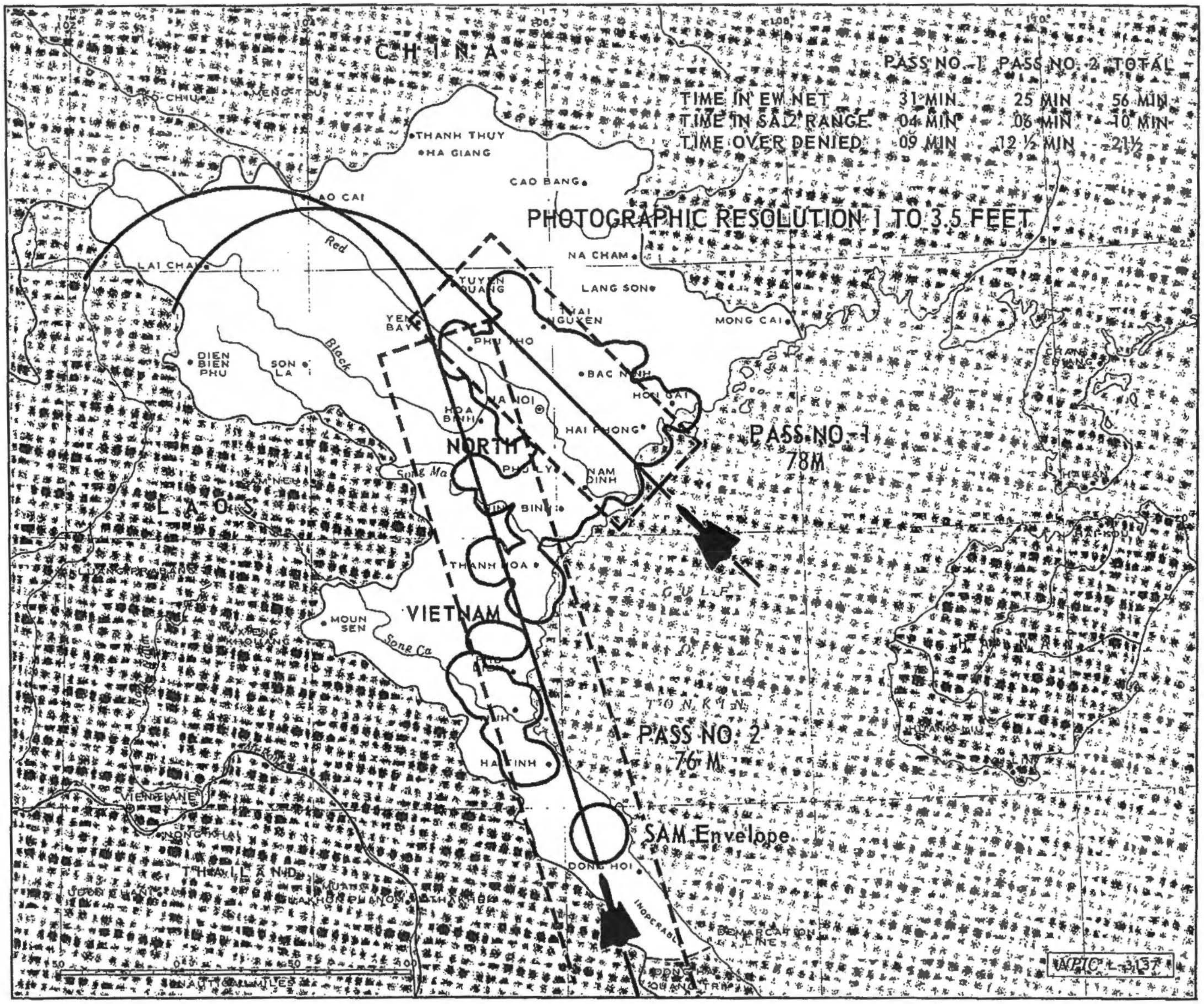
ATTACHMENT II/PART II
BYE 2369-67
Page 19

TOP SECRET OXCART



TOP SECRET OXCART

Handle via BYEMAN TALENT
KEYHOLE Control Systems



| | PASS NO. 1 | PASS NO. 2 | TOTAL |
|---|---|---|---|
| TIME IN EW NET | 31 MIN | 25 MIN | 56 MIN |
| TIME IN SA 2 RANGE | 04 MIN | 06 MIN | 10 MIN |
| TIME OVER DENIED | 09 MIN | 12 ½ MIN | 21½ |

Handle via BYEMAN TALENT
KEYHOLE Control Systems

ANNEX 152

[redacted]

~~TOP SECRET~~

18 May 1967

MEMORANDUM FOR THE RECORD

SUBJECT: Minutes of the Meeting of the 303 Committee, 12 May 1967

PRESENT: Mr. Rostow, Ambassador Kohler, Mr. Vance, Mr. Helms.

Admiral Taylor, General Bacalis, Mr. Carl Duckett, and Mr. Mark Wagner were also present.

OXCART Reconnaissance of North Vietnam

a. During higher authority's weekly luncheon on Thursday, 11 May, the detection of offensive missiles in North Vietnam was discussed. Higher authority asked for a proposal.

b. In response, the Agency prepared overnight a memorandum for discussion the following day, 12 May, before the 303 Committee. The memorandum was distributed at the meeting, and the discussion took the form of a briefing. Mr. Mark Wagner dealt with coverage requirements and the extent of current coverage. The second part of the briefing was an exposition by General Bacalis of a proposed use of OXCART to obtain the desired coverage. The discussion accompanied by charts, depicted a deployment schedule, priority search areas, tentative operational tracks, vulnerabilities, refueling, and kindred matters.

c. A number of detailed questions were asked. It was decided that Ambassador Kohler would address the question of political risks, and Mr. Vance stated that he would examine the intelligence background leading to any likelihood of the introduction of offensive missiles. Both principals would then refer their findings to the appropriate Secretaries.

d. While these steps were in progress, a second Tuesday luncheon was held on 16 May, and Mr. Rostow reported to the executive secretary that higher authority at that time gave his approval for immediate deployment and use. The deployment to Kadena Air Base from Site 51 was expected to take 13 to 15 days.

BYE 66,736/67-B
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CONTROL SYSTEM

~~TOP SECRET~~

e. The Interdepartmental Contingency Planning Committee is presently circulating its plan for members' approval. The Agency prepared OXCART Reconnaissance of North Vietnam (BYE 2369-67, 15 May 1967) as the basic operational document. This has been distributed to the principals.

f. The authority for photographic coverage of North Vietnam excludes any penetration of Mainland China.

(Signed)
Peter Jessup

Distribution
- Ambassador Kohler
- Mr. Vance
- Mr. Helms

C05492929

ANNEX 153

[redacted]

D/OSA

~~Top Secret~~

*No Foreign Dissem*

EO/SA

DD/SA

D/SA

CENTRAL INTELLIGENCE AGENCY

UNITED STATES OF AMERICA

DIRECTORATE OF
SCIENCE & TECHNOLOGY

# *BLACK SHIELD Reconnaissance Missions*

## *31 May - 15 August 1967*

*Handle via*
*Byeman-Talent-Keyhole-Comint*
*Channels Jointly*

~~Top Secret~~

OXCART 10
BYE No. 44232/67
DST-BS/BYE/67-1
22 September 1967

# WARNING

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~~GROUP 1~~
~~EXCLUDED FROM AUTOMATIC~~
~~DOWNGRADING AND~~
~~DECLASSIFICATION~~

BYE-44232/67

# BLACK SHIELD Reconnaissance Missions
## 31 May - 15 August 1967

DST-BS/BYE/67-1
22 September 1967

CENTRAL INTELLIGENCE AGENCY
*Directorate of Science and Technology*

# PREFACE

This report is the first of a series of resumes of the BLACK SHIELD reconnaissance missions flown over North Vietnam. This first resume spans the period from 31 May 1967 to 15 August 1967

## CONTENTS

### APPENDICES

### FIGURES

BYE-44232/67

# BLACK SHIELD Reconnaissance Missions
## 31 May - 15 August 1967

## SUMMARY

Fifteen BLACK SHIELD high-altitude reconnaissance missions were alerted during the period from 31 May to 15 August 1967. Seven of the 15 missions were flown, four of which were detected and tracked; there were no mission aborts. (Appendix I lists these missions and related significant events.)

The program's success in its primary mission can be measured by the fact that the two BLACK SHIELD missions flown on 19 and 20 July provided clear photographic coverage of 80 percent of North Vietnam and nearly total clear coverage of the primary SSM search areas. This enabled NPIC to state, with 80 percent confidence, that there were no SSM sites in North Vietnam as of mid-July 1967.

The BLACK SHIELD program has also done well in obtaining baseline coverage. There is now clear, interpretable photography of all of North Vietnam except the Cao Bang - Lang Son area in the northeast adjacent to the Chinese border. (See samples of mission photography at the end of this report.) BLACK SHIELD photography has also been invaluable in providing unique order of battle information on fighter aircraft and surface-to-air missiles (SAMs). Several missions have obtained simultaneous coverage of all or nearly all the major airfields of North Vietnam and have made possible some significant refinements in the current air order of battle. The simultaneous coverage of SAM sites--more than 80 percent of the sites were covered by one mission--has given US forces in the theater of operations a quick and fairly comprehensive reading on which sites are occupied. It has also significantly supplemented communications intelligence in determining the actual number of SAM battalions in North Vietnam and the general level of SAM site occupancy.

The program has contributed substantially to bomb damage assessment of point targets and to assessment of the interdiction effort against North Vietnamese road, rail, and water transportation. The BLACK SHIELD missions have identified new potential targets for US air strikes, and have also provided valuable information on Chinese military activity in North Vietnam and along the southern and western coasts of Hainan Island. Based on photography from back-to-back missions BX6709 and BX6710, the North Vietnamese rail inventory is now estimated to be approximately three times larger than previously believed. Photography of field artillery pieces at the Ping-hsiang, China, transshipment point has indicated the probable forward movement of these guns into North Vietnam.

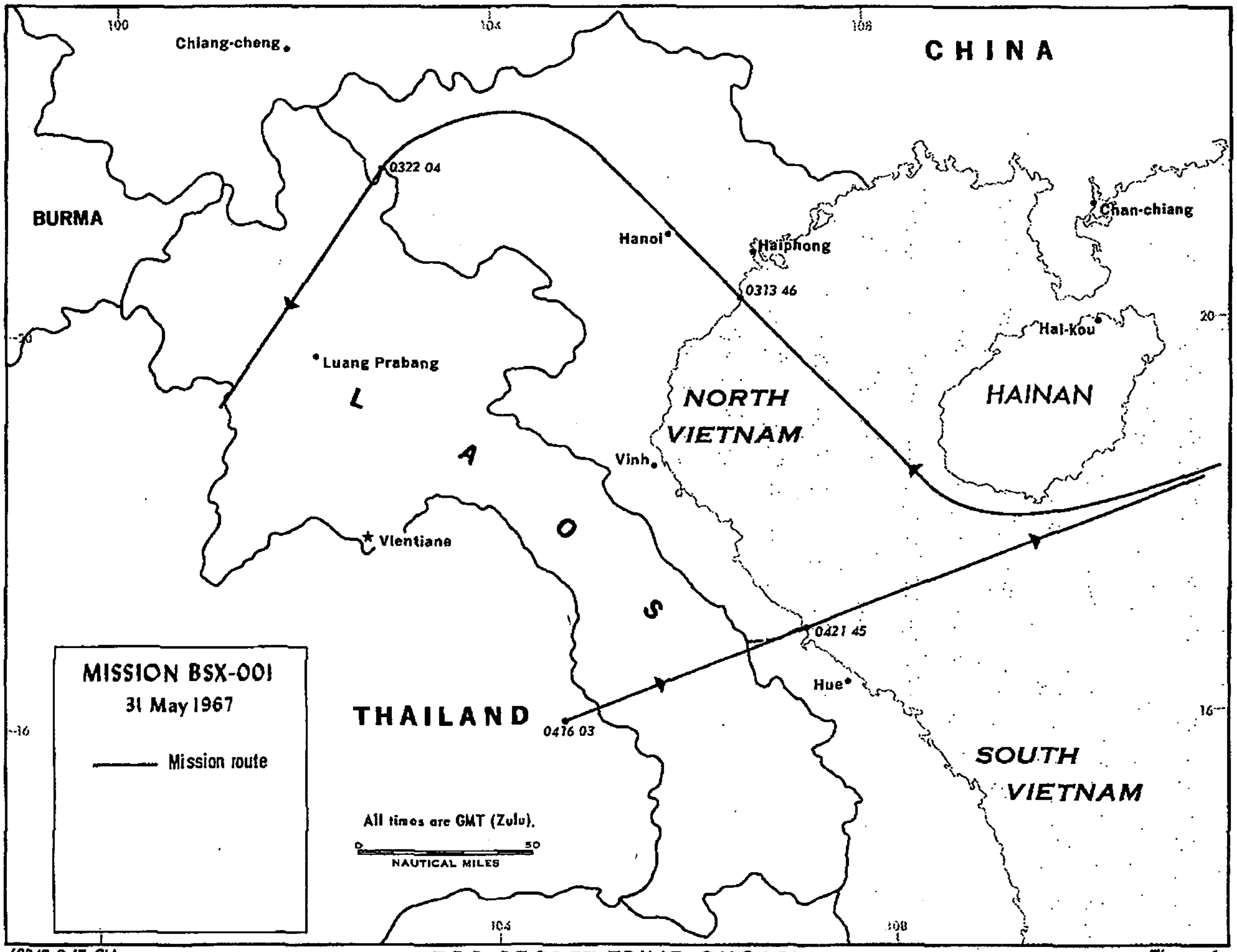
Initial detection and track of a mission vehicle occurred on the third mission flown--BX6705. The Chinese tracked missions BX6705, BX6706, BX6709, and BX6710. Comint did not give any indication of North Vietnamese tracking; however, the Chinese did pass a portion of the track of BX6710 to the North Vietnamese. With the exception of mission BX6710, the BLACK SHIELD vehicle was not detected by the Chinese Communists until their radars had the benefit of the vehicle's broadside radar cross section. The accuracy of tracking in general has increased with each mission tracked. (Appendix III lists the number and type of radar signals recorded by the SIP and System 6 Elint collection systems.)

There were no known weapons reactions to any BLACK SHIELD missions despite the fact that the SAM environment overflown is known to be the densest in existence.

# MISSION ANALYSIS

## BSX-001

BSX-001 was a single-pass reconnaissance mission flown over North Vietnam on 31 May 1967. The mission aircraft entered North Vietnam over Haiphong at 0313:46Z and exited over the demilitarized zone (DMZ) at 0421:45Z. Figure 1 shows the flight route.



68049 9-67 CIA

~~TOP SECRET~~ TRINE OXCART

Figure 1

Mission photography did not give any evidence of offensive surface-to-surface missile equipment (SSM) or facilities. There were 190 known North Vietnamese SA-2 sites before the mission. Seventy of these sites were photographed by BSX-001, as was the Chinese Naval Base at Yu-lin. Nine of the 27 COMIREX Priority I targets in North Vietnam were covered by this mission.

There was no indication of Chinese or North Vietnamese tracking. SIP, an Elint collection system, did not record any FAN SONG signals. There was no indication of a weapons reaction while the mission aircraft was over hostile territory.

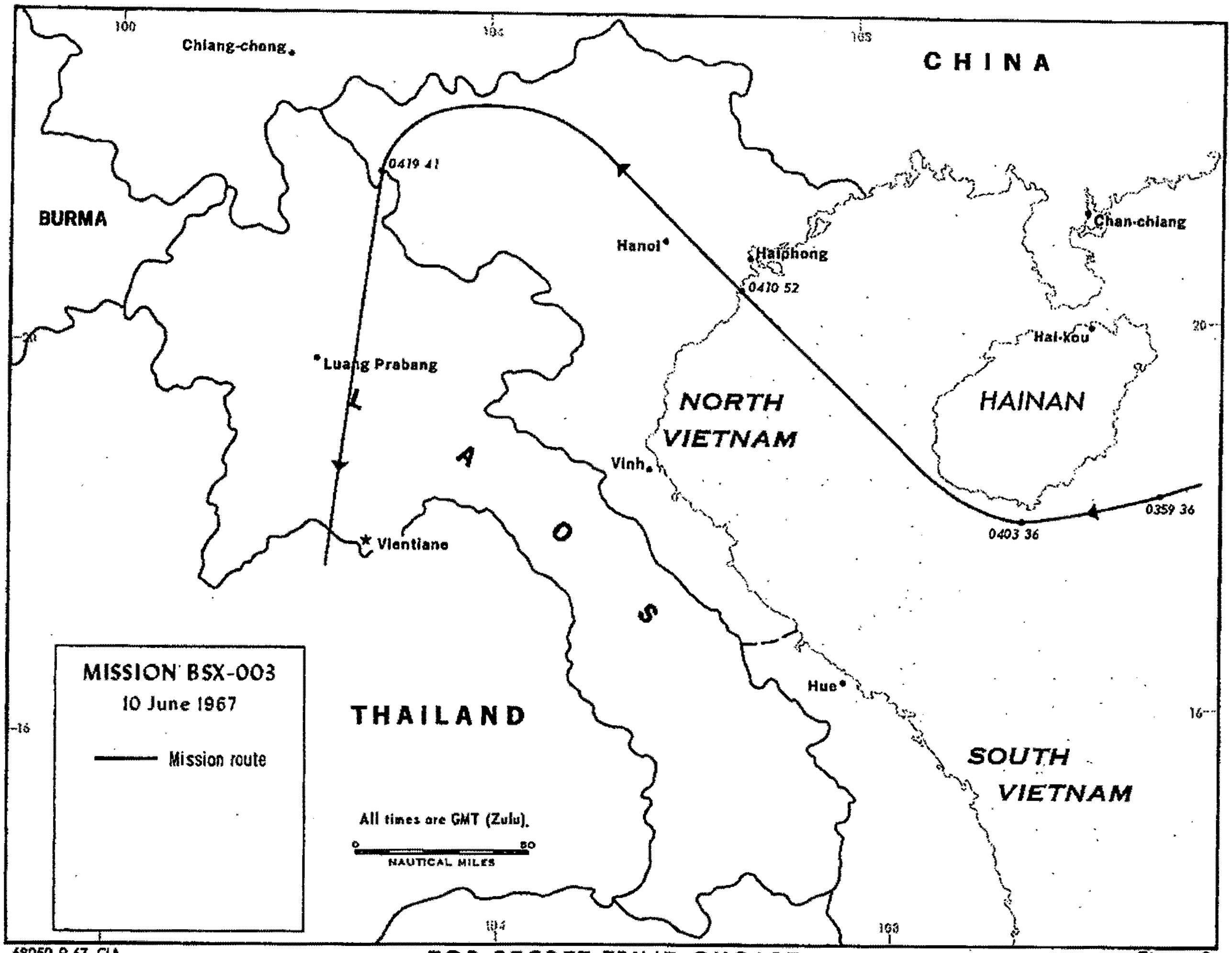
The Department of Defense (DOD) strike/jamming operations during the mission flight period were light. No EB-66B or EB-66C jamming aircraft were operational during the reconnaissance mission.

## BSX-003

BSX-003 was a single-pass reconnaissance mission flown over North Vietnam on 10 June 1967. The mission aircraft entered North Vietnam over Haiphong at 0410:52Z and exited at 0419:41Z. Figure 2 is a plot of the flight route.

Mission photography did not give any evidence of offensive SSM equipment or facilities. There were 193 known North Vietnamese SA-2 sites before the mission. Ninety-seven of these sites were photographed by BSX-003, including four previously unidentified sites. Of the SA-2 sites photographed, 18 were occupied. Thirteen of the 27 COMIREX Priority I targets in North Vietnam were covered on this mission.

There was no indication of tracking or a weapons reaction by either the Chinese or the North Vietnamese. SIP, an Elint collection system, did not record any FAN SONG signals. The DOD operational strike/jamming activity was heavy during the overflight period. Four EB-66C and one EB-66B aircraft conducted barrage and spot jamming during this period, affecting numerous early warning and fire control radars.



68050 9-67 CIA

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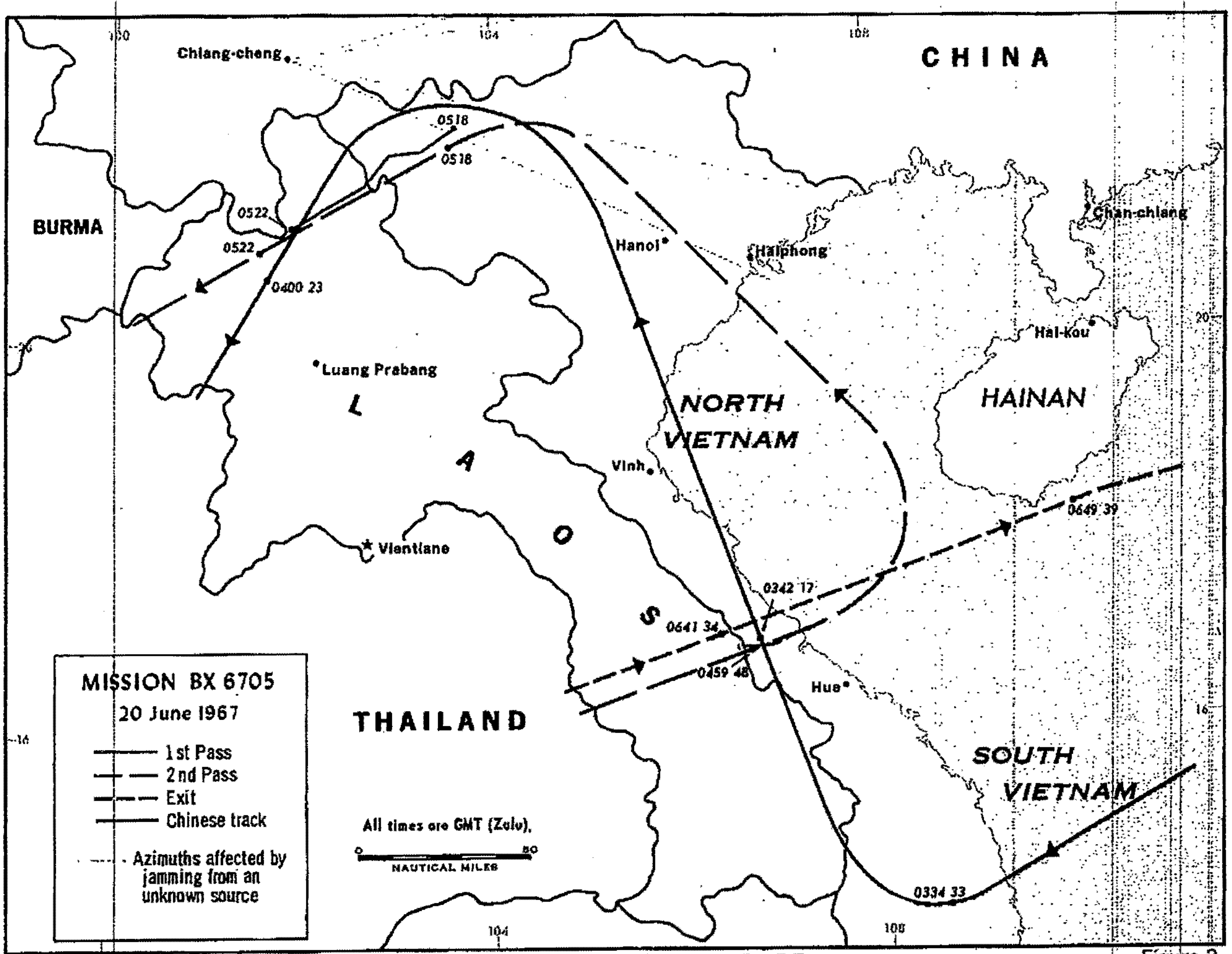
Figure 2

## BX6705

BX6705 was a double-pass reconnaissance mission flown over North Vietnam on 20 June 1967. The mission aircraft penetrated and exited over the DMZ at 0342:17Z and 0641:58Z, respectively. Figure 3 shows the mission route and associated events.



68051 9-67 CIA

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Figure 3

Mission photography did not give any evidence of SSM equipment or facilities in North Vietnam. There were 200 known North Vietnamese SA-2 sites before the mission. One hundred and thirty three sites were photographed by BX6705 including two previously unidentified sites. Of the sites covered, 20 were occupied. Seventeen of the 27 COMIREX Priority I targets in North Vietnam were covered, There were no known hostile weapons reactions to the mission aircraft. SIP, an Elint collection system, did not record any FAN SONG signals. The pilot did exercise the Big Blast* manual jam override while adjacent to Hainan Island on the return leg of the route.

The first known tracking of BLACK SHIELD aircraft occurred on this mission. It was reported by Chiang Cheng, a Chinese Communist radar facility located at 22°45'N, 101°50'E. This radar facility passed eight position points and eight altitudes from 0518Z to 0522Z. The initial detection range and the final radar-to-vehicle distances were respectively 86 nautical miles and 82 nautical miles. The known equipments for this radar station consist of a MOON FACE radar and a ROCK CAKE radar. Chiang Cheng reported jamming from an unknown source on its MOON FACE radar at 0509Z on azimuth bearings from 075-080 degrees. Jamming from an unknown source also affected the ROCK CAKE heightfinder radar at 0513Z on azimuth bearings from 105-115 degrees. These azimuths, relative to the heightfinder, bracket the second leg of the mission flight path and are indicated in figure 3. The ROCK CAKE radar operator was probably influenced by this jamming activity and, in searching these azimuths to identify the originator of the activity, detected and subsequently tracked the mission aircraft. The fact that altitudes were reported with each valid plot position supports the tentative conclusion that the mission was tracked by the Chiang Cheng ROCK CAKE heightfinder radar.

No DOD operational reporting available accounts for the above jamming activity. No BLACK SHIELD aircraft jammers were operated during this period. SIP, an Elint collection package, was inoperable during the tracking period and thus it was impossible to correlate the tracking data from the radar stations and the Elint data.

---

*Big Blast, an on-board defense mechanism, will transmit S- and C-band noise energy for approximately 90 seconds.

The radar facility also rebroadcast the track information to Kun-ming some 14 hours after the mission flight. There was no indication of North Vietnamese tracking or the passage of tracking data to the Vietnamese. DOD strike activity was very light during the mission overflight.

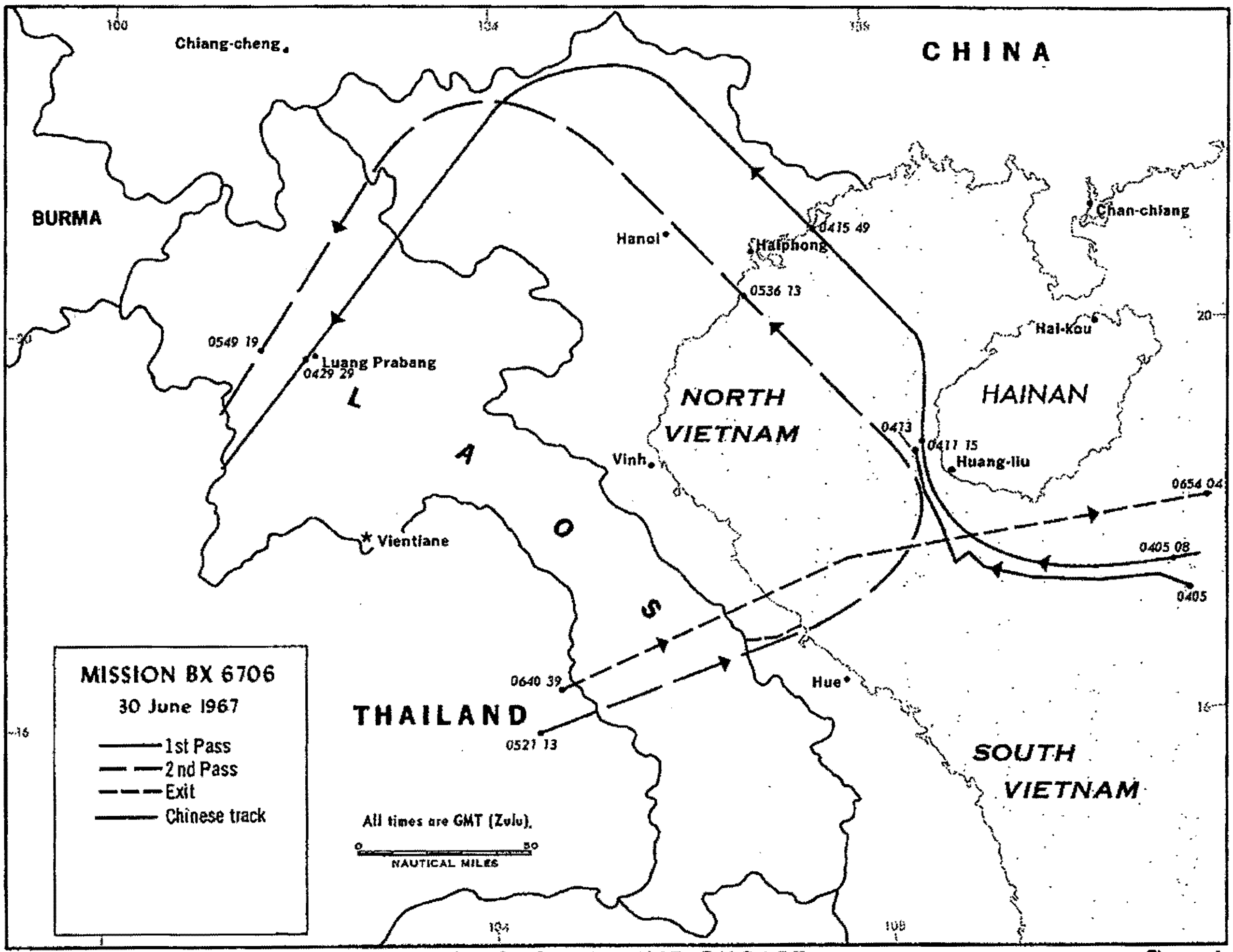
## BX6706

BX6706 was a double-pass reconnaissance mission flown over North Vietnam on 30 June 1967. The mission aircraft entered Vietnam north of Haiphong at 0415:45Z and exited over the DMZ at 0644:41Z. Figure 4 shows the flight route and associated events.

Mission photography did not give any evidence of SSM equipment or facilities. There were 205 known North Vietnamese SA-2 sites before the mission. One hundred and nine sites of these were photographed by BX6706 including three previously unidentified sites. Sixteen of the sites which were photographed were occupied. Twenty-one of the 27 COMIREX Priority I targets in North Vietnam were covered.

There was no indication of a hostile weapon reaction. System 6, an Elint collection package replacing SIP, recorded six FAN SONG signals during the mission overflight. None of these signals suggested tracking of the mission aircraft. No defensive systems were activated as a result of this activity. Haikou, a Chinese air defense zone facility located on Hainan Island at 20°02'N, 110°17'E, reported mission track information thirteen and a half hours late. The reported aircraft track times were from 0405Z to 0413Z as shown in figure 4. No altitudes were reported and the tracking radar station(s) were unidentified. Considering the region in which the mission was tracked and the fact that all radar tracks on Hainan Island report information to Haikou for rebroadcast, it seems most probable that the tracking radar was located on Hainan Island. There is no indication that this track information was passed to the North Vietnamese. An EA3B, Elint collection platform, in orbit during the overflight period, did intercept ROCK CAKE signals emanating from the Huang-liu area of Hainan Island. The time frame and duration of the intercept signals compared favorably with those of the track period. This may have been the radar station tracking the mission aircraft. In the time period from 0530Z to 0540Z, System 6, an Elint collection device, recorded a probable BIG MESH V-beam S-band radar changing scan modes from circular to steady to circular. This may be an indication of possible radar operator interest in the mission aircraft or interest in the volume of space in which the mission aircraft happened to be. Comint does not give any indication of North Vietnamese tracking during this period.

There were no known DOD strike/jamming operations being conducted during the mission overflight period.



68052 9-67 CIA

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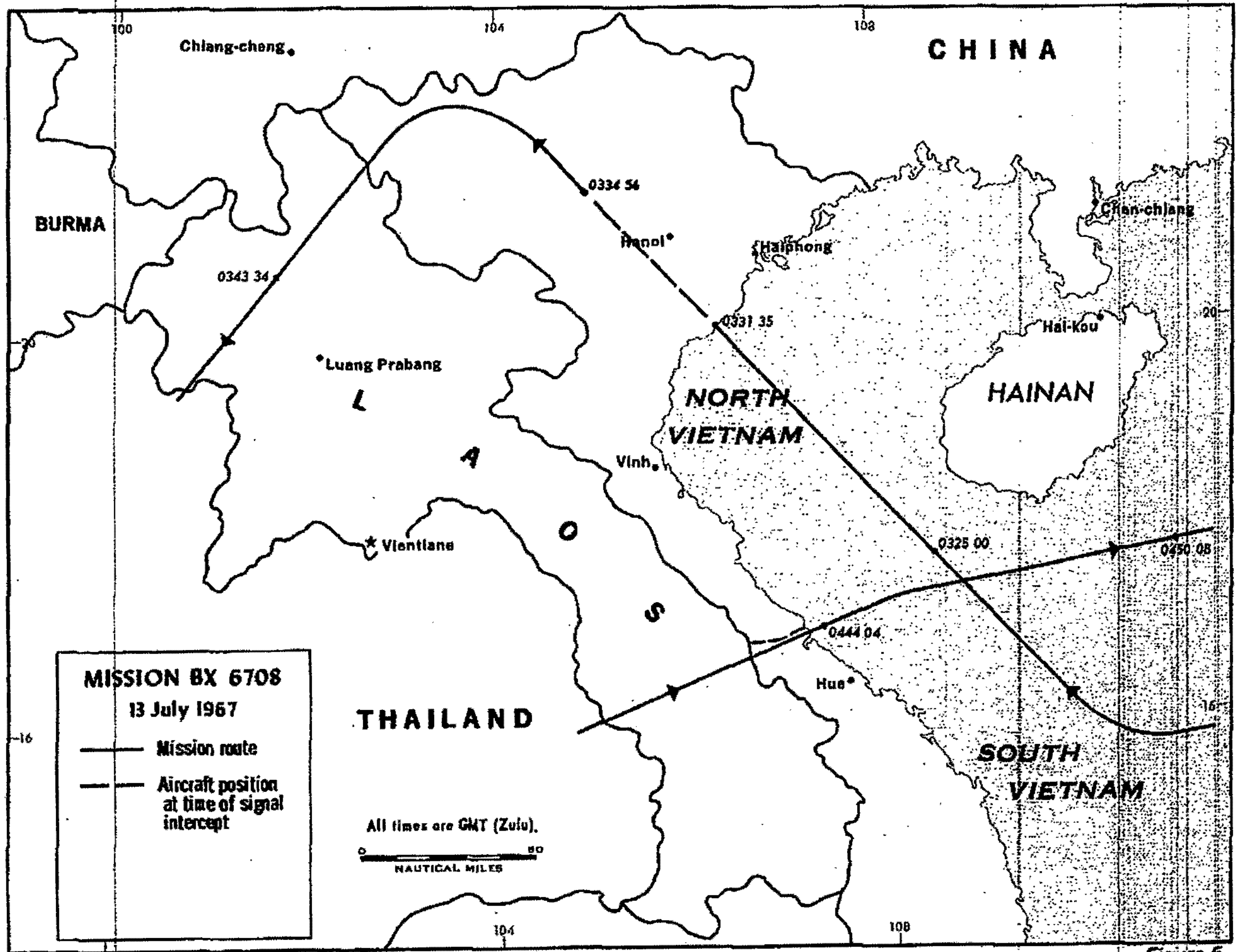
Figure 4

## BX6708

BX6708 was a single-pass, high-altitude reconnaissance mission flown over North Vietnam on 13 July 1967. The mission aircraft entered North Vietnam south of Haiphong at 0331:35Z and exited over the DMZ at 0442:03Z. Figure 5 is a map of the mission route and shows associated events.



68053 9-67 CIA

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Figure 5

Mission photography did not show any evidence of SSM equipment or facilities. There were 214 known North Vietnamese SA-2 sites before the mission. Seventy-one were photographed by BX6708 including one previously unidentified site. Of the 71 sites covered, five were occupied. Eight of the 27 COMIREX Priority I targets in North Vietnam were covered.

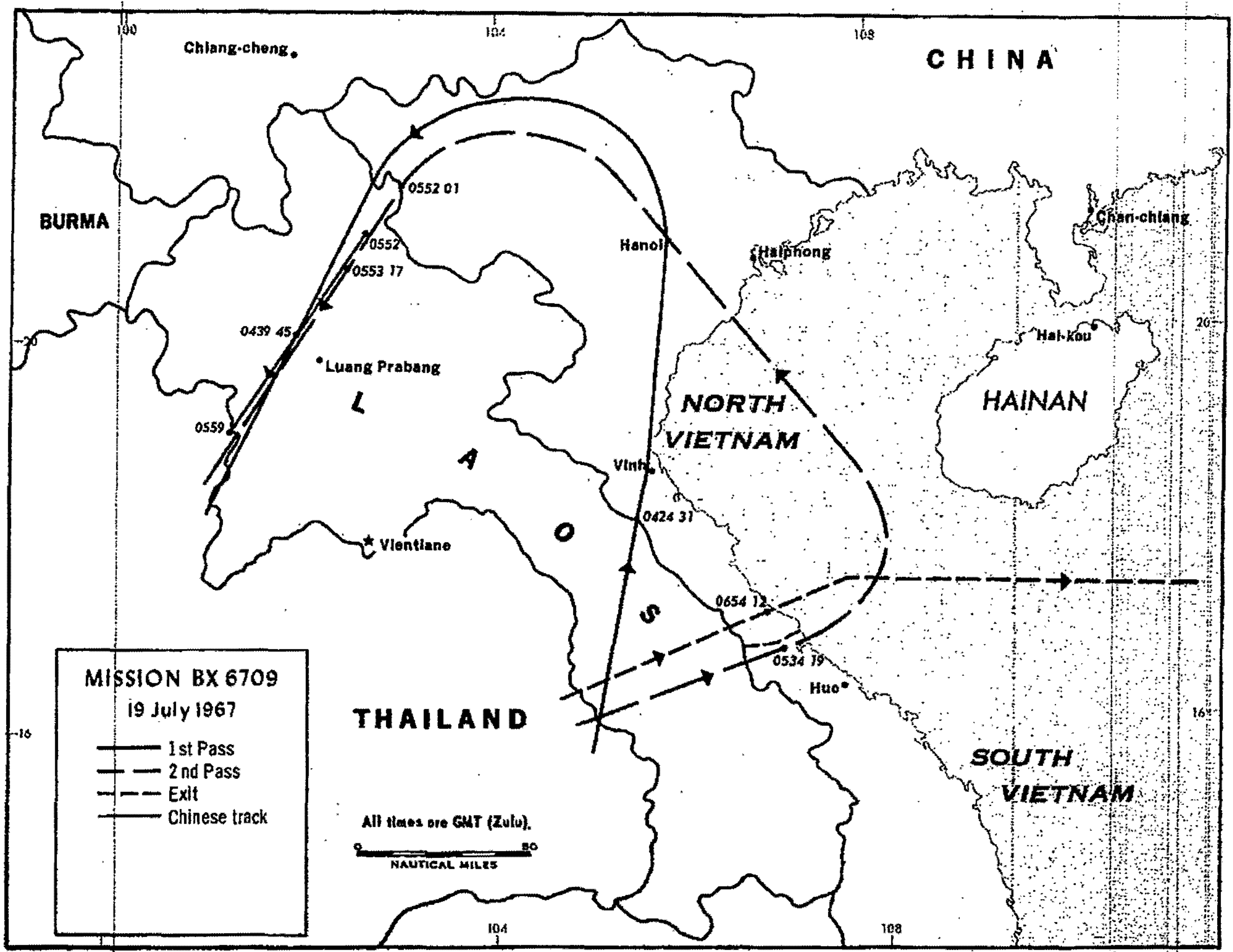
There was no indication of a hostile weapons reaction. System 6 recorded four FAN SONG signals during this mission. These signals did not appear to be tracking the mission aircraft. None of the defensive systems were activated as a result of these signals. There was no Comint intercept evidence of mission tracking by either Chinese or North Vietnamese radar facilities. Analysis of System 6 records indicate that two probable BIG MESH, V-beam, S-band radars changed scan modes from circular to manual to circular. Although these changes in scan mode may indicate an interest in that volume in space in which the mission aircraft was located, there is no Comint evidence that would indicate tracking by either the North Vietnamese or the Chinese. Figure 5 indicates aircraft position at time of intercept.

There was little or no DOD strike/jamming activity while the mission aircraft was over North Vietnam. One EB-66C, an Elint collection active jamming platform, was orbiting the area during the mission overflight period. Overall signal density was light.

## BX6709

BX6709 was a double-pass, high-altitude reconnaissance mission flown over North Vietnam on 19 July 1967. The mission aircraft entered North Vietnam over Vinh at 0424:31Z and exited over the DMZ at 0654:12Z. Figure 6 shows the mission flight route and notes significant events.

Mission photography did not give any evidence of SSM equipment or facilities. There were 215 known SA-2 sites in North Vietnam before the mission. One hundred and sixty-six sites were photographed by BX6709 including two previously unidentified sites. Of the 166 sites photographed, 12 were occupied. Twelve of the 27 COMIREX Priority I targets in North Vietnam were covered.



68054 9-67 CIA

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Figure 6

There was no indication of a hostile weapons reaction. System 6 recorded nine FAN SONG radar signals during this mission. These signals did not appear to be tracking the mission aircraft. None of the defensive systems were activated as a result of these signals. Chiang Cheng, a Chinese radar station located at 22°45'N/101°50'E, was reflected reporting track information on the mission aircraft. The initial and final plot distances to the radar station were 110 and 230 nautical miles, respectively. Initial and final plot times were respectively 0552Z and 0559Z resulting in seven minutes of continuous tracking. The track plot is compatible with the mission flight route, but reported altitudes ranged from 8,000 to 11,000 feet higher than the actual mission aircraft altitude. The type of radar generating these errors was not identified. There was no indication that this track information was provided to the North Vietnamese.

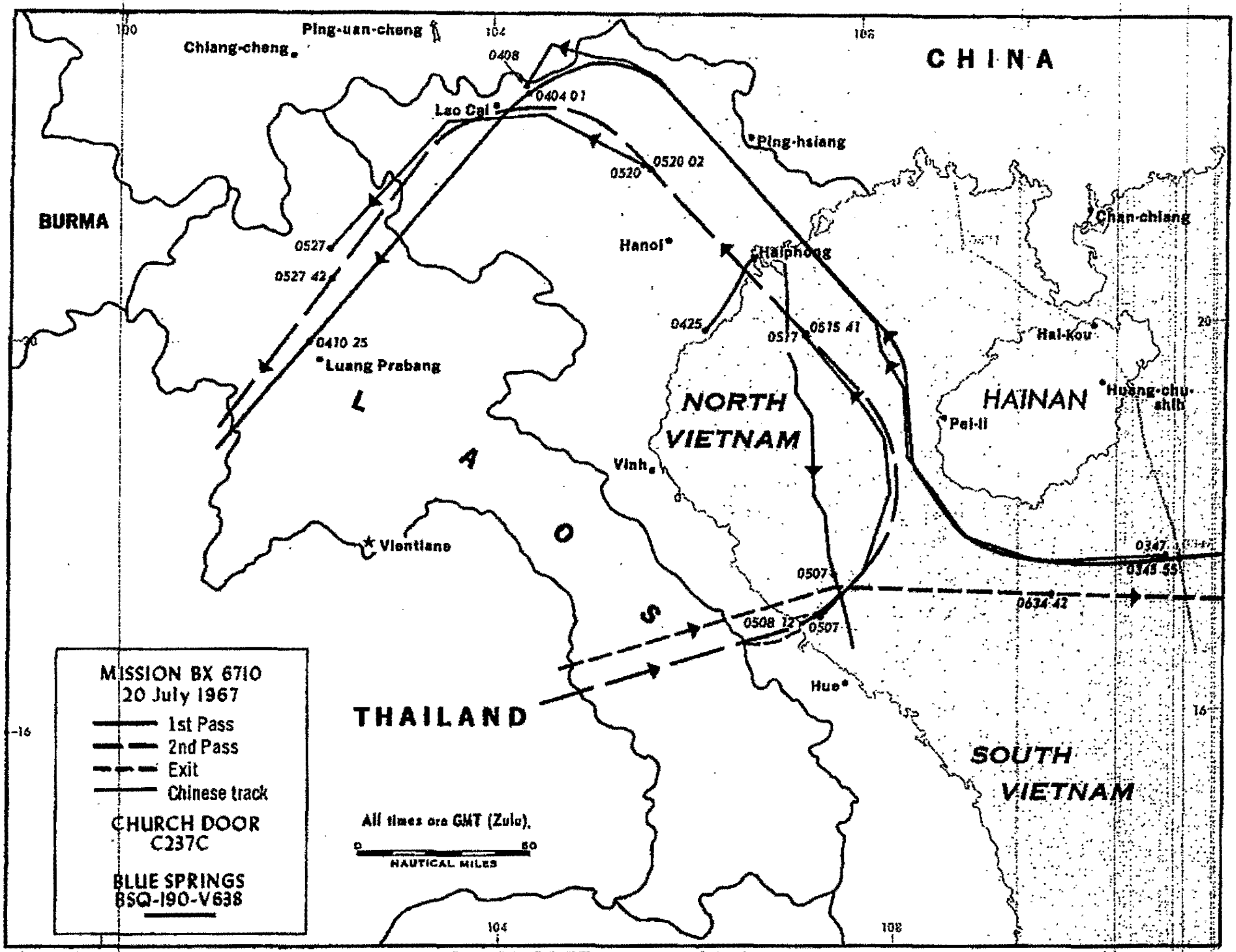
DOD strike/jamming activity was moderately heavy during the mission overflight time period. United States ECM aircraft in operation in the area during the mission overflight period were: two EA3B's, three EA1F's, one EB-66C, and one EB-66B.

## BX6710

BX6710 was a double-pass, high-altitude reconnaissance mission flown over North Vietnam on 20 July 1967. The mission aircraft entered North Vietnam north of Haiphong at 0367:00Z and exited over the demilitarized zone at 0628:33Z. Figure 7 shows the mission route and associated events.

Mission photography did not give any evidence of SSM equipment or facilities. There were 219 known SA-2 sites in North Vietnam before the mission. Eighty sites were photographed by BX6710 including one previously unidentified site. Of the 80 sites covered, five were occupied. Nineteen of the 27 COMIREX Priority I targets in North Vietnam were covered.

A reassessment of North Vietnam's rail inventory from the photography of back-to-back missions BX6709 and BX6710 indicates that the Vietnamese have a rail inventory approximately three times larger than previously believed. On the basis of this photography North Vietnam is now estimated to have 2,000 to 3,000 freight cars and 100 to 120 locomotives. Photography of the P'ing-hsiang, China (22°06'N, 106°44'E) transshipment point from missions BX6709 and BX6710 showed that approximately 100 to 130 field artillery pieces of unknown caliber were on a nearby railroad siding. These artillery pieces are enough to equip two to three regiments and are most probably destined for use in North Vietnam.



68055 9-67 CIA

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Figure 7

There was no indication of a hostile weapons reaction to the mission aircraft. System 6 did not record any FAN SONG signals during this overflight. Two other high-altitude reconnaissance missions were operational during the BX6710 overflight. The flight routes of Church Door C237C and Blue Springs BSQ-190-V638 are shown in figure 7. Mission C237C was tracked almost continuously while in the South China area. BSQ-190 was tracked continuously while over North Vietnam and the Gulf of Tonkin. Chinese air defense facilities reported track plot times on BX6710 of 0347Z to 0410Z, 0507Z to 0518Z and 0520Z to 0527Z. The reported altitudes were compatible with those of the BLACK SHIELD aircraft. Two Chinese radar stations reported track information. Huang-chu-shih's (19°29'N, 110°22'E) initial plot occurred at 0349Z at a range of 120 nautical mies and the final plot occurred at 0351Z at a range of 130 nautical miles. Ping-uan-cheng's (23°42'N, 103°50'E) initial plot occurred at 0524Z at a range of 110 nautical mies and the final plot at 0527Z at a range of 210 nautical miles.

At approximately 0346Z the BX6710 mission path crossed the path of the continuously tracked C237C flight. The Chinese broadcast facilities reported an initial plot point of the BX6710 vehicle at 0347Z. A similar phenomenon appears to have occurred over the Gulf of Tonkin where the Chinese Pei-li radar station (19°08'N, 108°43'E) was reflected reporting track information on Blue Springs Mission BSQ-190. At 0507Z, BX6710 appears to have entered the radar region in which the Blue Springs vehicle was being tracked. The initial plot point of the second pass was reported by Chinese facilities to have occurred at 0507Z. It appears at least in these two instances that a path crossing with an identified tracked vehicle enhanced the initial detection capability of the radar operator. In the past, initial radar detection appears to have occurred at about the time the radar station has had the benefit of the vehicle's broadside radar cross-section. Hanoi Bac Mai (21°02'N/105°53'E) reported track plot times of 0455Z to 0511Z on the receding vehicle of mission C237C. The Chinese passed BX6710 track plot time data of 0507Z to 0518Z to the North Vietnamese via the Kuang-chou-DRV liaison link. Hanoi Bac Mai reported BX6710 track plot time data of 0511Z to 0518Z. Considering the sequence of events it seems unlikely that the Hanoi Bac Mai hostile broadcast was a reflection of Vietnamese radar tracking, but rather that the broadcast was a rebroadcast of Chinese BX6710 tracking. In any event, this is the first known instance of actual North Vietnamese knowledge of a mission vehicle flight.

DOD strike/jamming operations were light during the mission overflight period.

Cancelled flights

During the period 31 May to 15 August 1967, the following BLACK SHIELD reconnaissance missions were alerted but cancelled because of the poor weather in the target area: BSX-002, 6 June; BX6704, 10 June; BX6707, 30 June; BX6711, 29 July; BX6712, 30 July; BX6713, 13 August; and BX6714 and BX6715, both on 14 August.

BYE-44232/67

# APPENDIX I

## BLACK SHIELD Operational Missions Alerted Between 31 May and 15 August 1967

| Mission No. | Date (1967) | Remarks |
|---|---|---|
| BSX-001 | 31 May | Flown (Rt. 4) |
| BSX-002 | 6 June | Cancelled due to weather (Rt. 4) |
| BSX-003 | 10 June | Flown (Rt. 10) |
| BX6704 | 10 June | Cancelled due to weather (Rt. 11) |
| BX6705 | 20 June | Flown (Rt. 8) |
| BX6706 | 30 June | Flown (Rt. 14) |
| BX6707 | 30 June | Cancelled due to weather (Rt. 19) |
| BX6708 | 13 July | Flown (Rt. 19, modified) |
| BX6709 | 19 July | Flown (Rt. 9, modified) |
| BX6710 | 20 July | Flown (Rt. 14, modified) |
| BX6711 | 29 July | Cancelled due to weather (Rt. 14) |
| BX6712 | 30 July | Cancelled due to weather (Rt. 19) |
| BX6713 | 13 August | Cancelled due to weather (Rt. 20 A+B) |
| BX6714 | 14 August | Cancelled due to weather (Rt. 20 C+D) |
| BX6715 | 14 August | Cancelled due to weather (Rt. 20 A+B) |

# APPENDIX II

| | | Date and Mission Number | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Item No. | COMIREX No. | 31 May 01 | 10 Jun 03 | 20 Jun 05 | 30 Jun 06 | 13 Jul 08 | 19 Jul 09 | 20 Jul 10 |
| 1 | 1J37 | | X | | | | | |
| 2* | 2C184 | X | X | X | X | | | X |
| 3* ** | 2C185 | X | X | X | X | | X | X |
| 4* | 2C186 | X | X | X | X | X | X | |
| 5* | 2C187 | X | X | X | X | X | X | X |
| 6* ** | 2C190 | | X | X | X | X | X | X |
| 7* | 2C221 | | | | X | | | X |
| 8* | 2C367 | | X | X | X | | X | X |
| 9 | 2C954 | | | X | | X | | |
| 10* | 2C967 | X | X | X | X | X | X | |
| 11 | 2C968 | | | X | | | | |
| 12* ** | 4C28 | X | X | X | X | | | X |
| 13* | 4C110 | | | | X | | | X |
| 14* | 4C111A | | | | X | | | |
| 15 | 4C111B | | | | X | | | |
| 16* | 4C112 | | | X | | | X | |
| 17 | 5E09 | | | X | | | | |
| 18 | 7A1473 | | | | X | | | X |
| 19 | 7A1486 | | | X | | | | |
| 20 | 7A1596 | | | | X | | | X |
| 21 | 7A1602 | | | | | | | X |
| 22 | 7A1603 | | X | X | X | | X | X |
| 23 | 7A1605 | | | | | | X | X |
| 24 | 7A1606 | | X | X | X | | X | |
| 25 | 7C3 | | X | X | | X | X | |
| 26 | 7C4 | X | X | X | X | X | X | X |
| 27 | 7C5 | X | | X | | X | X | |
| 28 | 7C6 | | | | X | | | X |
| 29 | 7C7 | | | | X | | | X |
| 30 | 7C8 | | | X | X | | X | X |

## APPENDIX II (continued)

| Item No. | COMIREX No. | 31 May 01 | 10 Jun 03 | 20 Jun 05 | 30 Jun 06 | 13 Jul 08 | 19 Jul 09 | 20 Jul 10 |
|---|---|---|---|---|---|---|---|---|
| 31 | 7C9 | X | X | X | X | X | X | |
| 32 | 7C10 | X | X | X | X | X | X | |
| 33* | 7C12 | | | X | X | | | X |
| 34* ** | 8A46 | | | | X | | | X |
| 35* | 8A48 | | X | X | X | | X | X |
| 36* | 8A49 | | | | X | | | X |
| 37* | 8A50 | | X | X | X | | | X |
| 38* | 8A51 | | | | X | | | X |
| 39* | 8A52 | | | | | | | |
| 40* | 8A407 | | | | X | | | X |
| 41* | 8A414 | | X | X | | X | X | |
| 42* | 8A415 | | | X | | X | | |
| 43* | 8A416 | X | | X | X | | | X |
| 44* ** | 8B353 | X | X | X | X | | X | X |
| 45* ** | 8B366 | | | | X | | | X |
| 46* ** | 8B367 | | | X | X | X | X | |
| 47* ** | 8B368 | X | X | X | | X | X | |
| 48* ** | 8A423 | | | | | | | X |

*Indicates Priority I Targets in North Vietnam.
**Indicates SSM Indicator Targets

## APPENDIX III

Radars Signals Recorded by BLACK SHIELD Missions
31 May - 15 August 1967

| Mission | No. of Signals | Radar Type |
|---|---|---|
| | SIP recorded radar signals | |
| BSX-001 | 0 | FAN SONG |
| 31 May 1967 | 6 | Possible SPOON REST A |
| | 5 | Possible TOKEN/BIG MESH |
| BSX-003 | 0 | FAN SONG |
| 10 June 1967 | 3 | Possible TOKEN/BIG MESH |
| BX6705 | 0 | FAN SONG |
| 20 June 1967 | 1 | Possible CROSS SLOT |
| | 1 | Possible TOKEN/BIG MESH |
| | System 6 recorded radar signals | |
| BX6706 | 6 | FAN SONG |
| 30 June 1967 | 6 | BIG MESH |
| | 10 | ROCK CAKE |
| | 2 | TOKEN/V-BEAM |
| | 7 | CROSS SLOT |
| | 1 | FIRE CAN |
| | 2 | FLAT FACE |
| BX6708 | 4 | FAN SONG |
| 13 July 1967 | 4 | BIG MESH |
| | 4 | TOKEN/V-BEAM |
| | 3 | SPOON REST A |
| | 4 | FLAT FACE |
| | 1 | MOON CONE |
| | 1 | ROCK CAKE |
| | 1 | FIRE CAN |

## APPENDIX III (continued)

| Mission | No. of Signals | Radar Type |
|---|---|---|
| BX6709<br>19 July 1967 | 9 | FAN SONG |
| | 1 | BIG MESH |
| | 3 | TOKEN/V-BEAM |
| | 9 | ROCK CAKE |
| | 4 | MOON CONE |
| | 7 | FLAT FACE |
| | 2 | MOON FACE |
| | 5 | FIRE CAN |
| | 1 | CROSS LEGS |
| | 4 | CROSS SLOT |
| BX6710<br>20 July 1967 | 0 | FAN SONG |
| | 0 | BIG MESH |
| | 4 | TOKEN/V-BEAM |
| | 11 | ROCK CAKE |
| | 9 | FLAT FACE |
| | 6 | MOON CONE |
| | 16 | MOON FACE |
| | 7 | CROSS SLOT |
| | 4 | FIRE CAN |
| | 4 | WHIFF |

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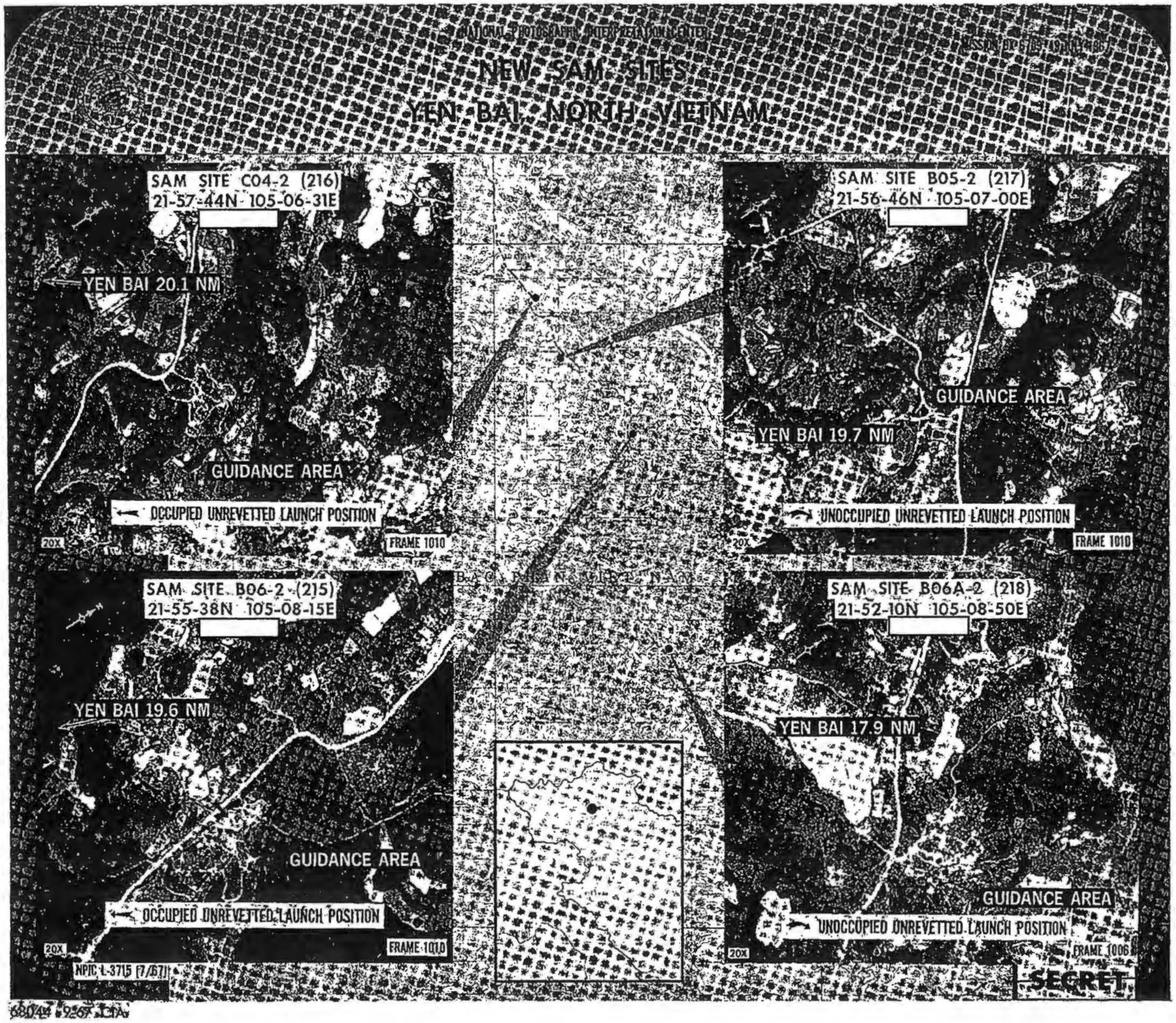

Figure 8

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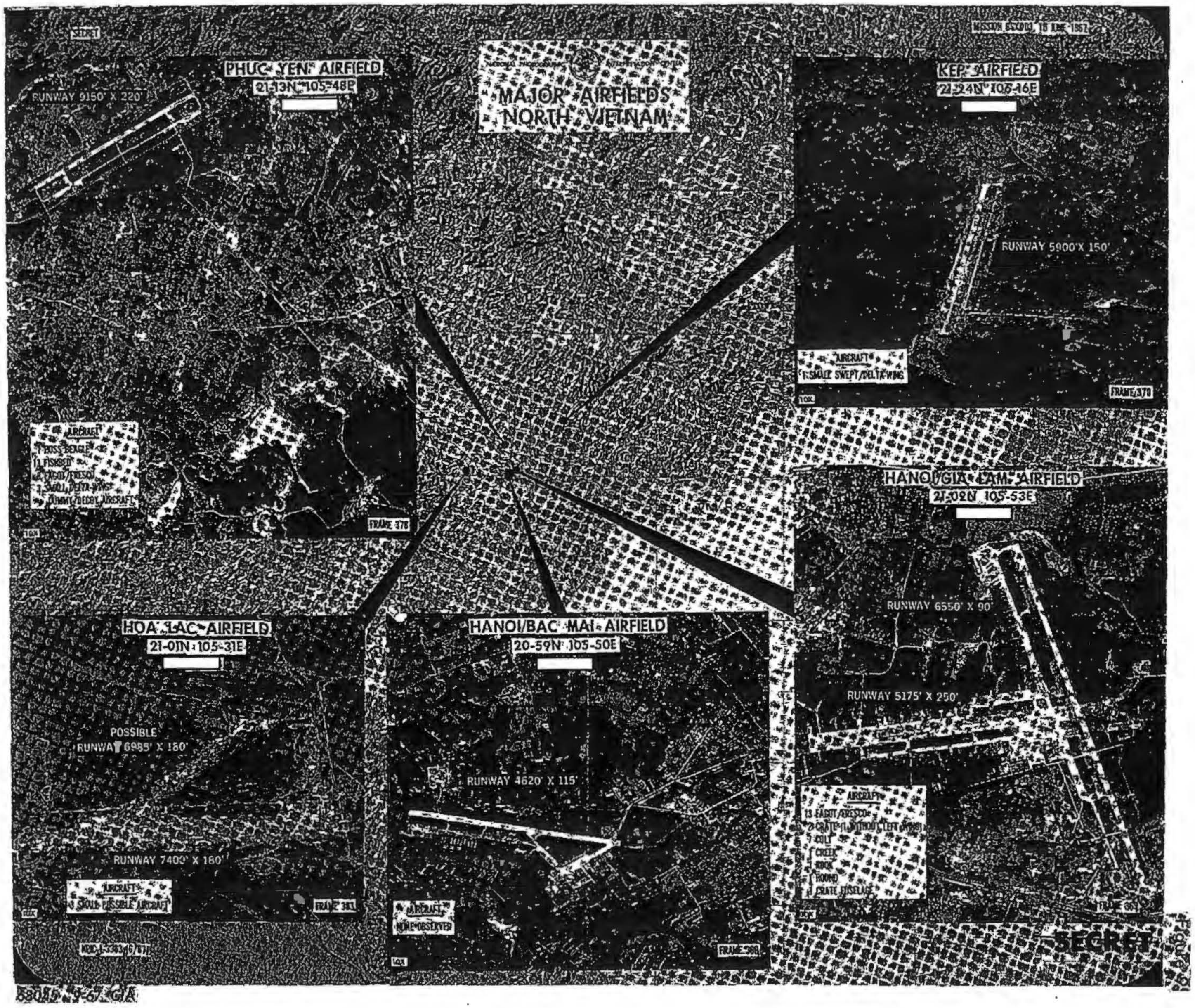

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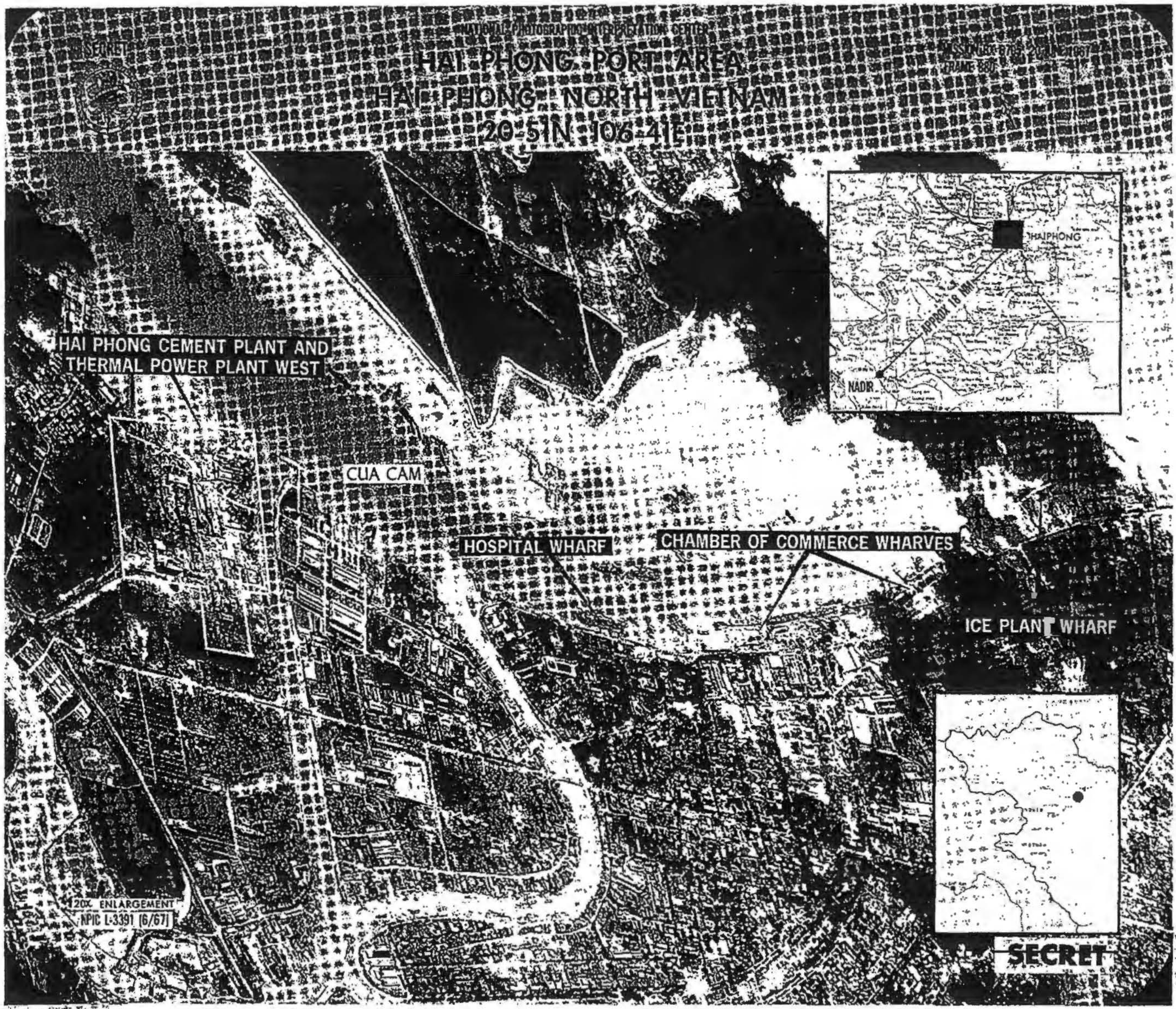

Figure 10

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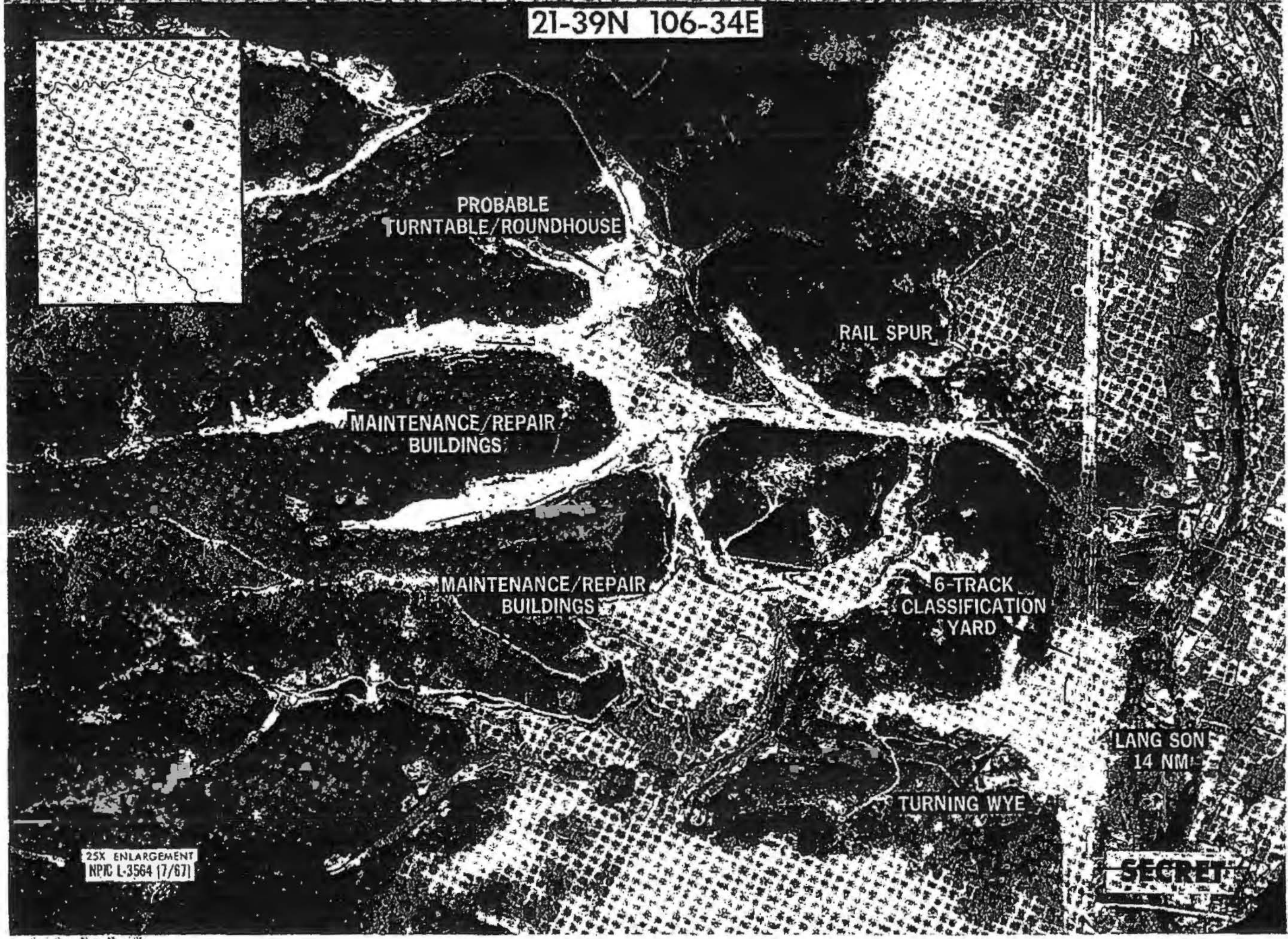

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Figure 1

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DDS&T Historical Paper
No. OSA-1
Vol. XV of XVI

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# OF
# SCIENCE & TECHNOLOGY
# HISTORY

(TITLE OF PAPER)
History of the Office of Special Activities

Annexes 154 through 165

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Date prepared : 1 April 1969

Written by : Helen Kleyla
Robert O'Hern

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DDS&T Historical Paper
No. OSA-I
Vol. XV of XVI

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(TITLE OF PAPER)
History of the Office of Special Activities
Annexes 154 through 165

(PERIOD)
From Inception to 1969

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ANNEX 154

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DD/SA ________
D/SA ________

CENTRAL INTELLIGENCE AGENCY
UNITED STATES OF AMERICA

DIRECTORATE OF
SCIENCE & TECHNOLOGY

# *BLACK SHIELD*
## *Reconnaissance Missions*
*16 August - 31 December 1967*

*Handle via*
*Byeman Comint*
*Channels Jointly*

~~Top Secret~~
10
OXCART
BYE No. 1296/68
DST-BS/BYE/68-1
31 January 1968

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# BLACK SHIELD Reconnaissance Missions
## 16 August - 31 December 1967

DST-BS/BYE/68-1
31 January 1968

CENTRAL INTELLIGENCE AGENCY
*Directorate of Science and Technology*

# PREFACE

This report is the second in a series of resumes of the BLACK SHIELD reconnaissance program flown over North Vietnam. This second resume spans the period from 16 August to 31 December 1967.

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## APPENDICES

## TABLE

## CONTENTS (continued)

### FIGURES

# BLACK SHIELD Reconnaissance Missions
## 16 August - 31 December 1967

## SUMMARY

Twenty-six BLACK SHIELD high-altitude reconnaissance missions were alerted during the period from 16 August to 31 December 1967. Fifteen of the 26 missions were flown, two of which were fired at by enemy SAM units. Eleven missions were cancelled, mainly due to weather conditions. (Appendix I lists these missions and related events.)

Through 31 December 1967, BLACK SHIELD coverage showed no evidence of surface-to-surface missiles, equipment, or facilities. The coverage continued to be of special value for investigating reports of missile deployment derived from other sources. For example, coverage of the Haiphong harbor area was obtained (BX6723) following the arrival there of the Soviet freighter Partizanskaya Iskra, which a clandestine source had reported to be carrying SS-N-2 (Styx) cruise missile crates. A search of the ship and port area photography did not reveal any such crates.

The BLACK SHIELD program has obtained good baseline coverage. There now exists clear, interpretable photography of all of North Vietnam except for a small area adjacent to the Chinese border in Northeast North Vietnam. BLACK SHIELD photography continues to be invaluable in providing unique order of battle information on fighter aircraft and surface-to-air missiles. A number of missions have provided total coverage of nearly all of the major North Vietnamese airfields. The simultaneous coverage of a large number of SAM sites has given US theater forces a quick, comprehensive listing of the occupied SA-2 sites. It has also significantly supplemented communications intelligence in determining the actual number of SAM battalions in North Vietnam and has aided in predicting with some degree of certainty the SA-2 occupancy status for tomorrow's strike operation. As an example, back-to-back missions BX6739 and BX6740, flown 15 and 16 December 1967, photographed 221 of North Vietnam's 226 useable SA-2 sites, including six new sites. Twenty of these SA-2 sites were occupied, including five of the six new sites. (Appendix II provides a listing of the COMIREX targets photographed.)

The program continues to contribute substantially to bomb damage assessment of point targets and of the interdiction effort directed against North Vietnam's

road, rail, and water transportation systems. BLACK SHIELD missions have identified new targets for US air strikes and have also provided valuable information on Chinese military activity, both in North Vietnam and along the southern and western coast of Hainan Island. In addition, BLACK SHIELD missions BX6737 and BX6738 were flown over the border areas of Cambodia, Laos, and South Vietnam to provide information on the North Vietnamese infiltration and supply routes and on the major North Vietnamese/Viet Cong troop deployment areas.

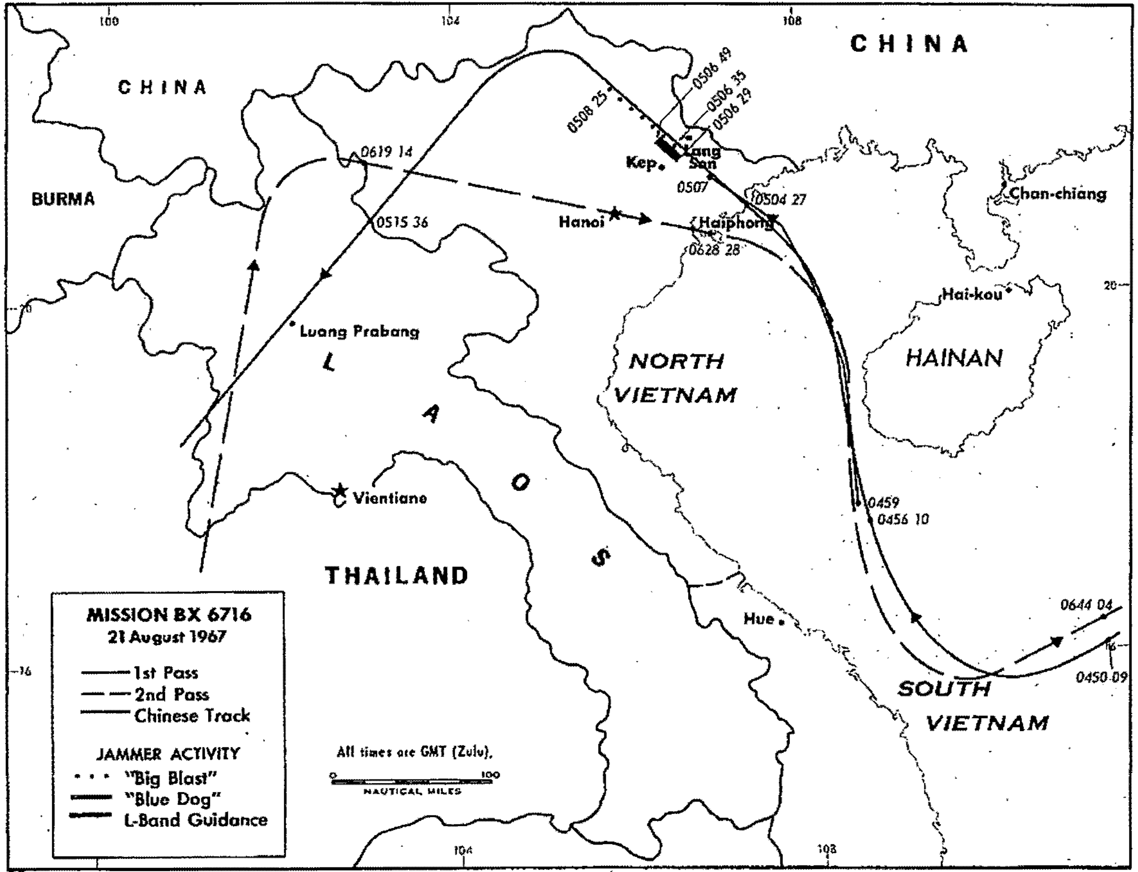
All of the North Vietnamese missions as well as Cambodian BLACK SHIELD mission BX6737 (which extended up the North Vietnamese panhandle) were tracked by Chinese and/or North Vietnamese air surveillance facilities. North Vietnamese air defense reaction to the vehicle was first noted in related SAM communications traffic during mission BX6723 (17 September). Subsequently, during mission BX6727 (6 October), air surveillance tracking of the vehicle by North Vietnamese facilities was also confirmed. BLACK SHIELD defensive mechanisms were activated on missions BX6716, BX6725, BX6732, and BX6734. One surface-to-air missile was launched at the vehicle on mission BX6732. Nine to eleven SAMs were fired at BLACK SHIELD mission BX6734. A change in the North Vietnamese SAM launch tactics was observed on missions BX6732 and BX6734, when for the first time missile firings occurred with the Fan Song guidance radar in low PRF (pulse repetition frequency) in an attempt to cope with a Mach-3 target; use of the low-PRF mode permits an earlier missile launch against very fast targets. (Appendix III lists the number and type of radar signals recorded by the System 6 Elint collection device carried by BLACK SHIELD vehicles).

North Vietnam air defense facilities were forewarned of the 6 October and 15 October missions (BX6727 and BX6728), apparently as a result of intercepting transmissions from the South China Sea refueling area. A more secure communications posture has since been employed, and no additional forewarning messages have been noted.

# MISSION ANALYSIS

## BX6716

BX6716 was a double-pass, high-altitude reconnaissance mission flown over North Vietnam on 21 August 1967. The BLACKSHIELD vehicle entered and exited North Vietnam on its first pass at 0504:27Z and 0515:36Z and on its second pass at 0619:14Z and 0628:28Z. Figure 1 shows the flight route and associated events.



69280 1-68 CIA

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Handle via BYEMAN Control System Only

Figure 1

Mission photography did not give any evidence of offensive surface-to-surface missile (SSM) equipment or facilities. Hanoi was covered in good clear photography; however, the ability to interpret photography of Haiphong and some other areas was limited by some clouds and haze over North Vietnam and China. The mission aircraft photographed 156 COMIREX targets plus five additional bonus targets. Of these, 108 were SA-2 sites, including one previously unidentified site. Fourteen of the SA-2 sites photographed were occupied.

The BLACK SHIELD mission provided good bomb damage assessment photography of the Hanoi electric power plant, enabling analysts to estimate probable damage to two turbine generators. Photographic coverage of 18 bridges and 11 rail yards yielded current information on the status of the transportation network.

There was no indication of a hostile weapon reaction directed against the mission vehicle; however, on-board warning/defensive systems were activated during the first pass of the overflight at 0506:34Z. (See figure 1.) Activity indicative of a missile launch and subsequent guidance was noted on the following systems:

a) System 6, an on-board Elint collection device,
b) Blue Dog, an L-band guidance jammer,
c) Big Blast, an S- and C-band noise jammer, and
d) the missile launch indicator lights.

However, analysis of the System 6 tape indicated that none of the seven Fan Song signals collected appeared to be tracking the mission vehicle. System 6 tapes also indicated that the L-band guidance signal came up before the mission aircraft was in the Fan Song sector; the Fan Song was in high PRF. The duration of the L-band signal (20 seconds) would indicate a missile flight to an altitude of 15,000 to 20,000 feet, an altitude compatible with the operational tactics of some of the DOD strike aircraft operating in North Vietnam. Analysis of the Blue Dog tapes indicated that the missile was not fired on a path that would intercept the BLACK SHIELD vehicle. Comint gave no indication of Fan Song tracking or a missile launch relative to the mission vehicle; however, Comint did show that several missiles had been fired at numerous strike aircraft operating in the Kep and Lang Son areas during this time period. Thus, it seems most likely that the radar/missiles that activated the on-board systems actually were directed at DOD strike aircraft.

No on-board systems were activated while over North Vietnam during the second pass. Air surveillance tracking (see figure 1) was carried out by Chinese air defense facilities; there is no indication that the track information was passed on to the North Vietnamese. The tracking of the mission vehicle was limited, probably because of the heavy DOD strike/jamming operations being conducted during the overflight period. Five EB-66B, two EB-66C, and one EAIF aircraft were actively engaged in jamming. Overall signal density was also heavy.

## BX6718

BX6718 was a double-pass reconnaissance mission flown over North Vietnam on 31 August 1967. The BLACK SHIELD vehicle entered North Vietnam on its first pass at 0402:22Z and exited on its final pass at 0645:46Z. Figure 2 indicates the flight route and related events.

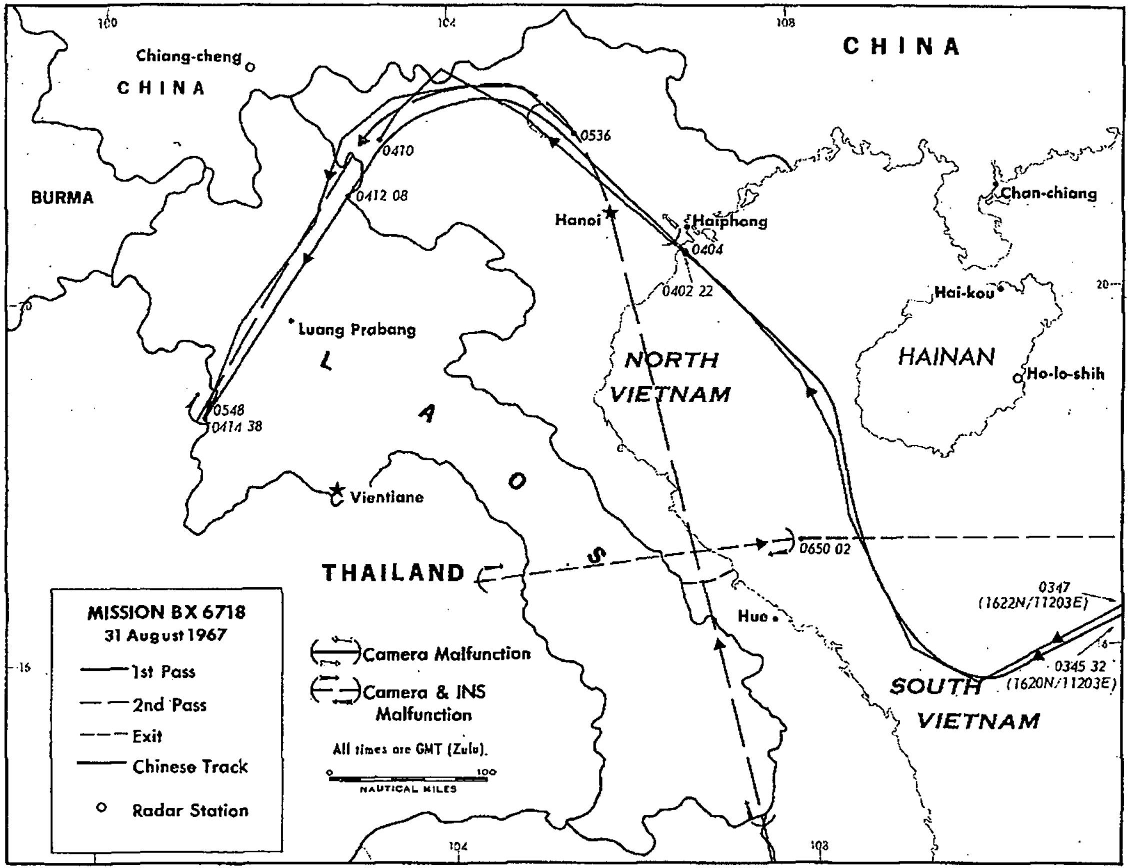

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Figure 2

BLACK SHIELD photography gave no evidence of SSM equipment or facilities. Camera malfunctions occurred on both the first and second passes, as indicated in figure 2. A malfunction in the inertial navigation system (INS) also occurred on the second pass. As a result, only 13 COMIREX targets were photographed. Three of these targets were unoccupied SA-2 sites.

There was no indication of a weapons reaction to the mission vehicle. System 6 recorded eight Fan Song signals during the overflight period. However, none of these sites appeared to be tracking the BLACK SHIELD vehicle, and no on-board defensive systems were activated as a result of these signals. Chinese air surveillance facilities were noted tracking the mission vehicle from 0347Z to 0410Z and 0536Z to 0548Z. Two Chinese radar stations were reflected reporting track information. The plot from Ho-lo-shih (18°55'N, 110°30'E) began at 0347Z, when the aircraft was at a ground range of 185 nautical miles, and ended at 0359Z at a radar-to-aircraft ground range of 140 nautical miles. Chiang-cheng's (22°45'N, 101°50'E) initial plot occurred at 0539Z at a ground range of 134 nautical miles, with the final plot occurring at 0547Z at a radar-to-aircraft ground range of 215 nautical miles. The Kuang-chou Sino-North Vietnamese liaison facility was reflected passing track information on the mission vehicle to the North Vietnamese from 0356Z to 0410Z; a rebroadcast of the same information occurred at 0415Z. This was the second* noted passage of track information by the Chinese to the North Vietnamese. Analysis of the tracking data of BX6718 indicated that from nine to eleven minutes elapsed between initial detection by the Chinese Ho-lo-shih radar station and the passage of the report to Hanoi. Significantly, this reporting time delay enabled the BLACK SHIELD vehicle to complete the first pass over the SA-2 threat zones prior to the initial air surveillance early warning.

Strike/jamming activity by US aircraft was very light during the overflight period, with one EB-66C and one EB-66B operating in the vicinity from 0402Z to 0505Z.

## BX6722

BX6722 was a double-pass, high-altitude reconnaissance mission flown over North Vietnam on 16 September 1967. The BLACK SHIELD vehicle entered and exited North Vietnam on its first pass at 0412:57Z and 0423:52Z and on its second pass at 0524:04Z and 0534:20Z. Figure 3 shows the mission route and associated events.

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*The first occurred on BLACK SHIELD mission BX6710 flown on 20 July 1967, as noted in BYE-44232/67.

The weather in the target area was much worse than anticipated, with most of the target area under heavy cloud cover. The mission aircraft photographed 45 COMIREX targets in the North Vietnam/China area. Seventeen of these targets were Vietnamese SAM sites, four of which were occupied. Photography gave no evidence of SSM equipment or facilities.

There was no indication of a hostile weapons reaction. System 6 recorded two Fan Song signals during this mission, but these signals did not appear to be tracking the mission aircraft, and no defensive system was activated by these signals. Chinese air surveillance defense facilities reported track plot times on this mission of 0409Z to 0418Z, 0423Z to 0431Z, and 0537Z to 0553Z. The plot from Pai-se (23°56'N, 106°37'E) began at 0417Z at a radar-station-to-aircraft ground range of 128 nautical miles and ended at 0418Z at a ground range of 105 nautical miles.

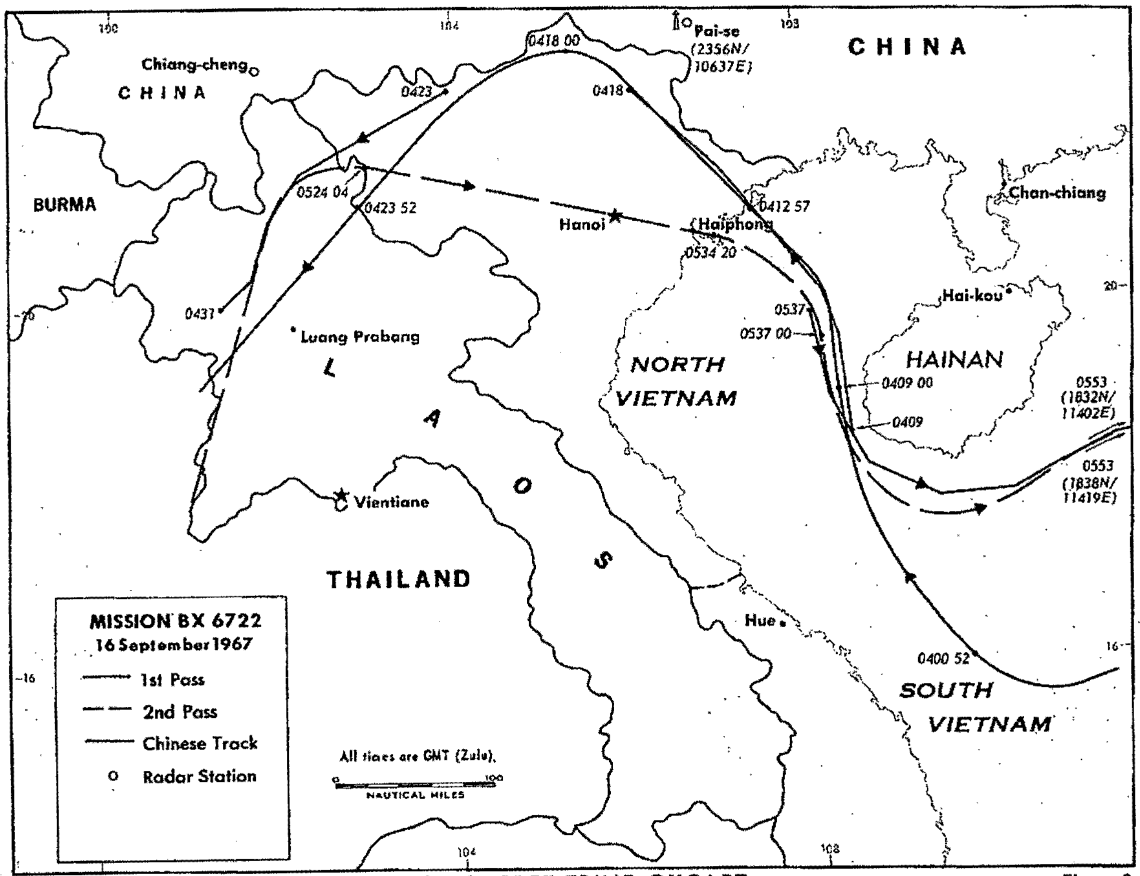

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Figure 3

The initial plot from Chiang-cheng occurred at 0428Z at a radar-to-aircraft ground range of 140 nautical miles, and the final plot occurred at 0431Z at a ground range of 160 nautical miles. North Vietnam's hostile broadcast facility at Hanoi was again noted reflecting the Chinese air surveillance plot information of the BLACK SHIELD vehicle.

One EB-66B and one EB-66C active ECM platforms were in operation over the Gulf of Tonkin from 0254Z to 0502Z.

## BX6723

BLACK SHIELD mission BX6723 was a double-pass, high-altitude reconnaissance mission flown over North Vietnam on 17 September 1967. The BLACK SHIELD vehicle entered and exited North Vietnam on its first pass at 0353:41Z and 0404:08Z and on its second pass at 0511:57Z and 0520:11Z. Figure 4 depicts the mission flight route and significant events.

Hanoi, Haiphong and the Chinese border area were covered in clear photography; only about 10 percent of the target area was cloud covered. Mission photography gave no evidence of SSM facilities or equipment. Even though the Soviet freighter Partizanskaya Iskra, an alleged carrier of SS-N-2 (Styx) cruise missiles, was noted berthed and with all five hatches open, a search of the ship and the port area failed to detect any SS-N-2 crates or equipment. Mission photography also provided bomb damage assessment of the port areas and land transportation network. The BLACK SHIELD vehicle photographed over 200 COMIREX targets of North Vietnam and China. Approximately 150 of these were North Vietnamese SA-2 sites, including four newly identified sites. Nineteen of the SA-2 sites photographed were occupied.

There was no indication of a hostile weapons reaction; however, North Vietnamese SAM communications did reveal a hostile intent. At 0352Z a SAM site (possibly located at 21°05'N, 106°19'E) was instructed to go to a "condition one" by his regimental controller. ("Condition one" in Soviet/Vietnamese terminology defines the highest readiness state of a SAM site.) Comint indicated that the site tracked the vehicle with its acquisition radar but was unsuccessful with its Fan Song guidance radar. References to the vehicle's "very fast" speed, and altitude of 25,000 meters (82,000 feet), were noted in the North Vietnamese SAM communication. Comint indicated that a second site (located at 20°59'N, 105°34'E) was unsuccessful in its attempt to pick up the vehicle on its guidance or acquisition radars. The first mention of the BLACK SHIELD aircraft by the North Vietnamese SAM air defense system occurred on mission BX6723.

System 6 recorded five Fan Song signals during the overflight, none of which appeared to be emanating from sites tracking the BLACK SHIELD vehicle; no defensive system was activated as a result of these signals. This is the first BLACK SHIELD mission with complete, unbroken air surveillance tracking of the vehicle while over North Vietnam. This air surveillance tracking was carried out by elements of the Chinese air defense system and passed to the North Vietnamese. Three Chinese radar stations were reflected in this exercise: Chiang-cheng, Hsin-hsing (19°55'N, 109°32'E), and Tung-kuan-shao (23°18'N, 101°22'E). The Chiang-cheng radar station's initial detection of the vehicle occurred at 0513Z at a radar-to-aircraft ground range of 108 nautical miles, and the final plot, at 0517 at a ground range of 218 nautical miles.

There was no indication of any DOD strike/jamming activity being conducted during the overflight period.

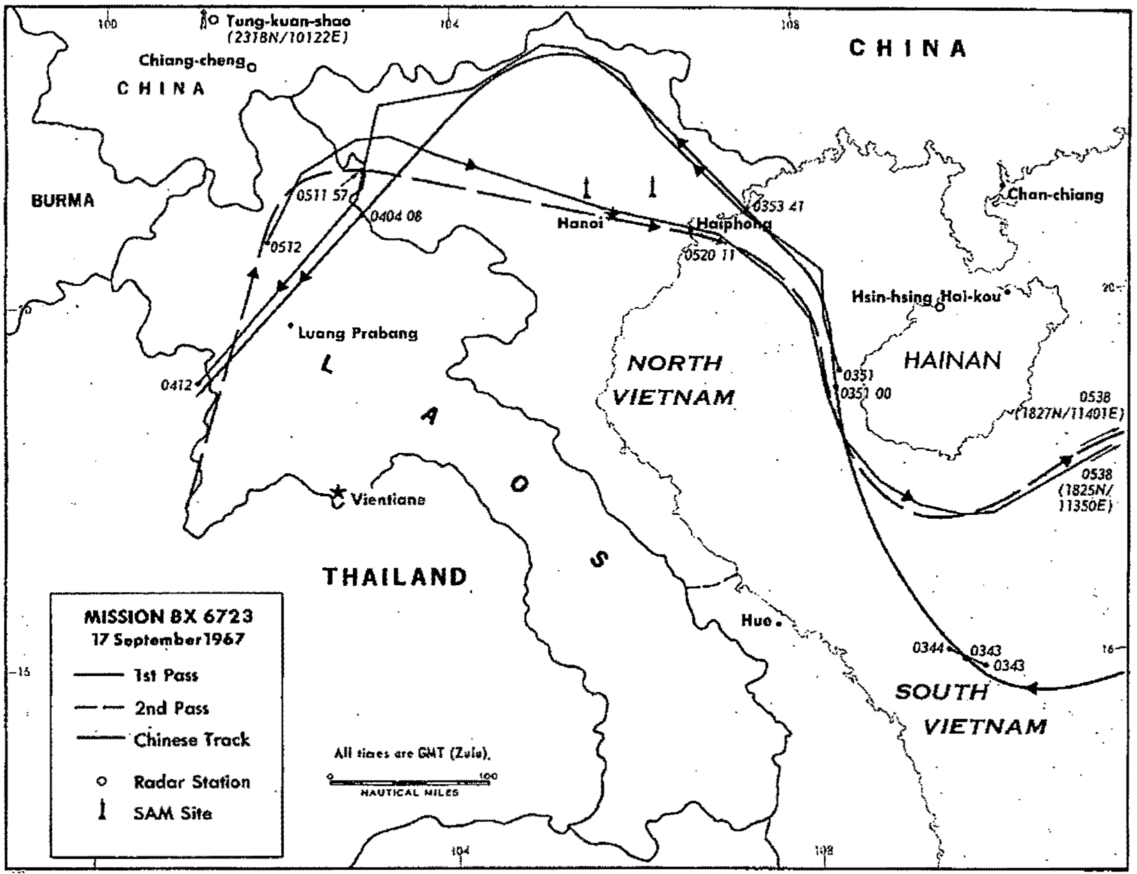

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Figure 4

## BX6725

BX6725 was a high-altitude, double-pass reconnaissance mission flown over North Vietnam on 4 October 1967. The mission aircraft entered and exited North Vietnam on its first pass at 0342:34Z and 0348:50Z and on its second pass at 0501:41Z and 0509:28Z. It intercepted two Fan Song signals on the first pass, which activated the on-board defensive systems, but there was no indication of a missile launch. No threat signals were intercepted during the second pass. Figure 5 indicates the mission route and other significant events.

BLACK SHIELD mission BX6725 obtained clear photography of over 40 percent of the country, including the Hanoi, Haiphong, and Thai Nguyen areas and the key Ping-hsiang and Dong Dang transshipment points on the Chinese/North Vietnamese border. Mission photography revealed for the first time the presence of armored vehicles on flatcars at Ping-hsiang, China, where combat equipment had been limited heretofore to field artillery and AA guns. Mission photography gave no evidence of SSM deployment. The BLACK SHIELD vehicle photographed 187 COMIREX and 16 bonus targets. Of these, 154 were SA-2 sites, including 18 that were occupied.

At 0335Z, the Kuang-chou District broadcast the initial detection of the BLACK SHIELD vehicle with a first-plot report time of 0333Z. The Hanoi Bac Mai hostile broadcast, upon reception of the Kuang-chou transmission of 0335Z, began retransmitting the track of the BLACK SHIELD vehicle. At 0338Z a SAM battalion, most probably the one located at site VN 64 (21°09'N, 105°45'E), alerted the senior regimental SAM controller to the approach of a high-altitude, "very fast" target at a range of 108 nautical miles. (This detection range is compatible with the Spoon Rest A radar, one of which is collocated with the battalion at site VN 64.) Shortly after entry into North Vietnam (0342:34Z), the BLACK SHIELD vehicle intercepted Fan Song signals (0343:39Z), which in turn activated the Mad Moth jammer.

According to Comint, two SAM battalions located in the Hanoi area at sites VN 64 and VN 142 (20°58'N, 105°57'E) were actively tracking the mission during this time period. A message intercepted two days later on 6 October reflected the SAM controller at site VN 142 conversing with his regimental controller. The former stated, "Several units picked up the target, the SR-71 .... We couldn't pick it up because it was too fast .... Those that picked it up lost it within 3 minutes." These statements of 6 October coincide with the events of 4 October. Pin Peg warning/DF lights located in the cockpit also indicated threat activity emanating from the Hanoi, Phuc Yen areas. Comint, Elint, and photography all suggest that site VN 64 was attempting a missile launch. The initial Fan Song low-PRF detection range of 57 nautical miles and the switch into and out of high PRF at 32 and 30 nautical miles are compatible with known SAM operations. Although the SAM battalion at VN 64 tracked the mission vehicle in the high-PRF mode for approximately 60 seconds, as shown in figure 6, it did not launch a missile. As apparent from the plot of ground range versus time in figure 6, the offset range between the mission flight path and SAM site VN 64 was 24.7 nm. Hence, had a missile launch been attempted by this unit, no possible threat to the BLACK SHIELD vehicle would have resulted.

Tracking of the BLACK SHIELD vehicle was reported by Chinese and North Vietnamese air defense echelons from 0333Z to 0401Z and from 0501Z to 0601Z. (The Chinese air surveillance authorities have apparently given position plots of

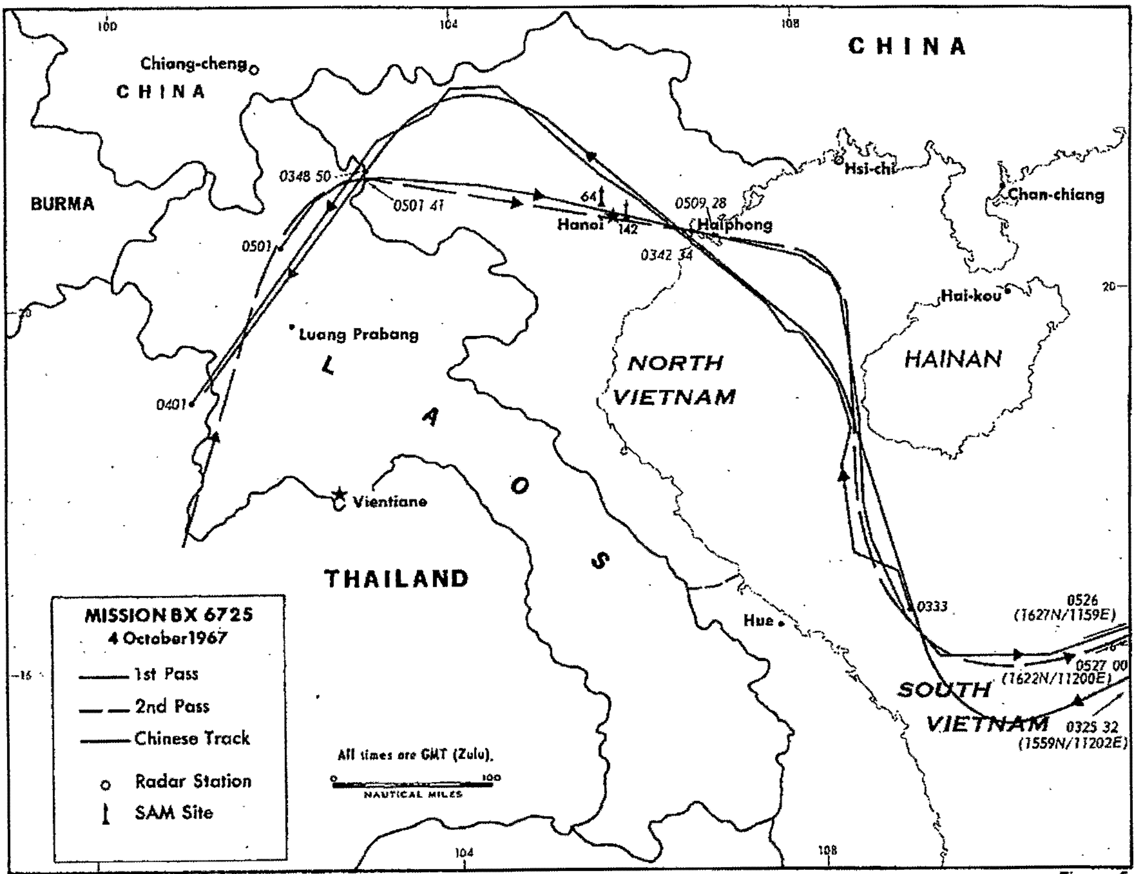

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Figure 5

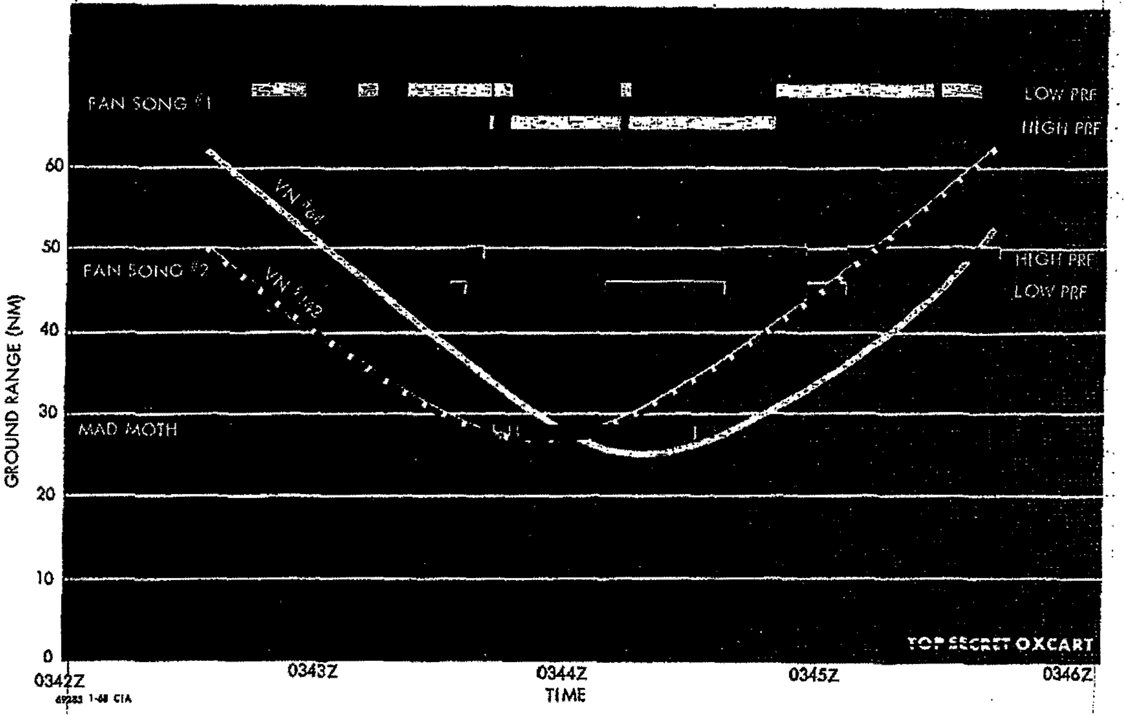

Figure 6. Activity Environment during Attempted Launch, Mission BX6725

the BLACK SHIELD vehicle a special "trinome" and designated the trinome for priority passage. This high priority for passage of special trinome messages has enabled the Chinese to reduce position plot routing delay times by 4 to 6 minutes. The elapsed time from initial detection by a Chinese facility to rebroadcast by Hanoi is now on the order of 1 to 3 minutes. This of course gives the Vietnamese SA-2 system more time to prepare for an engagement.) There was no indication of tracking by North Vietnamese air surveillance facilities on this mission. Two Chinese radar stations, Hsi-chi (21°34'N, 108°28'E) and Chiang-cheng (22°45'N, 101°50'E) were noted reporting tracking on the vehicle. The Hsi-chi radar station initially detected the vehicle at a ground range of 138 nautical miles and tracked it to 140 nautical miles in the period from 0340Z to 0346Z. Chiang-cheng initially tracked the vehicle at a ground range of 128 nautical miles and carried it out to 254 nautical miles.

It should be noted that seven DOD strike/reconnaissance aircraft were active during the SAM activity of the first pass, while 57 strike, four ECM, Iron Hand aircraft were active during the tracked but uneventful second pass.

## BX6727

BLACK SHIELD mission BX6727 was a single-pass reconnaissance mission flown over North Vietnam on 6 October 1967. The mission vehicle entered North Vietnam at 0233:36Z and exited at 0234:51Z. Figure 7 shows the route and associated events.

Mission photography gave no evidence of SSM facilities or equipment. Overall photography was good although scattered clouds covered approximately 40 percent of the target area. Thirty-six COMIREX targets were photographed by this single-pass mission. Nine of these were SA-2 sites, but occupancy could not be determined.

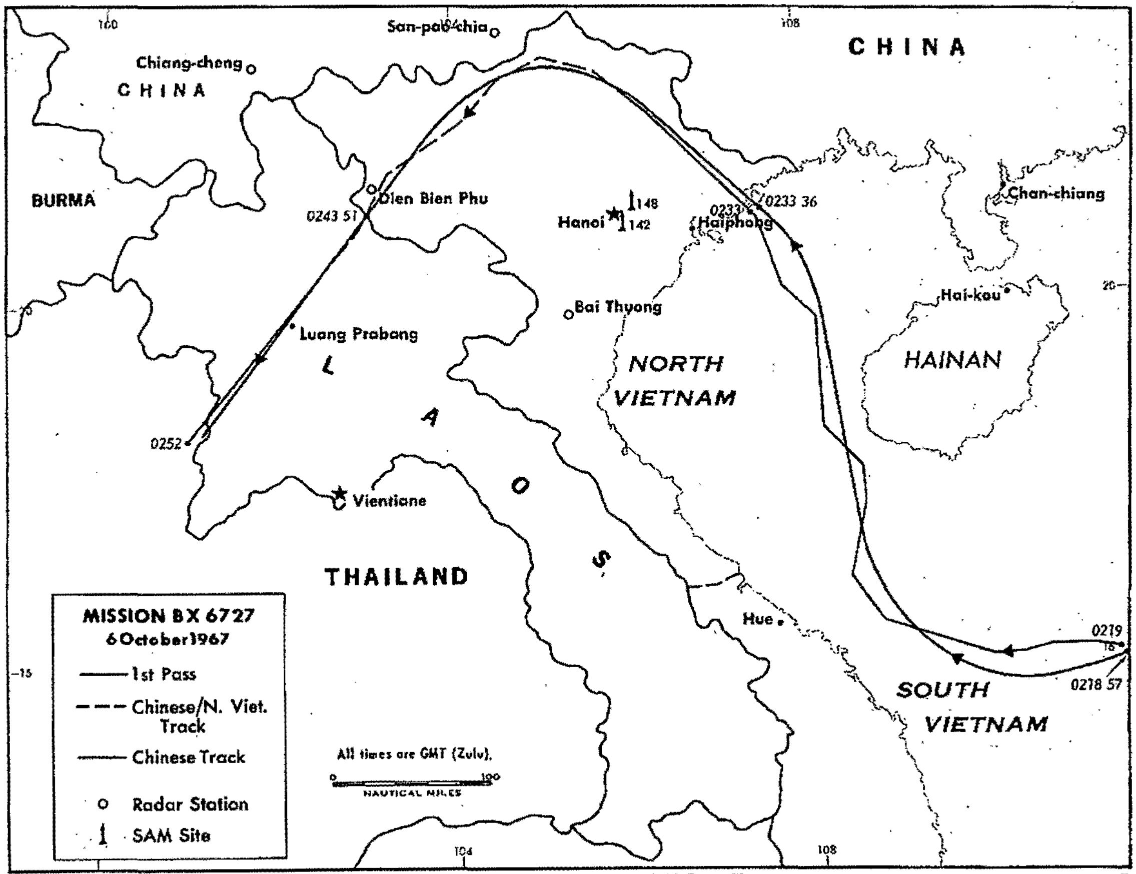

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Figure 7

System 6 recorded seven Fan Song signals during the mission overflight. None of these signals appeared to be tracking the vehicle, and no on-board defensive systems were activated as a result of these signals. At 0128Z the SAM battalion at VN 142 was informed, "From 0210Z on, there will be an SR-71 .... Be ready to battle." This warning message was passed 51 minutes prior to the initial detection of the mission vehicle by Chinese radar facilities. (Action was taken to determine the original source of this forewarning, but results were negative. Such a forewarning is significant in that it provides the North Vietnamese with ample time to prepare whatever defenses they might choose to use against the BLACK SHIELD vehicle.) Four SAM battalions were noted in Comint reacting to this mission aircraft, but there was no indication of launch activity by any of them. The mission flight path was well north of these SAM sites (see figure 7); two of the battalions, located by Comint at sites 142 and 148, were offset 60 and 65 nautical miles from the mission vehicle's track.

Chinese and North Vietnamese air defense facilities were noted reporting tracking of the BLACK SHIELD vehicle from 0219Z to 0253Z. Bai Thuong (19°52'N, 105°23'E) is the first North Vietnamese radar station where a tracking report of the BLACK SHIELD vehicle was intercepted. Bai Thuong detected the vehicle at 0237Z at a ground range of 156 nautical miles and continued tracking it out to a range of 172 nautical miles. Three Chinese radar stations--San-pao-chi (23°05'N, 104°33'E) and Chiang-cheng in China and Dien Bien Phu (21°18'N, 103°03'E) in North Vietnam--reported initial detection and final tracking ranges respectively of 56-248 nautical miles, 142-229 nautical miles, and 180-64 nautical miles. The reported tracks and altitudes were in general compatible with those of the mission aircraft.

During the overflight period one EB-66C and one EB-66B jamming platforms were active. Strike activity was very light during this time frame.

## BX6728

BLACK SHIELD mission BX6728 was a double-pass, high-altitude reconnaissance mission flown over North Vietnam on 15 October 1967. The mission vehicle entered and exited North Vietnam on its first pass at 0312:32Z and 0324:10Z and on its second pass at 0424:47Z and 0425:55Z. Figure 8 is a plot of the mission flight route and other associated events.

Extensive clouds limited clear coverage to about 10 percent of the photographed area. Mission photography gave no evidence of SSM equipment or facilities.

BLACK SHIELD photographed 19 COMIREX targets, seven of which were SA-2 sites. One new SA-2 site was identified, but none of the sites photographed was occupied.

In the period from 0025Z to 0111Z, warning messages were passed from authoritative Chinese echelons to Chinese radar stations. These messages informed the stations, "Today there will be a high-altitude, high-speed situation; complete preparations." BX6728 was the second BLACK SHIELD mission to be preceded by forewarning. Correlation of the time of intercept of the BX6728 warning messages with those of BX6727 indicated a probable tip-off from the South China Sea refueling area. A more secure communications posture has since been employed in the refueling area, and no more forewarning messages have been noted.

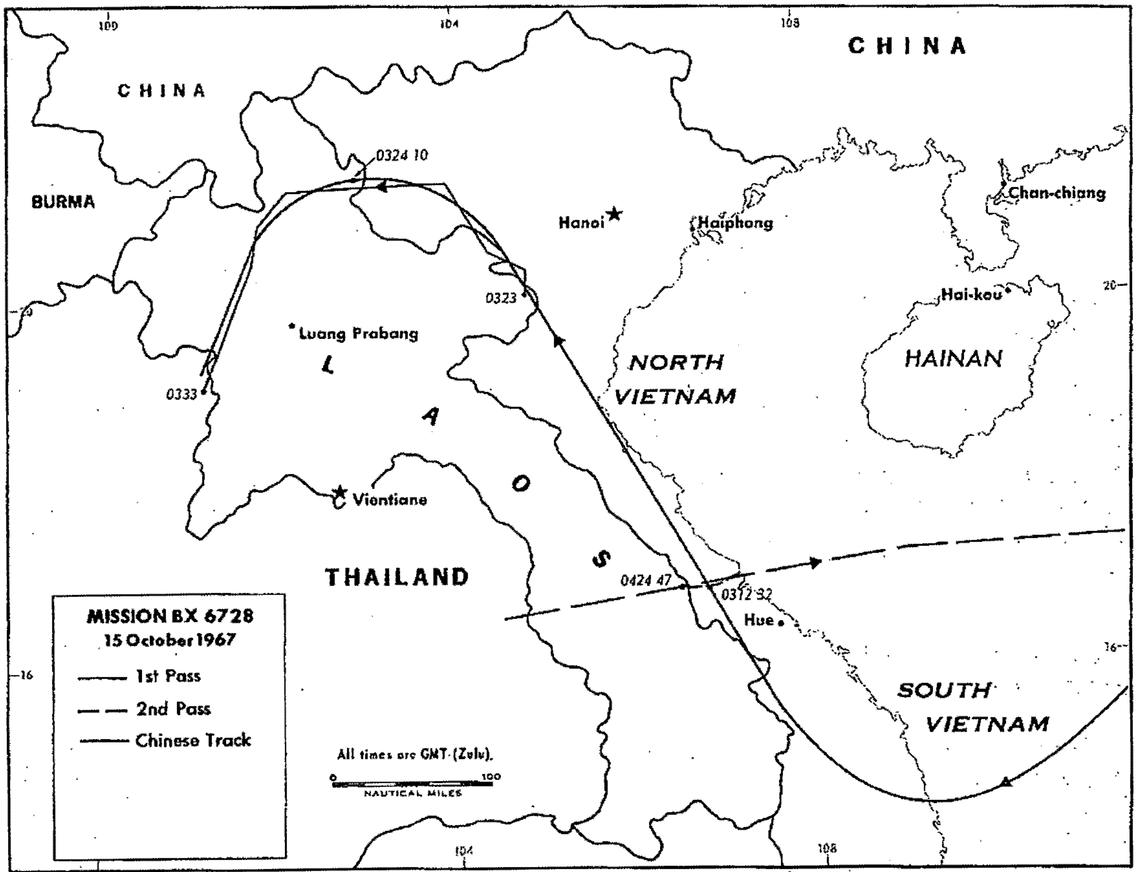

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Figure 8

System 6 recorded one Fan Song signal during the overflight period. The signal did not appear to be emanating from a site tracking the mission vehicle, and no defensive mechanism was activated as a result of this intercept.

Chinese and North Vietnamese air defense facilities were noted reflecting tracking data on the mission vehicle from 0323Z to 0333Z. The latter monitored the Kun-ming sector broadcast and rebroadcast the BLACK SHIELD track over the Hanoi Bac Mai facility.

Available information indicated little or no strike/jamming operations during the overflight period.

## BX6729

BX6729 was a double-pass reconnaissance mission flown over North Vietnam on 18 October 1967. The mission vehicle entered and exited North Vietnam on its first pass at 0346:43Z and 0355:56Z and on its second pass at 0506:23Z and 0513:47Z. Figure 9 is a display of the vehicle flight route and air surveillance tracking.

Cloud-free photography was obtained over about 50 percent of the country, including the Hanoi and Haiphong areas. The mission covered most of the surface-to-surface missile search area, but there was no evidence of SSM deployment. Construction activity by Chinese engineers of Yen Bai airfield was noted in mission photography. The mission aircraft photographed 193 COMIREX targets, 153 of which were SA-2 sites. Sixteen of these SA-2 sites were occupied, including one newly identified site. Dummy SA-2 missiles were noted occupying one SA-2 site.

System 6 recorded one Fan Song signal. This signal was not tracking the aircraft, and no on-board defensive systems were activated during the overflight.

Chinese and North Vietnamese air defense facilities were noted reporting tracking of the BLACK SHIELD vehicle with inclusive plot times from 0334Z to 0403Z and from 0503Z to 0533Z. The Chinese radar station Chiang-cheng detected and tracked the vehicle from 0355Z to 0404Z and from 0504Z to 0512Z. The corresponding radar station vehicle to ground ranges for these times were respectively

100-240 nautical miles and 124-253 nautical miles. The North Vietnamese radar station at Vinh (18°45'N, 105°43'E) was noted rebroadcasting the track of the vehicle from 0400Z to 0425Z.

No strike/jamming aircraft were noted in operation during the first pass. Two EB-66 active jamming platforms were in operation during the second pass. Overall signal density was light.

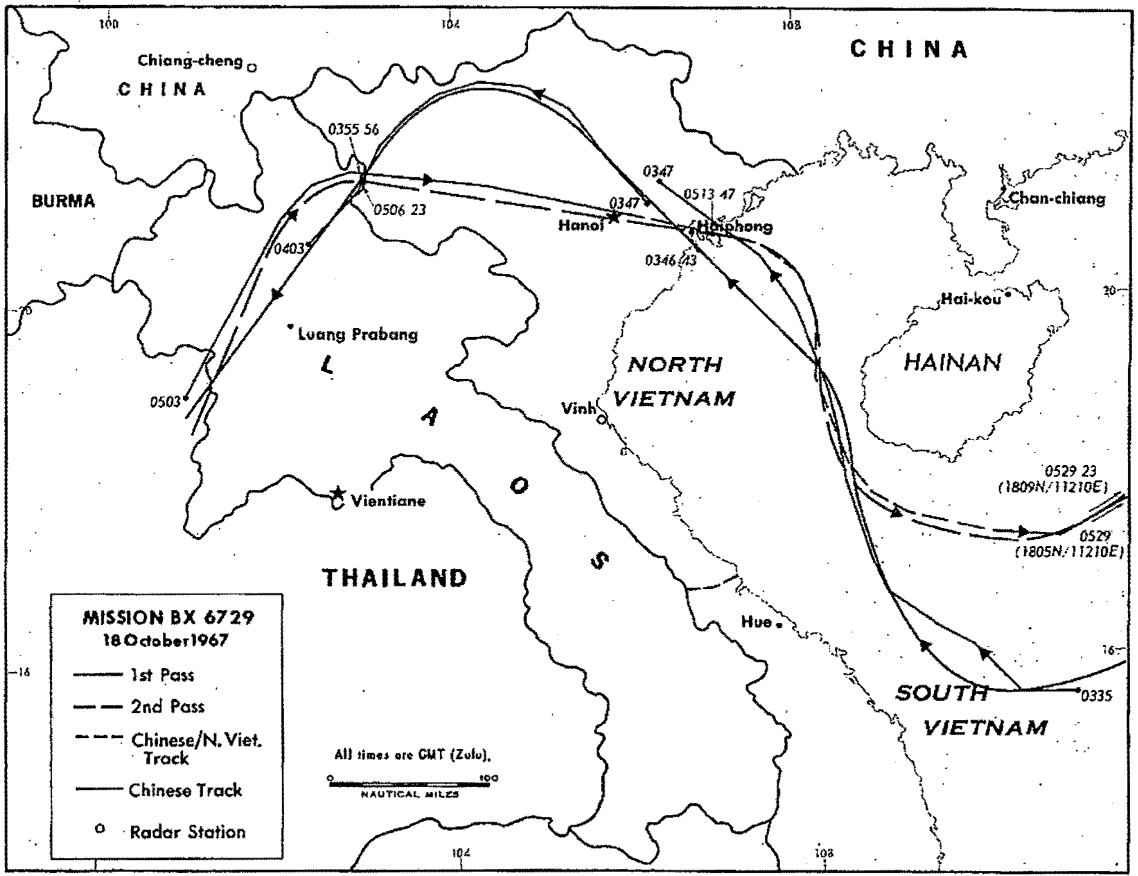

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Figure 9

## BX6732

BLACK SHIELD mission BX6732 was a double-pass, high-altitude reconnaissance mission flown over North Vietnam on 28 October 1967. The first pass entered North Vietnam at 0353:25Z and exited at 0406:12Z; the second pass entered at 0503:53Z and exited at 0511:44Z. A missile was fired at the vehicle during the second pass at 0508:36Z. Figure 10 portrays the BLACK SHIELD flight route and associated events.

BX6732 photography gave no evidence of SSM deployment. A probable rail-to-road transshipment point was shown under construction near Ho-kou, China, across the border from Lao Cai, North Vietnam. BX6732 provided good coverage of all six major airfields in North Vietnam. With the exception of Haiphong/Cat Bi Airfield, all appeared to be serviceable. The mission aircraft photographed 167 COMIREX targets and seven bonus targets. Of these, 120 were North Vietnamese SA-2 sites, 14 of which were occupied.

System 6 recorded four Fan Song signals during the first pass of the overflight. These signals did not appear to be emanating from radars tracking the vehicle; no on-board defensive systems were activated because of these signals.

During the second pass, System 6 recorded three Fan Song signals, two of which were tracking the vehicle. Correlation of all information of this overflight showed that North Vietnamese SAM site VN 133 launched a single, albeit unsuccessful, missile at the mission vehicle. This was the first known missile firing at a BLACK SHIELD vehicle by the North Vietnamese surface-to-air missile air defense system. Comint indicates that site VN 133 and an unidentified site were tracking the vehicle and that the former launched one missile. Figure 11 shows the active environment during the overflight. Analysis of Comint and System 6 tapes gives evidence of a missile launch while the Fan Song radar was in the low-PRF mode (1,200-1,265 pps). Prior to this mission, all known launches by SA-2 systems occurred when the Fan Song radar was in the high-PRF mode (2,400-2,530 pps). The low-PRF launch mode would require some modification in the SA-2 system; such modification probably was performed in the field. This change in procedure was an attempt to cope with a Mach-3 target. (The SA-2 system was designed for a maximum target velocity of Mach 2.)

Figure 12 shows two photographs from this mission: one of missile smoke above site VN 133 and the other of a missile (with missile vapor trail), which was probably fired by site VN 133 at the BLACK SHIELD vehicle. The second photograph also shows the missile flight path was then down and away from the BLACK SHIELD vehicle flight path.

The low-PRF launch mode extends the launch window of the SA-2 system (see figure 13.) However, even though this tactic maximizes system capability against a nonjamming Mach-3 target, the kill probability with the ECM equipment now on board the BLACK SHIELD vehicle remains essentially unchanged. The ECM equipment appeared to perform well against this first firing at the mission aircraft. While the low-PRF launch mode allows missile firings at ranges greater than the

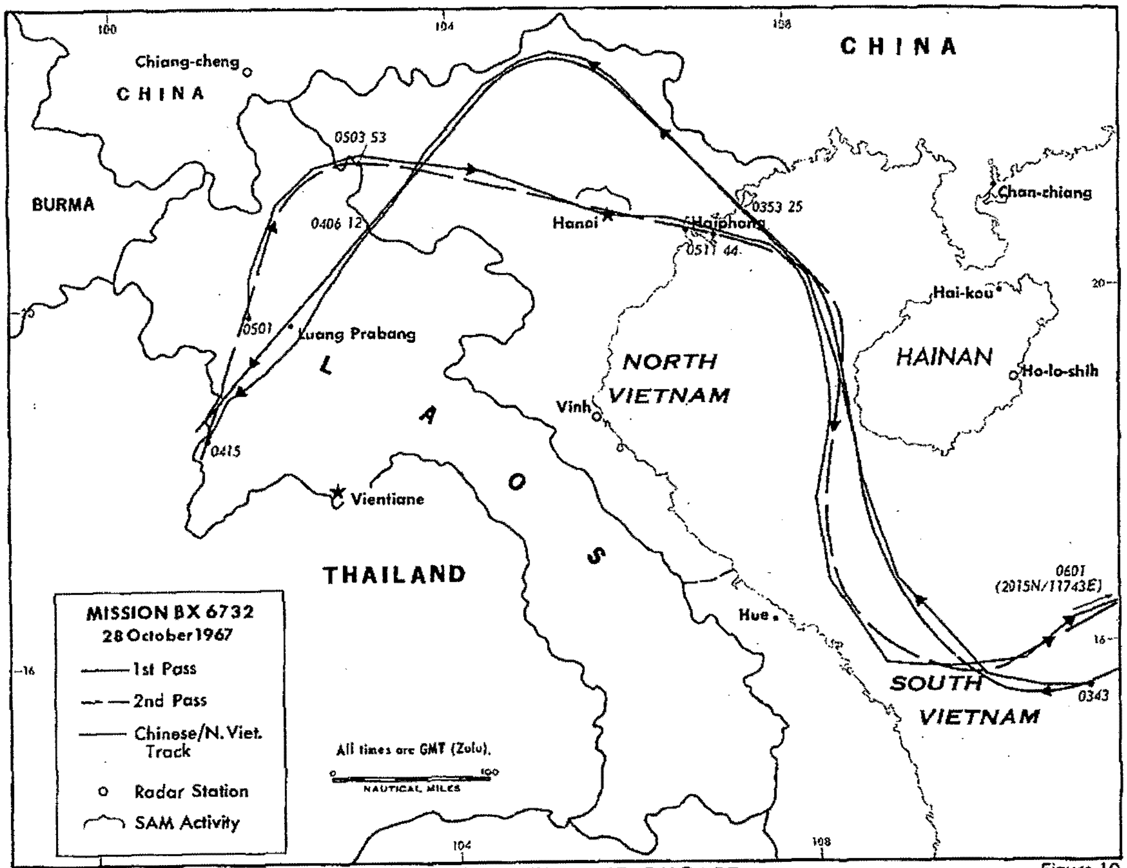

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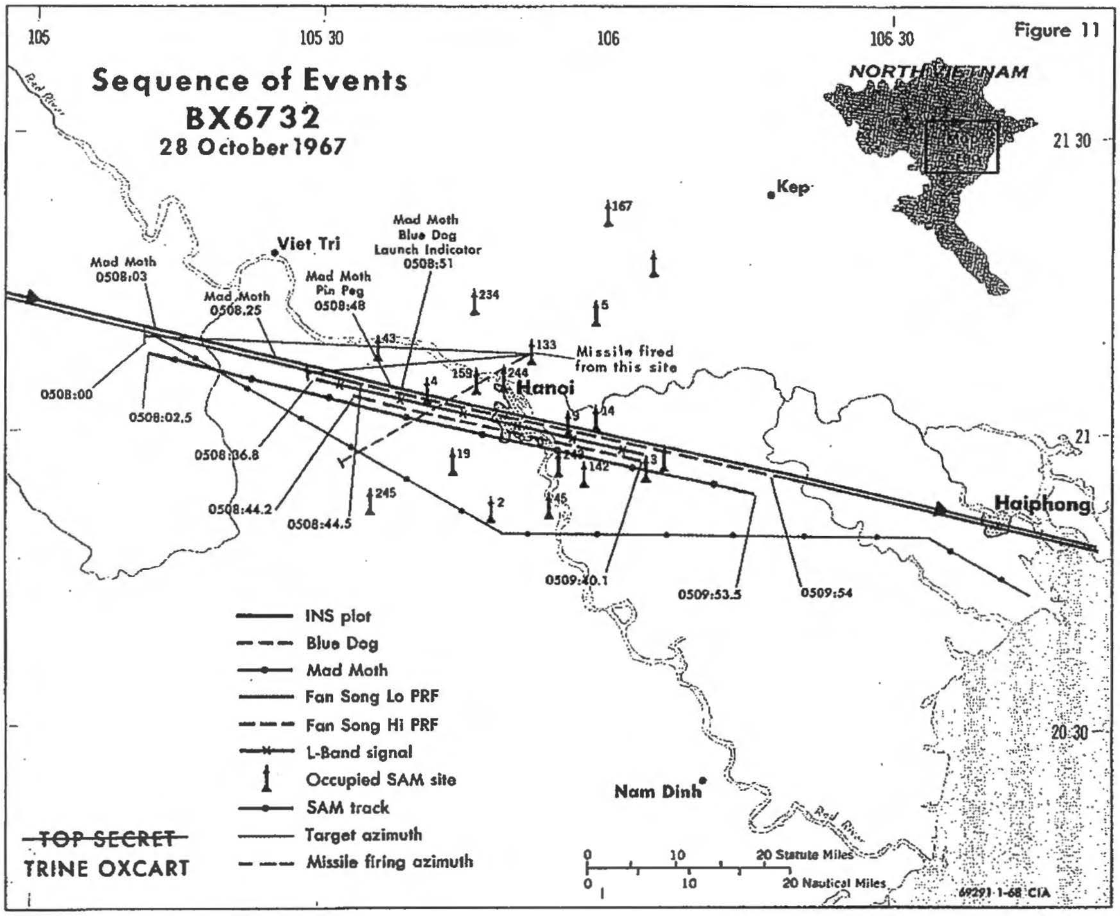
Figure 10



normal high-PRF launch range of 32 nautical miles, this particular missile launch occurred at a range of 25.2 nautical miles. The regimental controller criticized the SAM battalion controller for launching late, especially after the regimental controller had ordered a firing at 32.5 nautical miles.

Air surveillance tracking of the vehicle was carried out by Chinese and North Vietnamese air defense facilities. The tracking was in general complete and accurate.

DOD strike/jamming reports indicate that 23 aircraft were conducting operations during the first pass overflight. During the missile launch of the second pass, three DOD strike aircraft were conducting operations.

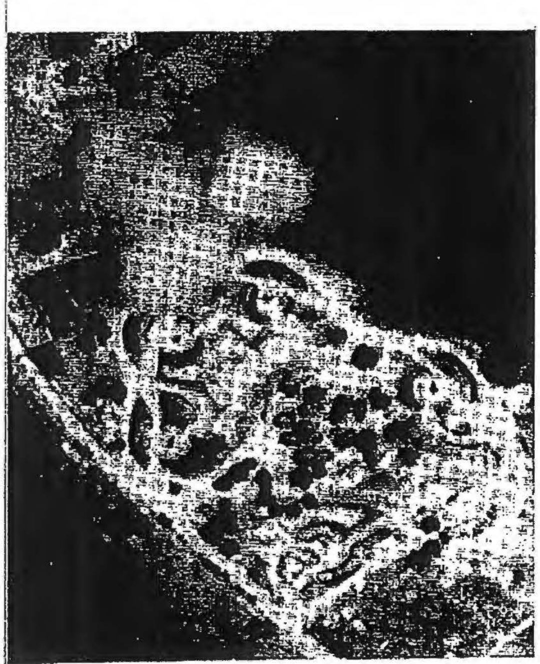


Figure 12a. Missile Smoke Above Site VN 133

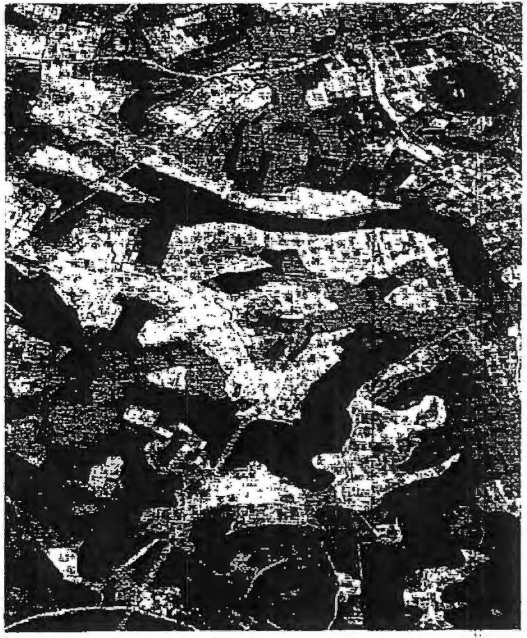


Figure 12b. Missile and Missile Vapor Trail

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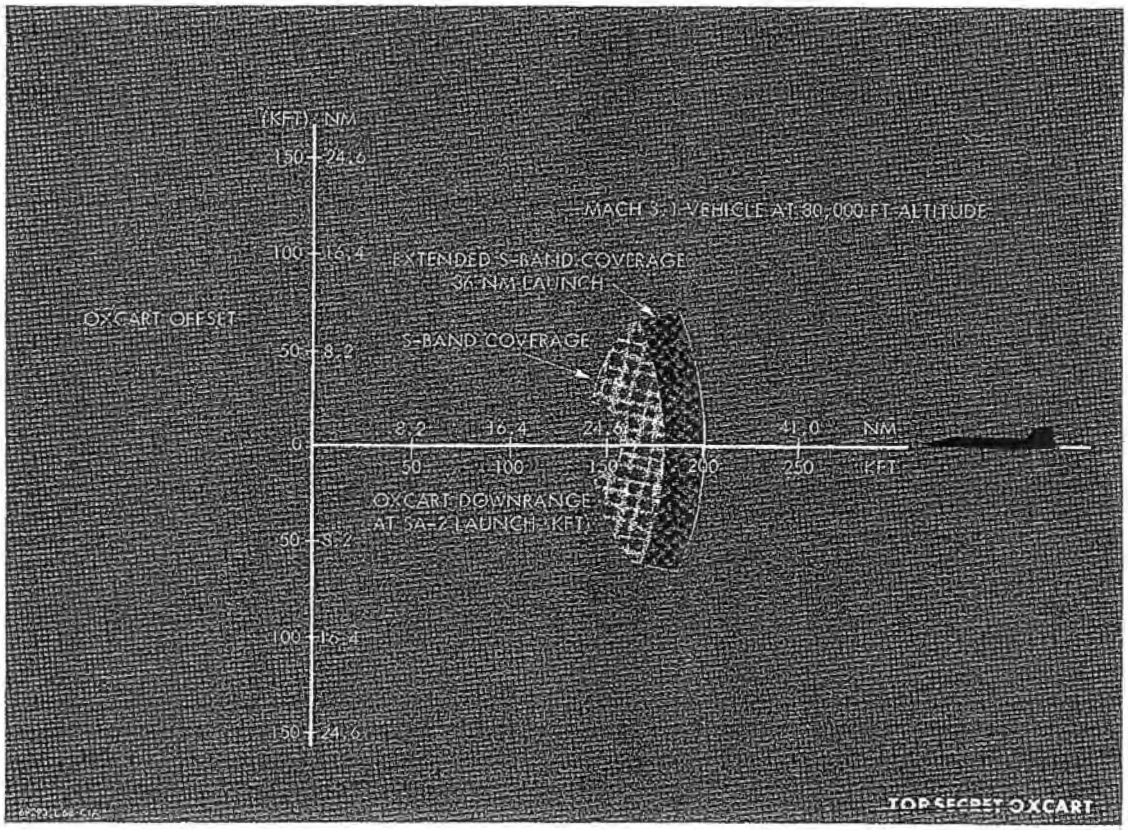

Figure 13. Plan View of SA-2 Launch Windows against Oxcart

## BX6733

BLACK SHIELD mission BX6733 was a two-pass reconnaissance mission flown over North Vietnam on 29 October 1967. The vehicle entered and exited North Vietnam on its first pass at 0335:02Z and 0346:42Z and on its second pass at 0449:48Z and 0458:52Z. Figure 14 presents the mission flight path and associated events.

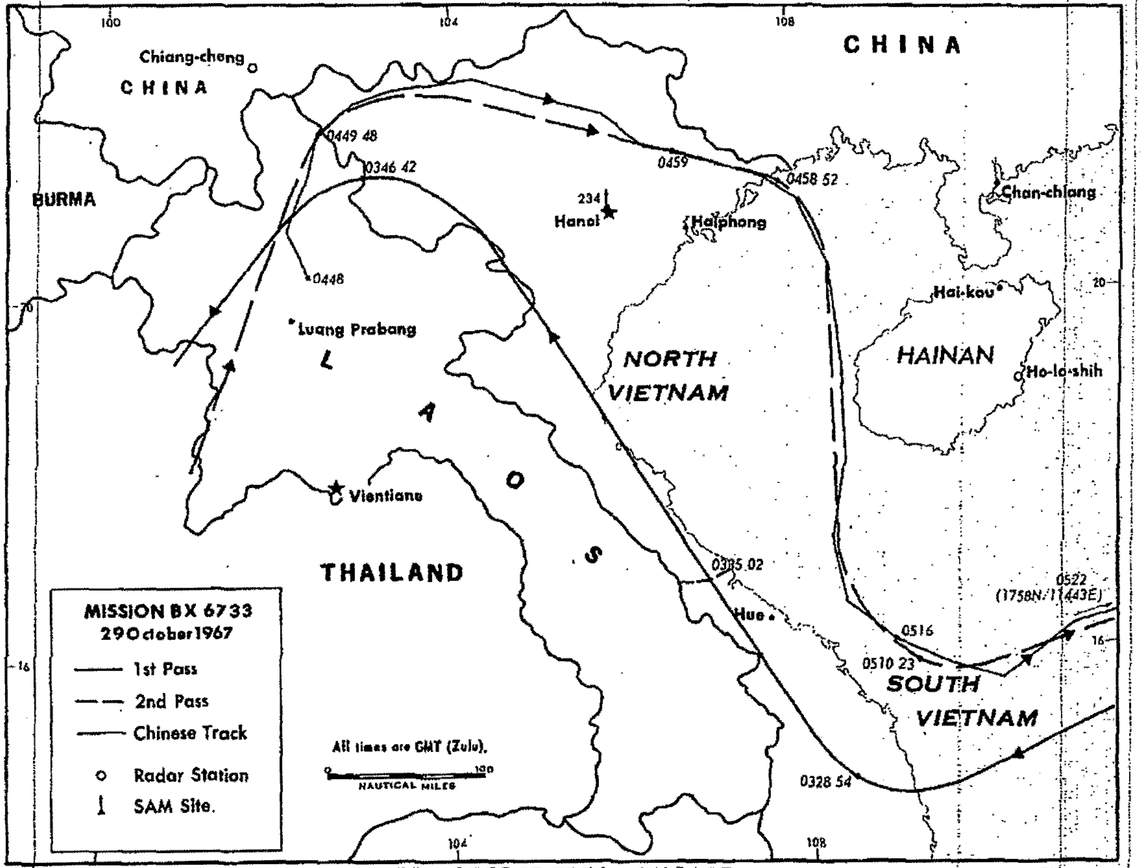

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Figure 14

Mission photography gave no evidence of SSM equipment or facilities. Continuing construction by Chinese engineers of North Vietnamese Yen Bai Airfield was the first sign of progress since 20 June 1967. The mission aircraft photographed 120 COMIREX targets. Of these, 74 were SA-2 sites, 16 of which were occupied. One new unoccupied SA-2 site was identified.

System 6 recorded eight Fan Song signals while the aircraft was over North Vietnam. None of these signals appeared to be tracking the BLACK SHIELD vehicle, and no on-board defensive systems were activated as a result of these signals.

During the first pass, there was no indication of air surveillance tracking by either the North Vietnamese or the Chinese. Nor were there any reported strike/jamming operations.

The Chinese air surveillance facilities tracked the BLACK SHIELD vehicle continuously during the second pass. There was no evidence of air surveillance tracking by the North Vietnamese; however, the Chinese did pass the BLACK SHIELD track to the North Vietnamese. Moderately heavy strike/jamming operations (38 aircraft) were being conducted during this pass. Chinese radar stations at Chiang-cheng and Ho-lo-shih were both noted passing mission plots from 0446Z to 0455Z and 0510Z to 0522Z. The initial detection and final tracking ranges for the Chiang-cheng radar station were 80 and 228 nautical miles, respectively. The Ho-lo-shih radar station's detection and final tracking ranges were 175 nautical miles and 265 nautical miles. Correlation of System 6 with the final position plot of the Ho-lo-shih radar station indicates the tracking radar to be a Moon Face VHF radar.

The Phuc Yen regimental controller and subordinate SAM site VN 234 were noted in communications referring to the BLACK SHIELD vehicle, which was over the Gulf of Tonkin at the time; it was never in VN 234's firing zone.

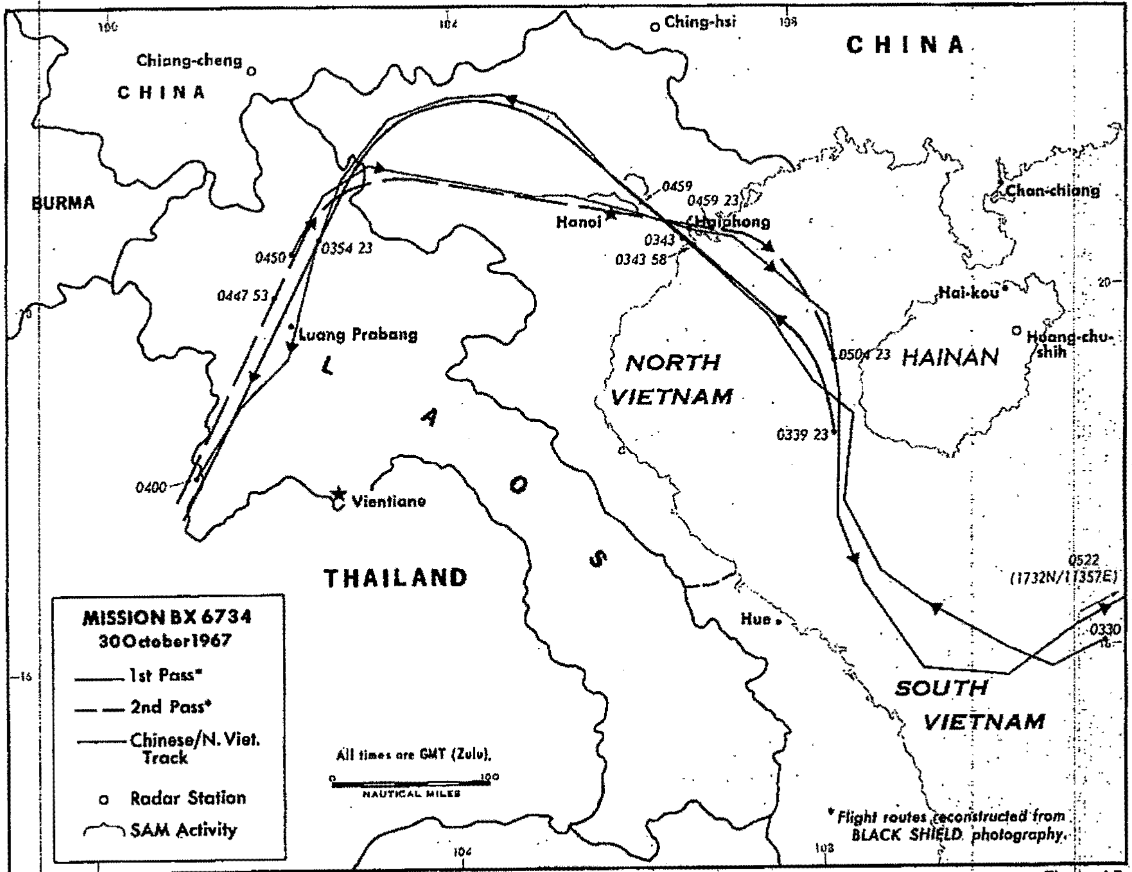
## BX6734

Mission BX6734 was a high-altitude, double-pass reconnaissance mission flown over North Vietnam on 30 October 1967. The first pass of the mission vehicle entered North Vietnam at 0343:58Z and exited at approximately 0353:00Z. The second pass was over North Vietnam from approximately 0445:00Z to 0459:23Z. Figure 15 shows the mission aircraft's flight route and associated air surveillance events.

The BLACK SHIELD vehicle photographed 118 COMIREX targets, 92 of which were North Vietnamese SA-2 sites. Thirteen of these sites were occupied, including one newly identified site. BLACK SHIELD photography gave no evidence of SSM facilities or deployment.

Surface-to-air missile reactions were noted on the first pass from 0340Z to 0402Z and during the second pass from 0420Z to 0501Z. Figure 16 shows the reaction area and related events during this time period.

During the first pass, two SAM battalions located at sites VN 234 and VN 142 were reflected attempting a missile launch. Neither of these sites launched any missiles, both being out of the required range limits for a successful launch. Analysis of System 6 tapes indicates that a low-PRF launch, similar to the one



*Flight routes reconstructed from BLACK SHIELD photography.

69296 1-68 CIA

~~TOP SECRET~~ TRINE OXCART
Handle via BYEMAN Control System Only

Figure 15

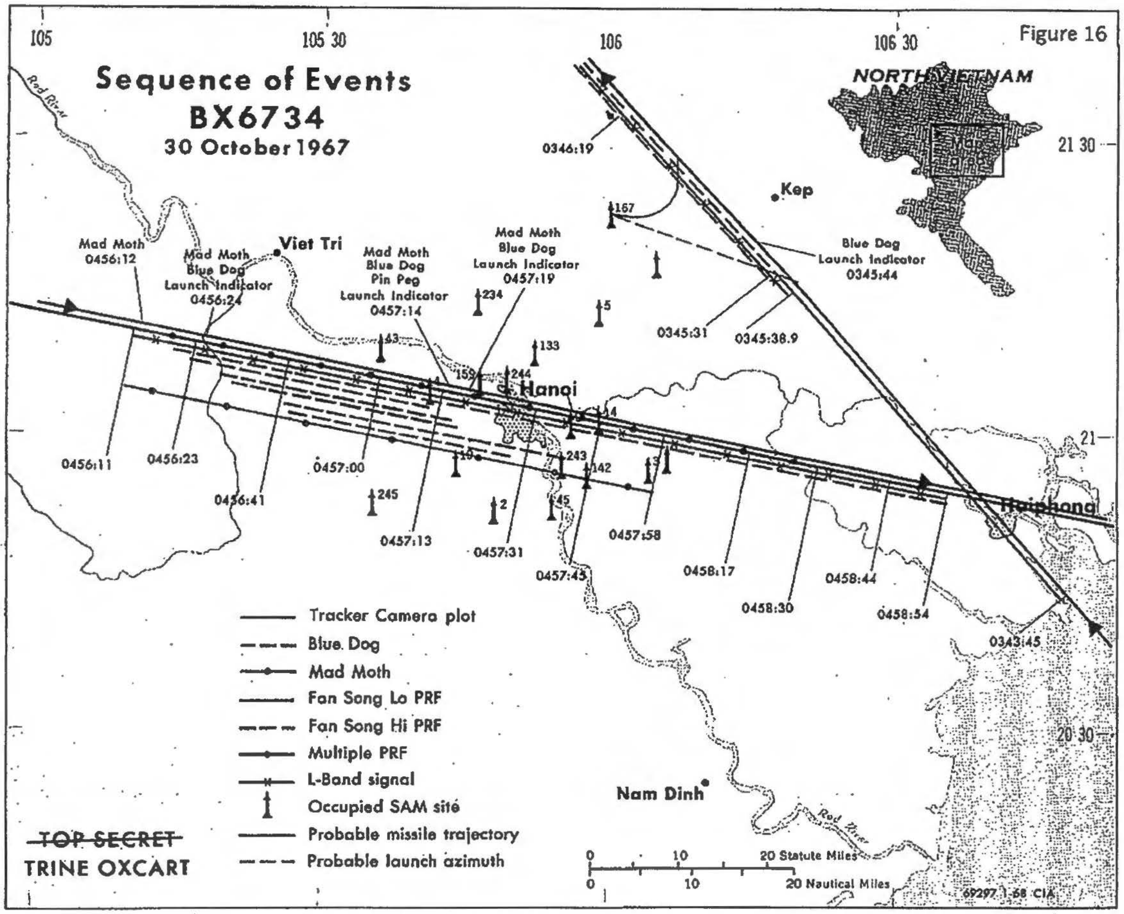


Figure 16

Sequence of Events
BX6734
30 October 1967

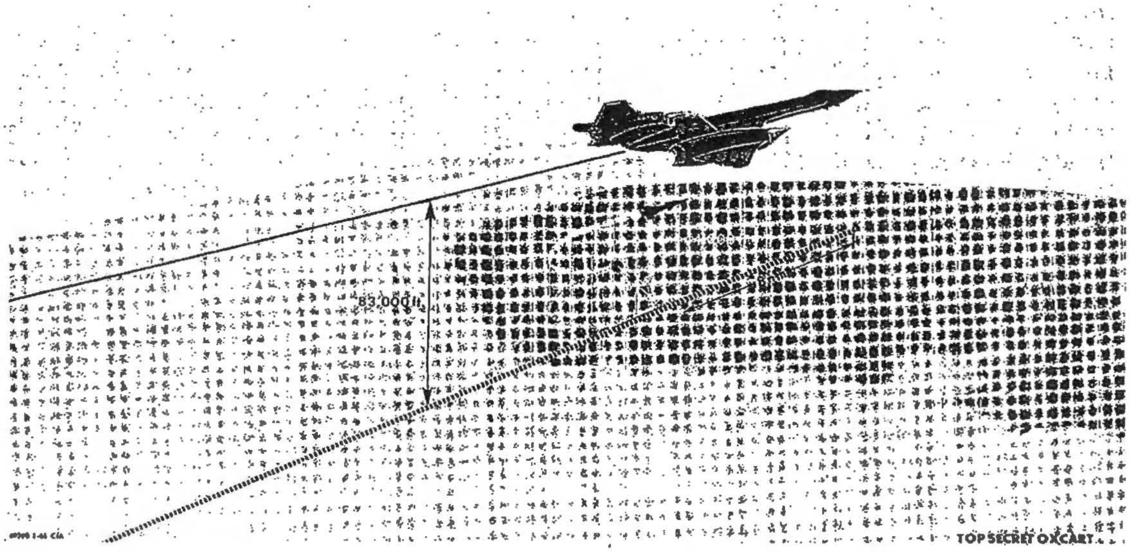


Figure 17. Probable Missile Trajectory Derived from L-band Signals

during mission BX6732, did occur. Signal analysis coupled with the missile flyout characteristics indicate the possible launching site to have been VN 167. (Figure 17 shows a probable missile trajectory from VN 167.) The pilot did not report sighting a vapor trail or missile, and it is possible the site fired at another aircraft. The intercepted Fan Song signal was weak; thus, the Mad Moth jammer was active for only a short period of time.

Correlation and analysis of all available data on the second pass shows that at least six SAM sites fired from eight to ten missiles at the BLACK SHIELD vehicle in the 2-minute period from 0456Z to 0458Z. As might be expected, the dense signal environment during the multiple engagement makes a complete delineation of events difficult. Table 1 presents the probable sequence of events and identifies the six SAM sites involved as numbers 234, 133, 244, 159, 142, and 19. Figure 16 depicts six active Blue Dog channels which tend to indicate a minimum of six missile launches most probably carried out by these six SAM sites. BLACK SHIELD photography shows vapor trails of six missiles (see figure 18). The pilot also saw these vapor trails and witnessed three SA-2 detonations.

Table 1 shows missile launches at ranges of 35, 38, and 41 nautical miles. Since these launch ranges are beyond the high-PRF acquisition range of the Fan Song radar (32.6 nautical miles), the launches might be construed to have been low-PRF launches. The ECM equipment (Mad Moth and Blue Dog) appeared to function normally. Mad Moth and Blue Dog replied to the signal environment and some type of interference on S-band was experienced by operators at three of the SA-2 sites. The degree of jamming evident was not reported, but the fact that the aircraft did not sustain a hit by a warhead pellet in an eight-missile-launch environment would appear to be a measure of the ECM configuration's effectiveness.

Postflight inspection of the BLACK SHIELD vehicle revealed that a piece of metal had penetrated the lower right wing fillet area and lodged against the support structure of the wing tank. The fragment is not an SA-2 warhead pellet but apparently is of Soviet manufacture. It was possibly a part of the debris from one of the three SA-2 missile detonations observed by the pilot. Figure 19 depicts the possible fragment path, the fragment, and a portion of the penetrated wing panel. Spectrographic and other measurements made on the fragment and various components of an SA-2 MOD I missile have to date shown no correlation. Efforts are continuing to identify the source of this fragment.

Chinese and North Vietnamese air defense facilities continuously tracked the mission vehicle over North Vietnam and the Gulf of Tonkin.

DOD strike/jamming activity was light during the first pass. In contrast, moderately heavy strike/jamming operations (62 aircraft) were conducted during the second pass. These operations were being conducted in the Haiphong area, however, while the SAM launches occurred near Hanoi.

# TABLE 1

## Chronology of Events Associated with Mission BX6734

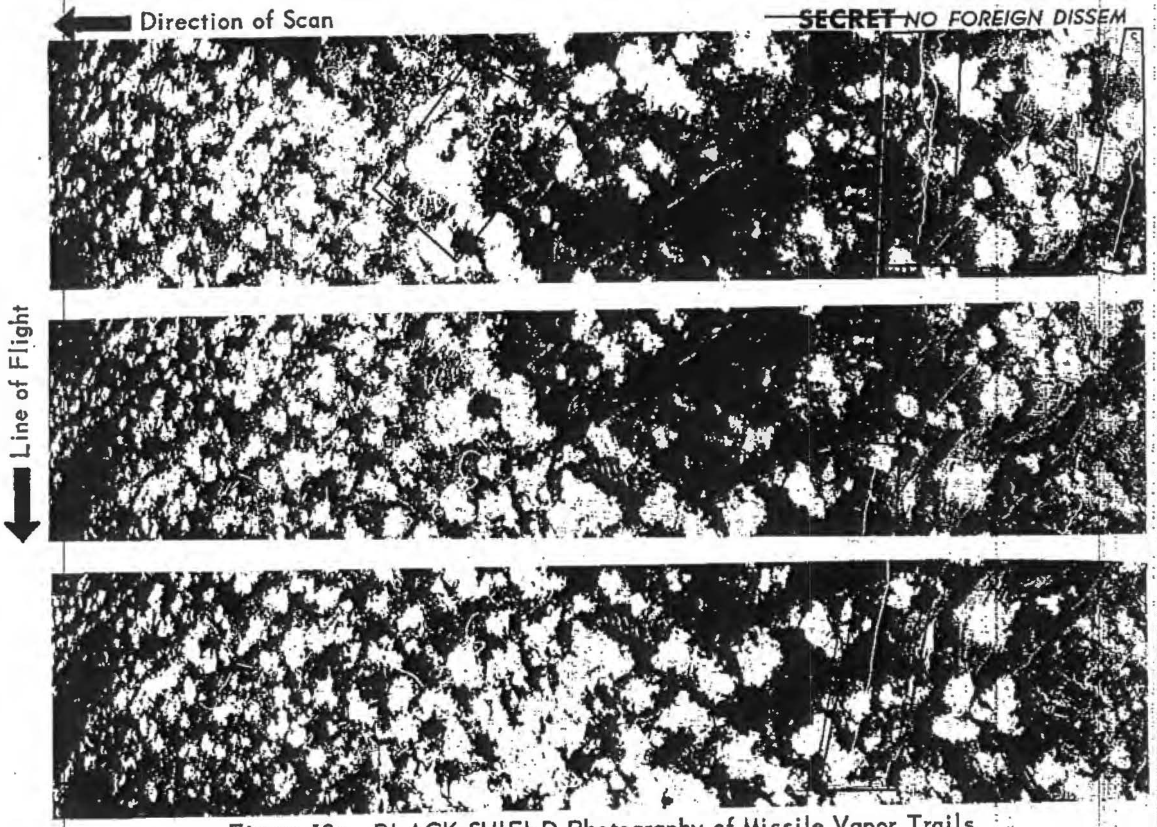
| Site No. | Vapor Trail* | SEARCH PARAMETERS |  |  |  | DETECTION PARAMETERS |  |  |  | LAUNCH PARAMETERS |  |  |  | DETONATION PARAMETERS |  |  | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  | Time** | Range (nm) | Azimuth (deg) | Altitude (ft) | Time | Range (nm) | Azimuth (deg) | Altitude (ft) | Time | Range (nm) | Azimuth (deg) | Altitude (ft) | Range (nm) | Azimuth (deg) | Altitude (ft) |  |
|  |  |  |  |  |  |  |  |  |  | *FIRST PASS* |  |  |  |  |  |  |  |
| 234 | ... | 0341Z | 161 | 90-180 | 82,020 | 0344Z | 81 | ... | .... | ... | .. | ... | .... | .. | ... | .... | Aircraft to radar minimum range: 32 nm; no launch. |
| 142 | ... | 0345Z | 81 | 100-140 | above 65,000 | 0346Z | 32.5 | 120 | .... | ... | .. | ... | .... | .. | ... | .... | Aircraft to radar minimum range: 32.5 nm; no launch. |
| 167 | ... | .... | .. | ... | .... | ... | .. | ... | .... | 0346Z | 36 | 110 | 83,000 | .. | ... | .... | Only possible launch parameters: no indication of launch other than Elint. |
|  |  |  |  |  |  |  |  |  |  | *SECOND PASS* |  |  |  |  |  |  |  |
| 234 | D | 0429Z | 167 | 270 | 82,025 | ... | .. | 273 | 83,000 | 0455Z | 38 | 268 | 82,000 | 22.5 | 180 | .... | 1 missile, lead angle, jamming on S-band. |
| 244/ 159 | AB,BC, EA | .... | .. | ... | .... | ... | .. | ... | .... | 0455Z | .. | ... | .... | 18.9 | 180 | .... | 2 missiles fired (error great) |
| 159/ 244 | A, B, E | 0426Z | .. | 270 | 78,740 | ... | .. | 280 | 78,700 | 0457Z | 40.5 | 275 | 78,700 | 19.0 | 265 | 78,000 | 1 missile, lead angle, jamming on S-band. |
| 133 | C | 0426Z | .. | ... | .... | 0457Z | .. | 270 | 75,700 | 0459Z | 35.2 | 270 | 75,700 | 20.5 | 240 | 82,020 | 1 missile, lead angle, jamming on S-band. |
| 142 | ... | .... | .. | ... | .... | ... | .. | ... | .... | ... | .. | ... | .... | 10.8 | 60 | .... | 2 missiles fired late. |
| 19 | F | .... | .. | ... | .... | ... | .. | ... | .... | ... | .. | ... | .... | .. | ... | .... | Photography indicated F vapor trail may have been fired from site 19. |

---

*Refer to Figure 18.

**All times are Greenwich Meridian times.

NOTE - Data in table derived from Comint, Elint, and photography.



~~SECRET~~ NO FOREIGN DISSEM

Figure 18a. BLACK SHIELD Photography of Missile Vapor Trails

~~SECRET~~ *NO FOREIGN DISSEM*

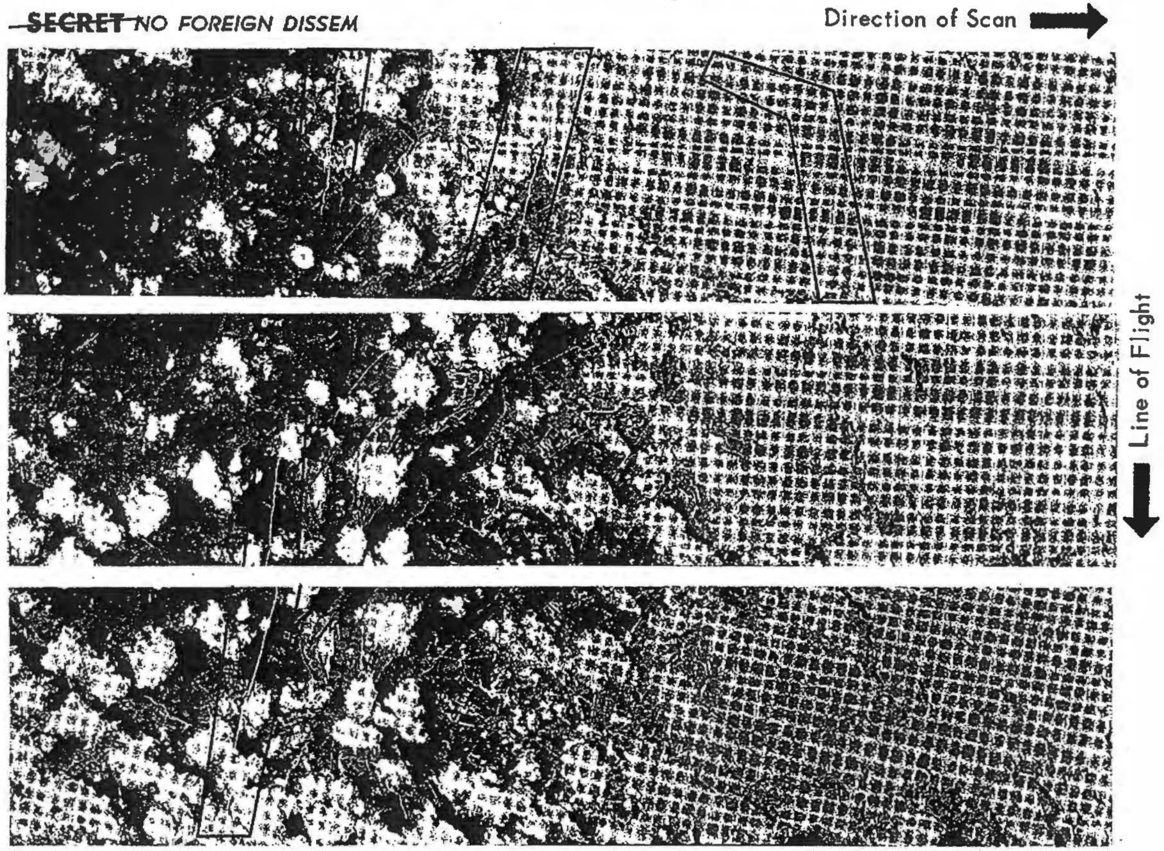
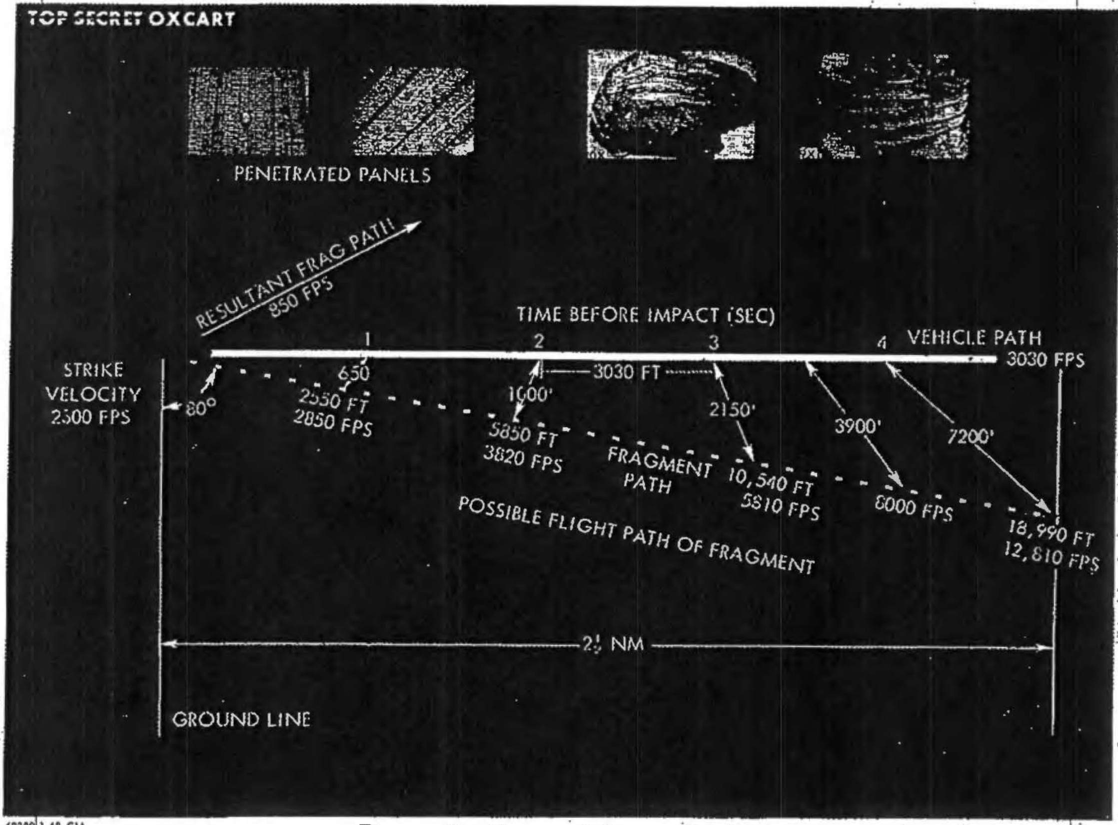


Figure 18b. BLACK SHIELD Photography of Missile Vapor Trails



69300 1-68 CIA

Figure 19. Fragment Impact Analysis

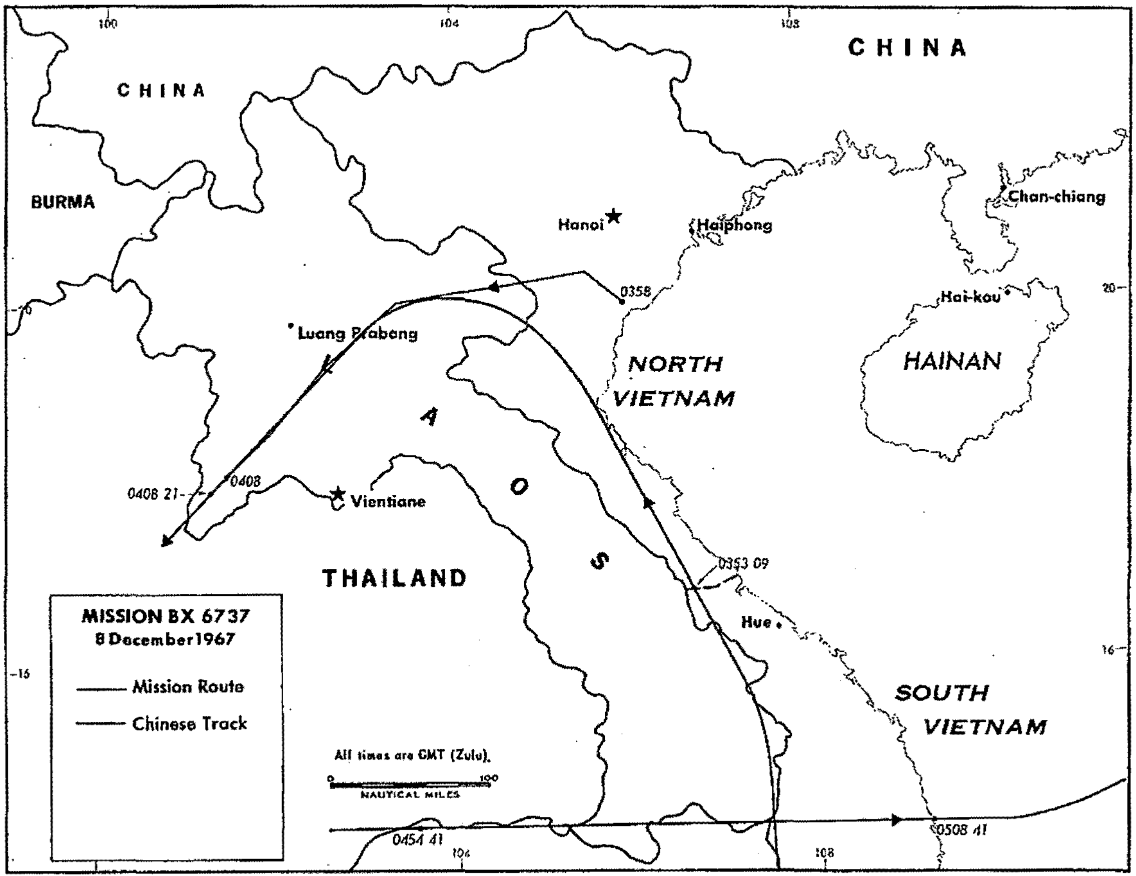
## BX6737

BLACK SHIELD mission BX6737 was a high-altitude, single-pass reconnaissance mission flown over the Cambodian/South Vietnamese and Laotian/North Vietnamese border areas on 8 December 1967. The mission entered Southeast Asia at 0340:15Z and exited same at 0505:41Z. Figure 20 shows the flight route and associated air surveillance tracking.

Seven specified priority search areas in northeastern Cambodia, southeastern Laos, and adjacent South Vietnam were covered for evidence of Viet Cong or North Vietnamese activity. BLACK SHIELD photography provided evidence of expanded supply transshipment facilities along the Tonle Kong River in Cambodia near the Laotian border. Several troop encampments served by numerous trails extending north to Cambodian Route 97 were detected. A probable new storage area and water-to-road transshipment point were also identified.

No threat signals were recorded on System 6. No defensive system was active during the overflight.

Air surveillance tracking lasting approximately 10 minutes was carried out by Chinese radar facilities. There was no indication of North Vietnamese awareness of the mission.



69301 1-68 CIA

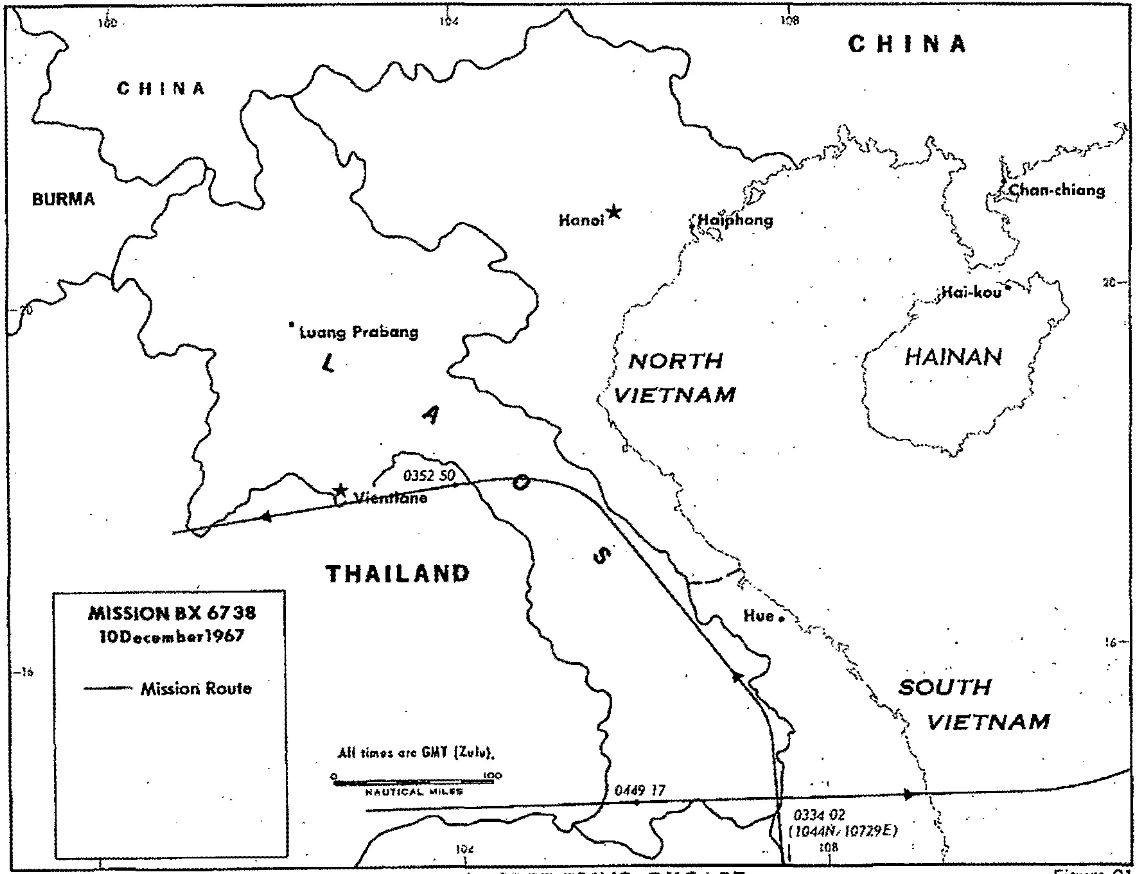
~~TOP SECRET~~ TRINE OXCART
Handle via BYEMAN Control System Only

Figure 20

## BX6738

BLACK SHIELD mission BX6738 was a single-pass reconnaissance mission flown over the Cambodian, Laotian, and South Vietnamese tri-border area on 10 December 1967. The mission entered and exited over South Vietnam at 0334:02Z and 0455:37Z. Figure 21 is a plot of the mission route.

Mission photography detected a new probable transshipment-storage facility on the Tonle Son River in Cambodia near the South Vietnamese border. Photography also showed a heavily used trail extending from Cambodia into the northwestern corner of Darlac Province in South Vietnam. Two automatic weapons positions were observed near the trail just inside the Cambodian border.



69302 1-68 CIA

~~TOP SECRET~~ TRINE OXCART
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Figure 21

There were no threat signals recorded nor defensive system activated during the overflight. There was no evidence of air surveillance tracking by either the Chinese or North Vietnamese.

## BX6739

BX6739 was a double-pass, high-altitude mission flown over North Vietnam on 15 December 1967. The vehicle entered and exited North Vietnam on its first pass at 0421:42Z and 0430:23Z and on its second pass at 0529:49Z and 0540:47Z. Figure 22 is a plot of the mission route and associated air surveillance tracking.

Mission photography obtained from this two-pass mission was clear, interpretable, and generally cloud free. No evidence of surface-to-surface missile deployment was noted. All of North Vietnam's major airfields, except Haiphong/Cat Bi, appeared to be serviceable. The mission aircraft photographed 195 COMIREX targets, 142 of which were North Vietnamese SA-2 sites. Eighteen of these sites were occupied.

System 6 recorded three Fan Song signals during the overflight. None of these signals appeared to be tracking the vehicle, and no defensive mechanism was activated by these signals.

The BLACK SHIELD vehicle was tracked by Chinese and North Vietnamese air defense facilities from 0416Z to 0437Z and from 0525Z to 0557Z. Bai Thuong, a North Vietnamese radar station at 19°56'N, 105°28'E, reported two position plots of the vehicle at 0530Z and 0531Z. The radar-to-aircraft ground ranges for these times were 180 and 148 nautical miles, respectively.

DOD strike/jamming operations were conducted during the overflight period.

## BX6740

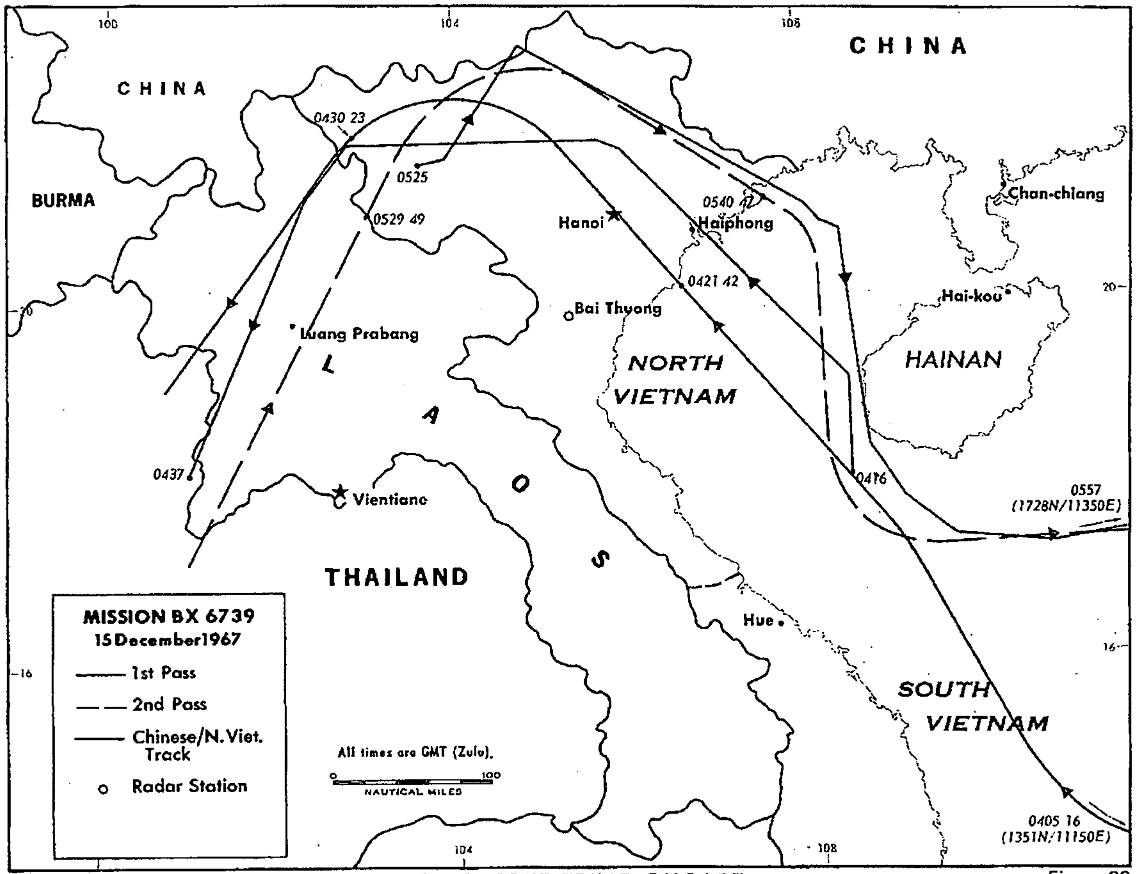
BX6740 was a double-pass reconnaissance mission flown over North Vietnam on 16 December 1967. The mission vehicle entered and exited North Vietnam on its first pass at 0257:51Z and 0309:21Z and on its second pass at 0405:00Z and 0418:03Z. Figure 23 presents the flight route and air surveillance tracking.

Mission photographs obtained about 60-percent cloud-free coverage of the target area. No evidence of SSM deployment was noted. The mission aircraft photographed 86 COMIREX targets, 74 of which were SA-2 sites. Two of these sites were occupied. Missions BX6739 and BX6740, flown on consecutive days, photographed 221 of North Vietnam's 226 useable SA-2 sites, including six new sites. Twenty were occupied, including five of the six new sites.

System 6 recorded six Fan Song signals, none of which appeared to be tracking the vehicle. No on-board defensive system was activated.

Chinese air surveillance facilities tracked the mission vehicle from 0251Z to 0258Z and from 0403Z to 0430Z. A Chinese radar station at Pa-ka (22°25'N, 101°00'E) was reflected tracking the aircraft from 0403Z to 0411Z at radar-to-aircraft ground ranges of 134 and 234 nautical miles, respectively. There was no indication of North Vietnamese awareness of the mission vehicle.

Moderate DOD strike/jamming operations were being conducted during the overflight.



69303 1-68 CIA

~~TOP SECRET~~ TRINE OXCART
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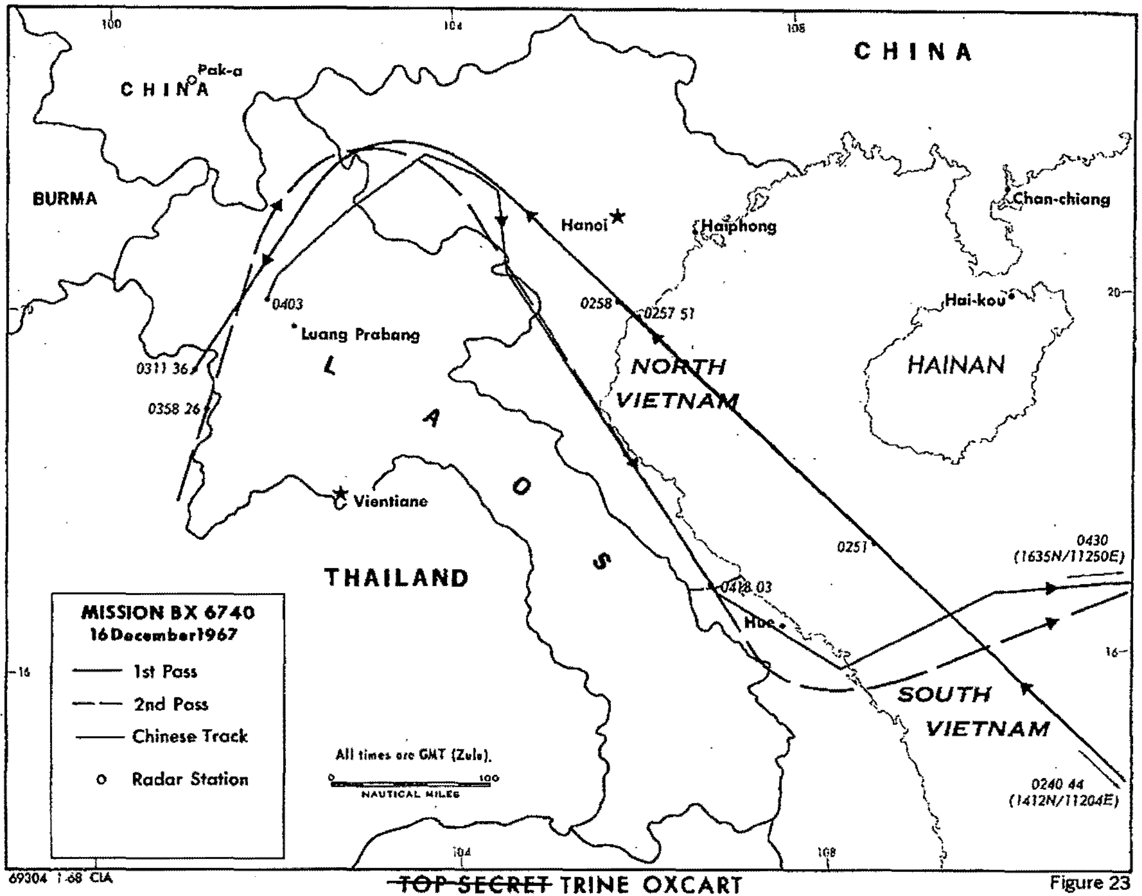
Figure 22



69304 1-68 CIA

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Figure 23

[redacted]

50X1, E.O.13526

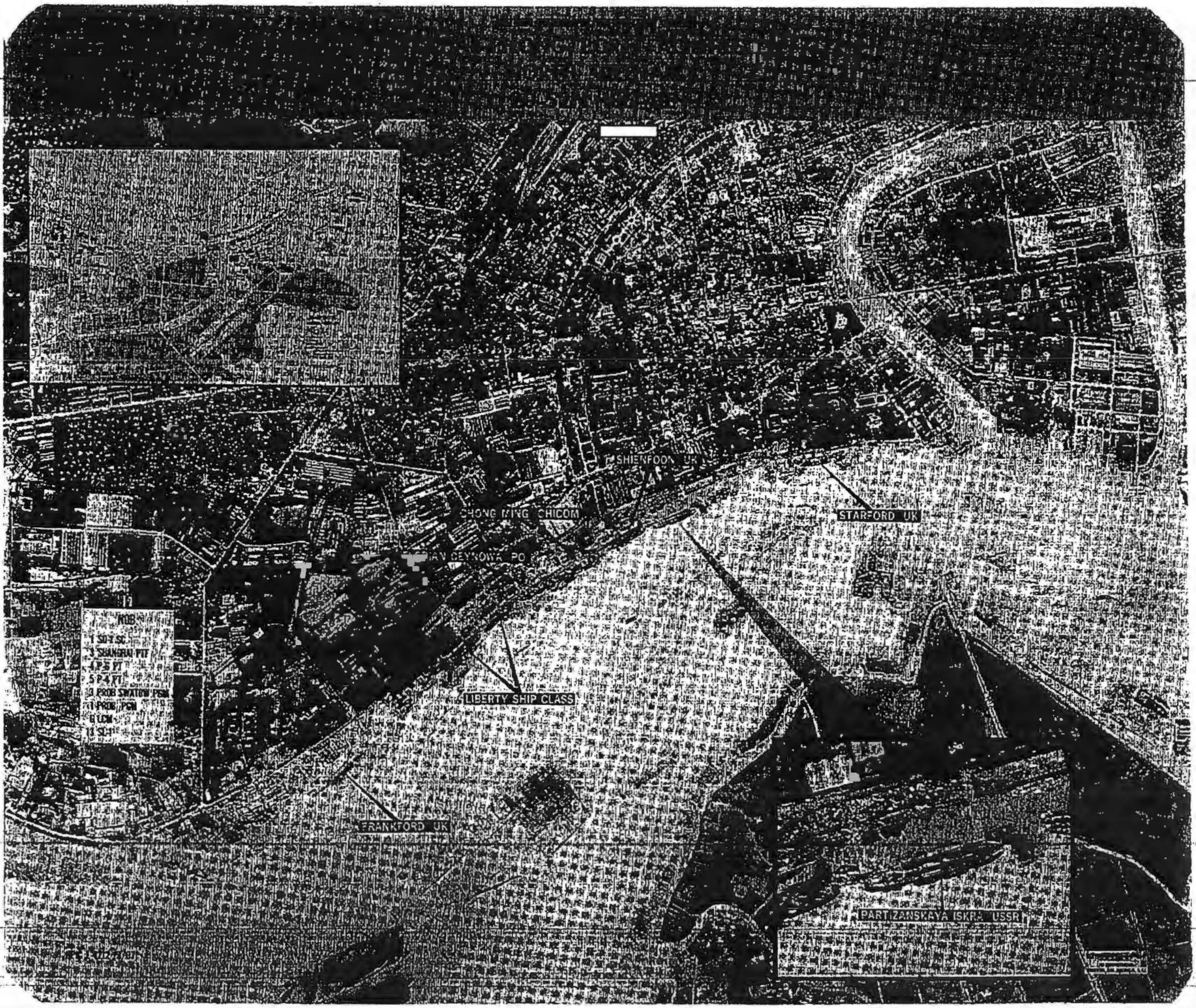

Figure 24

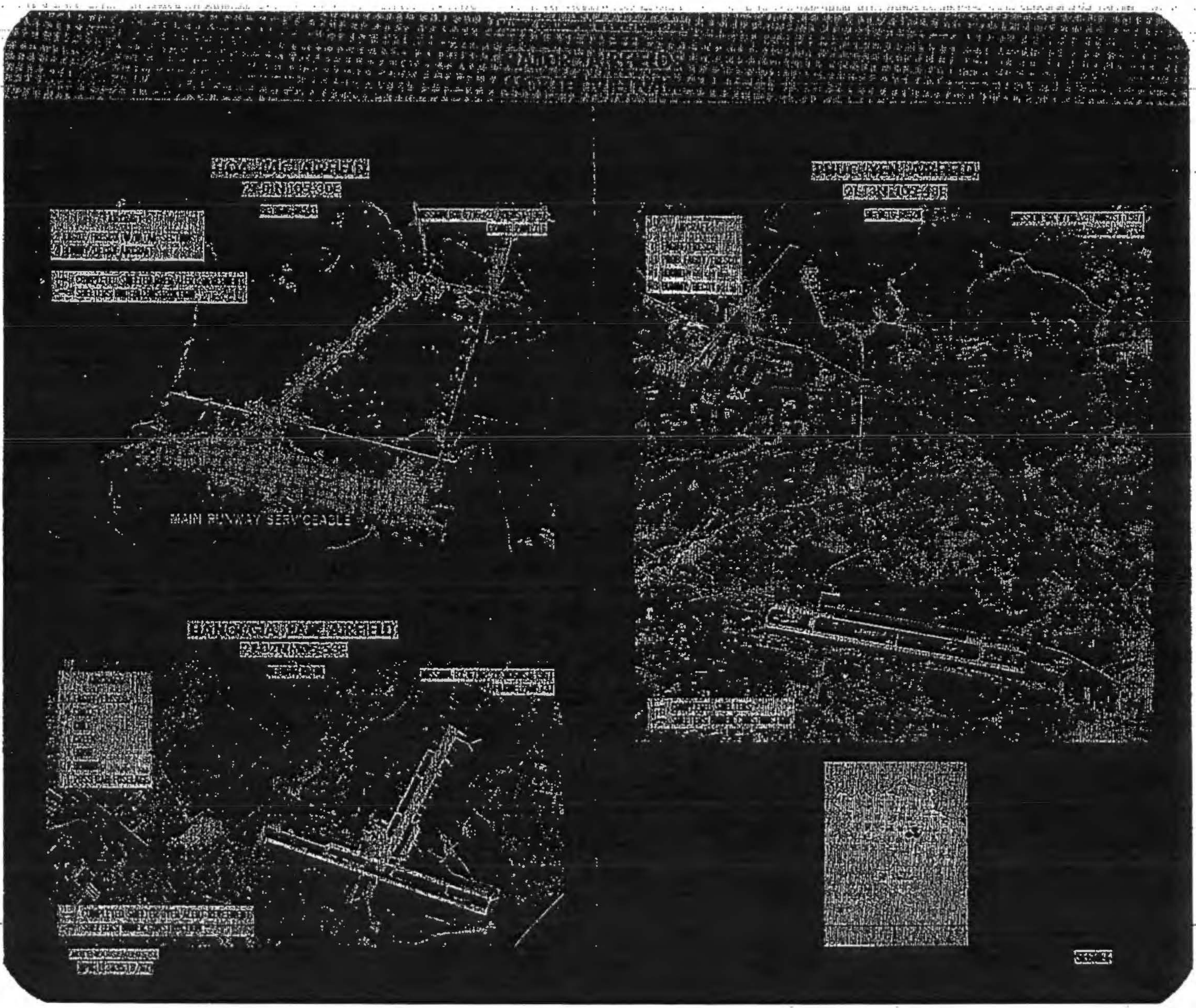

Figure 25

[redacted]

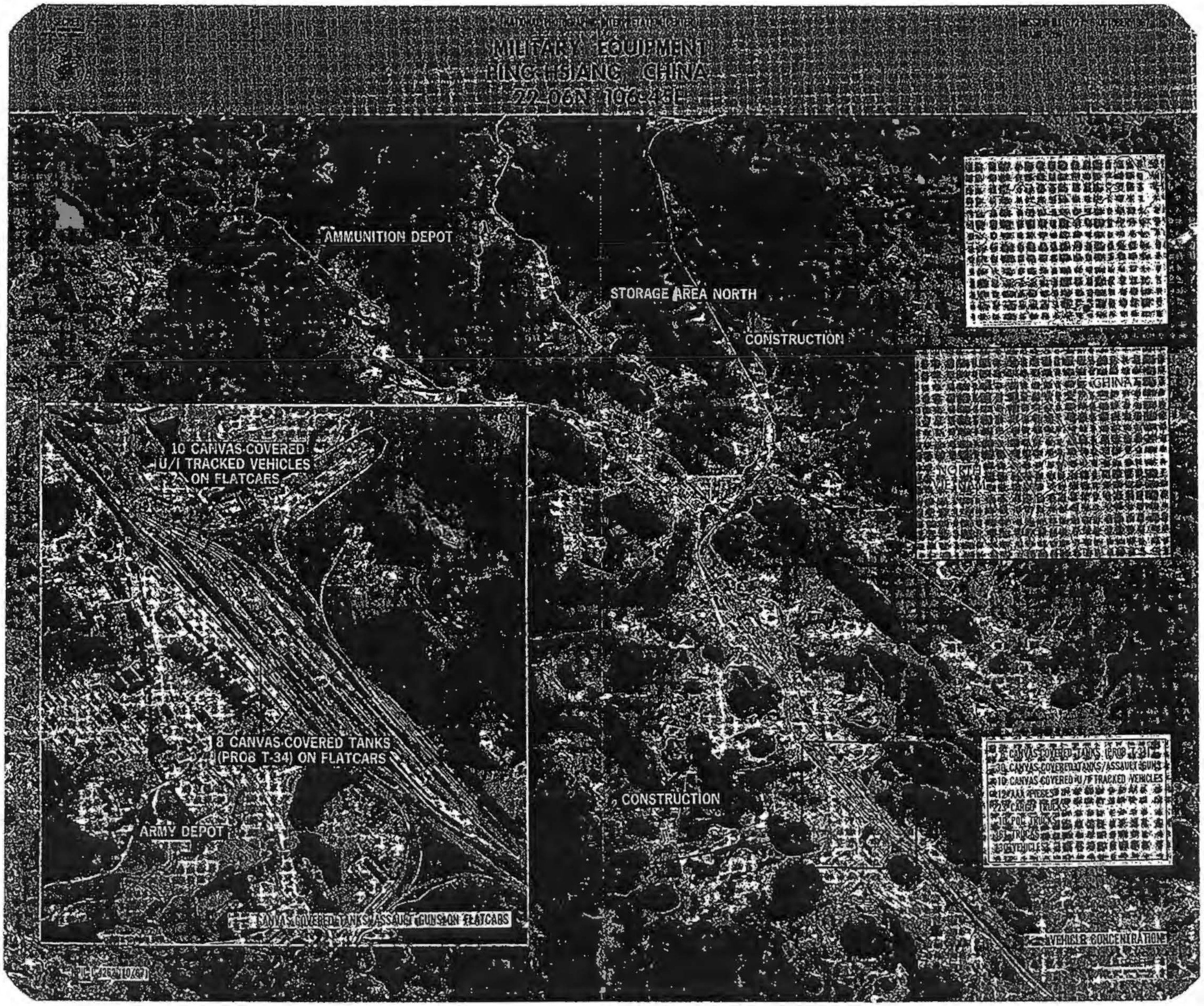

Figure 26


SECRET
NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER
NEW SAM SITES
NORTH VIETNAM
SAM SITE A02A-2 (253)
HAI PHONG, NORTH VIETNAM
20-55-40N 106-42-28E
UNREVETTED
GUIDANCE AREA
HAI PHONG 4.4 NM
FRAME 215
MISSION BX 6729, 18 OCTOBER 1967
SAM SITE B36-2 (255)
HA NOI, NORTH VIETNAM
21-13-17N 105-50-13E
BE 0616-03996
UNREVETTED
GUIDANCE AREA
HA NOI 11.6 NM
FRAME L2 189
MISSION BU 0597 25 OCTOBER 1967
PROBABLE SAM SITE 256
THANH HOA, NORTH VIETNAM
19-14-46N 105-33-13E
UNREVETTED
GUIDANCE AREA
THANH HOA 36.3 NM
FRAME 212
MISSION BX 6733, 29 OCTOBER 1967
SAM SITE B30B-2 (257)
HA NOI, NORTH VIETNAM
21-07-15N 105-39-04E
BE 8616-04005
UNREVETTED
GUIDANCE AREA
VANS
HA NOI 12.8 NM
FRAME 752
MISSION BX 6734, 30 OCTOBER 1967
OCCUPIED UNREVETTED LAUNCH POSITION
UNOCCUPIED UNREVETTED LAUNCH POSITION
NPIC L-4407 (11/67)
SECRET

Figure 27

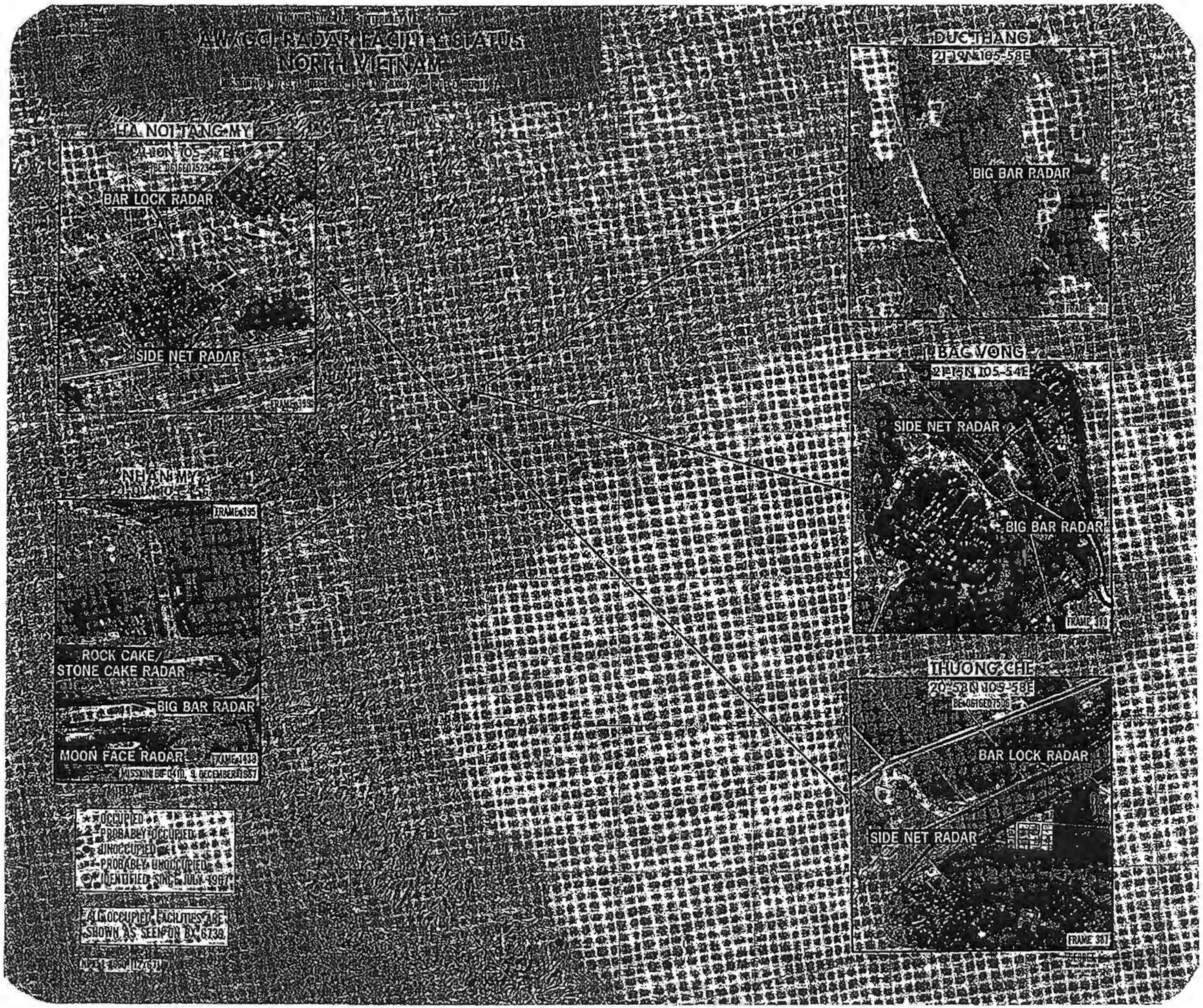
AW/GCI RADAR FACILITY STATUS
NORTH VIETNAM
HA NOI TANG MY
21-10N 105-47E
BAR LOCK RADAR
SIDE NET RADAR
NHAN MY
FRAME 395
ROCK CAKE/
STONE CAKE RADAR
BIG BAR RADAR
MOON FACE RADAR
FRAME 1438
MISSION BF 0410, 9 DECEMBER 1967
OCCUPIED
PROBABLY OCCUPIED
UNOCCUPIED
PROBABLY UNOCCUPIED
IDENTIFIED SINCE JULY 1967
ALL OCCUPIED FACILITIES ARE
SHOWN AS SEEN ON BX 6739
DUC THANG
21-19N 105-58E
BIG BAR RADAR
BAC VONG
21-14N 105-54E
SIDE NET RADAR
BIG BAR RADAR
THUONG CHE
20-58N 105-58E
BE 0616E07506
BAR LOCK RADAR
SIDE NET RADAR
FRAME 397

Figure 28

## APPENDIX I

### BLACK SHIELD Operational Missions Alerted Between 16 August and 31 December 1967

| Mission No. | Date | Remarks |
|---|---|---|
| BX6716 | 20 Aug. 1967 | Flown |
| BX6717 | 25 Aug. 1967 | Cancelled due to weather |
| BX6718 | 30 Aug. 1967 | Flown |
| BX6719 | 31 Aug. 1967 | Cancelled due to weather |
| BX6720 | 5 Sept. 1967 | Cancelled due to weather |
| BX6721 | 10 Sept. 1967 | Cancelled due to weather |
| BX6722 | 15 Sept. 1967 | Flown |
| BX6723 | 16 Sept. 1967 | Flown |
| BX6724 | 1 Oct. 1967 | Cancelled due to weather |
| BX6725 | 3 Oct. 1967 | Flown |
| BX6726 | 4 Oct. 1967 | Cancelled (Ops decision) |
| BX6727 | 5 Oct. 1967 | Flown (1 pass flown) |
| BX6728 | 14 Oct. 1967 | Flown |
| BX6729 | 17 Oct. 1967 | Flown |
| BX6730 | 19 Oct. 1967 | Cancelled due to weather |
| BX6731 | 25 Oct. 1967 | Cancelled due to weather |

## APPENDIX I (continued)

| Mission No. | Date | Remarks |
|---|---|---|
| BX6732 | 27 Oct. 1967 | Flown |
| BX6733 | 28 Oct. 1967 | Flown |
| BX6734 | 29 Oct. 1967 | Flown |
| BX6735 | 1 Nov. 1967 | Cancelled due to weather |
| BX6736 | | Cancelled due to weather |
| BX6737<br>(Cambodia) | 6 Dec. 1967 | Flown |
| BX6738<br>(Cambodia) | 8 Dec. 1967 | Flown |
| BX6739 | 14 Dec. 1967 | Flown |
| BX6740 | 15 Dec. 1967 | Flown |
| BX6741 | 22 Dec. 1967 | Cancelled due to weather |

## APPENDIX II

### COMIREX Targets Covered by BLACK SHIELD Missions
16 August - 31 December 1967

| COMIREX Number | Target | Mission Numbers* | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
| [redacted] 50X1, E.O.13526 | Hai Kou Airfield | | | | | x | | | | | | | | | | |
| [redacted] | Ling Shui Airfield | | | | | x | | | | | | | | | | |
| [redacted] | Meng Tzu Airfield West | x | x | | | | | | | | | | | | | |
| [redacted] | Haiphong/Cat Bi Airfield | x | | | | x | | | x | x | | x | | | x | |
| [redacted] | Haiphong/Kien An Airfield | x | | | | x | | | x | x | | x | | | x | |
| [redacted] | Hanoi/Bac Mai Airfield | x | | x | x | x | | | x | x | | x | | | x | x |
| [redacted] | Hanoi/Gia Lam Airfield | x | | | x | x | | | x | x | | | | | x | |
| [redacted] | Phuc Yen Airfield | x | | x | x | x | | | x | x | | x | | | x | |
| [redacted] | Lang Son Airfield | | | | | | x | | x | x | x | | | | x | |
| [redacted] | Kep Airfield | x | | | | x | | | x | x | x | x | | | x | |

*In this appendix, mission numbers are shortened to the last two digits.

## APPENDIX II (continued)

50X1, E.O.13526

| COMIREX Number | Target | Mission Numbers 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] | Ning Ming Airfield | | | | | | x | | | x | | | | | x | |
| [redacted] | Chia Lai Shih Airfield | | x | | | x | | | | | | | | | | |
| [redacted] | Ping Yuan Chieh Airfield | | x | | x | | | | | | | | | | | |
| [redacted] | Tien Yang Airfield | | x | | x | | x | | | | | | | | | x |
| [redacted] | Yen Bai Airfield | x | | x | | | | | | | x | | | | | |
| [redacted] | Hoa Lac Airfield | x | | x | | x | | | x | x | | x | | | x | x |
| [redacted] | Bai Thuong Airfield ([redacted]) | | | | | | | x | | | x | | | | | x |
| * | Tho Khoi Helicopter Dispersal Area | x | | | | x | | | | | | | | | | |
| * | Kep Ha Airfield | x | | | | | | | | | | | | | | |
| * | Hanoi Helicopter Dispersal Area | x | | | | | | | | | | | | | | |
| * | Hoa Lac Helicopter Dispersal Area | | | | | x | | | | | | | | | | |

50X1, E.O.13526

*Unnumbered.

## APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50X1, E.O.13526 | Pei Hai Naval Facility | | | | | x | | | | | x | | | | x | |
| | Hsin Hsing Naval Facility | | | | | x | | | | | | | | | | |
| | Port Wallut Naval Base | x | | | x | x | x | | x | | | x | | | x | |
| | Haiphong Naval Base and Port Facilities | x | | | x | x | | | x | x | | x | | | x | |
| | Cam Qha Port Facilities | | | | | | | | x | | | | | | | |
| | Pai Lung Port Facilities | | | | | x | | | | | x | | | | | |
| | Cam Pha Port Facilities | | | | | x | x | | x | x | | x | | | x | |
| | Hon Gai Port Facilities | x | | | x | x | x | | x | x | | x | | | x | |
| | Ha Tou Shipyard | x | | | x | x | x | | x | | | x | | | x | |
| | Ben Thuy Coastal Transport Point | | | | | | | | | | x | | | | | x |
| | Pei Li Port Facilities | | | | | x | x | | | | | | | | x | |

## APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| * | Lam Dong Naval Dispersal Facility | | | | x | | | | | | | | | | | |
| * | Swatow PGM-Hanoi Area | | | | x | | | | | | | | | | | |
| [redacted] 50X1, E.O.13526 | Thanh Hoa BW/CW Research Facility | | | | | | | x | | | | | | | | |
| [redacted] | Lai Chau Complex | | | | | | | | x | | | | | | | |
| [redacted] | Ma Li Po Supply Depot | x | | x | | | | | | | | | | | | |
| [redacted] | Mengtzu Military Complex | | | x | | | | | | | | | | | | |
| [redacted] | Ping Hsing Ammunition Depot | x | | | | | x | | | x | | | | | x | |
| [redacted] | Ping Hsing Army Depot | x | | x | x | | x | | | x | x | | | | x | |
| [redacted] | Ping Hsing Military Storage East | | | | | | | | | x | | | | | x | |
| [redacted] | Ping Hsiang Storage Area North | x | | | | | | | | x | | | | | x | |

*Unnumbered.

## APPENDIX II (continued)

| COMIREX Number | Target | 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Mission Numbers | | | | | | | | | | | | | | |
| [redacted]<br>50X1, E.O.13526 | Chin Ping Infantry Division Headquarters A Barracks | | | | | | | | | | x | | | | | |
| | Ban Lot A Barracks | | | x | | | | | x | | | | | | | |
| | Ha Giang Military Area | x | | x | | | | | x | | | | | | x | |
| | Van Hoi Military Areas | x | | | x | x | | | | | x | | | | | x |
| | Wen Shan Army Barracks West | | | | x | | | | | | | | | | | |
| | Ho Kou Army Barracks North | x | x | x | x | x | | | x | x | | | | | | |
| | Yen Shan Military Barracks and Storage Area | | | | x | | | | | | | | | | | |
| | Lang Son Army Barracks | | | x | x | | x | | | x | | | | | x | |
| | Y Son Ammunition Depot | | | x | | | | | x | | | x | | | | |
| | Xom Hau A Army Supply Depot | | | | | x | | | x | | | | | | | |
| | Ngoc Thi Barracks Supply Depot | | | | | | | | | | x | | | | | |

[redacted]

APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] | Tai Xouan Army Barracks, Nam Vu | | | | | | | | | | x | | | | | |
| [redacted] | Loc Binh Army Supply Depot | x | | | | | | | | x | x | | | | x | |
| [redacted] | Yen Bai Ordnance Depot | | | x | | | | | | | x | | | | | |
| [redacted] | Thai Nguyen Army Supply Depot North | | | | | x | | | | | x | | | | x | |
| [redacted] | Bac Can Barracks A Supply Depot | | | | | x | | | | | x | | | | | |
| [redacted] | Bac Giang Military Areas | x | | | | x | | | x | | x | x | | | x | |
| [redacted] | Tung Chia Army Barracks | | | | | x | | | | | | | | | | |
| [redacted] | Ba Binh Special Area 2009 | | | | | | | x | | | x | | | | | x |
| [redacted] | Ben Than Special Area 2013 | | | | | | | x | | | | | | | | |
| [redacted] | Vinh An Special Area 2014 | | | | | | | x | | | x | | | | | |
| [redacted] | Vit Thu Lu/NVN Special Area | | | | | | | | | | x | | | | | |

50X1, E.O.13526

[redacted]

## APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [redacted]<br>50X1, E.O.13526 | Tsi Ti Pao Road | x | x | x | x | x | | | | | | | | | | |
| | Wu Pu Chieh Road Construction | x | | x | x | | | | | | | | | | | |
| | Hanoi/Lao Cai Railroad Segment 2 | x | | | | x | | | x | | | | | | | |
| | Hanoi/Lao Cai Railroad Segment 1 | x | x | x | x | x | | | x | x | | | | | x | |
| | Hanoi/Lao Cai Railroad Segment 3 | x | | | x | | | | | | | | | | x | |
| | Hanoi/Ping Hsiang Railroad Segment 2 | x | | | x | x | | | x | x | x | x | | | x | |
| | Hanoi/Ping Hsiang Railroad Segment 1 | x | | x | x | | x | | x | x | x | x | | | x | |
| | Hanoi/Ping Hsiang Railroad Segment 3 | x | | | x | x | | | x | x | x | x | | | x | |
| | Hanoi/Lao Cai Railroad Segment 4 | x | | | x | x | | | x | x | x | | | | x | x |
| | Hanoi/Lao Cai Railroad Segment 5 | x | | x | x | x | | | x | x | x | x | | | x | x |

[redacted]

[redacted]

## APPENDIX II (continued)

50X1, E.O.13526

| COMIREX Number | Target | Mission Numbers 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] | An Cap Railroad Hanoi Thai Nguyen | | | | | x | | | x | x | x | | | | | |
| [redacted] | Ping Hsiang/Hanoi Railroad Segment 4 | x | | x | x | | x | | | x | x | | | | x | |
| [redacted] | Ho Kou Highway Segment, Route 24A | | | | | | | | x | | | | | | x | |
| [redacted] | Uong Bi Transformer Power Plant | | | | | | | | | x | | | | | | |
| [redacted] | Tien Pao Hwy. Sec. Route 25A | | | | | | | | | | | | | | x | |
| [redacted] | Chin Nan Kuan Hwy. Sec. | | | | | | | | | | | | | | x | |
| [redacted] | Ping Hsiang Complex | x | | x | x | | x | | | x | | | | | x | |
| [redacted] | Wen Shan Complex | | | x | x | | | | | | | | | | | |
| [redacted] | Dong Dang Railroad Yard | x | | | x | | x | | | x | x | | | | | |
| [redacted] | Bac Giang Complex | x | | | | x | | | | x | x | x | | | x | |

[redacted]

[redacted]

## APPENDIX II (continued)

| COMIREX Number | Target | 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50X1, E.O.13526 | Cao Bang Military Complex | x | | x | | | x | | | x | | | | | x | |
| | Lai Chau Complex | x | x | x | | | | | x | | x | x | | | x | x |
| | Lang Son Complex | x | | x | | | | | | x | x | | | | | |
| | Mon Cai Complex | | | | | x | | | | | x | x | | | x | x |
| | Tien Yen Complex | | | | | x | x | | x | x | x | x | | | x | |
| | Binh Lu Area | | | | | | x | | | | x | x | | | | |
| | Tuyen Quang Complex | | | x | | | | | | | x | | | | | |
| | Yen Bai Complex | x | | | | | | | | | | | | | x | x |
| | Dien Bien Phu Complex | x | x | x | | | | x | | x | | | | | x | |
| | Kep Complex | x | | | | x | | x | x | x | x | x | | | x | |
| | Lao Cai Complex | x | x | x | | x | | x | | x | | | | | | |
| | Haiphong Railroad Station Classification Yard | | | | | | | | | | | x | | | | |

Mission Numbers: 16–40 (column headings above)

[redacted]

[redacted]

50X1, E.O.13526

## APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] | Haiphong Railroad Station Classification Yard and Shops | x | | | | x | | x | | x | | x | | | x | |
| | Viet Tri Railroad Yard | x | | x | | x | | x | x | x | x | | | | x | |
| | Yen Vien Railroad Classification Yard | x | | | | x | | | x | x | | x | | | x | |
| * | Thai Nguyen Rail Activity | | | | | | | | | x | | | | | | |
| [redacted] | Kep Railroad Yard | | | | | | | | | | | | | | x | |
| | Highway Segment 10E | | | | | | | | x | | | | | | | |
| | Haiphong Highway Bridge | | | | | x | | | | | | | | | | |
| | Van Diem Battery Plant | | | | | | | | x | | | | | | | |
| | Hanoi Railroad - A Highway Bridge | | | | x | x | | | | | | | | | | |
| | Haiphong Warehouse Area Port | | | | | | | | x | | | | | | | |
| | Van Diem Vehicle Depot | | | | | | | | x | | | | | | | |

*Unnumbered.

50X1, E.O.13526

[redacted]

[redacted]

## APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  | 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
| [redacted] 50X1, E.O.13526 | Hai Duong Railroad Siding West |  |  |  |  |  |  |  | x |  |  |  |  |  |  |  |
|  | Hai Duong Railroad Station |  |  |  |  |  |  |  | x |  |  |  |  |  |  |  |
|  | Hgoc Kuyet Railroad Station |  |  |  |  |  |  |  | x |  |  |  |  |  |  |  |
|  | Ta Xa PPS North |  |  |  |  |  |  |  | x |  |  |  |  |  |  |  |
|  | Loi Dong Warehouse Area |  |  |  |  |  |  |  | x |  |  |  |  |  |  |  |
|  | Railroad Segment R-3-A |  |  |  |  |  |  |  | x |  |  |  |  |  |  |  |
| * | Ping Hsiang Railroad Transporting Yard Station and Shops | x |  |  | x |  |  |  |  |  |  |  |  |  |  |  |
| * | Ho Kou Vehicle Park |  |  |  | x |  |  |  |  |  |  |  |  |  |  |  |
| * | Hsia Shih Storage Areas |  |  |  | x |  | x |  |  |  |  |  |  |  |  |  |
| * | Ping Hsiang Storage Area |  |  |  | x |  | x |  |  |  |  |  |  |  |  |  |

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*Unnumbered.

[redacted]

[redacted]

## APPENDIX II (continued)

| | | Mission Numbers | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COMIREX Number | Target | 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
| * | Thai Nguyen Unidentified Construction Activity | | | | | x | | | | | | | | | | |
| * | Hanoi/Haiphong Railroad | | | | | x | | | | | | | | | | |
| * | Hanoi/Haiphong Railroad | | | | | x | | | x | | | | | | | |
| * | Hanoi Transformer Power Plant | | | | | | | | | x | | | | | | |
| * | Haiphong Transformer Power Plant East | | | | | | | | | x | | | | | | |
| * | Haiphong Transformer Power Plant West | | | | | | | | | x | | | | | | |
| * | Viet Tri Transformer Power Plant | | | | | | | | | x | | | | | | |
| * | Hon Gai Transformer Power Plant | | | | | | | | | x | | | | | | |
| * | Bac Giang Transformer Power Plant | | | | | | | | | x | | | | | | |

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*Unnumbered.

## APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] 50X1, E.O.13526 | Hanoi SAM Search | x |  | x | x | x |  |  | x |  |  | x |  |  |  |  |
|  | Lao Cai SAM Search | x | x | x |  | x |  |  | x |  | x |  |  |  |  |  |
|  | Dien Bien Phu SAM Search | x | x | x | x | x |  | x | x |  |  |  |  |  | x |  |
|  | Vinh SAM Search |  |  |  |  |  |  | x |  |  |  |  |  |  |  |  |
|  | Cao Bang SAM Search | x |  | x |  |  | x |  |  | x |  |  |  |  |  |  |
|  | Dong Hoi SAM Search |  |  |  |  |  |  | x |  |  | x |  |  |  |  |  |
|  | Fo Lo Probable CD Site |  |  |  |  | x | x |  | x |  |  |  |  |  | x |  |
|  | Cat Ba Coastal Defense Sites 1 and 2 |  |  |  |  | x | x |  | x | x |  | x |  |  | x |  |
|  | Dung Fang Suspect Coastal Defense Site |  |  |  |  | x | x |  |  |  |  |  |  |  |  |  |
|  | Chang Chiang Coastal Defense Site (Suspect) |  |  |  |  | x | x |  |  |  |  |  |  |  |  |  |
|  | Yai Cheng Probable Radar Site |  |  |  |  | x | x |  |  |  |  |  |  |  | x |  |

[redacted]

[redacted]

## APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] 50X1, E.O.13526 | Hanoi SAM Site A-10-2 | x | | | | x | | | x | | | | | | x | |
| | Hanoi SAM Site A-19-2 | x | | | | x | | | | x | | x | | | x | x |
| | Hanoi SAM Site A-29-2 | x | | x | | x | | | | | | | | | x | x |
| | Hanoi SAM Site B-04-2 | x | | | | x | | | x | | | x | | | x | |
| | Hanoi SAM Site B-12-2 | x | | | | x | | | x | | | x | | | x | |
| | Hanoi SAM Site B-25-2 | x | | | | x | | | | x | | | | | x | x |
| | Hanoi SAM Site B-29-2 | x | | x | | x | | | | x | | | | | | x |
| | Hanoi SAM Site B-30-2 | x | | x | | x | | | | x | | x | | | x | x |
| | Hanoi SAM Site C-29-2 | x | | x | x | x | | | x | x | | | | | x | x |
| | Hanoi SAM Site C-30-2 | x | | x | x | x | | | x | x | | | | | x | x |
| | Hanoi SAM Site D-19-2 | | | | | | | | | | | | | | | x |

## APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] 50X1, E.O.13526 | Yen Bai SAM Site B-12-2 | x | | x | | | | | | | | | | | x | x |
| | Yen Bai SAM Site C-10-2 | | | | | | | | | | | | | | x | |
| | Yen Bai SAM Site B-11-2 | | | | | | | | | | | | | | x | |
| | Yen Bai SAM Site C-03-2 | | | | | | | | | | | | | | x | |
| | Yen Bai SAM Site C-07-2 | | | | | | | | | | | | | | x | |
| | Yen Bai SAM Site C-09-2 | | | | | | | | | | | | | | x | |
| | Yen Bai SAM Site C-09A-2 | | | | | | | | | | | | | | x | |
| | Yen Bai SAM Site C-17-2 | x | | | | x | | | | x | | | | | x | x |
| | Yen Bai SAM Site B-06-2 | | | | | | | | | | | | | | x | |
| | Yen Bai SAM Site C-04-2 | | | | | | | | | | | | | | x | |
| | Yen Bai SAM Site B-05-2 | | | | | | | | | | | | | | x | |

[redacted]

APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
| 50X1, E.O.13526 | Yen Bai SAM Site B-10-2 | x | | | | | | | | | | | | | x | x |
| | Yen Bai SAM Site B-11A-2 | | | | | | | | | | | | | | | x |
| | Hanoi SAM Site B-17-2 | | | | | x | | | | x | | | | | x | x |

[redacted]

## APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [redacted]<br>50X1, E.O.13526 | Hanoi SAM Site B-21-2 | x | | | | x | | | | x | | x | | | x | x |
| | Hanoi SAM Site C-28-2 | x | | | | x | | | | x | | | | | x | x |
| | Hanoi SAM Site D-31-2 | x | | | | x | | | x | x | x | | | | x | x |
| | Hanoi SAM Site A-11-2 | x | | | | x | | | | | | | | | x | |
| | Hanoi SAM Site A-24-2 | x | | | | x | | | | | | x | | | x | x |
| | Hanoi SAM Site D-31A-2 | x | | | | x | | | | | x | | | | x | x |
| | Hanoi SAM Site D-16-2 | x | | | | x | | | | | | | | | x | x |
| | Hanoi SAM Site D-36-2 | x | | | x | x | | | | | | x | | | x | |
| | Hanoi SAM Site C-06-2 | x | | | | x | | | x | x | x | x | | | x | |
| | Hanoi SAM Site C-07-2 | | | | | x | | | | | | | | | x | |
| | Hanoi SAM Site D-31B-2 | x | | x | | x | | | x | | x | | | | x | x |
| | Hanoi SAM Site E07-2 | x | | | | x | x | | x | | | | | | x | |

APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] 50X1, E.O.13526 | Haiphong SAM Site A-29-2 | x |  |  |  | x |  |  | x | x |  | x |  |  | x |  |
|  | Haiphong SAM Site A-20-2 | x |  |  | x | x |  |  | x | x |  | x |  |  | x |  |
|  | Haiphong SAM Site A-17-2 | x |  |  |  | x |  |  | x | x |  | x |  |  | x |  |
|  | Haiphong SAM Site B-01-2 |  |  |  |  | x | x |  |  |  |  | x |  |  | x |  |
|  | Haiphong SAM Site A-29A-2 | x |  |  |  | x | x |  | x | x |  | x |  |  | x |  |
|  | Haiphong SAM Site B-33-2 | x |  |  |  | x |  |  |  |  |  |  |  |  | x |  |
|  | Haiphong SAM Site B-06-2 |  |  |  |  | x | x |  |  |  |  |  |  |  | x |  |
|  | Haiphong SAM Site C-32-2 | x |  |  |  | x |  |  |  |  |  |  |  |  | x |  |
|  | Haiphong SAM Site C-32A-2 | x |  |  |  | x |  |  | x |  |  | x |  |  | x |  |
|  | Haiphong SAM Site B-28-2 | x |  |  |  | x |  |  |  | x |  |  |  |  | x |  |
|  | Haiphong SAM Site B-30-2 | x |  |  |  | x |  |  |  |  |  |  |  |  | x |  |
|  | Haiphong SAM Site A-07-2 |  |  |  |  | x | x |  |  |  |  |  |  |  | x |  |

## APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
| [redacted] 50X1, E.O.13526 | Haiphong SAM Site A-23-2 | x | | | | x | | | | x | | | | | x | |
| | Haiphong SAM Site A-31-2 | x | | | | x | | | x | x | | | | | x | |
| | Haiphong SAM Site A-33-2 | x | | | | x | | | x | x | | x | | | x | |
| | Haiphong SAM Site C-30-2 | x | | | | x | | | | | | x | | | x | |
| | Haiphong SAM Site C-28-2 | x | | | | x | | | x | x | | | | | x | |
| | Haiphong SAM Site A-02-2 | x | | | | x | | | x | x | | | | | x | |
| | Haiphong SAM Site A-17A-2 | x | | | | x | | | x | x | | x | | | x | |
| | Haiphong SAM Site D-35-2 | x | | | | x | x | | x | | | | | | x | |
| | Haiphong SAM Site A-33A-2 | x | | | | x | | | x | x | | x | | | x | |
| | Thanh Hoa SAM Site B-28-2 | | | | | | | | | | x | | | | | |
| | Thanh Hoa SAM Site C-02-2 | | | | | | | | | | | | | | | x |
| | Thanh Hoa SAM Site B-01-2 | | | | | | | | | | | | | | | x |

## APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] | Thanh Hoa SAM Site B-02-2 | | | | | | | | | | | | | | | x |
| [redacted] | Thanh Hoa SAM Site | | | | | | | | | | | | | | | |
| [redacted] | Thanh Hoa SAM Site D-04-2 | | | | | | | | | | | | | | | x |
| [redacted] | Thanh Hoa SAM Site C-03-2 | | | | | | | | | | | | | | | x |
| [redacted] 50X1, E.O.13526 | Thanh Hoa SAM Site C-02A-2 | | | | | | | | | | | | | | | x |
| [redacted] | Thanh Hoa SAM Site A-17-2 | | | | | | | x | | | x | | | | | x |
| [redacted] | Thanh Hoa SAM Site C-04-2 | | | | | | | | | | | | | | | x |
| [redacted] | Thanh Hoa SAM Site D-02-2 | | | | | x | | | | | | | | | | x |
| [redacted] | Thanh Hoa SAM Site C-01-2 | | | | | | | | | | | | | | | x |
| [redacted] | Thanh Hoa SAM Site D-03-2 | | | | | | | | | | | | | | x | x |
| [redacted] | Thanh Hoa SAM Site D-03A-2 | | | | | | | | | | | | | | | x |

## APPENDIX II (continued)

| COMIREX Number | Target | 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] 50X1, E.O.13526 | Thanh Hoa SAM Site A-19-2 | | | | | | | | | | x | | | | | x |
| | Thanh Hoa SAM Site B-28A-2 | | | | | | | | | | x | | | | | x |
| | Thanh Hoa SAM Site B-27-2 | | | | | | | | | | x | | | | | x |
| | Thanh Hoa SAM Site A-14-2 | | | | | | | | | | | | | | | x |
| | Thanh Hoa SAM Site D-20-2 | | | | | | | x | | | x | | | | | x |
| | Thanh Hoa SAM Site D-20A-2 | | | | | | | x | | | x | | | | | |
| | Thanh Hoa SAM Site A-17A-2 | | | | | | | x | | | x | | | | | x |
| | Thanh Hoa SAM Site A-13-2 | | | | | | | | | | x | | | | | x |
| | Hanoi SAM Site D-04-2 | | | | | | | | x | | | | | | | |
| | Hanoi SAM Site C-30E-2 | | | | | | | | x | | | | | | | |

[redacted]

## APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] 50X1, E.O.13526 | Hanoi SAM Site B-30A-2 | x | | | | x | | | | | | | | | | x |
| | Hanoi SAM Site C-30A-2 | x | | x | | x | | | x | x | | | | | x | x |
| | Hanoi SAM Site D-03-2 | | | | | x | | | | | | | | | x | |
| | Hanoi SAM Site D-04-2 | x | | | | x | | | | | x | | | | x | |
| | Hanoi SAM Site A-17A-2 | x | | | | x | | | x | x | | | | | x | x |
| | Hanoi SAM Site C-30C-2 | x | | x | | x | | | x | x | | | | | x | x |
| | Hanoi SAM Site C-01-2 | x | | | | x | | | | | x | | | | x | |
| | Hanoi SAM Site C-05-2 | x | | | | x | | | x | x | x | | | | x | |
| | Hanoi SAM Site C-04-2 | x | | | | x | | | | | | x | | | x | |
| | Hanoi SAM Site C-02-2 | x | | | | x | | | | | x | | | | x | |
| | Hanoi SAM Site C-04A-2 | x | | | | x | | | x | | | x | | | x | |
| | Hanoi SAM Site C-01A-2 | x | | | | x | | | | | x | x | | | x | |

APPENDIX II (continued)

| COMIREX Number | Target | 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Mission Numbers | | | | | | | | | | | | | | |
| [redacted] 50X1, E.O.13526 | Hanoi SAM Site B-33-2 | x | | | | x | | | | x | | x | | | x | |
| | Hanoi SAM Site D-35-2 | | | | x | | | | | | | | | | x | |
| | Hanoi SAM Site C-06A-2 | x | | | | x | | | | | | x | | | x | |
| | Hanoi SAM Site C-13-2 | x | | | | x | | | x | x | | | | | x | |
| | Hanoi SAM Site C-11-2 | x | | | | x | | | x | x | | | | | x | |
| | Hanoi SAM Site C-12-2 | x | | | | x | | | x | | | x | | | x | |
| | Hanoi SAM Site C-30D-2 | x | | x | | x | | | | x | | | | | x | x |
| | Hanoi SAM Site B-07-2 | x | | | | x | | | | x | | x | | | x | |
| | Hanoi SAM Site D-06-2 | | | | | x | | | | | | | | | x | |
| | Hanoi SAM Site C-30E-2 | x | | | | x | | | | x | | | | | x | x |
| | Hanoi SAM Site B-34-2 | | | | | x | | | x | x | | x | | | | |
| | Bac Can SAM Site C-22-2 | | | | | x | | | x | | | | | | x | |

## APPENDIX II (continued)

50X1, E.O.13526

| COMIREX Number | Target | Mission Numbers 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] | Bac Can SAM Site B-20-2 | | | | | x | | | | | | | | | x | |
| [redacted] | Bac Can SAM Site C-20-2 | | | | | x | | | x | | x | | | | x | |
| [redacted] | Bac Can SAM Site C-19-2 | | | | | x | | | x | | | | | | x | |
| [redacted] | Hoa Binh SAM Site A-19-2 | | | | | x | | | | | | | | | | x |
| [redacted] | Hoa Binh SAM Site B-20-2 | | | | | x | | | | | | | | | | x |
| [redacted] | Hoa Binh SAM Site B-22-2 | | | | | x | | | | | x | | | | | x |
| [redacted] | Hoa Binh SAM Site B-17-2 | | | | | | | | | | | | | | | x |
| [redacted] | Hoa Binh SAM Site C-17-2 | | | | | | | | | | | | | | | x |
| [redacted] | Hoa Binh SAM Site B-19-2 | | | | | | | | | | | | | | | x |
| [redacted] | Hoa Binh SAM Site D-27-2 | | | | | | | | | | | | | | | x |
| [redacted] | Hoa Binh SAM Site D-28-2 | | | | | x | | | | | | | | | | x |
| [redacted] | Hoa Binh SAM Site A-04-2 | x | | | | x | | | x | x | | | | | | x |

APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
| [redacted] | Hoa Binh SAM Site B-08-2 | x | | | x | x | | | | x | | | | | | x |
| | Hoa Binh SAM Site C-27-2 | | | | | x | | | | | | | | | | x |
| | Hoa Binh SAM Site B-02-2 | | | | | x | | | | | | | | | x | |
| | Hanoi B-08-2 | | | | x | | | | | x | | | | | x | x |
| | Hoa Binh SAM Site B-04-2 | | | | x | x | | | x | x | | | | | x | x |
| | Hoa Binh SAM Site B-03-2 | | | | | x | | | | | | | | | | x |
| | Hoa Binh SAM Site B-08B-2 | | | | | | | | | | | | | | | x |
| | Hoa Binh SAM Site B-10-2 | | | | | | | | | | | | | | | x |
| | Haiphong SAM Site D-35A-2 | x | | | | x | x | | | | x | | | | x | |
| | Haiphong SAM Site B-07-2 | | | | | x | x | | | | | | | | x | |

[redacted]

APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
| [redacted] 50X1, E.O.13526 | Haiphong SAM Site A-27-2 | x | | | | x | | | x | | | | | | x | |
| | Haiphong SAM Site B-34-2 | x | | | | x | | | x | x | | | | | x | |
| | Haiphong SAM Site B-01A-2 | | | | | x | | | | | | | | | x | |
| | Haiphong SAM Site A-06-2 | | | | | x | x | | | | | | | | x | |
| | Haiphong SAM Site A-14-2 | x | | | x | x | | | x | x | | x | | | x | |
| | Haiphong SAM Site B-06B-2 | | | | | x | x | | | | | x | | | x | |
| | Haiphong SAM Site D-22-2 | | | | | x | | | | | | | | | x | x |
| | Haiphong SAM Site C-21-2 | | | | | x | | | | | | | | | x | |
| | Haiphong SAM Site D-23-2 | x | | | | x | | | x | | | | | | x | x |
| | Haiphong SAM Site B-27-2 | x | | | | x | | | x | x | | x | | | x | |
| | Haiphong SAM Site A-31A-2 | x | | | | x | | | x | x | | | | | x | |
| | Haiphong SAM Site A-14A-2 | x | | | | x | | | x | x | | | | | x | |

## APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] 50X1, E.O.13526 | Haiphong SAM Site C-29-2 | x | | | | x | | | x | | | | | | x | |
| | Haiphong SAM Site C-27-2 | x | | | | x | | | | | | | | | | |
| | Haiphong SAM Site C-26-2 | x | | | | x | | | | x | | | | | x | |
| | Haiphong SAM Site B-25-2 | x | | | | x | | | | x | | | | | x | |
| | Haiphong SAM Site A-29B-2 | x | | | | x | | | | | | | | | x | |
| | Haiphong SAM Site A-26-2 | | | | x | | | | | x | | | | | x | |
| | Haiphong SAM Site A-22-2 | | | | | x | | | x | x | | | | | x | |
| | Hanoi SAM Site B-01-2 | x | | | | x | | | | | | x | | | x | |
| | Hanoi SAM Site C-33-2 | x | | | | x | | | | x | | | | | x | |
| | Hanoi SAM Site B-01A-2 | x | | | | x | | | | | | | | | x | |
| | Hanoi SAM Site A-33-2 | x | | x | | x | | | | x | | | | | x | |
| | Hanoi SAM Site D-36A-2 | | | | | x | | | x | | | | | | x | |

APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] 50X1, E.O.13526 | Hanoi SAM Site C-01B-2 | x | | | | x | | | x | | x | | | | x | |
| [redacted] | Hanoi SAM Site A-01-2 | x | | x | | x | | | x | | | | | | x | |
| [redacted] | Hanoi SAM Site C-03-2 | x | | | | x | | | x | | | x | | | x | |
| [redacted] | Hanoi SAM Site C-03A-2 | x | | | | x | | | | | x | | | | x | |
| [redacted] | Hanoi SAM Site A-14-2 | x | | | | x | | | x | | | | | | x | |
| [redacted] | Hanoi SAM Site C-32-2 | x | | x | | x | | | | x | | | | | x | |
| [redacted] | Hanoi SAM Site B-32-2 | x | | | | x | | | | x | | | | | x | |
| [redacted] | Hanoi SAM Site B-07A-2 | x | | | | x | | | | x | | x | | | x | |
| [redacted] | Hanoi SAM Site C-17-2 | x | | | | x | | | x | | | | | | x | x |
| [redacted] | Hanoi SAM Site A-31-2 | x | | | | x | | | | | | | | | x | |
| [redacted] | Hanoi SAM Site C-17A-2 | | | | | x | | | x | | | x | | | | x |
| [redacted] | Hanoi SAM Site B-16-2 | x | | | | x | | | x | | | | | | x | x |

## APPENDIX II (continued)

| COMIREX Number | Target | 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Mission Numbers | | | | | | | | | | | | | | |
| 50X1, E.O.13526 | Hanoi SAM Site E-22-2 | | | | | | | | | | | | | | | x |
| | Hanoi SAM Site C-17B-2 | x | | | | x | | | x | x | | | | | x | x |
| | Vinh C-19-2 | | | | | | | | | | | | | | | x |
| | Vinh C-32-2 | | | | | | | | | | | | | | | x |
| | Vinh B-16-2 | | | | | | | | | | | | | | | x |
| | Vinh | | | | | | | | | | | | | | | |
| | Vinh | | | | | | | | | | | | | | | |
| | Vinh | | | | | | | | | | | | | | | |
| | Vinh C-32-2 | | | | | | | | | | | | | | | x |
| | Vinh | | | | | | | | | | | | | | | |
| | Vinh D-32-2 | | | | | | | | | | | | | | | x |
| | Vinh A-07-2 | | | | | | | | | | | | | | | x |

APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
| [redacted] 50X1, E.O.13526 | Vinh | | | | | | | | | | | | | | | |
| | Vinh C-32A-2 | | | | | | | | | | | | | | | x |
| | Vinh C-30-2 | | | | | | | | | | | | | | | x |
| | Vinh C-32B-2 | | | | | | | | | | | | | | | x |
| | Vinh B-21-2 | | | | | | | | | | | | | | | x |
| | Vinh B-29-2 | | | | | | | | | | | | | | | x |
| | Vinh B-32-2 | | | | | | | | | | | | | | | x |
| | Vinh A-01-2 | | | | | | | | | | | | | | | x |
| | Vinh A-36-2 | | | | | | | | | | | | | | | x |
| | Vinh A-11-2 | | | | | | | | | | | | | | | x |
| | Vinh C-31-2 | | | | | | | | | | | | | | | x |
| | Vinh A-01A-2 | | | | | | | | | | | | | | | x |

## APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] 50X1, E.O.13526 | Vinh D-35-2 | | | | | | | | | | | | | | | x |
| [redacted] | Vinh C-31A-2 | | | | | | | | | | x | | | | | x |
| [redacted] | Vinh | | | | | | | | | | | | | | | |
| [redacted] | Thanh Hoa SAM Site C-03A-2 | | | | | | | | | | | | | | | x |
| [redacted] | Thanh Hoa SAM Site B-01A-2 | | | | | | | | | | | | | | | x |
| [redacted] | Thanh Hoa SAM Site C-01A-2 | | | | | | | | | | | | | | | x |
| [redacted] | Thanh Hoa SAM Site C-04A-2 | | | | | | | | | | | | | | | x |
| [redacted] | Thanh Hoa SAM Site D-21A-2 | | | | | | | x | | | | | | | | x |
| [redacted] | Thanh Hoa SAM Site B-01B-2 | | | | | | | x | | | | | | | | x |
| [redacted] | Thanh Hoa SAM Site D-21B-2 | | | | | | | | | | | | | | | x |
| [redacted] | Thanh Hoa SAM Site A-17B-2 | | | | | | | | | | | | | | | x |

[redacted]

APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] 50X1, E.O.13526 | Hanoi SAM Site C-16-2 | x | | | | x | | | | x | | | | | x | x |
| | Hanoi SAM Site A-05-2 | x | | | | x | | | x | | | x | | | x | |
| | Hanoi SAM Site B-36B-2 | | | | | x | | | x | | | | | | x | |
| | Hanoi SAM Site C-03B-2 | x | | | | x | | | x | | x | | | | x | |
| | Hanoi SAM Site D-31C-2 | x | | x | | x | | | | | x | x | | | x | |
| | Hanoi SAM Site C-05B-2 | | | | | x | | | x | x | x | | | | x | |
| | Hanoi SAM Site B-27-2 | x | | | | | | | | | | | | | x | x |
| | Hanoi SAM Site B-13-2 | x | | | | x | | | | x | | | | | x | |
| | Hanoi SAM Site B-28-2 | x | | | x | x | | | x | x | | | | | x | x |
| | Hanoi SAM Site B-04A-2 | x | | | | x | | | | | | | | | x | |
| | Hanoi Prob. Site A | | | | | x | | | | | | | | | x | |
| | Hanoi Prob. Site B | | | | | x | | | | | | | | | x | |

## APPENDIX II (continued)

| COMIREX Number | Target | 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  | Mission Numbers |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| [redacted] 50X1, E.O.13526 | Hanoi SAM Site C-01D-2 | x |  |  |  | x |  |  |  |  |  |  |  |  | x |  |
|  | Hanoi SAM Site C-01E-2 | x |  |  | x | x |  |  |  |  |  |  |  |  | x |  |
|  | Hanoi SAM Site C-29A-2 | x |  | x |  | x |  |  |  | x |  |  |  |  | x | x |
|  | Hanoi SAM Site B-34A-2 | x |  | x |  | x |  |  |  |  |  |  |  |  | x |  |
|  | Hanoi SAM Site A-15-2 |  |  |  | x | x |  |  | x |  |  |  |  |  | x |  |
|  | Hanoi SAM Site A-34-2 |  |  |  | x |  |  |  | x |  |  | x |  |  | x |  |
|  | Hanoi SAM (A-29A) |  |  |  |  |  |  |  |  |  |  |  |  |  | x |  |
|  | Hanoi SAM (A-34-A) |  |  |  |  |  |  |  |  |  |  |  |  |  | x |  |
|  | Hanoi SAM Site D-35-2 |  |  |  |  | x |  |  | x |  |  |  |  |  |  |  |
|  | Vinh SAM Site A-01A-2 |  |  |  |  |  |  |  |  | x |  |  |  |  |  |  |
|  | Vinh SAM Site A-25-2 |  |  |  |  |  |  | x |  |  |  |  |  |  |  |  |
|  | Hanoi Probable SAM Equipment Training Area | x |  |  |  | x |  |  | x |  |  |  |  |  |  |  |

## APPENDIX II (continued)

50X1, E.O.13526

| COMIREX Number | Target | Mission Numbers | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
| [redacted] | Nan San SAM Site A-12-2 | x | | x | | | | | | | | x | | | | |
| [redacted] | Nan San SAM Site C-13-2 | | | | | | | | | | | | | | | x |
| [redacted] | Nan San SAM Site D-13-2 | | | | | | | | | | | | | | | x |
| * | Hanoi SAM Site | x | | | | | | | | | | | | | | |
| * | Hanoi SAM Site A-01A-2 | | | | x | x | | | x | | | x | | | | |
| * | Hanoi SAM Site A-35-2 | | | | | x | | | | | | | | | | |
| * | Hanoi SAM Site B-23-2 | | | | | x | | | | | | | | | | |
| * | Hoa Binh SAM Site D-27-2 | | | | | x | | | | | | | | | | |
| * | Haiphong SAM Site A-25-2 | | | | | x | | | x | | | | | | | |
| * | Haiphong SAM Site B-36-2 | | | | | x | | | | | | x | | | x | |
| * | Haiphong SAM Site A-16-2 | | | | | x | | | x | | | | | | | |
| * | Haiphong SAM Site A-02A-2 | | | | | | | | x | x | | x | | | | |

---

*Unnumbered.

## APPENDIX II (continued)

| COMIREX Number | Target | Mission Numbers | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
| * | Haiphong SAM Site | | | | | | | | x | x | | x | | | | |
| * | Thanh Hoa SAM Site D-31B-2 | | | | | | | | | | x | | | | | |
| * | Ban Xom Lom SAM Site | | | | | x | | | | | | | | | | |
| * | Chin Chou SAM Site (China) | | | | | | | | | | x | x | | | | |

---

*Unnumbered.

## APPENDIX III

### Number of Radar Signals Received by BLACK SHIELD Missions
### 16 August - 31 December 1967

| | Mission Numbers | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Radar | 16 | 18 | 22 | 23 | 25 | 27 | 28 | 29 | 32 | 33 | 34 | 37 | 38 | 39 | 40 |
| Fan Song | 17 | 8 | 2 | 5 | 4 | 7 | 1 | 1 | 7 | 8 | 12 | | | 3 | 6 |
| Big Mesh | 1 | 2 | 3 | 1 | 1 | 1 | | | | 3 | | | 1 | 1 | |
| Side Net | | 1 | | 1 | | | | | 1 | | | | | 1 | |
| Rock Cake | 6 | 6 | 10 | 15 | 6 | 8 | 7 | 15 | 14 | 11 | 16 | 4 | 4 | 8 | 10 |
| Cross Legs | | | | | | | | | | 2 | | | | | |
| Token | 6 | | 5 | 2 | 1 | 1 | | 1 | 4 | 2 | 1 | | 1 | 1 | 1 |
| Cross Slot | 1 | | 14 | 2 | 1 | | 1 | 2 | 2 | | 3 | | 3 | 7 | |
| Bar Lock | | | | 1 | 2 | | 6 | 1 | 4 | 3 | 5 | 3 | | 5 | 10 |
| Fire Can | 4 | 5 | 3 | 3 | | | | | 1 | 6 | 2 | | | 3 | 5 |
| Whiff | 6 | | | 1 | | 1 | | | | 2 | | | | | 3 |
| Spoon Rest | | | | 1 | 1 | 2 | | 5 | 1 | | 2 | | 1 | 4 | 1 |
| Flat Face | 5 | 5 | 1 | | | | | | 3 | 2 | 3 | 2 | | 5 | 1 |
| Moon Face | 11 | | 5 | 16 | 2 | 4 | | | 10 | 9 | 4 | 2 | 7 | | 4 |
| Moon Mat-2 | | | | 1 | 1 | | | | | | | | 1 | | 3 |
| Moon Cone | 1 | | 2 | | | | 1 | | 6 | 1 | 1 | | 4 | | |

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~~Top Secret~~

[redacted]

ANNEX 155

OSA

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EO/SA________

DD/SA________

D/SA________

CENTRAL INTELLIGENCE AGENCY
UNITED STATES OF AMERICA

DIRECTORATE OF
SCIENCE & TECHNOLOGY

# *BLACK SHIELD*
## *Reconnaissance Missions*
## *1 January - 31 March 1968*

*Handle via*
*Byeman Comint*
*Channels Jointly*

~~Top Secret~~

OXCART

BYE No. 1330/68
DST-BS/BYE/68-2
30 April 1968

Copy No. 10

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~~DECLASSIFICATION~~

C05492938

~~TOP SECRET~~ TRINE OXCART BYE-1330/68

# BLACK SHIELD Reconnaissance Missions
## 1 January - 31 March 1968

DST-BS/BYE/68-2
30 April 1968

*CENTRAL INTELLIGENCE AGENCY*
*Directorate of Science and Technology*

~~TOP SECRET~~ TRINE OXCART

## PREFACE

This report is the third in a series of resumes of the BLACK SHIELD reconnaissance program. This third resume spans the period from 1 January to 31 March 1968 and includes missions flown over North Vietnam and North Korea.

## CONTENTS

## APPENDICES

## FIGURES

# BLACK SHIELD Reconnaissance Missions
## 1 January - 31 March 1968

## SUMMARY

Fifteen BLACK SHIELD high-altitude reconnaissance missions were alerted during the period from 1 January to 31 March 1968. Six of the 15 missions were flown, four over North Vietnam and two over North Korea. Eight missions were cancelled due to weather conditions, and approval for one Korean mission was not obtained. (Appendix I lists these missions and related events.)

BLACK SHIELD photography of North Vietnam through 31 March 1968 revealed no evidence of surface-to-surface ballistic missiles, equipment, or facilities. Mission BX6843 photographed two suspect surface-to-surface (cruise) missile sites near Thanh Hoa. One site was unoccupied, and the second contained a few small unidentified objects.

The BLACK SHIELD program provided initial baseline coverage of North Korea on missions BX6847 and BX6853, with readable coverage of 70 percent of the country. These two missions supplied current photography of North Korean industrial and transportation systems and updated the existing order of battle. The ability of the BLACK SHIELD program to react rapidly is demonstrated by photographs of the USS Pueblo at anchor in Wonsan Bay obtained on mission BX6847. This mission was flown on 26 January, three days after the USS Pueblo was seized and one day after approval was granted. (Appendix II is a listing of the COMIREX targets photographed over North Korea.)

The BLACK SHIELD program has continued to supply good coverage of North Vietnam, particularly order of battle information of fighter aircraft and surface-to-air missile defenses. The program has contributed substantially to bomb damage assessment of point targets and of the interdiction effort directed against North Vietnamese road, rail, and water transportation systems. BLACK SHIELD missions have identified new targets and provided information of Chinese military activity, not only in North Vietnam and the border areas, but also of the periphery of Hainan Island. The tri-border area of South Vietnam, Laos, and Cambodia has also been covered well by BLACK SHIELD photography. BLACK SHIELD mission BX6856, flown over Khe Sanh and the border area of South Vietnam, provided strategic information of the hostile troop build-up, supply, and infiltration routes. (COMIREX targets photographed over North Vietnam are listed in Appendix III.)

All of the four North Vietnamese missions were tracked by Chinese and/or North Vietnamese air surveillance facilities. One unsuccessful surface-to-air missile (SAM) was launched at the vehicle of mission BX6842. The missile fired during the overflight was launched with the Fan Song radar in low PRF (first observed on missions BX6732 and BX6734). This was the first known instance of a Soviet SA-2 missile's having been guided by information derived from the Fan Song guidance radar operating in the low-PRF mode.

Missions BX6847 and BX6853 over North Korea were tracked by radars of the Chinese Air Defense System. Soviet air defense radars tracked the BX6847 vehicle for approximately five minutes. The initial evidence of EW tracking by the North Koreans occurred on BX6853 when the Maryong-San radar station reported position plots of the vehicle during a nine-minute period. (Appendix IV lists the number and type of radar signals recorded by the System 6 Elint collection device carried by BLACK SHIELD vehicles.)

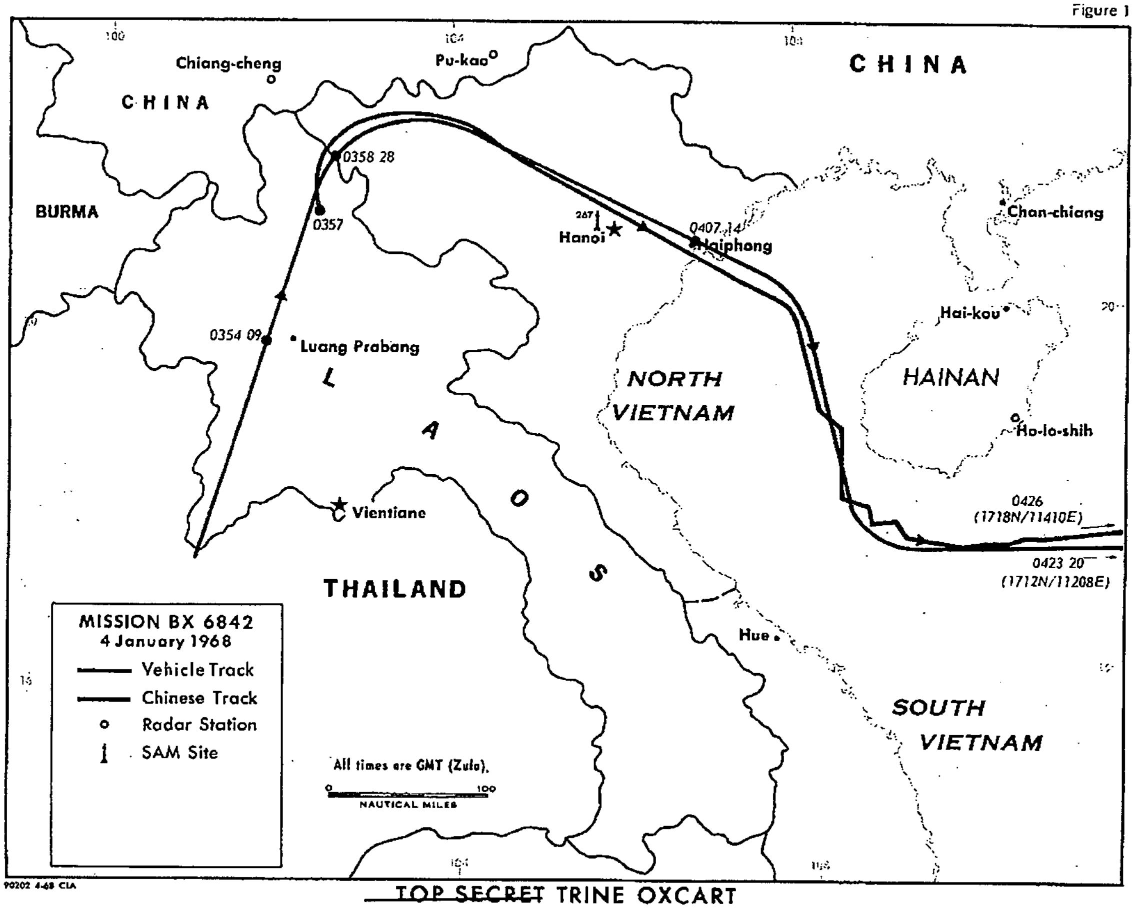
# MISSION ANALYSIS

## BX6842

BLACK SHIELD mission BX6842 was a single-pass, high-altitude reconnaissance mission flown over North Vietnam on 4 January 1968. The BLACK SHIELD vehicle entered and exited North Vietnam at 0358:28Z and 0407:14Z. The mission vehicle encountered a SAM reaction at approximately 0405Z. Figure 1 shows the mission route and associated events.

There was no indication of surface-to-surface missile (SSM) activity in the photographed areas. The BLACK SHIELD vehicle photographed 176 Chinese and North Vietnamese COMIREX targets plus 16 bonus (non-COMIREX) targets.

Figure 1



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Of the 176 COMIREX targets photographed, 139 were North Vietnamese SA-2 sites, 12 of which were occupied. The mission vehicle also photographed a number of probable cave defense sites near Hanoi and Haiphong.

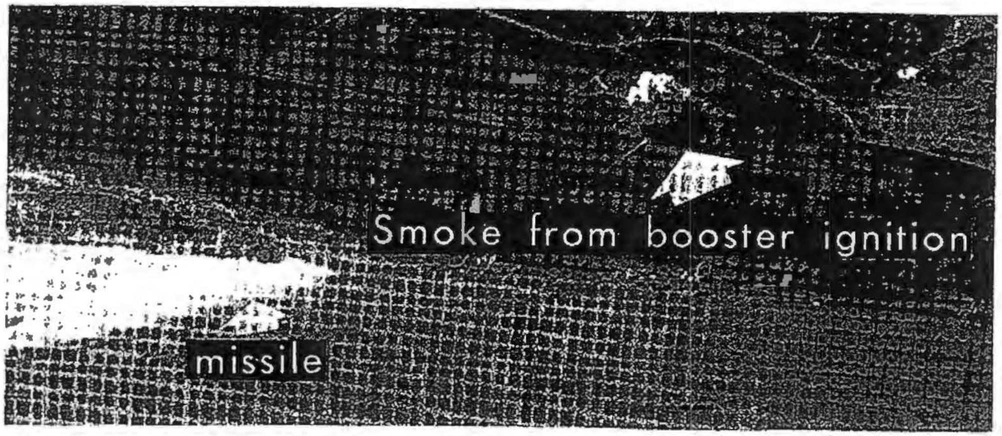
Three S-band and one L-band Fan Song B radar signals were recorded during the overflight. The third S-band signal qualified as a valid threat and activated the Mad Moth and Blue Dog BLACK SHIELD jammers. Correlation and analysis of all available data indicate that SAM site 267 (21°05'N, 105°44'E) launched a missile at the BLACK SHIELD vehicle at 0405:02Z. Figure 2 presents three photographs: one of smoke over site 267; a second of the launched missile, missile vapor trail and missile burn-out; and the third of missile detonation. Missile trajectory analysis from photography indicates the missile's approach to the mission vehicle was no closer than 8,000 feet and probably was much greater.

A departure from the normal Fan Song B launch/guidance techniques was noted on this mission. Normal operational procedures specify launch/guidance to occur while the target and missile are under the influence of the Fan Song B radar operating in the high-PRF mode (2,400-2,530 pps). Intentional atypical missile launch sequences were observed in October 1967 during missions BX6732 and BX6734,* when missiles were launched while the radar was in low PRF. The Fan Song was switched to high PRF in two of these firings approximately six seconds after launch, and missile guidance was provided thereafter. The missile fired at the vehicle of BX6842 was launched while the radar was in the low-PRF mode, and missile guidance (high-PRF) information was computed with the radar operating in the low-PRF mode. This atypical launch/guidance sequence may have been an attempt by the Vietnamese to reduce the effect of the BLACK SHIELD jammers while suffering only a small loss in capability due to the lower data rate. Figure 3 is a presentation of the signal and vehicle flight environment during the missile launch/flight phase.

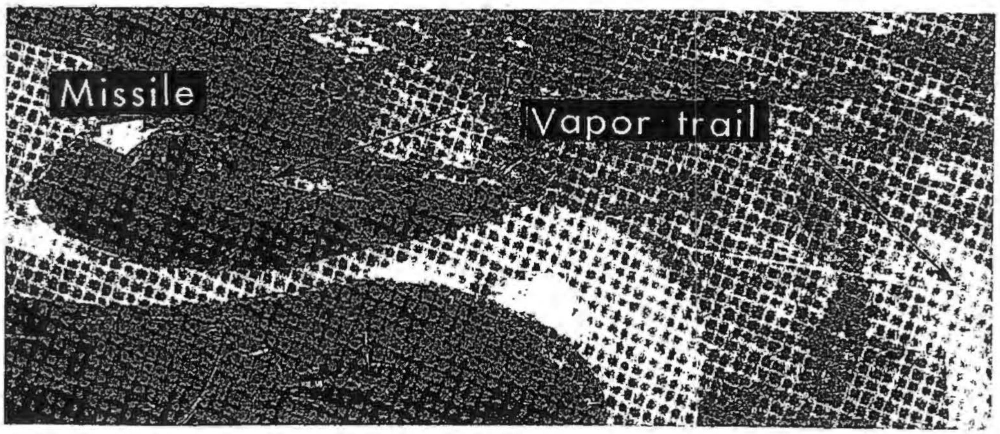
The situation geometry as depicted in figures 1 and 3 tends to indicate that the launch occurred in anticipation of a BLACK SHIELD path offset amenable to a successful missile intercept. This prediction was apparently generated via erroneous EW tracking information which projected the target flight path to within 4 nautical miles of the SA-2 site. The actual vehicle flight path was approximately 20 nautical miles from site 267 and too distant for a successful intercept. The erroneous EW tracking data coupled with the effects of the BLACK SHIELD jammers resulted in a late and probable hasty launch, a launch that could not have been successful because of the large offset range. The missile continued to automatic destruct which occurs approximately 62 seconds after launch. This was also the approximate duration of the L-band signal (see figure 3).

*Evaluated in BYE-1296/68.

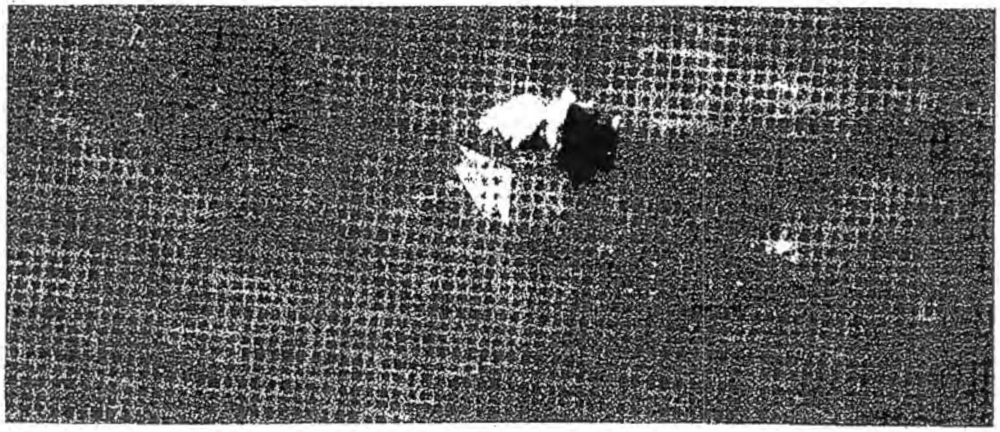
Figure 2. Photography of Missile Launched by Site 267



SA-2 launch



Flight & Missile Burnout



Warhead burst

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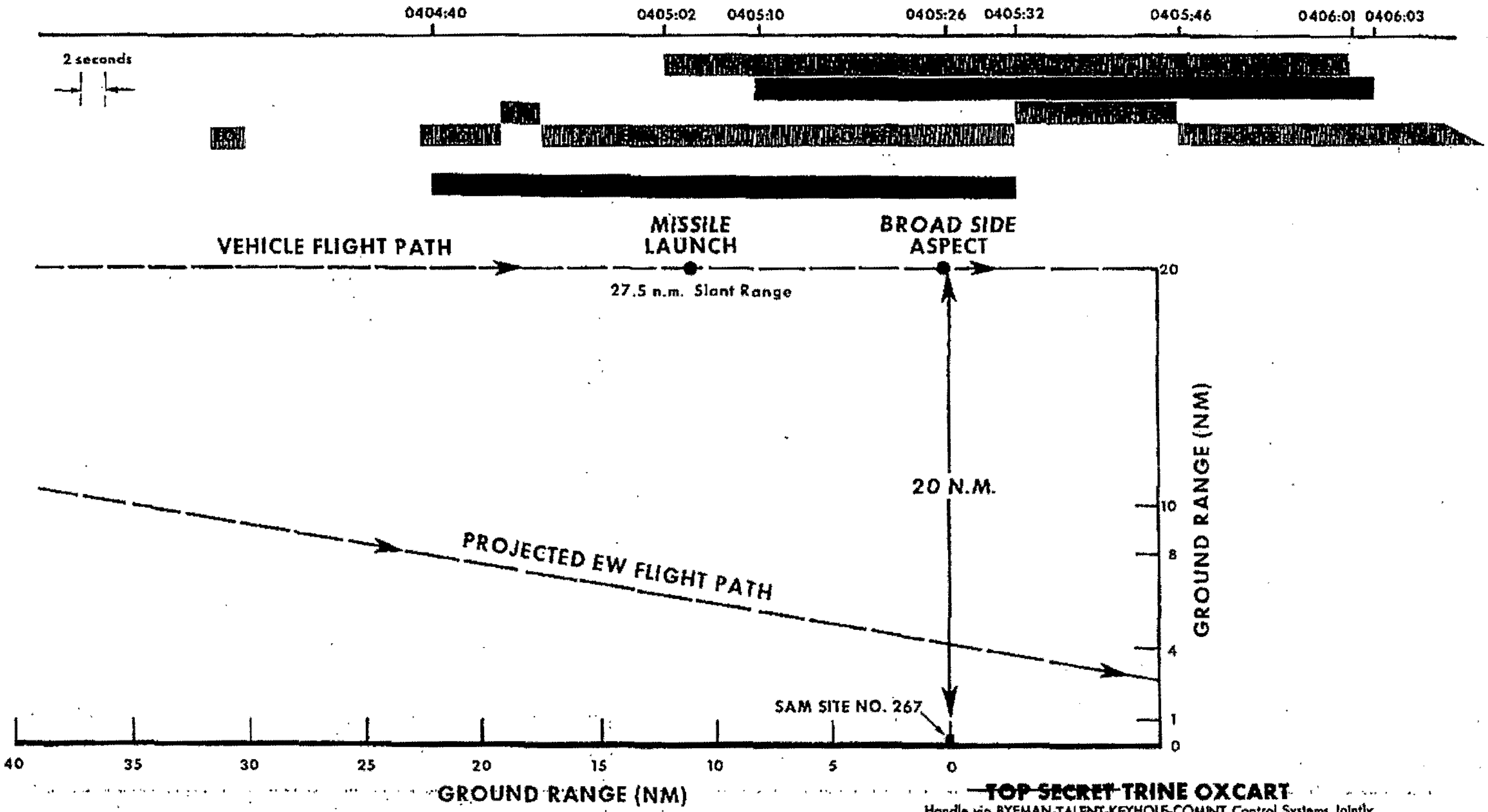
Figure 3. Signal & Vehicle Flight Environment



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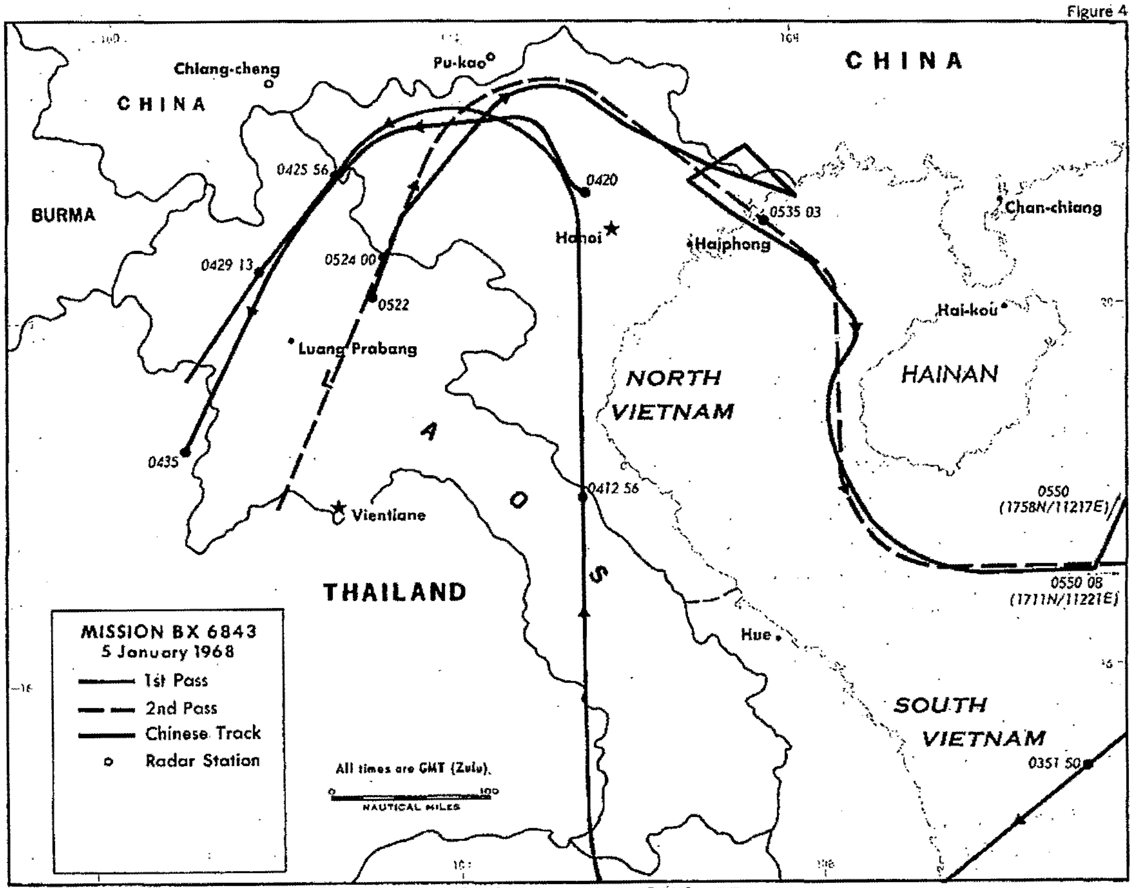
Early warning track was apparently first established by the Chinese radar facility located at Chiang-cheng. Other radar stations at Pu-kao and Ho-lo-shih supplemented and maintained track of the vehicle. The initial detection and final track radar-to-vehicle ground ranges for these three stations were 67 and 246, 91 and 136, and 137 and 239 nautical miles, respectively. There was no indication of North Vietnamese radar tracking of the vehicle; however, it is likely that the Vietnamese broadcast of the vehicle track was based upon reception of the Chinese plot information.

Strike/jamming activity during the overflight period was moderate and restricted to the Haiphong area.

## BX6843

This BLACK SHIELD mission was a double-pass overflight of North Vietnam flown on 5 January 1968. The vehicle entered and exited North Vietnam at

Figure 4



90203 4-68 CIA

0412:56Z and 0425:56Z on its first pass, and at 0524:00Z and 0535:03 on its second pass. Figure 4 is a presentation of the flight route and associated events.

Two suspect SS (cruise) missile sites near Thanh Hoa were photographed, one containing a few small unidentified objects and the other unoccupied. The BLACK SHIELD vehicle photographed 233 Chinese and North Vietnamese COMIREX targets plus 10 bonus (non-COMIREX) targets. Of the 233 COMIREX targets photographed, 182 were North Vietnamese SA-2 sites. Fifteen of these sites were occupied. This mission also provided photography of five of North Vietnam's major airfields and coverage of almost all of the rail network.

Eleven Fan Song B S-band signals were recorded during the overflight. None of these signals appeared to be tracking the mission vehicle, and no defensive system was activated. Initial EW tracking was accomplished by Chinese facilities, and this track information was subsequently broadcast by the North Vietnamese. There was no indication of tracking by North Vietnamese radars. Initial detection and final track ranges of Chinese radar stations during the first pass were 109 and 217 nautical miles for Chiang-cheng and 96 and 237 nautical miles for Pu-kao. Chiang-cheng's ranges for the second-pass track were 117 and 325 nautical miles.

There was little or no strike/jamming during the overflight period.

## BX6847

BLACK SHIELD mission BX6847 was a three-pass, high-altitude reconnaissance mission flown over North Korea on 26 January 1968. The mission vehicle was over the North Korean land mass on its first pass from 0217:53 to 0222:05, on the second pass from 0244:09 to 0248:36, and on the third pass from 0420:21 to 0425:07. Figure 5 presents the mission flight path and associated air surveillance events.

The BLACK SHIELD vehicle photographed 82 North Korean and Chinese COMIREX targets and 837 bonus targets. The mission obtained comprehensive baseline coverage of most of North Korea's armed forces and industry as well as large portions of the transportation system. The USS Pueblo and three new guided missile patrol boats (Komar PTG) were observed on photography of this mission. A BLACK SHIELD photograph of the USS Pueblo at anchor in a bay north of Wonsan is included in the examples of mission photography at the end of this report.

There was no indication of a hostile weapons reaction; no defensive system was activated during the overflight. The majority of the air surveillance tracking

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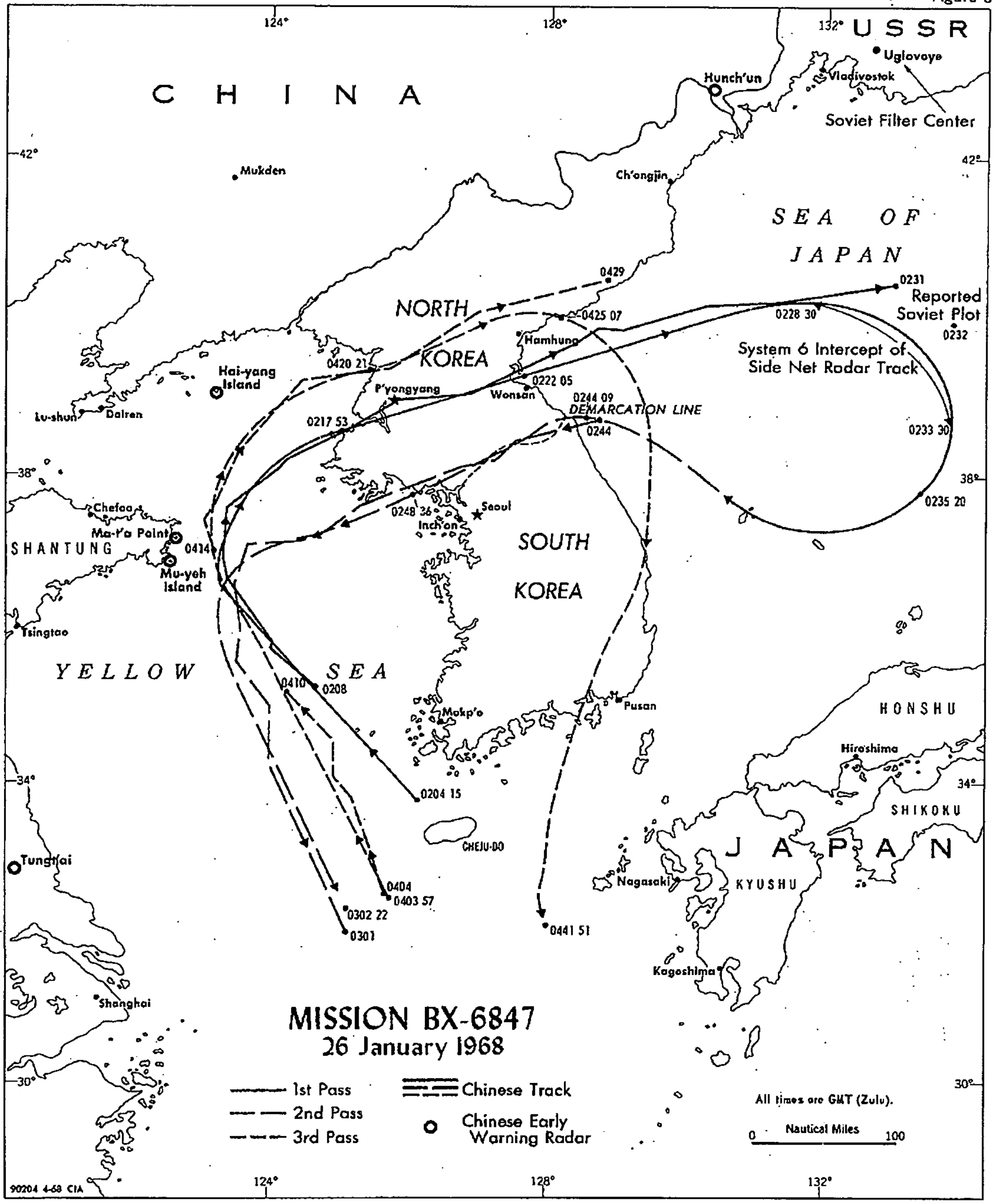
Figure 5



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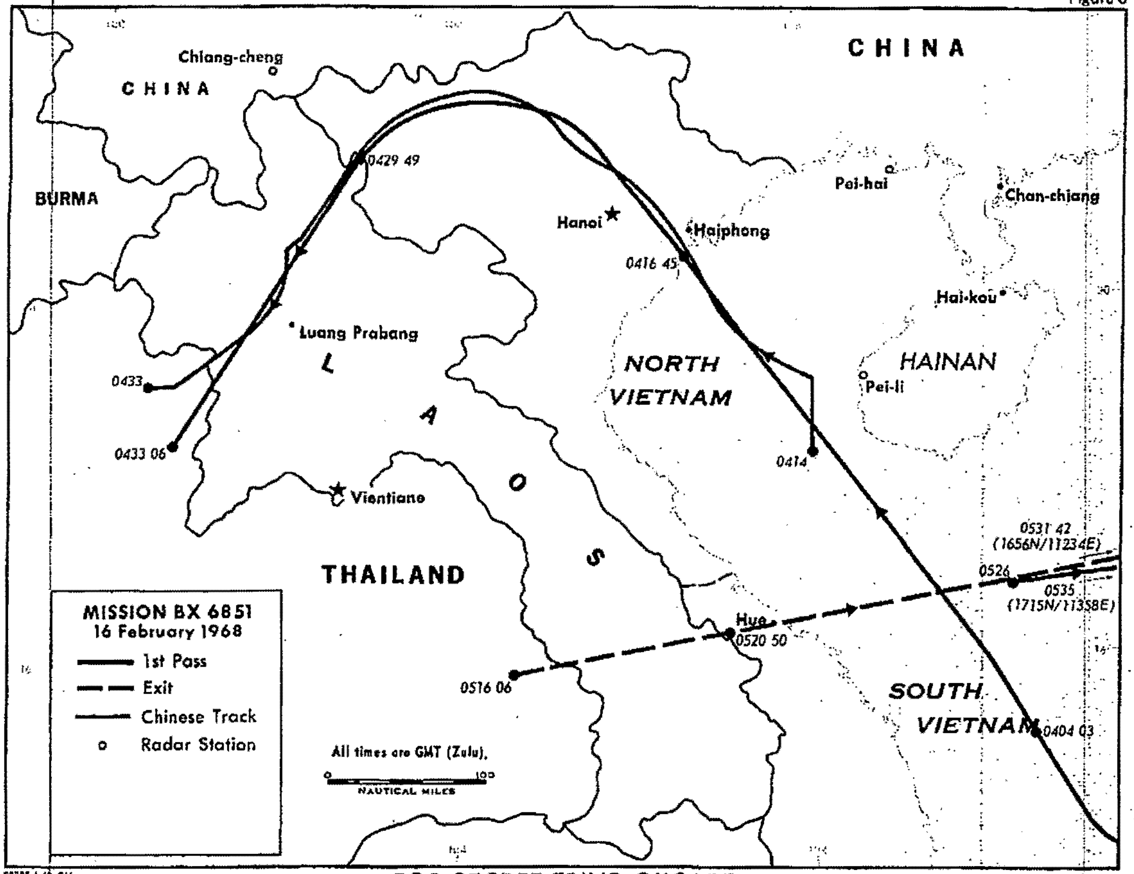
was accomplished by Chinese radar facilities at Ma-t'a Point (33°12'N, 122°37'E), Tungt'ai (32°52'N, 120°20'E), Mu-yeh Island (36°55'N, 122°31'E), Hai-yang Island (39°20'N, 123°10'E), and Hunch'un (42°50'N, 130°20'E).

Analysis of System 6 Elint indicates that Soviet Bar Lock, Tall King, and Side Net radars, subordinate to Uglovoe (43°21'N, 132°40'E), tracked the vehicle in the time period from 0228:30 to 0233:30. The Soviets broadcast one position plot of the vehicle at 0232Z. There was no indication of any North Korean surveillance tracking.

## BX6851

BLACK SHIELD mission BX6851 was a two-pass mission flown over North Vietnam on 16 February 1968. The vehicle entered North Vietnam on its first

Figure 6



90205 4-68 CIA

pass at 0416:45 and exited at 0424:49. Overflight of the DMZ occurred from 0520:50 to 0521:46. Figure 6 is a plot of the mission route and associated tracking.

A rapid deterioration of weather over the target area resulted in little useable photography.

There was no indication of a hostile weapons reaction, and no electronic defensive equipment was activated during the overflight. Air surveillance tracking of the BLACK SHIELD vehicle was maintained by Chinese radar facilities at Pei-li (19°08'N, 108°43'E), Pei-hai (21°27'N, 109°E), and Chiang-cheng (22°45'N, 101°50'E). Initial detection and final radar-to-aircraft track ranges for these radar stations were 39 to 228, 126 to 286, and 169 to 233 nautical miles, respectively. Although there was no indication of North Vietnamese radar tracking, track information probably was obtained by monitoring Chinese broadcast facilities.

There was little or no strike/jamming activity during the overflight period.

## BX6853

BLACK SHIELD mission BX6853 was a two-pass reconnaissance mission flown over North Korea on 19 February 1968. The mission vehicle penetrated and exited the North Korean land mass on its first pass at 0306:01 and 0309:50, and on its second pass at 0451:30 and 0456:51. Figure 7 is a plot indicating the mission route and related events.

The BLACK SHIELD vehicle photographed 84 North Korean COMIREX targets plus 89 bonus targets. Scattered clouds covered 20 percent of the area photographed, concealing the area in which the USS Pueblo was photographed on mission BX6847. One new, occupied SA-2 site was identified near Wonsan.

There was no indication of a hostile weapons reaction. Air surveillance tracking of the vehicle was accomplished by elements of the Chinese Air Defense System (ADS) from 0300Z to 0332Z on the first pass and from 0448Z to 0516Z on the second pass. This mission marks the first tracking of the vehicle by the North Korean ADS; the North Korean Maryong-San radar station (37°56'N, 125°56'E) reported track and altitude information on the BLACK SHIELD vehicle from 0458Z to 0507Z of the second pass. Initial detection and final track ranges for the Maryong-San radar station were 54 and 237 nautical miles. There was no indication of tracking by Soviet radars.

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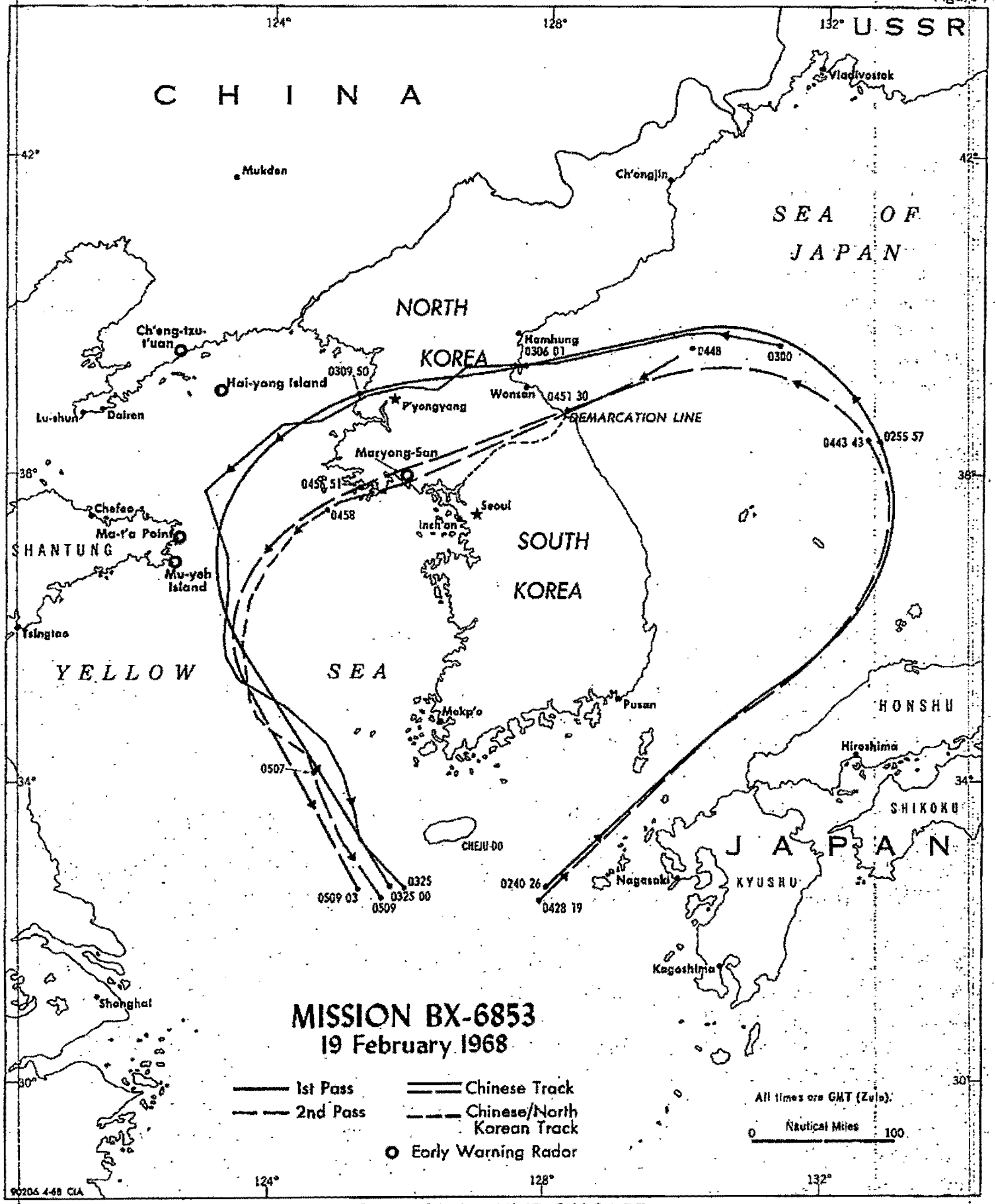
Figure 7



MISSION BX-6853
19 February 1968

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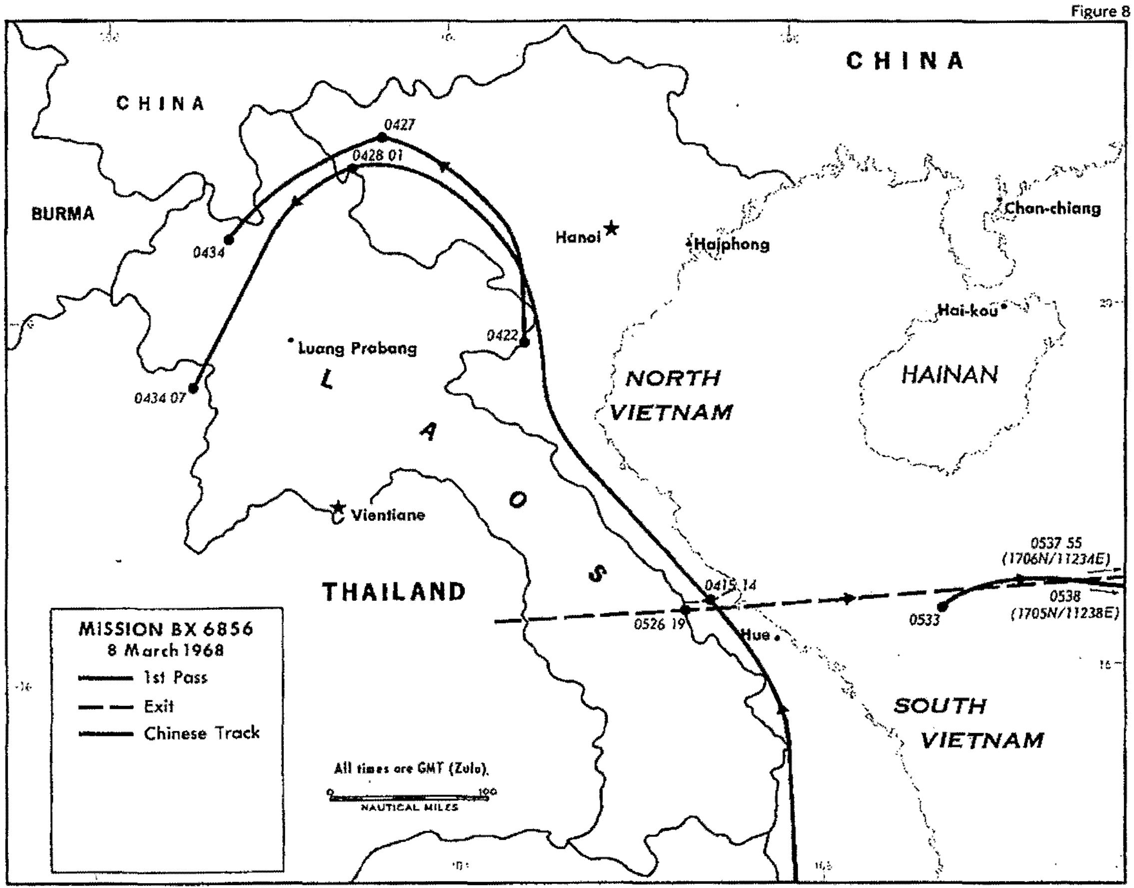
## BX6856

This BLACK SHIELD two-pass mission was flown over North Vietnam and the Demilitarized Zone on 8 March 1968. The mission vehicle entered North Vietnamese airspace on its first pass at 0415:14Z and exited at 0428:01Z. On the second pass it overflew the DMZ area in the time period from 0526:14Z to 0527:10Z. Figure 8 is a presentation of the flight route and associated tracking.

Good quality photography was obtained of Khe Sanh and the Laos, Cambodia, and South Vietnamese border areas. No useable photography was obtained of North Vietnam due to adverse weather conditions.

There was no indication of a hostile weapons reaction, and no on-board defensive systems were activated. Chinese Air Defense radar facilities

Figure 8



90207 4-68 CIA

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tracked the mission vehicle from 0422Z to 0434Z and from 0533Z to 0538Z. There was no apparent tracking of the vehicle or indication of knowledge of the overflight by the North Vietnamese. A change in normal route penetration apparently hampered detection of the vehicle by Chinese/North Vietnamese radar facilities.

Little or no strike/jamming activity was conducted during the overflight period.

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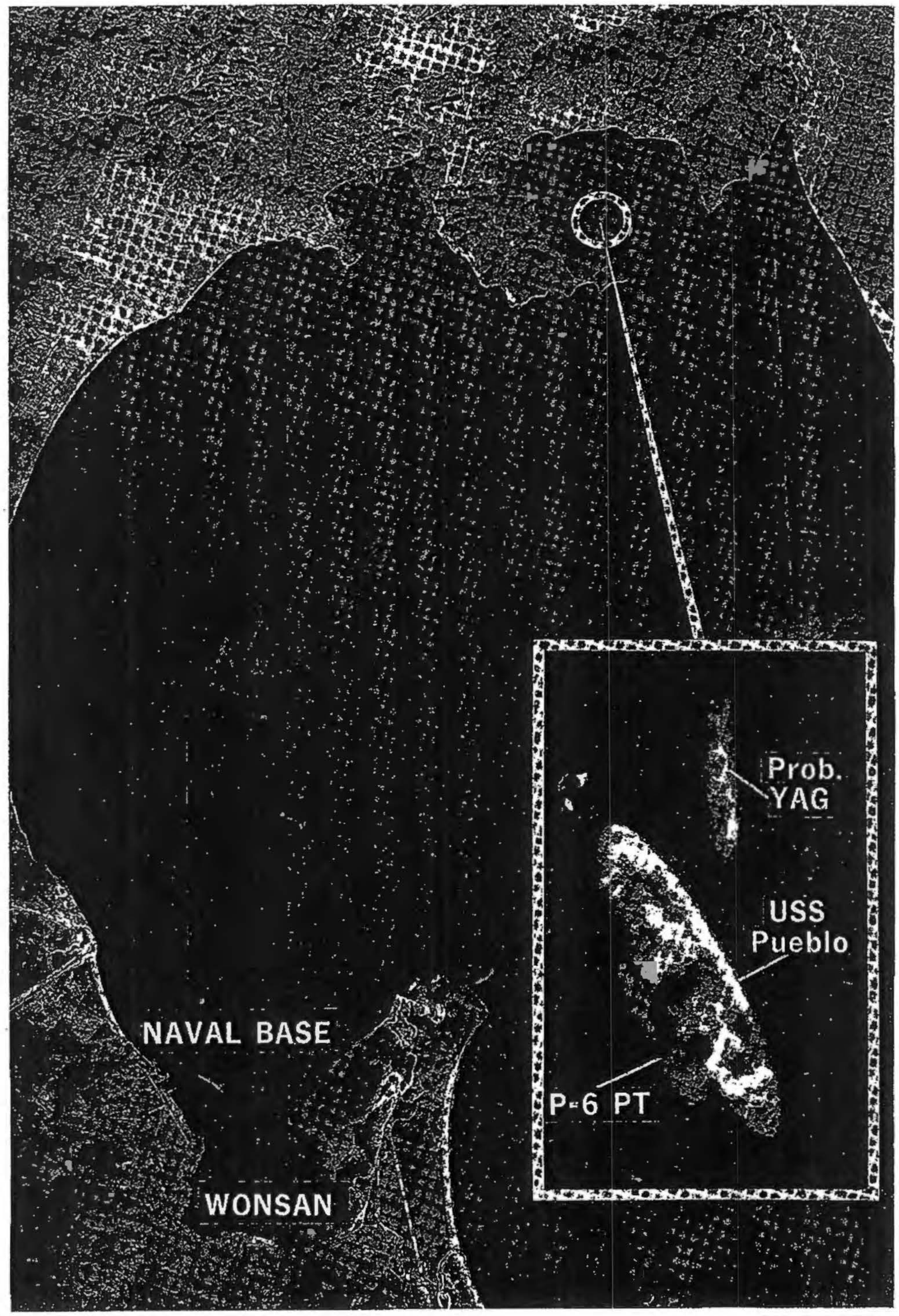
Figure 9.



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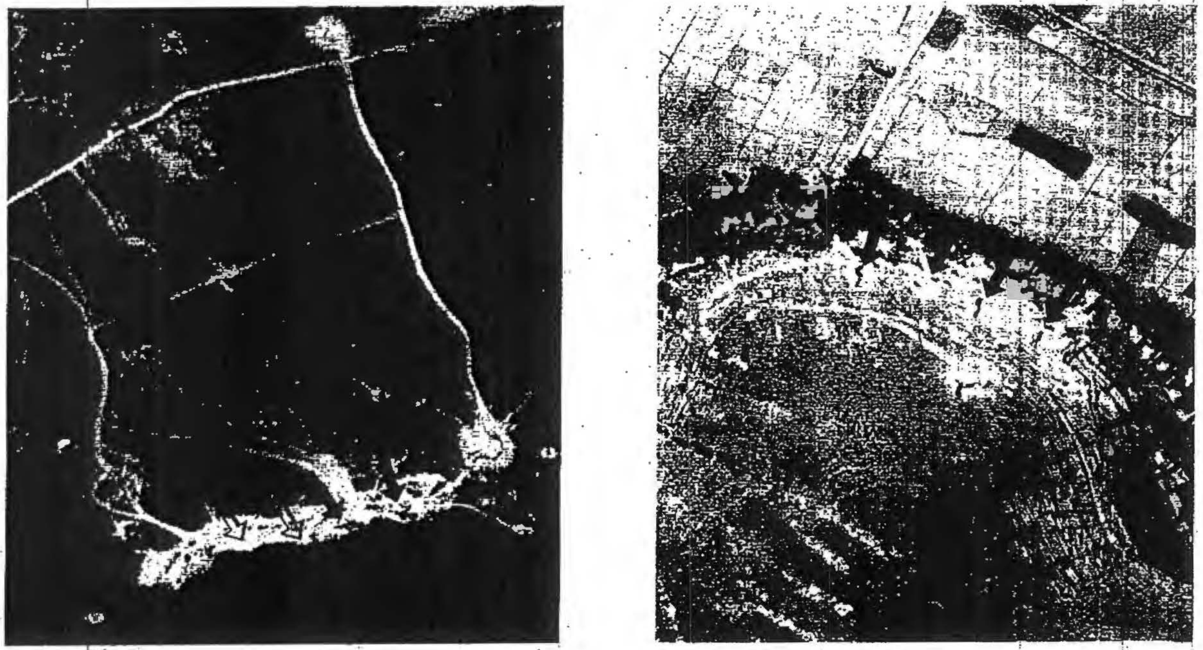
90199 4-68 CIA

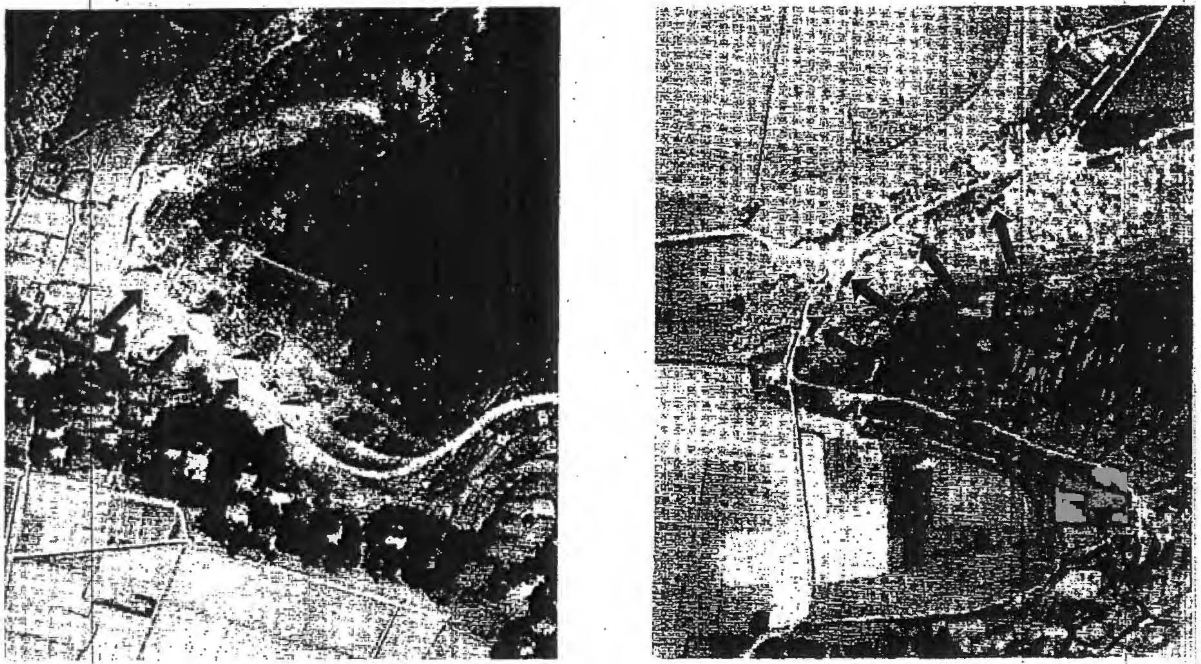
Figure 10. Cave Defense Sites



⇦ Early-Stage Construction

← Initial-Stage Construction

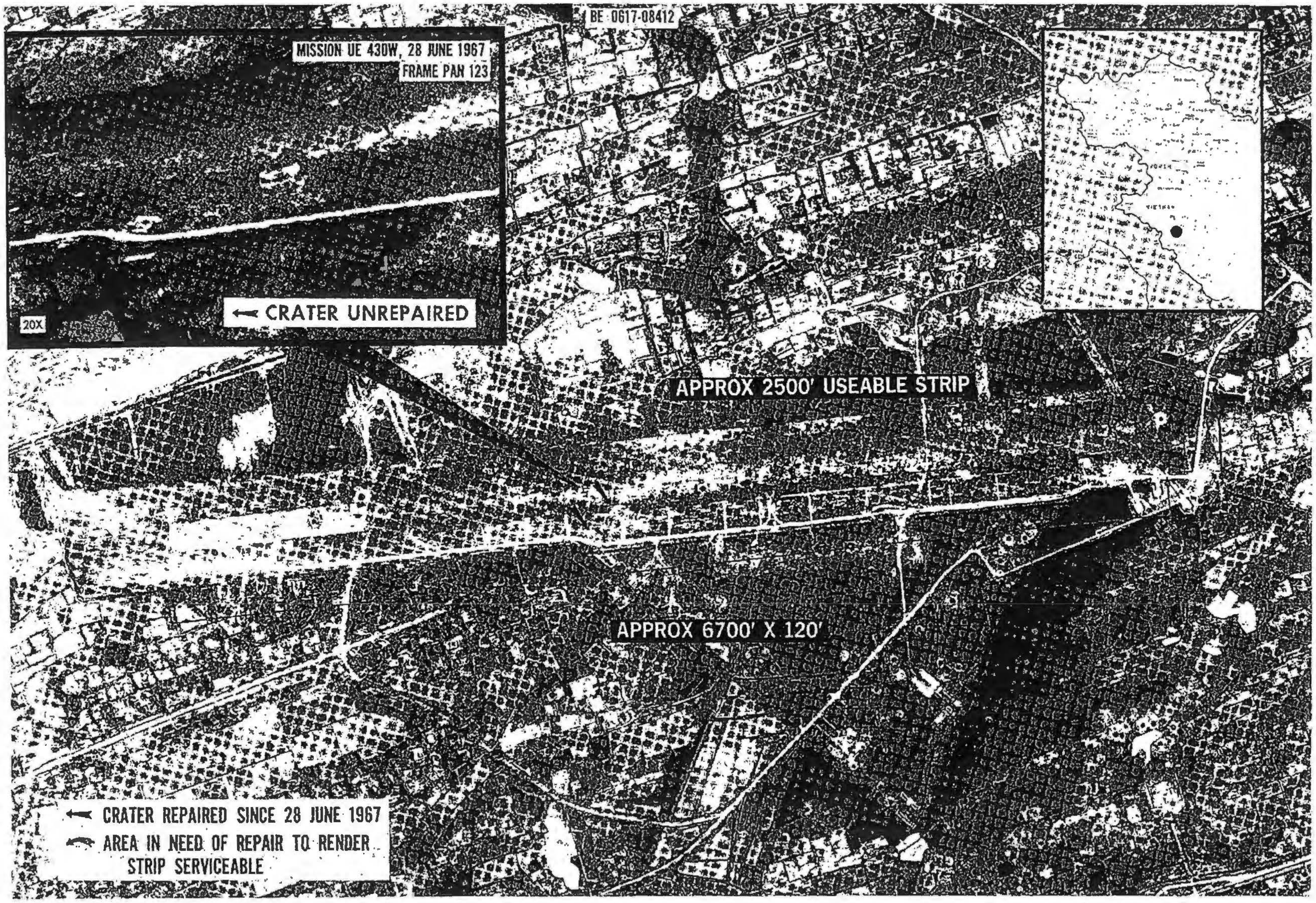
← Early-Stage Construction



← Parapet

← Early-Stage Construction

Figure 11. Vinh Airfield



## APPENDIX I

### BLACK SHIELD Operational Missions Alerted Between 1 January and 31 March 1968

| MISSION NO. | DATE | REMARKS |
|---|---|---|
| BX6842 | 3 Jan. 1968 | Flown |
| BX6843 | 4 Jan. 1968 | Flown |
| BX6844 | 6 Jan. 1968 | Cancelled due to weather |
| BX6845 | 19 Jan. 1968 | Cancelled due to weather |
| BX6846 | 20 Jan. 1968 | Cancelled due to weather |
| BX6847<br>(Korea) | 25 Jan. 1968 | Flown (3 Passes) |
| BX6848 | 29 Jan. 1968 | Cancelled due to weather |
| BX6849 | 9 Feb. 1968 | Cancelled due to weather |
| BX6850<br>(Korea) | 14 Feb. 1968 | No Approval |
| BX6851 | 15 Feb. 1968 | Flown |
| BX6852 | 16 Feb. 1968 | Cancelled due to weather |
| BX6853<br>(Korea) | 18 Feb. 1968 | Flown |
| BX6854 | 27 Feb. 1968 | Cancelled due to weather |
| BX6855 | 5 Mar. 1968 | Cancelled due to weather |
| BX6856 | 7 Mar. 1968 | Flown |

## APPENDIX II

## COMIREX Targets Covered by BLACK SHIELD Missions over North Korea
1 January - 31 March 1968

| COMIREX Number | Target | Mission Number | |
|---|---|---|---|
| | | 47 | 53 |
| [redacted] | Nampo SAM Site C-24-2 | X | |
| [redacted] | Hungnam SAM Site A-25-2 | | X |
| [redacted] | Pyongyang SAM Site C-33-3 | X | X |
| [redacted] | Sariwon SAM Site A-21-2 | X | |
| [redacted] | Wonsan SAM Site A-10-2 | X | X |
| [redacted] | Sinpo SAM Site A-09-2 | X | |
| [redacted] | Nampo SAM Site B-30-2 | X | |
| [redacted] | Hungdogi-Dong SAM Site C-22-2 | X | X |
| [redacted] | Pyongyang SAM Site B-17-2 | X | X |
| [redacted] | Pyongyang SAM Site B-23-2 | X | X |
| [redacted] | Pyongyang SAM Site C-29-2 | X | X |
| [redacted] | Pyongyang SAM Site C-12-2 | X | |
| [redacted] | Pyongyang SAM Site C-05-2 | X | X |
| [redacted] | Pyongyang SAM Support Factory | X | X |

50X1, E.O.13526

## APPENDIX II (continued)

| COMIREX Number | Target | Mission Number | |
|---|---|---|---|
| | | 47 | 53 |
| [redacted] | Nampo Cruise Missile Launch Site #1 | X | X |
| [redacted] | Pyongyang Airfield East | X | X |
| [redacted] | Sondong Ni Airfield | | X |
| [redacted] | Sunan Up Airfield | X | X |
| [redacted] | Pukchang-Ni Airfield | X | X |
| [redacted] | Wonsan Airfield | X | X |
| [redacted] | Hwangju Airfield 2 | X | X |
| [redacted] | Pyong Ni Airfield | | X |

50X1, E.O.13526

## APPENDIX II (continued)

| COMIREX Number | Target | Mission Number | |
|---|---|---|---|
| | | 47 | 53 |
| [redacted] 50X1, E.O.13526 | Onchon-Up Airfield | X | X |
| | Taechon Airfield | X | |
| | Nampo Naval Base | X | |
| | Munchon Naval Base Wonsan | X | X |
| | Changjon Naval Base | X | |
| | Haeju Naval Base | X | X |
| | Pipa-Got Probable Naval Dock Yard | X | |
| | Wonsan Port Facilities | X | X |
| | Nampo Naval Base | | X |
| | Nampo Port Complex | X | X |
| | Nampo Ship Yard Myonghyop | X | X |
| | Hungnam Port Facilities | | X |
| | Pyongyang BW Institute | | X |
| | Hwang-Chon Army Supply Depot | X | X |
| | Ongjin Complex | X | |

## APPENDIX II (continued)

| COMIREX Number | Target | Mission Number 47 | Mission Number 53 |
|---|---|---|---|
| [redacted] 50X1, E.O.13526 | Hoeyang Headquarters First Army Group | X | X |
| | Hoeyang Army Barracks | | X |
| | Hungnam Military Activity | | X |
| | Hungnam Military Barracks Area | | X |
| | Kangdong Army Barracks East | | X |
| | Koksan Military Activity | | X |
| | Koksan Army Barracks/Storage Area | | X |
| | Koksan Army Barracks | | X |
| | Kumchon Army Barracks Area E. | | X |
| | Pyongyang Airborne Training School | | X |
| | Pyongyang Army Barracks/Storage East. | X | X |
| | Pyongyang Depot | | X |
| | Ningye Military Depot South | | X |
| | Yangdog-Up Military Complex | X | X |

## APPENDIX II (continued)

| COMIREX Number | Target | Mission Number | |
|---|---|---|---|
| | | 47 | 53 |
| 50X1, E.O.13526 | Chong Dong Army Barracks/Training | | X |
| | Kumsong Army Barracks | X | |
| | Sangjok Tong Army Barracks West | X | |
| | Sangjok Tong Army Barracks Headquarters | X | X |
| | Masan Ni Army Barracks Headquarters 12th | | X |
| | Changdo Ri Army Barracks Headquarters | X | X |
| | Changdo Ri Army Barracks NE | X | X |
| | Changdo Ri Army Barracks NE | | X |
| | Sowon Dong Barracks Headquarters 8th Infantry | | X |
| | Ousil Army Barracks | | X |
| | Wa Dong Army Barracks Headquarters | | X |
| | Ichon Army Barracks NE Headquarters 5th | | X |
| | Ichon Army Barracks SSW | | X |
| | Pyongsan Army Barracks/Storage Depot | | X |
| | Siksadong-Ni Army Barracks/Storage | X | X |

## APPENDIX II (continued)

| COMIREX Number | Target | Mission Number | |
|---|---|---|---|
| | | 47 | 53 |
| [redacted] | Sibyong Ni Storage Area | | X |
| [redacted] | Sariwon Headquarters 46th Infantry Division SW | X | |
| [redacted] | Yung Ni Army Barracks | | X |
| [redacted] | Pyongsan Army Barracks | | X |
| [redacted] | Pyongyang Railroad Yard Taedong | X | |
| [redacted] | | | X |
| [redacted] | Pyongsan Railroad Yards | | X |
| [redacted] | Pokkye Ri Railroad Yards Shops | X | X |
| [redacted] | Tosong Ni Railroad Yards | | X |
| [redacted] | Nampo Railroad Station Yards & Shops | | X |
| [redacted] | Kowon Railroad Yards | | X |
| [redacted] | Sariwon Railroad Yard | X | X |
| [redacted] | Pyongyang Railroad Yards | X | X |
| [redacted] | Pyongyang Railroad Station & Yards | X | X |
| [redacted] | Pyongyang Railroad Yards Sopo-Dongsgon | X | X |
| [redacted] | Pyongyang Railroad Yards | X | X |
| [redacted] | Sariwon Complex | X | |

50X1, E.O.13526

APPENDIX II (continued)

| COMIREX Number | Target | Mission Number 47 | Mission Number 53 |
|---|---|---|---|
| 50X1, E.O.13526 | Kaesong Complex | | X |
| | Wonsan Complex | X | X |
| | Sunchon Complex | | X |
| | Haeju Complex | | X |
| | Yonan Complex | X | |
| | Kosong Complex | X | X |
| | Hwangju Complex | | X |
| | Sariwon Complex | | X |
| | Ongjin Complex | X | X |
| | Nampo Complex | | X |
| | Yonan Complex | | X |

## APPENDIX III

### COMIREX Targets Covered by BLACK SHIELD Missions over North Vietnam*
### 1 January - 31 March 1968

50X1, E.O.13526

| COMIREX Number | Target | Mission Number 42 | 43 |
|---|---|---|---|
| [redacted] | Hanoi SAM Search | | |
| [redacted] | Lao Cai SAM Search | | |
| [redacted] | Dien Bien Phu SAM Search | | |
| [redacted] | Vinh SAM Search | | |
| [redacted] | Cao Bang SAM Search | | |
| [redacted] | Dong Hoi SAM Search | | |
| [redacted] | Fo Lo Probable CD Site | X | |
| [redacted] | Cat Ba Coastal Defense Sites 1 and 2 | X | X |
| [redacted] | Dung Fang Suspect Coastal Defense Site | | |
| [redacted] | Chang Chiang Coastal Defense Site (Suspect) | | |
| [redacted] | Yai Cheng Probable Radar Site | | |
| [redacted] | Hanoi SAM Site A-10-2 | X | X |

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*Bad weather precluded photography of targets on BLACK SHIELD Missions BX6851 and BX6856.

APPENDIX III (continued)

| COMIREX Number | Target | Mission Number 42 | Mission Number 43 |
|---|---|---|---|
| [redacted] 50X1, E.O.13526 | Hanoi SAM Site A-19-2 | X | X |
| | Hanoi SAM Site A-29-2 | X | X |
| | Hanoi SAM Site B-04-2 | X | X |
| | Hanoi SAM Site B-12-2 | X | X |
| | Hanoi SAM Site B-25-2 | | X |
| | Hanoi SAM Site B-29-2 | X | X |
| | Hanoi SAM Site B-30-2 | X | X |
| | Hanoi SAM Site C-29-2 | X | X |
| | Hanoi SAM Site C-30-2 | X | X |
| | Hanoi SAM Site D-19-2 | | X |
| | Hanoi SAM Site B-17-2 | | X |
| | Hanoi SAM Site B-21-2 | | X |
| | Hanoi SAM Site C-28-2 | X | X |
| | Hanoi SAM Site D-31-2 | X | X |
| | Hanoi SAM Site A-11-2 | X | X |
| | Hanoi SAM Site A-24-2 | X | X |

## APPENDIX III (continued)

| COMIREX Number | Target | Mission Number | |
|---|---|---|---|
| | | 42 | 43 |
| [redacted] 50X1, E.O.13526 | Hanoi SAM Site D-31A-2 | | |
| | Hanoi SAM Site D-16-2 | | X |
| | Hanoi SAM Site D-36-2 | X | X |
| | Hanoi SAM Site C-06-2 | X | X |
| | Hanoi SAM Site C-07-2 | X | X |
| | Hanoi SAM Site D-31B-2 | X | X |
| | Hanoi SAM Site E07-2 | X | X |
| | Yen Bai SAM Site B-09-2 | X | X |
| | Yen Bai SAM Site C-09-2 | | |
| | Haiphong SAM Site A-29-2 | X | |
| | Haiphong SAM Site A-20-2 | X | |
| | Haiphong SAM Site A-17-2 | X | |
| | Haiphong SAM Site B-01-2 | X | X |
| | Haiphong SAM Site A-29A-2 | X | |

## APPENDIX III (continued)

| COMIREX Number | Target | Mission Number | |
|---|---|---|---|
| | | 42 | 43 |
| [redacted] | Yen Bai SAM Site B-12-2 | X | X |
| [redacted] | Yen Bai SAM Site C-10-2 | X | X |
| [redacted] | Yen Bai SAM Site B-11-2 | X | X |
| [redacted] | Yen Bai SAM Site C-03-2 | X | X |
| [redacted] | Yen Bai SAM Site C-07-2 | X | X |
| [redacted] | Yen Bai SAM Site C-09A-2 | | |
| [redacted]<br>50X1, E.O.13526 | Yen Bai SAM Site C-17-2 | X | X |
| [redacted] | Yen Bai SAM Site B-06-2 | X | X |
| [redacted] | Yen Bai SAM Site C-04-2 | X | X |
| [redacted] | Yen Bai SAM Site B-05-2 | X | X |
| [redacted] | Yen Bai SAM Site B-06A-2 | X | X |
| [redacted] | Yen Bai SAM Site B-10-2 | X | X |
| [redacted] | Yen Bai SAM Site B-11A-2 | X | |

## APPENDIX III (continued)

| COMIREX Number | Target | Mission Number | |
|---|---|---|---|
| | | 42 | 43 |
| 50X1, E.O.13526 | Haiphong SAM Site B-33-2 | X | X |
| | Haiphong SAM Site B-06-2 | X | X |
| | Haiphong SAM Site C-32-2 | | X |
| | Haiphong SAM Site C-32A-2 | X | X |
| | Haiphong SAM Site B-28-2 | X | X |
| | Haiphong SAM Site B-30-2 | X | X |
| | Haiphong SAM Site A-07-2 | X | X |
| | Haiphong SAM Site A-23-2 | X | |
| | Haiphong SAM Site A-31-2 | X | |
| | Haiphong SAM Site A-33-2 | X | |

## APPENDIX III (continued)

| COMIREX Number | Target | Mission Number 42 | Mission Number 43 |
|---|---|---|---|
| 50X1, E.O.13526 | Haiphong SAM Site C-30-2 | X | X |
| | Haiphong SAM Site C-28-2 | X | X |
| | Haiphong SAM Site A-02-2 | X | X |
| | Haiphong SAM Site A-17A-2 | X | |
| | Haiphong SAM Site D-35-2 | X | X |
| | Haiphong SAM Site A-33A-2 | X | |
| | Thanh Hoa SAM Site B-28-2 | | X |
| | Thanh Hoa SAM Site C-02-2 | | X |
| | Thanh Hoa SAM Site B-01-2 | | X |
| | Thanh Hoa SAM Site B-02-2 | | X |
| | Thanh Hoa SAM Site | | |
| | Thanh Hoa SAM Site D-04-2 | | X |
| | Thanh Hoa SAM Site C-03-2 | | X |
| | Thanh Hoa SAM Site C-02A-2 | | X |
| | Thanh Hoa SAM Site A-17-2 | | X |

## APPENDIX III (continued)

| COMIREX Number | Target | Mission Number 42 | Mission Number 43 |
|---|---|---|---|
| [redacted] 50X1, E.O.13526 | Thanh Hoa SAM Site C-04-2 | | X |
| | Thanh Hoa SAM Site D-02-2 | | X |
| | Thanh Hoa SAM Site C-01-2 | | X |
| | Thanh Hoa SAM Site D-03-2 | | X |
| | Thanh Hoa SAM Site D-03A-2 | | X |
| | Thanh Hoa SAM Site A-19-2 | | X |
| | Thanh Hoa SAM Site B-28A-2 | | X |
| | Thanh Hoa SAM Site B-27-2 | | X |
| | Thanh Hoa SAM Site A-14-2 | | X |
| | Thanh Hoa SAM Site D-20-2 | | |
| | Thanh Hoa SAM Site D-20A-2 | | |
| | Thanh Hoa SAM Site A-17A-2 | | X |
| | Thanh Hoa SAM Site A-13-2 | | X |
| | Hanoi SAM Site D-04-2 | | |

## APPENDIX III (continued)

| COMIREX Number | Target | Mission Number 42 | 43 |
|---|---|---|---|
| [redacted] 50X1, E.O.13526 | Hanoi SAM Site C-30E-2 | | |
| [redacted] | Hanoi SAM Site B-30A-2 | X | X |
| [redacted] | Hanoi SAM Site C-30A-2 | X | X |
| [redacted] | Hanoi SAM Site D-03-2 | X | X |
| [redacted] | Hanoi SAM Site D-04-2 | X | X |
| [redacted] | Hanoi SAM Site A-17A-2 | X | X |
| [redacted] | Hanoi SAM Site C-30C-2 | X | X |
| [redacted] | Hanoi SAM Site C-01-2 | X | X |
| [redacted] | Hanoi SAM Site C-05-2 | X | X |
| [redacted] | Hanoi SAM Site C-04-2 | X | X |
| [redacted] | Hanoi SAM Site C-02-2 | X | X |
| [redacted] | Hanoi SAM Site C-04A-2 | X | |
| [redacted] | Hanoi SAM Site C-01A-2 | X | X |
| [redacted] | Hanoi SAM Site B-33-2 | X | X |
| [redacted] | Hanoi SAM Site D-35-2 | X | X |
| [redacted] | Hanoi SAM Site C-06A-2 | X | X |

## APPENDIX III (continued)

50X1, E.O.13526

| COMIREX Number | Target | Mission Number | |
|---|---|---|---|
| | | 42 | 43 |
| [redacted] | Hanoi SAM Site C-13-2 | X | |
| [redacted] | Hanoi SAM Site C-11-2 | X | X |
| [redacted] | Hanoi SAM Site C-12-2 | X | X |
| [redacted] | Hanoi SAM Site C-30D-2 | X | X |
| [redacted] | Hanoi SAM Site B-07-2 | X | X |
| [redacted] | Hanoi SAM Site D-06-2 | X | X |
| [redacted] | Hanoi SAM Site C-30E-2 | X | X |
| [redacted] | Hanoi SAM Site B-34-2 | | |
| [redacted] | Bac Can SAM Site C-22-2 | X | X |
| [redacted] | Bac Can SAM Site B-20-2 | X | X |
| [redacted] | Bac Can SAM Site C-20-2 | X | X |
| [redacted] | Bac Can SAM Site C-19-2 | X | X |
| [redacted] | Hoa Binh SAM Site A-19-2 | | X |
| [redacted] | Hoa Binh SAM Site B-20-2 | | X |
| [redacted] | Hoa Binh SAM Site B-22-2 | | X |
| [redacted] | Hoa Binh SAM Site B-17-2 | | X |

APPENDIX III (continued)

| COMIREX Number | Target | Mission Number | |
|---|---|---|---|
| | | 42 | 43 |
| 50X1, E.O.13526 | Hoa Binh SAM Site C-17-2 | | X |
| | Hoa Binh SAM Site B-19-2 | | X |
| | Hoa Binh SAM Site D-27-2 | | |
| | Hoa Binh SAM Site D-28-2 | | |
| | Hoa Binh SAM Site A-04-2 | | |
| | Hoa Binh SAM Site B-08-2 | | X |
| | Hoa Binh SAM Site C-27-2 | | |
| | Hoa Binh SAM Site B-02-2 | X | X |
| | Hanoi B-08-2 | X | X |
| | Hoa Binh SAM Site B-04-2 | X | X |
| | Hoa Binh SAM Site B03-2 | | X |
| | Hoa Binh SAM Site B-08B-2 | | X |
| | Hoa Binh SAM Site B-10-2 | | X |
| | Haiphong SAM Site D-35A-2 | X | X |

## APPENDIX III (continued)

| COMIREX Number | Target | Mission Number 42 | Mission Number 43 |
|---|---|---|---|
| 50X1, E.O.13526 | Haiphong SAM Site B-07-2 | X | X |
| | Haiphong SAM Site A-27-2 | X | |
| | Haiphong SAM Site B-34-2 | X | X |
| | Haiphong SAM Site B-01A-2 | X | X |
| | Haiphong SAM Site A-06-2 | X | X |
| | Haiphong SAM Site A-14-2 | X | |
| | Haiphong SAM Site B-06B-2 | X | X |
| | Haiphong SAM Site D-22-2 | | |
| | Haiphong SAM Site C-21-2 | | |
| | Haiphong SAM Site D-23-2 | | |
| | Haiphong SAM Site B-27-2 | X | X |
| | Haiphong SAM Site A-31A-2 | | |
| | Haiphong SAM Site A-14A-2 | X | |
| | Haiphong SAM Site C-29-2 | | |
| | Haiphong SAM Site C-27-2 | X | X |
| | Haiphong SAM Site C-26-2 | X | |

## APPENDIX III (continued)

| COMIREX Number | Target | Mission Number 42 | Mission Number 43 |
|---|---|---|---|
| [redacted] 50X1, E.O.13526 | Haiphong SAM Site B-25-2 | X | |
| | Haiphong SAM Site A-29-B-2 | X | X |
| | Haiphong SAM Site A-26-2 | X | X |
| | Haiphong SAM Site A-22-2 | X | |
| | Haiphong SAM Site A-25A-2 | X | |
| | Vinh C-19-2 | | X |
| | Vinh C-32-2 | | |
| | Vinh B-16-2 | | |
| | Vinh | | |
| | Vinh | | |
| | Vinh | | |
| | Vinh C-32-2 | | |

## APPENDIX III (continued)

| COMIREX Number | Target | Mission Number 42 | Mission Number 43 |
|---|---|---|---|
| [redacted] 50X1, E.O.13526 | Vinh | | |
| | Vinh D-32-2 | | |
| | Vinh A-07-2 | | X |
| | Vinh | | |
| | Vinh C-32A-2 | | X |
| | Vinh C-30-2 | | X |
| | Vinh C-32B-2 | | X |
| | Vinh B-21-2 | | |
| | Vinh B-29-2 | | X |
| | Vinh B-32-2 | | X |
| | Vinh A-01-2 | | |
| | Vinh A-36-2 | | |
| | Vinh A-11-2 | | X |
| | Vinh C-31-2 | | X |
| | Vinh A-01A-2 | | X |
| | Vinh D-35-2 | | X |

## APPENDIX III (continued)

| COMIREX Number | Target | Mission Number 42 | Mission Number 43 |
|---|---|---|---|
| [redacted] 50X1, E.O.13526 | Vinh C-31A-2 | | X |
| | Vinh A-25-2 | X | X |
| | Hanoi SAM Site B-01-2 | X | X |
| | Hanoi SAM Site C-33-2 | X | X |
| | Hanoi SAM Site B-01A-2 | X | X |
| | Hanoi SAM Site A-33-2 | X | X |
| | Hanoi SAM Site D-36A-2 | X | X |
| | Hanoi SAM Site C-01B-2 | X | X |
| | Hanoi SAM Site A-01-2 | X | X |
| | Hanoi SAM Site C-03-2 | | |
| | Hanoi SAM Site C-03A-2 | X | X |
| | Hanoi SAM Site A-14-2 | X | X |
| | Hanoi SAM Site C-32-2 | X | X |
| | Hanoi SAM Site B-32-2 | X | X |
| | Hanoi SAM Site B-07A-2 | X | X |
| | Hanoi SAM Site C-17-2 | | X |

## APPENDIX III (continued)

| COMIREX Number | Target | Mission Number | |
|---|---|---|---|
| | | 42 | 43 |
| [redacted] | Hanoi SAM Site A-31-2 | X | X |
| [redacted] | Hanoi SAM Site C-17A-2 | | X |
| [redacted] | Hanoi SAM Site B-16-2 | X | X |
| [redacted] | Hanoi SAM Site E-22-2 | | X |
| [redacted] | Hanoi SAM Site C-17B-2 | | X |
| [redacted] | Thanh Hoa SAM Site C-03A-2 | | X |
| [redacted] | Thanh Hoa SAM Site B-01A-2 | | |
| [redacted] | Thanh Hoa SAM Site C-01A-2 | | |
| [redacted] | Thanh Hoa SAM Site C-04A-2 | | X |
| [redacted] | Thanh Hoa SAM Site D-21A-2 | | X |
| [redacted] | Thanh Hoa SAM Site B-01B-2 | | X |
| [redacted] | Thanh Hoa SAM Site D-21B-2 | | X |
| [redacted] | Thanh Hoa SAM Site A-17B-2 | | X |
| [redacted] | Thanh Hoa SAM Site D-21-B | | X |
| [redacted] | Hanoi SAM Site C-16-2 | | X |

50X1, E.O.13526

## APPENDIX III (continued)

| COMIREX Number | Target | Mission Number 42 | 43 |
|---|---|---|---|
| [redacted] 50X1, E.O.13526 | Hanoi SAM Site A-05-2 | X | X |
| | Hanoi SAM SITE B-36B-2 | | |
| | Hanoi SAM Site C-03B-2 | X | X |
| | Hanoi SAM Site D-31C-2 | | |
| | Hanoi SAM Site C-05B-2 | X | X |
| | Hanoi SAM Site B-27-2 | X | X |
| | Hanoi SAM Site B-13-2 | X | X |
| | Hanoi SAM Site B-28-2 | X | X |
| | Hanoi SAM Site B-04A-2 | X | X |
| | Hanoi Prob. Site A | | |
| | Hanoi Prob. Site B | | |
| | Hanoi SAM Site C-01D-2 | X | X |
| | Hanoi SAM Site C-01E-2 | X | X |
| | Hanoi SAM Site C-29A-2 | X | X |
| | Hanoi SAM Site B-34A-2 | X | X |
| | Hanoi SAM Site D-35-2 | | |

## APPENDIX III (continued)

| COMIREX Number | Target | Mission Number 42 | Mission Number 43 |
|---|---|---|---|
| [redacted] 50X1, E.O.13526 | Vinh SAM Site A-01A-2 | | |
| [redacted] | Hanoi SAM Site A-15-2 | X | X |
| [redacted] | Hanoi SAM Site A-34-2 | X | X |
| [redacted] | Hanoi SAM Site B-36-2 | X | X |
| [redacted] | Hanoi SAM Site B-30B-2 | X | X |
| [redacted] | Hanoi SAM Site A-29-A | X | X |
| [redacted] | Hanoi SAM Site A-34-A | X | X |
| [redacted] | Hanoi SAM Site A-22-2 | X | X |
| [redacted] | Hanoi SAM Site A-15A-2 | X | X |
| [redacted] | Hanoi SAM Site A-32-2 | X | X |
| [redacted] | Hanoi SAM Site A-30-2 | X | X |
| [redacted] | Hanoi SAM Site A-24A-2 | | X |

## APPENDIX III (continued)

| COMIREX Number | Target | Mission Number | |
|---|---|---|---|
| | | 42 | 43 |
| [redacted] 50X1, E.O.13526 | Vinh SAM Site A-25-2 | | |
| | Hanoi Probable SAM Equipment Training Area | | |
| | Nan San SAM Site A-12-2 | | |
| | Nan San SAM Site C-12-2 | | |
| | Nan San SAM Site D-13-2 | | |
| * | Hanoi SAM Site | | |
| * | Hanoi SAM Site A-01A-2 | X | X |
| * | Hanoi SAM Site A-35-2 | | |
| * | Hanoi SAM Site B-23-2 | | |
| * | Hoa Binh SAM Site D-27-2 | | |
| * | Haiphong SAM Site A-25-2 | | |
| * | Haiphong SAM Site B-36-2 | X | X |
| * | Haiphong SAM Site A-16-2 | | |
| * | Haiphong SAM Site A-02A-2 | X | |
| * | Haiphong SAM Site | | |
| * | Thanh Hoa SAM Site D-31B-2 | | |

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*Unnumbered.

APPENDIX III (continued)

| COMIREX Number | Target | Mission Number 42 | Mission Number 43 |
|---|---|---|---|
| * | Ban Xom Lom SAM Site | | |
| * | Chin Chou SAM Site (China) | | |
| [redacted] | Hai Kou Airfield | | |
| [redacted] | Ling Shui Airfield | | |
| [redacted] | Meng Tzu Airfield West | | |
| [redacted] | Haiphong/Cat Bi Airfield | X | X |
| [redacted] | Haiphong/Kien An Airfield | X | X |
| [redacted] | Hanoi/Bac Mai Airfield | X | X |
| [redacted] | Hanoi/Gia Lam Airfield | X | X |
| [redacted] | Phuc Yen Airfield | X | X |
| [redacted] | Lang Son Airfield | X | X |
| [redacted] | Kep Airfield | X | X |
| [redacted] | Ning Ming Airfield | | |
| [redacted] | Chia Lai Shih Airfield | | |
| [redacted] | Ping Yuan Chieh Airfield | | |
| [redacted] | Tien Yang Airfield | | |

50X1, E.O.13526

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*Unnumbered.

50X1, E.O.13526

## APPENDIX III (continued)

| COMIREX Number | Target | Mission Number | |
|---|---|---|---|
| | | 42 | 43 |
| [redacted] | Yen Bai Airfield | X | X |
| [redacted] | Hoa Lac Airfield | X | X |
| [redacted] | Bai Thuong Airfield (2C0987) | X | X |
| * | Tho Khoi Helicopter Dispersal Area | | |
| * | Kep Ha Airfield | | |
| * | Hanoi Helicopter Dispersal Area | | |
| * | Hoa Lac Helicopter Dispersal Area | X | X |
| [redacted] | That Khe Air Facility | | |
| [redacted] | Pei Hai Naval Facility | | |
| [redacted] | Hsin Hsing Naval Facility | | |
| [redacted] | Port Wallut Naval Base | X | X |
| [redacted] | Haiphong Naval Base and Port Facilities | X | X |
| [redacted] | Cam Qha Port Facilities | | |
| [redacted] | Pai Lung Port Facilities | | X |

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*Unnumbered.

50X1, E.O.13526

50X1, E.O.13526

## APPENDIX III (continued)

| COMIREX Number | Target | Mission Number | |
|---|---|---|---|
| | | 42 | 43 |
| [redacted] | Cam Pha Port Facilities | X | X |
| [redacted] | Hon Gai Port Facilities | X | X |
| [redacted] | Ha Tou Shipyard | X | X |
| [redacted] | Ben Thuy Coastal Transport Point | X | X |
| [redacted] | Pei Li Port Facilities | X | X |
| * | Lam Dong Naval Dispersal Facility | | |
| * | Swatow PGM-Hanoi Area | | |
| [redacted] | Thanh Hoa BW/CW Research Facility | | |
| [redacted] | Lai Chau Complex | | |
| [redacted] | Ma Li Po Supply Depot | | |
| [redacted] | Mengtsu Military Complex | | |
| [redacted] | Ping Hsing Ammunition Depot | | X |
| [redacted] | Ping Hsing Army Depot | | X |
| [redacted] | Ping Hsing Military Storage East | | X |

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*Unnumbered.

50X1, E.O.13526

## APPENDIX III (continued)

| COMIREX Number | Target | Mission Number 42 | Mission Number 43 |
|---|---|---|---|
| [redacted] 50X1, E.O.13526 | Ping Hsiang Storage Area North | | X |
| | Chin Ping Infantry Division Headquarters A Barracks | | X |
| | Chin Ping Supply Depot NW | | X |
| | Ban Lot A Barracks | | |
| | Ha Giang Military Area | X | X |
| | Van Hoi Military Areas | X | X |
| | Wen Shan Army Barracks West | | |
| | Ho Kou Army Barracks North | X | |
| | Yen Shan Military Barracks and Storage Area | | |
| | Lang Son Army Barracks | | X |
| | Y Son Ammunition Depot | | |
| | Xom Hau A Army Supply Depot | X | |
| | Ngoc Thi Barracks Supply Depot | | |
| | Tai Xouan Army Barracks, Nam Vu | | |
| | Loc Binh Army Supply Depot | X | X |

## APPENDIX III (continued)

| COMIREX Number | Target | Mission Number 42 | 43 |
|---|---|---|---|
| [redacted] | Yen Bai Ordnance Depot | | |
| [redacted] | Thai Nguyen Army Supply Depot North | X | X |
| [redacted] | Liu Tiao Pan Army Supply Depot | X | |
| [redacted] | Bac Can Barracks A Supply Depot | | X |
| [redacted] | Bac Giang Military Areas | X | X |
| [redacted] | Mai Li Po Supply Depot | | X |
| [redacted] | Tung Chia Army Barracks | | |
| [redacted] | Ban Tchepone/NVN Special Area 1916 | X | X |
| [redacted] | Ba Binh Special Area 2009 | X | X |
| [redacted] | Ben Than Special Area 2013 | X | X |
| [redacted] | Vinh An Special Area 2014 | X | X |
| [redacted] | Vit Thu Lu/NVN Special Area | X | X |
| [redacted] | Ha Huang tien Highway U.C. | | X |
| [redacted] | Tsi Ti Pao Road | | |
| [redacted] | Wu Pu Chieh Road Construction | | |
| [redacted] | Hanoi/Lao Cai Railroad Segment 2 | X | X |

50X1, E.O.13526

## APPENDIX III (continued)

| COMIREX Number | Target | Mission Number | |
|---|---|---|---|
| | | 42 | 43 |
| [redacted] 50X1, E.O.13526 | Hanoi/Lao Cai Railroad Segment 1 | X | X |
| | Hanoi/Lao Cai Railroad Segment 3 | X | X |
| | Hanoi/Ping Hsiang Railroad Segment 2 | X | X |
| | Hanoi/Ping Hsiang Railroad Segment 1 | X | X |
| | Hanoi/Ping Hsiang Railroad Segment 3 | X | X |
| | Hanoi/Lao Cai Railroad Segment 4 | X | X |
| | Hanoi/Lao Cai Railroad Segment 5 | X | X |
| | An Cap Railroad Hanoi Thai Nguyen | X | X |
| | Ping Hsiang/Hanoi Railroad Segment 4 | | X |
| | Ho Kou Highway Segment, Route 24A | X | X |
| | Uong Bi Transformer Power Plant | | |
| | Tien Pao Highway Sec., Route 25A | | |
| | Chen Nan Kuan Highway Sec. | | X |
| | Ping Hsiang Complex | X | X |
| | Wen Shan Complex | | |
| | Dong Dang Railroad Yard | X | X |

## APPENDIX III (continued)

| COMIREX Number | Target | Mission Number | |
|---|---|---|---|
| | | 42 | 43 |
| 50X1, E.O.13526 | Phu Lang Thuong Complex | X | X |
| | Cao Bang Military Complex | X | X |
| | Lai Chau Complex | X | X |
| | Lang Son Complex | X | X |
| | Mon Cai Complex | X | X |
| | Tien Yen Complex | X | X |
| | Binh Lu Area | | |
| | Tuyen Quang Complex | X | X |
| | Yen Bai Complex | X | X |
| | Dien Bien Phu Complex | X | X |
| | Kep Complex | | |
| | Lao Cai Complex | X | X |
| | Haiphong Railroad Station Classification Yard | | |
| | Haiphong Railroad Station Classification Yard and Shops | X | X |
| | Viet Tri Railroad Yard | X | X |

50X1, E.O.13526

## APPENDIX III (continued)

| COMIREX Number | Target | Mission Number 42 | 43 |
|---|---|---|---|
| [redacted] | Yen Vien Railroad Classification Yard | X | X |
| * | Thai Nguyen Rail Activity | | |
| [redacted] | Kep Railroad Yard | X | X |
| [redacted] | Highway Segment 10E | | |
| [redacted] | Haiphong Highway Bridge | | |
| [redacted] | Van Diem Battery Plant | | |
| [redacted] | Hanoi Railroad - A Highway Bridge | | |
| [redacted] | Haiphong Warehouse Area Port | | |
| [redacted] | Van Diem Vehicle Depot | | |
| [redacted] | Hai Duong Railroad Siding West | | |
| [redacted] | Hai Duong Railroad Station | | |
| [redacted] | Hgoc Kuyet Railroad Station | | |
| [redacted] | Ta Xa PPS North | | |
| [redacted] | Loi Dong Warehouse Area | | |
| [redacted] | Railroad Segment R-3-A | | |

*Unnumbered.

50X1, E.O.13526

## APPENDIX III (continued)

| COMIREX Number | Target | Mission Number 42 | 43 |
|---|---|---|---|
| * | Ping Hsiang Railroad Transporting Yard Station and Shops | | |
| * | Ho Kou Vehicle Park | | |
| * | Hsia Shih Storage Areas | | |
| * | Ping Hsiang Storage Area | | |
| * | Thai Nguyen Unidentified Construction Activity | | |
| * | Hanoi/Haiphong Railroad | | |
| * | Hanoi/Haiphong Railroad | | |
| * | Hanoi Transformer Power Plant | | |
| * | Haiphong Transformer Power Plant East | | |
| * | Haiphong Transformer Power Plant West | | |
| * | Viet Tri Transformer Power Plant | | |
| * | Hon Gai Transformer Power Plant | | |
| * | Bac Giang Transformer Power Plant | | |

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*Unnumbered

## APPENDIX IV

### Number of Radar Signals Received by BLACK SHIELD Missions 1 January - 31 March 1968

|  | Mission Numbers |  |  |  |  |  |
|---|---|---|---|---|---|---|
| Radar | 42 | 43 | 47* | 51 | 53* | 56 |
| Fan Song | 4 | 11 |  |  |  |  |
| Big Mesh |  |  | 5 | 2 | 7 |  |
| Side Net |  |  | 2 |  | 1 | 3 |
| Rock Cake | 10 | 17 | 9 | 4 | 10 | 14 |
| Rice Cake |  |  |  |  | 1 |  |
| Cross Legs | 3 | 2 |  | 2 |  | 1 |
| Token |  |  | 11 | 1 | 9 |  |
| Cross Slot | 2 |  | 13 | 1 | 6 | 8 |
| Bar Lock | 1 | 3 | 6 | 2 |  | 1 |
| Tall King |  |  | 1 |  | 1 |  |
| Spoon Rest |  | 2 | 2 |  |  |  |
| Flat Face | 2 | 2 | 1 | 2 |  | 2 |
| Moon Face | 2 | 8 | 7 | 2 | 5 |  |
| Moon Mat II |  | 1 |  |  |  |  |
| Moon Cone | 2 | 1 | 1 |  | 2 |  |
| Whiff |  |  | 6 |  |  |  |
| Fire Can | 2 | 8 | 7 | 1 |  |  |

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*North Korean Missions

~~Top Secret~~

[redacted]

~~Top Secret~~

OSA

~~Top Secret~~
*No Foreign Dissem*

CENTRAL INTELLIGENCE AGENCY
UNITED STATES OF AMERICA

DIRECTORATE OF
SCIENCE & TECHNOLOGY

# *BLACK SHIELD*
## *Reconnaissance Missions*
## *1 April - 9 June 1968*

*Handle via*
*Byeman Comint*
*Channels Jointly*

~~Top Secret~~
OXCART
BYE No. 1367/68
DST-BS/BYE/68-3
7 August 1968
Copy No. 10

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~~DECLASSIFICATION~~

# BLACK SHIELD Reconnaissance Missions
## 1 April - 9 June 1968

DST-BS/BYE/68-3
7 August 1968

*CENTRAL INTELLIGENCE AGENCY*
*Directorate of Science and Technology*

# PREFACE

This report is the last of a series of resumes of the BLACK SHIELD reconnaissance program flown over North Vietnam and North Korea. This final report spans the period from 1 April to 9 June 1968. Only North Korean missions were flown during this time period.

## CONTENTS

## APPENDICES

## FIGURE

# BLACK SHIELD Reconnaissance Missions
## 1 April - 9 June 1968

## SUMMARY

Two BLACK SHIELD high-altitude reconnaissance missions were alerted during the period from 1 April to 9 June 1968. One mission was flown over North Korea. Approval was not granted for the other North Korean mission. (Appendix I lists these missions and related events).

Photography of BLACK SHIELD mission BX6858 flown over North Korea on 5 May 1968, although hampered by clouds and heavy haze, revealed no significant changes in North Korean military posture or disposition. Coverage of the DMZ, transportation, and infiltration routes disclosed no significant troop build-ups or logistic movements. (COMIREX targets photographed over North Korea are listed in Appendix II. Appendix III is a listing of the number and type of radar signals recorded by the System 6 Elint collection device).

## MISSION ANALYSIS

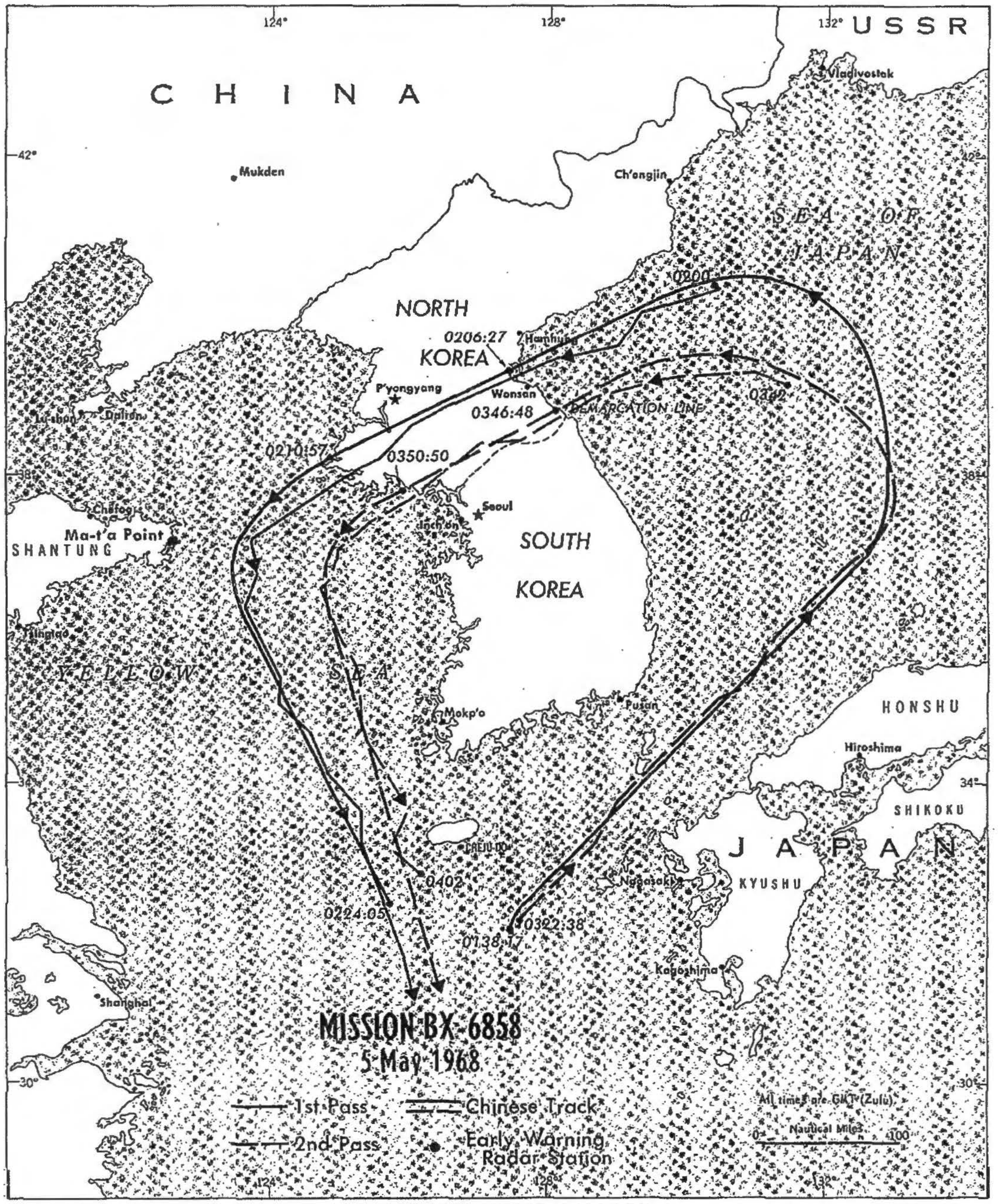
BX6858 was a double-pass, high-altitude reconnaissance mission flown over North Korea on 5 May 1968. The BLACK SHIELD vehicle entered and exited North Korean airspace on its first pass at 0206:27Z and 0210:57Z, and its second pass at 0346:48Z and 0350:50Z. Figure 1 shows the flight route and associated air surveillance tracking.

Interpretability of mission photography was severely hampered by cloud cover and heavy haze. The mission aircraft photographed 68 COMIREX targets plus 30 bonus targets. Of the targets photographed, 15 were SA-2 sites. Three of the SA-2 sites were occupied, one was unoccupied, and eleven were identified only. A possible SAMLET coastal defense cruise missile site was tentatively identified on the east coast between Wonsan and Ham hung. Existing weather conditions in the target area did not permit the photographing of the USS Pueblo.

There was no indication of a hostile weapons reaction. Air surveillance tracking of the mission vehicle was accomplished by elements of the Chinese Air Defense System (ADS) from 0200Z to 0233Z of the first pass and from 0342Z to 0402Z of the second pass. Initial detection and final track ground ranges for the Chinese radar station at Mata Point were 118 and 264 nautical miles, respectively. There was no indication of tracking by either the North Korean ADS or the Soviet ADS.

C05492938

~~TOP SECRET~~ TRINE OXCART



91561 8-68 CIA

~~TOP SECRET~~ TRINE OXCART
Handle via BYEMAN-COMINT Control Systems Jointly

## APPENDIX I

### BLACK SHIELD Operational Missions Alerted Between 1 April and 9 June 1968

| Mission No. | Date | Remarks |
|---|---|---|
| BX6857 | 27 Apr. 1968 (Korea) | Cancelled-no approval |
| BX6858 | 5 May 1968 (Korea) | Flown |

## APPENDIX II

### COMIREX Targets Covered by BLACK SHIELD Mission BX6858
5 May 1968

| COMIREX NO. | TARGET |
|---|---|
| [redacted] | Nampo Coastal Defense Site, 1 |
| [redacted] | Nampo Cruise Missile Site |
| [redacted] | Sinpo Possible Cruise Missile Site |
| [redacted] | Pyongyang Airfield, East |
| [redacted] | Sondok Airfield |
| [redacted] | Hwangju Airfield 2 |
| [redacted] | Onchon UP Airfield |
| [redacted] | Mayang Do Naval Base |
| [redacted] | Panja Ri Naval Facility |
| [redacted] | Pipa-Got Naval Dockyard |
| [redacted] | Chinnampo Port |
| [redacted] | Nampo Port Facilities |
| [redacted] | Nampo Shipyard |
| [redacted] | Chaho Nodongjagu Port Facilities |
| [redacted] | Hungnam Port Facilities |
| [redacted] | Pyongyang Biological Research Institute |
| [redacted] | Hoeyang Hq First Army Group |
| [redacted] | Hoeyang Army Barracks E |
| [redacted] | Hungnam Hamhung Military Activity |
| [redacted] | Hungnam Military Barracks Area |
| [redacted] | Kangdong Army Barracks East |
| [redacted] | Koksan Military Activity |
| [redacted] | Koksan Army Barracks A Stor Area SSW |
| [redacted] | Koksan Army Barracks A Hq Inf Div |
| [redacted] | Kumchon Barracks Areas |
| [redacted] | Pyongyang Airborne Training School |
| [redacted] | Pyongyang Army Barracks A Stor Area E |
| [redacted] | Pyongyang Ord Dep N Tongpo RI |
| [redacted] | Singye Military Activity |
| [redacted] | Yangdok Military Complex |
| [redacted] | Chong Dong Military Installation |
| [redacted] | Kumsong Army Barracks |
| [redacted] | Anhyop Army Bks A Hq 45th Inf Div |
| [redacted] | Sangjok Tong Army Barracks W |
| [redacted] | Sangjok Tong Army Bks A Hq 5th Inf Corps |

50X1, E.O.13526

| COMIREX NO. | TARGET |
|---|---|
| [redacted] | Masan Ni Army Bks A Hq 12th Inf Div |
| [redacted] | Changdo RI Army Bks Hq 2nd Inf Div |
| [redacted] | Changdo RI Army Barracks N |
| [redacted] | Changdo RI army Barracks NE |
| [redacted] | Sowon Dong Bks A Hq 8th Inf Div |
| [redacted] | Nasan Ni Army Barracks N |
| [redacted] | Wa Dong Army Barracks A Hq Inf Div |
| [redacted] | Ichon Army Bks NE AHQ 5th Inf Div |
| [redacted] | Ichon Army Barracks SSW |
| [redacted] | Koum Dong Army Barracks A Stor Opo |
| [redacted] | Soksadong Ni Army Bks/Hoejong Dong |
| [redacted] | Sam San Ni Military Installation |
| [redacted] | Sibyong Ni Storage Area |
| [redacted] | Sariwon Hq Inf Div |
| [redacted] | Inchon Hq Infantry Corps |
| [redacted] | Kaesong Complex |
| [redacted] | Yonan Complex |
| [redacted] | Kwangju |
| [redacted] | Koksan Complex |
| [redacted] | Sariwon Complex |
| [redacted] | Nampo Complex |
| [redacted] | Pyongyang RR Clf Rd Taedonggang |
| [redacted] | Pyongsan RR Yards |
| [redacted] | Pokkye RI RR Yards |
| [redacted] | Tosong Ni RR Yards |
| [redacted] | Nampo RR Station Yards A Shops |
| [redacted] | Kowon RR Clf Yards |
| [redacted] | Sariwon Railroad Yards |
| [redacted] | Pyongyang RR Clf Yards |
| [redacted] | Pyongyang RR Station and Yards |
| [redacted] | Pyongyang RR Clf Yard Sopo-Dong |
| [redacted] | Hamhung Railroad Yards |
| [redacted] | Pyongyang RR Yards |

50X1, E.O.13526

## APPENDIX III

Number of Radar Signals Received by BLACK SHIELD Mission BX6858,
5 May 1968

| | |
|---|---|
| Big Mesh | 2 |
| Side Net | 2 |
| Rock Cake | 4 |
| Cross Legs | 1 |
| Token | 3 |
| Cross Slot | 2 |
| Bar Lock | 11 |
| Moon Cone | 9 |
| One Eye | 1 |
| Long Talk | 1 |
| Moon Face | 3 |

C05492938

~~Top Secret~~

[redacted]

~~Top Secret~~

[redacted]

ANNEX 156

~~TOP SECRET~~

BYE 2417-67, Rev. #2
Copy 15 of 28
29 May 1967

MEMORANDUM FOR: Interdepartmental Contingency Planning Committee

SUBJECT: Contingency and Cover Plan for BLACK SHIELD Operations

1. Attached is Revision #2 to BYE 2417-67. This is the final version of the Interdepartmental Contingency and Cover Plan for BLACK SHIELD operations, as approved by the Interdepartmental Contingency Planning Committee.

2. This supersedes all previous versions of BYE 2417-67 which should be removed from the files and destroyed.

John Parangosky
JOHN PARANGOSKY
Acting Director of Special Activities

Handle Via
BYEMAN
Control System Only

OXCART
~~TOP SECRET~~

~~GROUP 1~~
~~Excluded from automatic~~
~~downgrading and~~
~~declassification~~

SA/D/SA/EFRoth:fd (29 May 1967)
Distribution:
#1 - Dr. Alexander Flax, D/NRO
#2 - Dr. Alexander Flax, D/NRO
#3 - Dr. Alexander Flax, D/NRO
#4 - Mr. Peter Jessup, Exec. Office of the President
#5 - Col Clason Saunders, AFRDR
#6 - Col Clason Saunders, AFRDR
#7 - Mr. Thomas Hughes, Dept. of State
#8 - Gen Ralph D. Steakley, JCS
#9 - Col William Hall, DIA
#10 - DD/S&T
#11 - D/SA
#12 - OXC/O/OSA
#13 - D/O/OSA
#14 - D/R&D/OSA
#15 - SA/D/SA
#16 - SS/OSA
#17 - SS/OSA
#18 - KWCABLE
#19 - Lockheed, Mr. C. L. Johnson (To be Hand Carried)
#20 - Hughes, Gene Peters and Marc Havard (To be Hand Carried)
#21 - Pratt & Whitney, William Gorton and Leonard Mallett (To be Hand Carried)
#22 - RB/OSA
23 - 28 - SA/D/SA

Attachment to
BYE 2417-67
Revision #2
29 May 1967

# INTERDEPARTMENTAL CONTINGENCY PLAN FOR BLACK SHIELD OPERATIONS

## I. MISSION:

To obtain high resolution photographic coverage of priority targets in North Vietnam by utilization of OXCART (A-12) aircraft staging from Kadena AB, Okinawa. The proposed operation does not include overflight of Mainland China.

## II. OBJECTIVES:

A. To conduct overflight operations with the least amount of publicity and to protect the true nature of the mission.

B. To conceal intelligence community (particularly CIA) participation in the development and utilization of the A-12.

C. To provide herein guidance and procedures to be adhered to should the following situations occur:

1. Protest without incident.
2. Loss of aircraft in Communist Bloc country.
3. Emergency landing or bailout in hostile neutral areas.
4. Landing at alternate air base.

D. To provide instructions to the pilot for contingency situations.

## III. GENERAL:

A. For purposes of this contingency plan Mainland China, North Vietnam and Laos will be considered Communist Bloc countries.

Burma and Cambodia are considered to be hostile neutrals.

B. On operational overflights the BLACK SHIELD aircraft will carry no markings other than tail numbers.

## IV. POSSIBLE CONTINGENCIES:

A. Presence of OXCART at Kadena.

In the event of a formal (i.e., press or quasi-official) inquiry as to the identity of the vehicles at Okinawa or the nature of the mission, the Kadena Public Information Officer will state that they are experimental test bed versions of the YF-12A and SR-71 family which are at Okinawa to undergo field tests. He will further state, if necessary, that any additional inquiries will have to be answered by the Office of the Secretary of the Air Force. Other than that stated above no additional information will be released at Okinawa regarding the mission. The Office of the Secretary of the Air Force, if queried, will verify the information released by the PIO, Kadena without further comment or details.

B. Protest without incident.

1. Should a successful overflight evoke a protest or public denunciation by the opposition, the aircraft being described as an SR-71/YF-12A or Mach 3 type, all personnel in the field will disclaim any knowledge of the overflight. Such disclaimer will not be volunteered but will be offered only in response to direct query. An exception to this procedure is considered appropriate in the case of queries directed to U.S. Ambassadors. They will neither disclaim nor acknowledge awareness of any overflight and refer such queries to the State Department.

2. If queries are directed to the government officials in Washington, D. C., the initial response will be "No Comment". After reviewing the circumstances of the situation the 303 Committee

may determine that a further response is required. This would consist of an appropriately worded statement acknowledging the use of an unarmed reconnaissance aircraft for essential surveillance of North Vietnam military activity. Details concerning the operation, sponsorship and basing of the aircraft will not be divulged. The Committee will designate the appropriate spokesman.

C. Loss of Aircraft in Communist Bloc Country.

1. If a BLACK SHIELD aircraft is lost in Communist Bloc territory, whether from hostile action or other cause, no statement will be volunteered until there has been a full evaluation by the 303 Committee of the circumstances surrounding the incident and the political ramifications.

2. News media queries generated by opposition statements will be referred to the State Department. The latter, through a properly designated spokesman, initially will state only that the alleged incident is under investigation.

3. After evaluation the 303 Committee will authorize an appropriately worded statement. The sole spokesman for the U. S. Government will be the Department of State. The Committee will initially consider the adequacy of the following suggested responses in light of the circumstances.

Loss of Aircraft in North Vietnam:

If pilot fate uncertain or known dead: "No Comment". If pilot alive, produced and identified as CIA employee: "A reconnaissance aircraft was lost during operations over North Vietnam. The matter is still under investigation and no further details are available at this time."

Loss of Aircraft in China or Laos:

"A reconnaissance aircraft was lost during a mission intended to reconnoiter North Vietnam. It now appears possible that the pilot may have strayed off course due to mechanical difficulties and crashed in Communist China (or Laos, as appropriate). No further details are available at this time."

4. Depending on the circumstances, the 303 Committee will further consider:

a. The necessity of acknowledging the pilot's identity and CIA affiliation.

b. The necessity of making some statement as to the place of mission origin.

c. The necessity of making some statement to refute possible allegations that mission was intended to reconnoiter Communist China.

d. The necessity of identifying a particular type of aircraft.

D. Landing at alternate air base.

If, during the course of an operational mission, the aircraft should be required to land at an alternate air base, in response to query the aircraft will be described as an experimental test bed version of the YF-12A/SR-71 family on a routine field test flight. Further details concerning the aircraft and the field test program are classified.

## V. INSTRUCTIONS TO THE PILOT

A. If the pilot is forced down in Communist Bloc territory, he will adhere to the provisions of Headquarters Directive 50-1055-24, dated 27 October 1965 (approved by the 303 Committee 16 December 1965. See BYE 3066-65, dated 26 November 1965) which states, in essence, that he will give:

1. Name

2. Date and Place of Birth

3. Address in United States

4. CIA Affiliation (Civilian)

(NOTE: All project pilots have been thoroughly indoctrinated in the procedures prescribed in the referenced Headquarters Directive, including resistance to interrogation training. The foregoing instructions are consistent with the psychological preparation they have undergone throughout their assignment to the Program.)

B. In the extremely remote possibility that the pilot should be forced down in Burma or Cambodia, he will not disclose his CIA affiliation. He will state that he is a civilian test pilot ferrying the aircraft from Okinawa to Thailand. His overflight was inadvertent and due to mechanical malfunction of his Inertial Guidance System. A dummy map of the alleged ferry flight will be carried to backstop his story. He will request that the American Consulate be notified of the situation.

## VI. COORDINATION

A. Washington, D. C. Area

1. The following named individuals are being furnished a copy of this document for purposes of internal coordination with cleared personnel within their respective departments:

Dr. Alexander Flax - D/NRO
Mr. Peter Jessup - Executive Office of the President
Brig Gen Paul N. Bacalis - D/SA, Central Intelligence Agency
Col Clason Saunders - AFRDR
Mr. Thomas Hughes - D/INR, Department of State
Brig Gen Ralph D. Steakley - JCS
Col William Hall - DIA
Maj Gen Eugene LeBailly - SAFOI

B. Outside Washington, D. C.

1. Officials at Lockheed (C. L. Johnson), at Hughes (Gene Peters and Marc Havard) and at Pratt & Whitney (William Gorton and Leonard Mallett) have been briefed on this contingency plan and the handling of inquiries should they be made.

2. Commander Detachment D, Col Hugh C. Slater, has been briefed and furnished a copy of this plan.

VII. It is recommended that each Agency maintain a list of all cleared personnel within their respective organization who have been briefed on this cover plan.

VIII. The Central Intelligence Agency will notify each Agency of any change to this plan and in turn requests that any alterations be coordinated with the CIA prior to implementation:

CIA CONTACT: James C. Johnson, Security Officer

OFFICE TELEPHONE: CODE 143 or 351-4397

CIA CONTROL CENTER: CODE 143 or 351-5771

HOME TELEPHONE: 354-3387

[redacted]

ANNEX 157

# U.S. Spy Jet Is Missing Over Pacific

NAHA, Okinawa, June 5 (UPI)—A U.S. Air Force SR-71, fastest plane in the world, is missing and presumed crashed in the Pacific, American military spokesmen said today.

The test version of the high altitude reconnaissance jet—successor to the U-2 spy plane used over the Soviet Union and China—was reported overdue yesterday during a "routine training flight" from the local air force base.

[The SR-71 also has been flying out of Thailand's Takhli fighter base, George Wilson of The Washington Post reported from Saigon May 22. The plane was believed to be keeping track of North Vietnamese military traffic and monitoring China's border.

[Wilson reported that the CIA is involved in the reconnaissance flights from Thailand, and that the SR-71s rotate between Takhli and Kadena Air Force Base on Okinawa, apparently for security reasons.]

The pilot of the black, needle-nosed plane sent a final message from a spot about 600 miles south of here and 500 miles east of Manila, the spokesmen said.

American military officials have launched a search operation.

THE WASHINGTON POST Thursday, June 6, 1968 A 31

Good Mornings Begin with The
Morning Star
OKINAWA

NE NUMBER 099-(899)-5155 MONDAY, JUNE 10, 1968 STAR PHONE NUMBER 0

# Missing KAFB Pilot Identified

WASHINGTON, June 9 (UPI) — The Air Force today identified the pilot of a supersonic test aircraft reported missing in the Pacific since June 4 as Jack W. Weeks of Los Angeles, an employe of the Hughes Aircraft Corp.

The plane was last heard from about 600 miles south of Kadena, Okinawa, and 500 miles east of Manila. The Air Force described the plane as a "YF-12A/SR-71 type test aircraft."

Only a few prototypes of the 2,000-mile an hour interceptor have been built, and it currently is not scheduled for mass production.

The missing plane was a reconnaissance model which has been operated for some time by the Strategic Air Command.

A "test bed" aircraft is one being used to test equipment. The Air Force said the plane was engaged in "field testing." But it would not say what kind.

[redacted]

ANNEX 158

## AIRCRAFT LOSSES

a. A-12 Aircraft: Four A-12 aircraft losses were experienced during test/training phase, and one aircraft was lost during operational phase while on a functional check flight.

(1) Aircraft No. 123:

- (a) 24 May 1963
- (b) Pilot: Kenneth Collins (Project pilot)
- (c) Location: 14 miles South of Wendover, Utah
- (d) Cause: Materiel failure - pitot system
- (e) Successful ejection at 36,000 feet

(2) Aircraft No. 133:

- (a) 9 July 1964
- (b) Pilot: William Park (LAC)
- (c) Location: Area 51
- (d) Cause: Materiel failure - Elevon Servo valve
- (e) Successful ejection at 200 feet

(3) Aircraft No 126:

- (a) 28 December 1965
- (b) Pilot: Mele Vojvodich (Project pilot)
- (c) Location: Area 51
- (d) Cause: Maintenance error - stability augmentation system pitch and yaw rate gyros connected in reverse.
- (e) Successful ejection at 150 feet

(4) Aircraft No. 125:

(a) 5 January 1967

(b) Pilot: Walter Ray (Project Pilot)

(c) Location: near Leith, Nevada

(d) Cause: Fuel depletion - probable fuel gage error

(e) Unsuccessful ejection - fatality

(5) Aircraft No. 129:

(a) 4 June 1968

(b) Pilot: Jack W. Weeks (Project pilot)

(c) Location: 520 N.M. East of Phillipines

(d) Cause: Unknown, Probable catastrophic engine failure

(e) Ejection: Unknown - Fatality

b. F-101 Aircraft: Two F-101 aircraft losses were experienced as follows:

(1) Aircraft No. 56272:

(a) 1 June 1967

(b) Pilot: Lt. Col. Welton King (USAF detailee)

(c) Location: Kadena AB, Okinawa

(d) Cause: Materiel failure - aircraft tail section separated in flight.

(e) Unsuccessful ejection at low altitude - fatality

[redacted]

ANNEX 159

~~SECRET~~

# COMMANDER'S MONTHLY

# ACTIVITIES REPORT

## STATION "D"

## AUGUST 1967

~~SECRET~~

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# INDEX

~~S E C R E T~~

[redacted] THE FOLLOWING IS A SUMMARY OF THE BASE SUPPORT ACTIVITIES FOR THE MONTH OF AUGUST:

MILITARY PERSONNEL:

[redacted] 1. The total strength, assigned and attached for this Detachment as of 31 August, is as follows:

[redacted]

| | OFFICERS | | AIRMEN | | TOTALS | |
|---|---|---|---|---|---|---|
| | AREA | B/S | AREA | B/S | AREA | B/S |
| Assigned<br>[redacted]et 1, 1129 USAF SAS | 28 | 12 | 150 | 34 | 178 | 46 |
| Attached<br>[redacted]et 1, 2nd Wea Sq | 4 | 0 | 10 | 2 | 14 | 2 |
| Attached<br>[redacted]et 11, 1800 Spt Sq | 1 | 0 | 32 | 2 | 33 | 2 |
| Attached<br>[redacted]q SAC | 2 | 0 | 0 | 0 | 2 | 0 |
| [redacted] TOTALS | 35 | 12 | 192 | 38 | 227 | 50 |

[redacted] 2. The following personnel departed this station during this period for the reason indicated:

| [redacted]GRADE | NAME | SECTION | REASON |
|---|---|---|---|
| COL | Burton S. Barrett | COMD | Reassignment |
| [redacted]MSGT | Douglas F. Buie | Acft Maint | Reassignment |
| MSGT | Frank V. Derby | Acft Maint | Retirement |
| MSGT | Robert A. Fernandez | Operations | Reassignment |
| TSGT | James L. Sanford | Acft Maint | Reassignment |
| [redacted]TSGT | Leamon E. Smith | Fire Dept | Retirement |
| SSGT | Westley L. Brees | Acft Maint | Reassignment |
| CMSGT | William R. Hufhand | AFCS | Retirement |
| [redacted]MSGT | Olga C. Lytton | AFCS | Reassignment |
| MSGT | Ronald E. Pletsch | Weather | Retirement |

[redacted] STAFF PERSONNEL:

1. The number of Staff Personnel decreased one (1) during the Month of August with the departure of Mr. James H. Foss.

[redacted] CONTRACT PERSONNEL:

[redacted] 1. Contract Security Guard Strength remained the same as July.

[redacted]

[redacted]

[redacted]

~~S E C R E T~~

MOTOR POOL:

1. During this period there were:

9739 Gallons of gasoline issued to USAF vehicles and equipment.
701 Gallons of gasoline issued to AEC vehicles and equipment.
857 Quarts of oil issued.
5978 Gallons of diesel issued to USAF vehicles and equipment.
45 Requisitions submitted thru REECO.
146 Requisitions submitted thru base supply on 1150.
41 Requisitions submitted thru base supply VVP.
702 Items issued on recap sheet at parts warehouse.
92 Work orders written.
31 Trips tickets issued.
20 Drivers license issued.

2. There was one (1) vehicle received during this period. (1) Sweeper Rotary.
3. There was two (2) vehicles turned in during this period. (1) Fork Lift 6,000LB. (1) Tractor Warehouse 4,000LB. DBP.
4. There is one (1) vechile deadlined at this time.

BASE FINANCE:

1. Expenditures and obligations of FY-68 station funds during August totaled $114,350.00. This was an increase of $25,774.00 over FY-67 funds for the same period last year. In addition we expensed and obligated $30,600.00 against Headquarters funds for travel of contractor personnel in support of Black Shield. This is an increase of $28,675.00 over FY-67 funds for the same period last year. A total of 723 individual vouchers were processed during the Month.

2. Personnel strength, assigned and attached, decreased from 440 in August to 386 this Month, a decrease of 54 (12.2%).

BASE CIVIL ENGINEERS:

1. Construction: There was no construction started or completed in August.

2. Maintenance: 14 Work Requests (AF Form 332) from various base supported activities were processed. 9 maintenance work orders were completed. 307 emergency work requests ( service calls) were received and processed.

3. Utilities: 4,106,600 gallons of water were consumed, for a daily average of 132,460 gallons. 18,132 gallons of fuel were used to operate the base heating plants.

BASE FIRE DEPARTMENT:

1. Emergency Responses: Responded to four (4) airborne emergencies and three (3) ground responses during the Month.

2. Fire Prevention Inspection: There were a total of 604 inspections made of housing facilities. There were 205 inspections made of hangars, shops, and other working facilities.

3. Extinguisher Maintenance: 14 CO2 extinguishers repaired, 10 15LB CO2 extinguishers weighted and checked, 5 CO2 extinguishers replaced, 4 new extinguishers installed.

4. HH-43B Section Activities: One hot drill fire 6 man hours, 12 special missions 12 man hours, 2 mission supports 6 man hours, 3 special projects 6 man hours, One TSGT received stanboard check.

5. Traning: B-52 Rescue Procedures, 40 man hours.

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Control System

WILLIAM M. FAIRHALL AND ASSOCIATES:

Attached is Mr. Fairhall's Area 51 Activities report for the Month of August 67.

~~SECRET~~

THE FOLLOWING IS THE STRENGTH BREAKDOWN FOR THIS STATION AS OF 31 AUGUST 1967:

| CONTRACTOR | AREA | KADENA | TOTAL |
|---|---|---|---|
| **REECO:** | | | |
| Construction | 0 | 0 | 0 |
| Maintenance | 75 | 0 | 75 |
| General Office - Supervisor | 16 | 1 | 17 |
| Culinary - Kitchen | 45 | 0 | 45 |
| Culinary - Janitorial and Housing | 43 | 0 | 43 |
| TOTAL--- | 179 | 1 | 180 |
| **LOCKHEED:** | | | |
| Engineers/Maintenance/Supply/ | 275 | 102 | 377 |
| TOTAL--- | 275 | 102 | 377 |
| **CONTRACTORS:** | | | |
| MH/MINN | 11 | 3 | 14 |
| HYCON | 8 | 0 | 8 |
| MH/FLA | 27 | 12 | 39 |
| EK | 6 | 1 | 7 |
| PE | 13 | 11 | 24 |
| EG&G | 28 | 0 | 28 |
| P&W | 44 | 8 | 52 |
| HAM STAND | 2 | 0 | 2 |
| FIREWEL | 3 | 1 | 4 |
| DAVID CLARK | 3 | 1 | 4 |
| COLLINS RADIO | 3 | 3 | 6 |
| MAGNAVOX | 3 | 3 | 6 |
| AIRESEARCH | 4 | 3 | 7 |
| BAIRD ATOMIC | 1 | 1 | 2 |
| UNIVAC | 2 | 0 | 2 |
| SANDERS | 1 | 1 | 2 |
| EDL | 2 | 2 | 4 |
| SRL | 2 | 2 | 4 |
| RCA | 2 | 0 | 2 |
| HAC | 8 | 4 | 12 |
| TRW | 0 | 1 | 1 |
| TOTAL--- | 173 | 57 | 230 |
| **BASE STAFF COMPLEMENT:** | | | |
| Civilian: | | | |
| Staff | 22 | 18 | 40 |
| Staff TDY: Admin/Security | 1 | 1 | 2 |
| Contract: | | | |
| Security Guards | 31 | 22 | 53 |
| Other Contracts | 6 | 2 | 8 |
| Drivers | 3 | 3 | 6 |
| TOTAL--- | 63 | 46 | 109 |
| **MILITARY:** | | | |
| Officers Assigned | 28 | 12 | 40 |
| Officers Attached (WEA/AFCS) | 5 | 0 | 5 |
| Officers Attached (SAC) | 2 | 0 | 2 |
| Officers TDY Tagboard | 6 | 0 | 6 |
| Airmen TDY Tagboard | 15 | 0 | 15 |
| Airmen Assigned | 150 | 34 | 184 |
| Airmen Attached | 42 | 4 | 46 |
| TOTAL__ | 248 | 50 | 298 |
| GRAND TOTAL STRENGTH AS OF 31 AUGUST 1967:--------- | 938 | 256 | 1,194 |

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Control System

# ACTIVITIES REPORT
# FOR
# WILLIAM M. FAIRHALL
# AND
# ASSOCIATES
# CONSULTING ENGINEERS

(AREA 51)

PERIOD: August 1 to August 31, 1967

## A. ENGINEERING OFFICE

(1) Final Plans and Specifications for New Construction Activities at Beale Air Force Base were completed and delivered to the Base Engineer on August 2, 1967. At the present time, the work on this Project is waiting for final allocation of funds, prior to the further action by the Procurement Officer.

## B. TRAVEL

Dave Welles of this Office, delivered the Plans and Specifications on the Beale Project on August 2, 1967.

William M. Fairhall

William M. Fairhall

Handle via BYEMAN
Control System

~~S-E-C-R-E-T~~

## MATERIEL ANNEX TO MONTHLY ACTIVITY REPORT

## PROJECT AIRCRAFT MAINTENANCE

1. Sorties and flying time: (Does not include deployment flights)

| | | |
|---|---|---|
| Aircraft 124 | 5 Sorties | 10:20 total flying hours |
| Aircraft 128 | 1 Sortie | 1:20 total flying hours |
| Aircraft 130 | 4 Sorties | 9:00 total flying hours |
| Aircraft 132 | 5 Sorties | 9:45 total flying hours |
| TOTAL: | 15 Sorties | 30:25 total flying hours |

## SUPPORT AIRCRAFT MAINTENANCE

1. Personnel: Auth: 47 O/H: 49 Due In: 0

2. Sorties and flying time:

| | Sorties | Flying Time |
|---|---|---|
| C-130B | 53 | 119.5 |
| F-101 | 87 | 110.0 |
| UH-1F | 32 | 32.2 |
| T-33 | 46 | 75.4 |
| U-3B | 27 | 30.8 |
| TOTAL | 245 | 367.9 |

3. Maintenance:

a. T-33, 58-670 - Output from Hill - Phase Inspection.

4. The C-130 airlifted 125.5 tons of cargo during this period.

## POL

1. Personnel: Auth: 28 O/H: 21

2. Servicing: 77 project aircraft were refueled/defueled.

3. Storage:

a. During this period, 39 commercial carriers were offloaded.

~~S-E-C-R-E-T~~

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b. The average storage levels, total receipts and issues for the period are as follows:

| TYPE | AUG LEVEL | TOTAL RECEIPTS | TOTAL ISSUES |
|---|---|---|---|
| PF-1A | 972,214 | 81,324 | 199,171 |
| Jp-4 | 167,440 | 243,832 | 257,816 |
| AVGAS | 5,250 | 4,700 | 5,292 |
| LN2 | 3,675 | 10,800 | 5,250 |
| L02 | 4,075 | 7,300 | 1,350 |
| PS-67A | 54 | 0 | 18 |
| A-50 | 206 | 0 | 102 |

## SUPPLY

1. Personnel: Auth: 55 O/H: 45

2. Storage:

30,128 Sq Ft Inside (net) 95% utilized.
50,230 Sq Ft Outside (net) 48% utilized.

3.

| | |
|---|---|
| Requisitions to Depot | 1,274 |
| Line Items Processed | 12,657 |
| Line Items Issued or Shipped | 4,458 |
| Active Stock Records Maintained | 28,922 |
| Freight Received | 356,221 |
| Freight Shipped | 305,766 |

4. Inventory:

| | |
|---|---|
| Cycle | 0 |
| Special | 0 |

5. Bench Stock:

Fill rate to organization

| | |
|---|---|
| Federal | 97.5% |
| Prime | 100% |

Fill rate by Depot

| | |
|---|---|
| Federal | 84% |
| Prime | 85% |

6. BEMO:

| | |
|---|---|
| Line Items Requisitioned | 22 |
| Line Items Turned In | 120 |
| Line Items Received | 91 |

[redacted]

7. P-438 Funds:

Accumulative total of P-438 funded items requested from depot is $104,692.37.

8. Machine Room:

| | Key Punch | Reproducer | Tape Sys | Sorter | Interptr |
|---|---|---|---|---|---|
| Utilization Hours | 140 | 38 | 75 | 20 | 45 |
| Breakdown Hours | | | 101 | | |

Tape System: Had motor replaced, power roller replaced. Reason for delay, parts had to be ordered from company.

## OPERATIONS ANNEX TO MONTHLY ACTIVITY REPORT

(AUGUST 1967)

### 1. AIR TRAFFIC:

| | SCHEDULED | FLOWN |
|---|---|---|
| a. A-12 | | |
| Detachment/Aircraft Pilots | 20 | 14 |
| Lockheed/Aircraft Pilots | 1 | 1 |
| b. F-101 | | |
| Detachment Chase | 23 | 16 |
| Lockheed Chase | 2 | 2 |
| B-52 Chase | 1 | 1 |
| Proficiency (Includes FCF) | 77 | 68 |
| Total: | 103 | 87 |
| c. Air Refueling: | | |
| KC-135 | 22 | 18 |
| A-12 | 21 | 14 |
| F-101 | 14 | 11 |

### 2. OPERATIONS AND TRAINING DIVISION:

a. UH-1F Support:

(1) Training Accomplishments:

(a) Proficiency Flights: 17 sorties, 18:40 hours.

(b) Flight Checks: Annual Instrument (Capt Pinaud).

(2) Support Flights:

(a) Parachute Search & Pick-up (EG & G): 6 sorties, time: 4:55 hours.

(b) Parachute drops: 4 sorties, time: 1:10 hours.

(c) Scramble Missions: Dutch emergencies - 3 sorties, 1:00; Precautionary orbit after major maint (Dutch) - 1 sortie, 0:10; Precautionary orbit, B-52 takeoff & landing - 5 sorties, 2:25; F-105 emergencies - 1 sortie, 0:20.

(3) Miscellaneous Flights and Activity:

(a) Baldy, 7 people and 6 drums of fuel - 3 sorties, 3:30.

(b) Functional test flight: 1 sortie, 0:10

(c) Capt Pinaud completed testing & test report on URT-21 installation in Dutch parachutes.

b. Survival Training Section:

(1) EG&G Test Project:

(a) Total missions: 10

(b) Total high altitude drops: 2

(c) Total low altitude drops: 20

(2) Parachute Jumps: 16 static line

(3) Survival Training:

(a) Overwater bailout procedures and use of equipment: 11 SAC Personnel

(b) New treeletdown device and the new mod on the placing of the URT-21 radio in the CYG parachute: 3 Project pilots.

(4) Special Projects:

(a) Completed testing and made report on the URT-21 radio installation in the cygnus pilots parachute.

(b) MSgt Staggs met with Capt Bassett, Project Hqs, and vendors on 10 August on the installation of a battery pack in the cygnus pilots parachute. One device was selected for use.

(c) Tested outer garment that had larger floatation cells and the automatic inflation device.

(5) Personnel:

(a) MSgt Bailey returned from TDY at Color, departed again 16 August to attend a two month Project Hqs special school.

(b) TSgt Schneider departed on 23 Augest to Color for Approximately 2 weeks TDY to give training to P.P.

(6) Miscellaneous:

(a) Completed the six month inspection of the emergency survival kits.

(b) Received two tree letdown devices for training use.

(c) Mr Kent Baylor, Project Hqs, visited Las Vegas 16 August. He and MSgt Staggs met with Mr Les Arndt (Mr Arndt is in charge of the parasail boats) concerning parasail training. Mr Baylor wanted to see the site presently used for parasail training and to survey the lake for other sites. The return of the boats and crews and next years parasail training program was also discussed.

3. <u>MISSION SUPPORT DIVISION</u>:

a. Mission Planning:

(1) Three new routes (map/film strips and pilot maps) have been constructed in support of the current testing and validation.

(2) Procedures for the control and timing of flights has been coordinated with the FAA and Project Hqs.

b. Performance: Revision 1 to the Black Shield Operations Order "Scope Heaven", 54-67-01, and "Super Maiden", 53-67-01, have been completed and transmitted to Project Hqs.

c. Personnel: MSgt Robert A. Fernandez departed this station on 16 August PCS.

d. Automation: Mr John G. Papageorge, 1004 Programmmer/Operator, arrived on station TDY from Project Hqs. Continued with normal reporting.

e. Periscope Section:

(1) Mr W. W. Striker arrived from the home plant to instruct Mr Hicks in the alignment of the optical system.

(2) All systems have been checked and it has been decided to replace the system in Article 132.

(3) Alignment of periscope system is currently in progress.

4. <u>LIFE SUPPORT DIVISION</u>:

a. A total of 20 flight procedures were supported for the month of August by the Life Support Division.

| | |
|---|---|
| 11 | Project Suit Flights |
| 9 | Project Low Flights |
| 0 | Hangar Flights |
| 20 | Total |

b. A total of seven low pressure chamber flights were accomplished.

c. No further testing of the constant flow thermal protective helmet has been done to date.

d. Problem Areas:

(1) Visor reflections remain a problem.

e. Suit Status:

(1) 1049-1 is at Edwards AFB on hand receipt.

(2) 1051-3 and 1054-4 have been returned to the factory for zipper replacements.

(3) 1046 (7-3), 1046-3, 1050-3, 1050-4, 1052-3, and 1052-4 are TDY.

(4) All other suit configurations are in service and satisfactory.

5. OPERATIONS EVALUATION DIVISION:

a. Standardization/Evaluation flight check activity for August consisted of written and flight examination as indicated below by type aircraft:

A-12 ---------------- 2

F-101 --------------- 5

T-33 ---------------- 4

C-130 --------------- 4

U-3B ---------------- 3

UH-1F --------------- 1

Total: 19

b. Conducted a condensed ground school to qualify Lt General Martin for front cockpit flight in TA-12 aircraft.

c. DCOE met with LAC representatives to coordinate a major revision to A-12 emergency procedures.

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# AEROSPACE MEDICINE REPORT

## AUGUST 1967

## SECTION I FLIGHT MEDICINE

1. Health of Flying Personnel:

   a. Lt Col Simon was placed on DNIF for 1 week with gastroenteritis; and Major Gugin placed on DNIF for 2 weeks for hemorrhoidectomy.

2. Flying Safety and Equipment:

   a. See Physiological Training Section of DCO monthly report.

   b. Flying Safety meeting was not held this month.

3. Training, Administration and Research:

   a. Dr. Nichols and Sgt Gerholt departed TDY.

   b. Dr. Dake on leave from 7 August to 28 August 1967.

   c. MSgt Oswalt reenlisted during this reporting period.

   d. Dr. Dake made 3 parachute jumps during the month of August.

   e. Dr. Flickinger visited the area on 28 Aug 67 to coordinate medical matters.

## SECTION II PUBLIC HEALTH

A. Sanitary inspections of various facilities were made during this period with satisfactory results.

B. One airman was hospitalized at Nellis AFB Hospital with a diagnosis of Myocardial Infarction.

## SECTION III STATISTICAL SUMMARY

1. During this reporting period there were 719 patient visits recorded at the area medical facility. 490 were for medical care according to the following breakdown; USAF-146, DAFC - 50, REECo - 96, Military Dependents - 59 (at USAF Hospital, Nellis AFB) and 139 other civilian contractor personnel. 8 Flying and 8 Non-flying physical examinations were performed. 44 Food Handler examinations were performed. A total of 435 shots were administered to all categories of personnel. A total of 46 other tests/examinations were performed.

2. A total of 299 patients were seen at the forward area according to the following breakdown; USAF - 139, DAFC - 41, Civilian contract personnel - 119. There were 172 immunizations administered to all categories of personnel.

3. Flight Line coverage was provided for all flying activities and the medical department responded to 4 crash calls.

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## COMMUNICATIONS ANNEX TO MONTHLY ACTIVITIES REPORT

AUGUST 1967

[redacted]

[redacted] PERSONNEL:

[redacted] Mr. Conley Marcum departed for Kadena TDY on 2 August.

Mr. Harry Gillum departed for Kandena TDY on 9 August.

[redacted] Mr. John McClintock returned from Kadena TDY on 11 August.

Mr. James Bodnar returned from Kadena TDY on 11 August.

[redacted] Mr. David Stevens departed for Kadena TDY on 23 August.

[redacted] Mr. Barry Gowan returned from Kadena TDY on 25 August.

II. COMMUNICATIONS PERSONNEL STRENGTH SUMMARY:

[redacted]

| | Senior Officers | Engineering & Technical | Operations | Signal Center | Total |
|---|---|---|---|---|---|
| [redacted] PCS on board beginning of Month | 2 | 8 | 5 | 10 | 25 |
| [redacted] PCS on board end of Month | 2 | 8 | 5 | 10 | 25 |
| [redacted] TDY to Area Man/Days | 0 | 0 | 0 | 0 | 0 |
| [redacted] TDY from Area Man/Days | 30 | 120 | 70 | 124 | 344 |

[redacted] Area Communicators worked a total of 50 hours overtime during August.

[redacted] SIGNAL CENTER ACTIVITY:

[redacted] 1. The following is a summary of cable traffic volumes for the past three Months;

| MONTH | INCOMING MESSAGES | OUTGOING MESSAGES | TRANSMISSIONS IN (INCL RELAYS) | TRANSMISSIONS OUT (INCL RELAYS) |
|---|---|---|---|---|
| [redacted] JUNE | 1791 | 867 | 4446 | 4838 |
| JULY | 1448 | 595 | 4314 | 4320 |
| [redacted] AUGUST | 1672 | 644 | 4730 | 4996 |

[redacted] 2. Telecons with PW/Fla: There were 28 Telecons lasting a total of 9 Hrs & 35 Min.

[redacted]

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3. During August, the Auxiliary Signal Center in the Command Post was manned for 31 hrs & 54 Min. Time spent there is broken down as follows:

| | | |
|---|---|---|
| DATACOM | 32 transmissions | lasting 11 Hrs & 55 Min. |
| HY-2 | 29 conversations | lasting 19 Hrs & 59 Min. |

V. SYSTEMS:

1. BIRDWATCHER: Communications personnel operated the Birdwatcher ground readout system for a total of 23 Hrs & 35 Min covering 10 missions with 3 Cygnus aircraft.

2. HF SINGLE SIDEBAND: No problems were encountered with the HFSSB equipment during the Month. Routine adjustments and line checks were made on the transceivers and remoting equipment during the Month.

VI. OPERATIONS: The Communications annex portion of the Headquarters Operation Plan 54-67 Revision One (Scope Heaven) was reviewed and revised for inclusion in Area Operations Order 54-67-01 Revision One.

VII. COLLATERAL SERVICES:

1. TELEPHONES: A total of 9 seperate work orders for service were handled during the Month.

2. TELEVISION: Area Technicians undertook the realignment of the Area's UHF to VHF TV translators in an effort to provide better quality service.

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## SECURITY ANNEX TO MONTHLY REPORT

The following is a resume of Security activities during the period 1 August - 31 August 1967.

### SECTION I - Security Violations

There were two Security violations reported to Project Headquarters.

### SECTION II - Briefings/Debriefings

| BRIEFINGS | | DEBRIEFINGS | |
|---|---|---|---|
| OXCART 3 | 4 | OXCART 3 | 13 |
| OXCART 2 | 9 | OXCART 2 | 3 |
| TAGBOARD | 7 | | |
| UP-GRADE 02 to 03 | 39 | | |

### SECTION III - Physical Security

During the month one ASHCAN was reported activated and recovered. Security coordinated transmit and cover times to all base activities. The base was secured during ASHCAN coverage.

### SECTION IV - Operational Support

The security staff expended the following in connection with liaison, courier service and operational support:

| AIR MILES FLOWN | POV MILEAGE | MANHOURS EXPENDED |
|---|---|---|
| 13,010 | 0 | 105 |

a. On 2 August 1967 Mr. Zubon, Security Officer, traveled to Beale AFB to brief personnel 0-3.

Manhours Expended 8 Miles Flown 720

b. On 4 August 1967 Michael Sullivan, Shift Captain, traveled to Beale AFB and Moffat AFB as courier with Project material.

Manhours Expended 12 Miles Flown 950

c. On 16 August 1967 Thomas R. Hallam, Security Guard, traveled to Andrews AFB as courier with Project material.

Manhours Expended 24 Miles Flown 3700

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d. On 21 August 1967 Warren Solheim, Shift Captain, traveled to Burbanks, Calif. as courier with Project material.

Manhours Expended 5 Miles Flown 480

e. On 22 August 1967 Michael Sullivan, Shift Captain, traveled to Hill AFB and Norton AFB as courier with Project material.

Manhours Expended 8 Miles Flown 1000

f. On 24 August 1967 Michael Sullivan, Shift Captain, traveled to Norton AFB as courier with Project material.

Manhours Expended 6 Miles Flown 420

g. On 28 August 1967 Michael Sullivan, Shift Captain, traveled to Andrews AFB as courier with Project material.

Manhours Expended 12 Miles Flown 3700

h. On 29 August 1967 Raymond Schell, Security Guard, traveled to Moffat NAS as courier with Project material.

Manhours Expended 6 Miles Flown 600

## SECTION V - General

a. Mr. Zubon briefed several persons on T-program per request of Col. Hartley.

b. Mr. Zubon assisted 3 USAF personnel on personnal problems.

c. Thomas Brown III, Security Officer, TDY from Boston Field Office arrived and sent to Okinawa to assist the Senior Security Officer.

d. Meeting with Air Force Communication Service at Nellis AFB re secur communication proceedures.

e. Meeting with William Adair, AEC Security Chief for Nevada Operations, concerning a special shot to be fired in November. The shot will vent and will release a radioactive cloud. Area 51 will be in standby alert for possible evacuation.

f. Several inspections were made in the T-program area to assure good physical security and personal security control procedures.

G. Initiated survey on document control proceedures between Area and LAC plant in Burbank to assure maximizing security during document movement between both places. Results indicated procedures are secure.

h. Gave assistance to the West Coast Security Office through use of OSI/AF facilities in searching for Kenneth E. White in the Las Vegas area. White, LAC employee was on extended absence from work and was reported to be in Las Vegas. White was not found in Las Vegas, nor did the OSI investigation uncover any bad checks or other debts. White turned up later in NYC and established contact with his plant.

i. Mr. Zubon briefed 30 personnel at Beale AFB on T-program for authority of AFRDR.

j. Security Staff participated in CPX.

k. Mr. Zubon traveled to Salt Lake City, Utah, to debrief Stuart Halsey who departed the SLC and briefed O-3 William Cassun who replaced Halsey.

l. Renegioted access proceedures with US Public Health Service to assure maximun security and yet provide access to Area 51 during detonation of AEC devices by radiation safety engineers.

m. Attended a meeting with Stan Ratomski, FAA,DCA; David Candland, SLC; William Cassun, SLC; Capt. Arnold Williams, Detco AFCS area re SOA proceedures.

n. Several meetings were held with Lt/Col. Richard Baldwin, Detco Baker 52 concerning flying proceedures and cover story in event of difficult in different parts of the SW US.

o. Discussed at length with EG&G security, Las Vegas, concerning a second bomb threat to the Main Las Vegas plant received from (it is assumed) an ex-employee who complained of unfair employment practices within the company. The letter from the crank mentioned unfair practices both at Las Vegas and the Nevada Test Site. As of this writing, two weeks after the incident, no bombs were found nor has anything further been heard from the crank.

p. Mr. Zubon met with Colonel Nelson, SR-71 Commander at Beale AFB in regards to T-program security.

q. Several meetings were held with members of the security force re-emphasizing codes of conduct and standards both in Area 51 and Blackshield deployment location.

r. The security staff is continuing to maintain close surveillance on the case of a REECO employee who is undergoing severe mental depressions. The employee is currently in Southern Nevada Hospital after attempting to committ suicide by shot gun.

s. Total passenger traffic from Las Vegas to the Area was:

| PASS FLT #1 | PASS FLT #2 | TOTAL |
|---|---|---|
| 796 | 0 | 796 |

A detailed report is attached.

## SECTION VI - Personnel

Security personnel strength summary:

| TYPE | AUTH | ASSIGNED | STATUS |
|---|---|---|---|
| Staff | 9 | 8 | -1 |
| Staff Contract | 2 | 3 | +1 |
| Contract Guards | 65 | 54 | -11 |

Out of the Fifty-four guards available to Station "D" twenty are stationed at Blackshield staging area. In addition to these guards, one Senior Security Officer and two Security Officers are in place providing security guidance for the deployed task force.

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# COMMANDER'S MONTHLY

# ACTIVITIES REPORT

## STATION "D"

## AUGUST 1967

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ANNEX 160

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ANNEX 160

~~TOP SECRET~~

November 10, 1965

TO: The Director

FROM: Military Division and International Division (W. R. Thomas 3d)

SUBJECT: High Altitude Reconnaissance Systems

The accompanying memorandum on the A-12 (OXCART) and SR-71 has been written in such a way that it can be shown to persons who are cleared only for these aircraft. In reading it you should bear in mind that the requirements referred to are requirements for specialized reconnaissance of denied areas which have sophisticated defenses. "Specialized reconnaissance" means reconnaissance which cannot be accomplished by satellites because of timeliness (North Vietnam), amount of cloud cover (North Vietnam, South China), or geography (Cuba, the Sino-Indian border). "Sophisticated defenses" mean those equipped with the Soviet SA-2 missile. Although the memorandum includes projections out to 1975, these are highly problematical. They are not valid if the Russians develop and deploy a better antiaircraft missile, and we cannot counter it electronically. They are also not valid if the Russians deploy a sprint-type ABM around the major target areas. The A-12 and SR-71 would both be vulnerable to such a missile.

Reconnaissance of unsophisticated areas (e.g., the Congo) is not an issue here. It can be accomplished more covertly and economically by using U-2's.

~~TOP SECRET~~

Handle via BYEMAN
Control System.

November 10, 1965

TO: Director

FROM: International Division (W. R. Thomas 3d) and
Military Division (S. B. Leach)

SUBJECT: High Altitude Aircraft Reconnaissance Systems

The purpose of this memorandum is to discuss the current status of, and to recommend alternatives to the proposed programs for the A-12 (OXCART) and SR-71 aircraft. By the end of this fiscal year we will have spent some $2.5 billion on these two aircraft. The programs proposed for FY 67-71 would add another $2.1 billion. We believe it is time to review the overall direction of the programs and their relationship to each other.

## The A-12 and the SR-71

Background: The A-12 was conceived and designed as a successor to the U-2. It made the tremendous technological breakthrough to Mach 3.2. Procured and operated by CIA, it is a single seat aircraft and its principal sensor is a camera which will cover a 60-mile wide swath along the entire flight path with a peak 1 foot resolution. It also will have an infrared capability. The SR-71 is a successor aircraft designed and being procured for SAC. It is a heavier, 2 seat aircraft which carries a pilot and a sensor control officer. It will have a greater variety of sensors, with varying combinations selected from: 3 different cameras with coverages and resolution ranging down to a spotting camera with a peak 5 inch resolution, COMINT/ELINT systems, side looking radars, and infrared cameras. The programmed flight capabilities of the two aircraft are so similar that they can be treated as interchangeable. Pertinent flight capability data are:

| | | A-12 | |
|---|---|---|---|
| | SR-71 Planned[1] | Planned | Achieved to date |
| Range between refuelings NM | 3,800 | 4,000 | 3,000 |
| Cruise speed (Mach) | 3.2 | 3.2 | 3.2 |
| Maximum altitude (feet) | 90,000 | 86,000 | 86,000 |

1/ Data on actual SR-71 performance are not yet available.

In a typical flight profile either aircraft would enter denied territory at an altitude of 75,000-80,000 ft., flying at Mach 3.1 or 3.2. It would cruise at this speed steadily climbing until it exited at maximum altitude. Range over denied territory would be about 15% less than maximum range to allow ascent and descent and enough fuel reserve to reach an emergency landing field.

In addition to the A-12 and the SR-71 there are two other existing versions, the YF-12A, an experimental interceptor, and the Tagboard, an A-12 configured to carry and launch the Mach 3 Tagboard drone. There are 3 YF-12A's and 2 Tagboards. The number of A-12's and SR-71's are:

| | Authorized and Produced or in Production | | Additional Requested | |
|---|---|---|---|---|
| | A-12 | SR-71 | A-12 | SR-71 |
| Total | 13 | 31 | 0 | 15 |
| Test aircraft 1/ | 2 | 6 | - | - |
| Trainers | 1 | 2 | - | - |
| Operational aircraft | 8 | 23 | - | - |
| Lost | 2 | - | - | - |
| Attrition Replacement | - | - | - | 15 |

1/ One A-12 and four SR-71 test aircraft are proposed for conversion to operational configuration in later years.

The SR-71 will be based at Beale Air Force Base in California. The A-12 and Tagboard are based at Area 51, a classified facility in the western U.S. operated by CIA. The YF-12A is based at Edwards Air Force Base in California.

Proposed Utilization: The Air Force requirement for 25 operationally configured SR-71's is based on the planned capability to simultaneously:

--conduct sustained operations of one sortie per day in each of two theatres, e.g., the Middle East and Southeast Asia.

--conduct 7 missions per month over Cuba.

--maintain 6 SR-71's on hard alert for crisis reconnaissance of the USSR, or of China if the theatre aircraft were otherwise engaged.

--support 66 crews in training.

--as an additional benefit, not a primary mission, provide a post SIOP reconnaissance capability.

The projected employment of the 10 operational A-12's is essentially the same except for a lesser sortie rate. The full planned operational capability would provide:

--one permanent overseas detachment, e.g., Southeast Asia.

--a capability to deploy to another area at the same time, e.g., the Middle East.

--continued maintenance of the ability to conduct reconnaissance over Cuba.

--the ability to provide crisis reconnaissance of the USSR from Area 51.

--continued crew training.

The only distinction between the proposed uses of the two aircraft is the claim that the A-12 alone can conduct "covert" overflights. How "covert" they would really be is debatable. CIA is currently preparing to deploy three A-12s for two sixty-day periods to Kadena Air Force Base on Okinawa against the contingency that they may be required for overflights of China or North Vietnam (the flights have not yet been authorized). In preparation for these two 60-day deployments, special construction has been required at Kadena, one million pounds of equipment have been shipped by sea, 15 C-130 sorties to Kadena will be required, and specially configured KC-135 tankers will have to be deployed to the Far East. This seems to be stretching the definition of covert quite a bit.

It appears that the real distinction between the aircraft is that, if one were shot down, an A-12 could be blamed on CIA while an SR-71 would be a SAC plane. The important point is whether the other country would believe it was being overflown by SAC and not who actually conducted the overflight. Because the SR-71 has surfaced, a downed A-12 would surely be labeled an SR-71 by the aggrieved country. CIA operational plans, partly to offset this, and partly to profit from the U-2 experience, call for a downed pilot to identify himself and the plane with CIA. This simple declaration would probably not be convincing, and we might well be put in the position of trying to prove publicly that there are two different types of planes. Indeed this question may arise even if there is no shoot down. Both planes emit a continuous sonic boom. A country subjected to sonic boom by a plane flying over 80,000 feet at about Mach 3 would surely connect it with the SR-71, the only reconnaissance aircraft of this capability known to them. Thus, vigorous foreign accusations of warlike action by SAC may result from any overflight.

If there is a policy distinction between an overflight which can be attributed to 'those spies up to their dirty tricks again', and one which is the warlike act of our military forces, one important question remains:--Is this distinction worth an expenditure of $500 - $700 million over the next five years?

The costs: The costs of the A-12 and SR-71 programs through 1971 are as follows:

TOA (in millions of dollars)

| | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | Total |
|---|---|---|---|---|---|---|---|---|
| SR-71 | 451.1 | 479.8 | 452.3 | 312.1 | 227.8 | 210.3 | 197.2 | 2,330.6 |
| A-12 | 137.1 | 111.6 | 147.6 | 169.0 | 153.2 | 151.7 | 122.8 | 933.0 |
| Total | 588.2 | 591.4 | 599.9 | 481.1 | 381.0 | 362.0 | 320.0 | 3,323.6 |

The costs in the above table are based on the amounts currently being requested for the two programs, rather than the currently approved programs. We expect them to be reduced somewhat during the budget review process on straightforward budgetary issues, e.g., contract prices, time between overhauls, etc. These reductions are not included here because the details of the programs are still being reviewed. They would not affect the basic economics of the alternatives which are discussed below.

There is an implicit issue associated with the SR-71. The proposed procurement would keep the production line open against the contingency that the F-12 is approved next year. We do not believe the potential savings are sufficient to warrant doing this. The F-12 can stand on its own merits when the time comes.

## ALTERNATIVES

The following discussion sets forth major alternatives to the programs proposed for the A-12 and the SR-71. We recommend Alternative 1.

### Alternative 1

Do not procure additional SR-71's and phase out the A-12 program by September 1966. From an analysis of the requirements for additional SR-71 aircraft (Attachment) we do not believe the procurement of additional SR-71's is justified. (The Systems Analysis Staff in OSD agrees and will soon forward a Format B which recommends no additional SR-71 procurement.) Based on the attrition experience of the B-58 program, the presently authorized number of SR-71's will be adequate to meet a realistic estimate of requirements through fiscal 1975, which are the same as the requirements postulated for the A-12. The only thing that will be lost is the A-12's claimed distinction of covert overflights. As indicated in our discussion above, we do not believe this distinction is meaningful. It is certainly not worth the cost of maintaining the A-12 program.

Under this alternative we would immediately halt further upgrading of the A-12's and phase down the program during FY 1966 to the three aircraft now becoming fully operational. These would remain operational until September 1966, two months after the first SR-71's unit becomes operational. We would then phase these last three out. We would dispose of the A-12 aircraft with the possible exception of one which might be retained as a back-up aircraft for Tagboard.

We would also close down Area 51. This would require transfer of the Tagboard program to Beale AFB This should present no difficulties. Tagboard is an Air Force program and security could be as good as that of the CIA U-2's which are currently based at Edwards AFB. Our estimated TOA based on a December 1 decision for this alternative is:

TOA (in millions of dollars)

| | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | Total 66-71 |
|---|---|---|---|---|---|---|---|
| SR-71 | 479.8 | 255.9 | 220.5 | 215.8 | 198.3 | 179.2 | 1,549.5 1/ |
| A-12 | 85.0 | 40.0 | - | - | - | - | 125.0 |
| Total | 564.8 | 295.9 | 220.5 | 215.8 | 198.3 | 179.2 | 1,674.5 |
| (Difference from proposed program) | | | | | | | |
| SR-71 | - | -196.4 | -91.6 | -12.0 | -12.0 | -18.0 | -330.0 |
| A-12 | -26.6 | -107.6 | -169.0 | -153.2 | -151.7 | -122.8 | -730.9 2/ |
| Total | -26.6 | -304.0 | -260.6 | -165.2 | -163.7 | -140.8 | -1,060.9 |

1/ Subject to further budgetary adjustments.

2/ This is based on the program director's request. On the basis of the DNRO's proposed program, which assumes that the larger 34K engines will not be procured in later years, the savings would be about $180 million less.

Alternative 2

Do not procure additional SR-71's, transfer 6 A-12's to the Air Force, and cancel the balance of the A-12program. This would provide 6 A-12's against the contingencies of unexpected attrition of requirements. It would have the disadvantage of leaving SAC with a mixed fleet of aircraft, but the problems would be no greater than those caused by the differences between the B-52G and H's and earlier B-52's. It would provide the advantage of retaining an option for covert overflight. Two or three civilian crews could be kept proficient in the A-12 so that we could publicly make the same claims of a CIA crew and plane that we can make under the present programs.

TOA

The additional TOA required for this alternative is difficult to gauge without the benefit of detailed estimates by the program operators.

The additional costs would result from maintaining separate stocks of parts, separate training programs, separate contractor support, etc. We estimate that they would add $20 - $25 million per year (1966-1971) to the TOA shown under Alternative 1. There would also be a potential addition of $54 million to put the new 34K engines in the 6 A-12's which are retained.

### Alternative 3

Procure 6 additional SR-71's and phase out the A-12 program by September 1966. The 6 additional SR-71s would provide insurance against attrition rates in excess of those we have forecast or to meet sustained requirements beyond those which we forecast.

### TOA

This alternative would add the following to the TOA required under Alternative 1.

TOA (in millions of dollars)

| 1967 | 1968 | 1969 | 1970 | 1971 | Total |
|---|---|---|---|---|---|
| 69.6 | 6.0 | 12.0 | 12.0 | 18.0 | 117.6 |

### Summary

Under the presently proposed programs we will have spent well over $4 billion on the SR-71 and A-12 by 1971. While it is partly hindsight, we do not believe that the intelligence we will get and the contingency capability will be worth this amount of money. It seems clear now that we should have reconciled the two programs before we launched into the SR-71. Not having done so, the time has come to cut our losses. We do not believe there is a real distinction between the purposes or possible uses of the two aircraft. We recommend that the A-12 program be phased out. Nor do we believe that additional SR-71's are required to meet the combined requirement. We recommend that no additional planes be procured.

If you wish to explore the alternatives set out in this memorandum, we suggest that you arrange a meeting with Secretary McNamara and Mr. Raborn. (You might prefer to discuss the additional SR-71's with Secretary McNamara first and then hold a joint meeting.) We have provided copies of this memorandum to Dr. Flax (the DNRO), Dr. Samuel Koslov (the Director of Defense Research and Engineering's Special Assistant for Reconnaissance), and Mr. John Bross (the Deputy Director of Central Intelligence - NIPE). This will permit Secretary McNamara and Mr. Raborn to be informed of our proposal in advance so that it can be discussed readily.

Attachment

## Analysis of Attrition Requirements SR-71

The Air Force has submitted a program change proposal which requests approval of the purchase of 15 additional SR-71 aircraft (9 in FY 67 and 6 in FY 68) for attrition replacement. The requested TOA to support this purchase is:

TOA (in missions of dollars)

| 1967 | 1968 | 1969 | 1970 | 1971 | Total - through 1971 |
|---|---|---|---|---|---|
| 196.4 | 101.1 | 32.8 | 39.3 | 41.9 | 411.5 |

The stated Air Force requirement for the 15 aircraft is premised on a requirement for 25 operational (U. E.) aircraft and a loss rate of 1.5 aircraft per year. The proposed procurement would provide for losses through FY 1975. The two issues involved in the procurement center on the required U. E. aircraft and the loss rate.

The Air Force's projected loss rate is based on the number of B-58's lost per year (2.75 from an inventory of 97) and the number of SAC U-2 training losses per year (1.6 from an inventory of 35). By interpolation they forecast a loss rate of 1.5 SR-71's per year. The B-58 experience appears to be more applicable to a sophisticated aircraft like the SR-71 than the U-2 experience. The B-58 is supersonic and represented a major technological step forward, while the U-2 is a subsonic aircraft which operates at the margin of its envelope and is tricky and dangerous to fly.

A straight extension of the B-58 losses in relation to inventory would produce a projected SR-71 loss rate of .9 per year. However, loss rates are more properly (and historically) based on flying hours. The following table compares the Air Force projection and a revised projection based on the B-58 attrition per thousand flying hours. (The developmental losses prior to 1961 have been excluded because similar losses have already been met by the A-12 program.)

SR-71 losses projected

| | | Air Force projection | | Revised projection based on B-58 experience | |
|---|---|---|---|---|---|
| FY | Cumulative Flying hrs. | Cumulative losses a/c | Loss rate per 1,000 flying hrs. | Cumulative losses a/c | Loss rate per 1,000 flying hrs. |
| 1966 | 1 | 1 | 1.00 | - | .20 |
| 1967 | 5 | 3 | .60 | 1 | .19 |
| 1968 | 11 | 5 | .46 | 1 | .13 |
| 1969 | 17 | 7 | .41 | 2 | .09 |
| 1970 | 24 | 8 | .40 | 2 | .09 |
| 1971 | 31 | 10 | .32 | 3 | .09 |
| 1972 | 38 | 11 | .30 | 3 | .09 |

The second issue is whether the 25 U.E. aircraft are needed. Based on a 70% in commission rate, 25 aircraft would provide 9 aircraft deployment as two theatres and 16 aircraft based in the U.S. Nine aircraft will give each theatre the ability to conduct regularly one 8-hour mission per day (i.e., one 16,000 mile sortie). This capability far exceeds any requirement we have experienced to date. The peak U-2 requirement has been for 27 missions per month over North Vietnam, 7 missions per month over Cuba (not a theatre requirement) plus sporadic (perhaps 3 per month) missions elsewhere. This equates to less than thirty 3-hour missions by SR-71's. Three aircraft deployed to each theatre would provide a recurring capability far beyond these past requirements and the ability to peak up to one 8-hour mission a day for short periods.

The 16 aircraft based in the U.S. would provide for proficiency training and 7 missions per month over Cuba (total 10 aircraft) plus 6 aircraft on hard alert for crisis reconnaissance of the USSR. The 6 would cover the 265 targets on SAC's crisis indicator list. This latter requirement is open to serious question. In a major crisis such as the Cuban missile crisis, would the President authorize any action as provocative as the launching of 6 supersonic aircraft to fly over the Soviet Union? It seems too unlikely to justify maintaining 6 aircraft on continuous hard alert for this purpose. If a crisis reconnaissance capability seems desirable, it can be provided by standing down proficiency training when a crisis begins to build. Thus, a U. E. of 16 SR-71's would provide a deployed capability in two theatres far in excess of past requirements, a Cuban overflight capability, proficiency training, and the ability to provide alert aircraft for crisis management by standing down training temporarily.

Alternatives:

The above analysis offers several combinations of losses and requirements. The following table shows the number of U. E. aircraft available under the different loss rates and the alternative U. E. requirements.

| | Aircraft Available for U. E. | | | U. E. Requirements | |
|---|---|---|---|---|---|
| | Based on B-58 losses per 1000 flying hrs. | Based on B-58 losses per aircraft | Based on Air Force loss rate | Air Force Personnel | Alternative |
| 1966 | 11 | 10 | 10 | 25 | 16 |
| 1967 | 22 | 21 | 20 | 25 | 16 |
| 1968 | 24 | 22 | 20 | 25 | 16 |
| 1969 | 23 | 21 | 18 | 25 | 16 |
| 1970 | 23 | 20 | 17 | 25 | 16 |
| 1971 | 22 | 20 | 15 | 25 | 16 |
| 1972 | 22 | 19 | 14 | 25 | 16 |
| 1973 | 21 | 18 | 12 | 25 | 16 |
| 1974 | 20 | 17 | 11 | 25 | 16 |
| 1975 | 20 | 16 | 10 | 25 | 16 |

Alternative 1

Do not procure any additional SR-71's. This will provide sufficient aircraft to meet a realistic U. E. of 16 through 1975, regardless of whether losses occur at the rate per flying hour or the rate per aircraft experienced by the B-58.

TOA - Alternative 1 (assuming lowest loss rate)
(millions of dollars)

| 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | Total |
|---|---|---|---|---|---|---|
| -- | -- | 9.5 | 20.8 | 27.3 | 23.9 | 81.5 |

Alternative 2

Procure 6 additional SR-71's. This will provide sufficient aircraft to meet Air Force's U. E. requirement through 1972 if losses occur at the B-58 rate per aircraft. Even if losses reached the Air Force rate, sufficient aircraft will be available to meet a more realistic U. E. of 16 through 1975.

TOA - Alternative 2 (using middle loss rate)
(millions of dollars)

| 1967 | 1968 | 1969 | 1970 | 1971 | Total |
|---|---|---|---|---|---|
| 69.6 | 15.5 | 32.8 | 39.3 | 41.9 | 199.1 |

ANNEX 161

[redacted]

~~TOP SECRET~~

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ExCom-M-11

# NRP EXECUTIVE COMMITTEE

Minutes of Meeting Held September 29, 1967
Office of Deputy Secretary of Defense
Room 3E 928, The Pentagon
3:00 p.m. - 4:45 p.m.

## Members Present

| | |
|---|---|
| Mr. Paul H. Nitze | Deputy Secretary of Defense |
| Mr. Richard Helms | Director of Central Intelligence |
| Dr. Donald F. Hornig | Special Assistant to the President for Science and Technology |

## Others Present

| | |
|---|---|
| Dr. Alexander H. Flax | Director, National Reconnaissance Office, Member Ex Officio |
| Brig. Gen. Russell A. Berg | Acting Secretary, NRP Executive Committee |
| Dr. John S. Foster, Jr. | DDR&E |
| Vice Adm. Rufus Taylor | Deputy DCI |
| Mr. Huntington D. Sheldon | CIA |
| Mr. Carl E. Duckett | CIA |
| Dr. Donald Steininger | PSAC Staff |
| Mr. Fred S. Hoffman | Assistant Director, BOB |
| Mr. C. William Fischer | BOB |
| Mr. Herbert Benington | DDR&E Staff |
| [redacted] 50X1, E.O.13526 | [redacted] |
| Col. Paul Worthman | NRO Staff |
| Col. Clason Saunders | Director, NRO Prog D |

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OXCART Phase-Out

Mr. Nitze stated that the purpose of this meeting was to review the status of the SR-71, to determine what problems may have arisen from SR-71 Category III Tests, and to recommend actions for the future on OXCART phasedown and SR-71 deployment.

Dr. Flax referred briefly to the papers he had distributed to the members, pointing out that they summarized about two-thirds of the information available from the SR-71 Category III Tests (which would be officially concluded about October 1, 1967). He stated that, in general, the SR-71 was in a satisfactory state and it was the judgment of operational experts that the Air Force could assume the North Viet Nam missions on December 1, 1967. This judgment was also reflected in a Joint Chiefs of Staff statement that the SR-71 is ready for operational employment.

Dr. Hornig referred to the documents furnished to the ExCom and, in particular, to data dealing with the vulnerability of both the OXCART and SR-71 aircraft. He pointed out that, from his assessment of the data, the SR-71 appeared to be two to four times more vulnerable than the OXCART, based on the listed equipments, statistical factors, and performance curves. There followed a detailed discussion on vulnerability studies, operational techniques and impact, ECM systems and capabilities, the present activity of the enemy, his intentions in the future, and the outlook for future operations. Dr. Hornig then compared the payload volumes of the aircraft and the photographic swath widths of their sensors. He believed the committee should not be too hasty in reaching a decision to deploy the SR-71.

Dr. Flax stated that a simple comparison of sensor swath widths was not, in his view, a valid way to compare the mission coverage capabilities of the aircraft and that a factor of two in vulnerability which might be assumed on this basis did not reflect mission requirements in any event, since complete area coverage of North Viet Nam was not being sought or achieved.

Mr. Nitze outlined the following options for consideration: (1) delay the transition from OXCART to the SR-71, (2) recommend a reversal of the December 1966 decision, or (3) adhere to that decision. The discussion turned to the first option. Asked the desirability of this option, Dr. Flax stated that if there were no economic restraints whatever he would prefer to retain the total force. However, economic constraints were very real and he believed a firm decision was called for at this time. A six-months' delay, in making the transition, he pointed out, could cost $32.0 million. A question was raised as to the cost of reclaiming OXCART aircraft from storage, if required. [redacted] [redacted] stated that this would involve approximately $300 to $500 thousand per aircraft, if done within the first year. [redacted] also pointed out that the present financial plan provides some OXCART overlap by providing for continued operation at Area 51 during December.

50X1, E.O.13526

Mr. Nitze observed that the additional $32.0 million required for a delay in transition from the OXCART to the SR-71 was extremely critical in today's budgetary environment. Dr. Hornig favored a delay of six months. Dr. Foster agreed with the concept of delay but recommended a shorter period: somewhere between three and six months. Mr. Hoffman stated that the original decision of last December should be followed unchanged. Mr. Helms favored a delay. Dr. Flax agreed that a delay would provide a higher degree of confidence in assuring continued operational effectiveness in the face of possible improvement of North Viet Namese defenses, which were just now beginning to be brought to bear on the OXCART aircraft. The cost of this insurance would of course be related to the length of delay in phase-out. He believed that the SR-71 deployment should not be held until the very last day of any agreed-to delay period; if a three-month delay were recommended, the SR-71 deployment should be scheduled for mid-February 1968.

Mr. Nitze asked for a memorandum spelling out (1) what the decision for a three-month delay would do for the program, (2) the associated costs, and (3) what is intended for the interim. Dr. Flax was asked to prepare such a paper. Mr. Nitze stated that he would confer with the Secretary of Defense on this matter early in the following week.

Series C
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R.A. Berg
Russell A. Berg
Brigadier General, USAF
Acting Secretary
NRP Executive Committee

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ANNEX 162

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

OFFICE OF THE DIRECTOR

October 3, 1967,

MEMORANDUM FOR THE DEPUTY SECRETARY OF DEFENSE

SUBJECT: OXCART Phase Down Extension and Related SR-71 Considerations

On December 23, 1966, the President directed the phase out of Project OXCART by January 1, 1968, primarily since the SR-71 was scheduled to be operationally ready before that time, and a special study indicated that the total numbers of SR-71/A-12 aircraft could be reduced without degradation to mission requirements.

On May 16, 1967, approval was given to deploy three of the OXCART A-12's to Kadena to perform a surveillance mission over North Vietnam to guard against a surprise introduction of Soviet surface-to-surface missiles in this area. There has been no evidence of surface-to-surface missiles in North Vietnam but the simultaneous coverage of large areas of Vietnam by the A-12 has been very useful to U.S. commanders in the field.

On September 19, 1967, and upon recommendation of the Joint Chiefs of Staff, it was reaffirmed that Project OXCART should be phased out in December 1967 and that the Strategic Air Command should be prepared to conduct the North Vietnam overflight mission on December 1, 1967, operating out of Kadena Air Base.

SR-71 operational testing is now complete and while final reports have not been submitted, sufficient data are available to arrive at an evaluation of the readiness of the SR-71 to take over the North Vietnam overfly mission. Although it is the DOD view that the SR-71 is now essentially ready to take over the OXCART mission at Kadena, the view was generally expressed at the September 29 meeting of the ExCom that the OXCART/BLACK SHIELD operations should be extended for three months to allow better assessment of vulnerability of the aircraft to the SA-2 and the relative adequacy of the installed ECM on the OXCART and the SR-71 in the light of operational experience. At the present time there is no pertinent experience since no SA-2 has successfully tracked the OXCART and, in fact, only on one recent mission was an attempt noted. It was considered that in the light of vulnerability considerations, further exposure of the OXCART over the hostile environment during the extended period would provide more experience in coping with an improving defensive environment. It would appear prudent to derive this information from a vehicle which is already in position and will be phased out with the employment of the SR-71. Additionally the OXCART has two ECM devices against the SA-2, while the SR-71 interim system includes only one. There is a considerable divergence of opinion as to the absolute values of SA-2 kill probability in the face of either or both devices, since the effectiveness of the SA-2 in the face of ECM depends on a number of undetermined factors including the skill, training, and experience of the SA-2 crew. However, tests, simulations, and analyses, which give the SA-2 the benefit of doubt, indicate relatively small probabilities of kill against either the OXCART or the SR-71 as long as the ECM techniques used remain viable (i.e., not countered by specific ECM or techniques designed against these ECM measures).

Since the ExCom meeting, a plan has been developed which would provide the necessary degree of overlap and insurance required to protect against the possibility that some problem would prevent deployment or successful operation of the SR-71 from Kadena in the BLACK SHIELD role. This assumes that other contingency situations (particularly Cuba) will be covered by other than OXCART. Basically, the plan would be to:

1. Retain the three operational OXCART aircraft at Kadena until redeployment to Area 51 by February 1, 1968,

2. Retain two operational OXCART at Area 51 as back-up for the BLACK SHIELD mission.

3. Upon redeployment from Kadena, continue to fly the then five operational aircraft at Area 51 thru March 31, 1968 to maintain proficiency, then mothball all five starting in April 1968.

4. Mothball the one remaining test aircraft and one of the operational aircraft in January 1968, as previously planned. Mothball the trainer aircraft in January or February 1968.

5. The Strategic Air Command would deploy three SR-71 aircraft to Kadena, and be ready to assume the BLACK SHIELD operations by February 15, 1968.

The maximum added cost to the NRP for this OXCART extension should be $9.1 million ($2.7 million less than if all eight current OXCART aircraft were continued thru March). Detailed implementation considerations will attempt to reduce this cost. The appropriate funding will initially be covered from a present fund reservation in the NRP of $9.8 million intended to finance mothballing of the current 8 OXCART (two A-12's have been mothballed to date), equipment teardown and movement, closing of Area 51, and related phaseout costs. Except for the costs of mothballing three aircraft in January/February 1968, these phaseout costs will now be deferred until the April-June 1968 time period. Periodic reassessment of the NRP total FY 1968 fund requirements will be made to identify whether there is an overall fund deficiency and, if so, possible sources of funding.

Alexander H. Flax
ALEXANDER H. FLAX
Director

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ANNEX 163

~~TOP SECRET~~

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

Office of the Director March 7, 1968

MEMORANDUM FOR THE DEPUTY SECRETARY OF DEFENSE

SUBJECT: **Study of Options for Continuing Operation of the OXCART Aircraft in Fiscal Year 1969**

In accordance with your request, a study of the feasibility and cost of continuing operation of the OXCART aircraft beyond the currently programmed phaseout date of June 30, 1968 has been completed. Although a number of alternatives have been studied, I believe the following options are significant for your consideration:

Option 1. The OXCART aircraft would be transferred to the Strategic Air Command (SAC) by October 31, 1968. SAC operation of seven of these aircraft (six operationally configured plus one trainer) at current rates would begin by about January 1, 1969, with substitution of Air Force for contractor support wherever possible. The eighth (test) aircraft would be sent to Palmdale for continuing contractor test operation.

Option 2. The OXCART aircraft would be transferred to SAC as in Option 1 and the SAC SR-71 inventory would be reduced by eight SR-71's to be stored at Palmdale, starting September 1, 1968. Flying at current OXCART rates would begin by November 1, 1968.

Option 3. The OXCART aircraft would be retained under CIA operational control and management. Area 51 would be closed and aircraft and other program assets would be transferred from Area 51 to Beale Air Force Base by October 31, 1968. Substitution of some Air Force maintenance and other support for contractor support is assumed. Present OXCART flying rates would be resumed by January 1, 1969.

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Option 4. Current OXCART operations would be continued at Area 51. This is a base line option against which the costs of other options may be measured.

The costs of the options studied were derived for FY 1968 and 1969 on the basis of the best currently available data. These costs were necessarily estimates, since details of operating arrangements and contractor support would need to be worked out on the basis of more complete planning for implementation of any of these options. One factor affecting costs of options other than Option 4 (continuing CIA operation at Area 51) was the need for additional facilities at Beale Air Force Base, including aircraft shelters, hangars, trailers and headquarters building. For purposes of cost estimation, it was assumed that the demountable units at Area 51 could be moved to Beale Air Force Base and costs were included for site preparation, foundations and utilities required to accommodate these buildings. On-base housing for additional military personnel at Beale would also pose a problem in the long run, but this could not be resolved initially in any event on the schedules proposed for the phaseover options. Housing trailers from Area 51 could help to alleviate this situation for either military or contractor personnel, and it was assumed these trailers would be made available.

The costs of the options are as follows:

| | Additional FY 1968 | Total FY 1969 |
|---|---|---|
| Option 1 | $2,789,000 | $62,160,000 |
| Option 2 | 2,819,000 | 40,960,000 |
| Option 3 | 2,789,000 | 72,240,000 |
| Option 4 | 2,789,000 | 72,000,000 |

These costs include consideration of NRP costs for operation of the OXCART by the CIA, Air Force costs for operation of the OXCART (as appropriate in each option), CIA and Air Force direct support costs for each option, costs of closeout of Area 51 for Options 1, 2 and 3, and costs of construction (including $5,400,000 for additional military housing) at Beale Air Force Base for Options 1 and 3. The cost for closeout of Area 51 will be incurred as an NRP cost in any event in FY 1969 under the current plan for phaseout of the OXCART program after June 30, 1968. The OXCART associated costs in Option 3 (SAC operation of the OXCART offset by removal of eight SR-71's from the inventory) have been reduced by $20,900,000 to account for decreased SR-71 program cost. A more detailed breakdown of costs is given in the attached Table I. It should be noted that the FY 1969 costs for closing Area 51 and for new construction at Beale Air Force Base are "one-time" costs; however, costs for years subsequent to FY 1969 cannot be derived by subtracting these one-time costs from the totals, since Options 1, 2 and 3 involve curtailment of OXCART operations to varying degrees during the period June 30, 1968 to January 1, 1969.

In order to provide comparative costs for these options corresponding to a full year of operation without one-time costs included, an estimate for FY 1970 costs is included in the attached Table II. In summary, the FY 1970 costs are estimated to be as follows:

| | |
|---|---|
| Option 1 | $57,600,000 |
| Option 2 | $39,800,000 |
| Option 3 | $64,600,000 |
| Option 4 | $67,000,000 |

The Air Force has reviewed the feasibility of options calling for operation of the OXCART aircraft by SAC, from the standpoint of training, maintenance, facilities at Beale Air Force Base, and contractor support and has concluded that the options and schedules described above are feasible. However, there are substantial differences in the configurations of the OXCART and SR-71 aircraft in the areas of cockpit, instruments, sensors, engines and airframe. If commonality in subsystems were to be sought between the two aircraft, considerable expenditure of time and money would be required for modification. Therefore, the options considered contemplated only the operation of the OXCART aircraft in their present configurations. This would require formation of specialized units within SAC capable of maintaining and operating the OXCART aircraft as is. Conversion of as much of the maintenance from contractor to military personnel will require substantial improvements in the technical data available for the OXCART aircraft; continuation of essentially the current level of contractor maintenance and overhaul services would be required until the SAC unit were manned and trained. However, because of the small number of OXCART aircraft and their special subsystems, the continuing level of contractor support would continue to be greater than that utilized for the SR-71. These factors were taken into account in estimating option costs.

Continuation of the OXCART program into FY 1969 under any of the options discussed herein will not only require additional procurement of spares, AGE and other equipment in the OXCART program, but will impact the SR-71 program, since up to $5M of such items common to the SR-71 and OXCART programs have not been procured for the SR-71 in FY 1968, on the assumption that OXCART assets would become available in FY 1969. However, adoption of any of the options for the continued operation of the OXCART will call for adjustments of the allocation of assets and fund reimbursement between the OXCART and SR-71 programs. Our current assessment indicates that if such transfers of assets and outstanding reimbursement liabilities between programs are made, the net costs for FY 1968 and FY 1969 for any of the options may be reduced by between $5 million and $10 million.

Security would require special attention under all of the options calling for transfer of the OXCART aircraft to Beale Air Force Base. The most difficult problems would arise in connection with Option 3, in which the CIA would continue to operate the aircraft at Beale Air Force Base. This option has not been reviewed with the CIA, and if implemented, might require additional buildings and other facilities at Beale Air Force Base, not included in the present cost estimates, in the interest of maintaining security separation between the OXCART and the SR-71 programs at Beale Air Force Base. Options 1 to 3, however, all call for development of a plausible explanation for the surfacing of these additional aircraft, differing in configuration from either the YF-12A or the SR-71. These security problems have not been addressed in the current study but would require detailed attention if implementation of any of Options 1 through 3 were contemplated.

(Signed)
Alexander H. Flax
Director

2 Attachments

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## TABLE I
## Estimated Costs of OXCART Program Options (thousands)

| | Option 1 | | Option 2 | | Option 3 | | Option 4 | |
|---|---|---|---|---|---|---|---|---|
| | FY 68[a] | FY 69 | FY 68[a] | FY 69 | FY 68[a] | FY 69 | FY 68[a] | FY 69 |
| OXCART Program Operating Cost: | | | | | | | | |
| Air Force Funds | - | $26,900 | - | $41,900 | - | - | - | - |
| NRP Funds | $2,789 | 9,800 | $2,789 | 6,000 | $2,789 | $44,900 | $2,789 | $62,100 |
| Air Force Support | - | 7,720 | 30 | 4,540 | - | 5,300 | - | 3,400 |
| CIA Support | - | 2,200 | - | 1,600 | - | 6,500 | - | 6,500 |
| Closing of Area 51[b] (NRP Funds) | - | 7,900 | - | 7,900 | - | 7,900 | - | - |
| Construction at Beale AFB [c] | - | 7,640 | - | - | - | 7,640 | - | - |
| TOTAL | $2,789 | $62,160 | $2,819 | $61,940 | $2,789 | $72,240 | $2,789 | $72,000 |
| Reduction in SR-71 Program Cost | - | - | - | (20,980) | - | - | - | - |
| NET TOTAL | $2,789 | $62,160 | $2,819 | $40,960 | $2,789 | $72,240 | $2,789 | $72,000 |

a/ FY 1968 costs in addition to programmed costs to continue OXCART operations to June 30, 1968.

b/ These closeout costs would be incurred in FY 69 in any event under the current plan for phaseout after June 30, 1968.

c/ Construction estimates include $2,240 for shop and mission support buildings and $5,400 for additional military housing at Beale AFB.

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ANNEX 164

~~TOP SECRET~~

BYE-6441-68

18 April 1968

MEMORANDUM FOR Mr. Nitze
Dr. Hornig

SUBJECT: Considerations Affecting OXCART Program Phaseout

REFERENCE: BYE-12948-68

1. I have examined the four options for continuing the OXCART program which are discussed in referent memorandum and feel it appropriate to express some of my initial reactions prior to the EXCOM meeting scheduled for 23 April 1968.

2. I note that one option, the second, involves storage of some of the SR-71 fleet. I find it difficult to make a judgment on the overall size of the SR-71 fleet. From the viewpoint of national intelligence alone, however, we have for several years considered that requirements could be satisfied with six to eight operational aircraft of the OXCART-SR-71 type. I know that the SR-71 was designed to satisfy other requirements which are of a purely military nature; but if in fact the fleet is larger than is required for these military missions, I see no reason why the storage of eight SR-71's cannot be effected with the resultant projected savings in all of the options listed.

3. As to the specific cost figures quoted for the various options, I do not understand the rationale involved in arriving at some of the variations. For example, it is indicated that even if CIA retains responsibility for the OXCART Program and continues to maintain the current quick-reaction capability, the cost could be substantially reduced by moving from an existing established operational base to Beale Air Force Base. My Staff has examined this question and feels that the cost would in fact significantly increase for at least the first

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year or two, and at no time would they expect the operating costs to be lower than those projected for Area 51. I do not know the basis of the cost estimates for SAC operating the OXCART, but we believe that with the major emphasis given to efficiency in the last couple of years we have brought the expenditures for this Program to a very nearly bare minimum. I have serious doubts, therefore, that others could operate the existing OXCART fleet at a lower cost than that we projected for FY 1969. Our latest estimates for maintaining the OXCART fleet at Area 51 under CIA control is $68.8 million.

4. Option 3, which would move the OXCART fleet to Beale Air Force Base but continue under CIA management, I consider unacceptable from the viewpoint of security. If there is reason to continue the Program under CIA management at all, it should be retained as a truly civilian program; I do not believe that cover can be maintained by mixing the fleet with a clearly-identified military unit.

5. Aside from the costs as projected in the four options, I consider that the key question is the desirability of maintaining a covert civilian capability with an advanced aircraft system and believe that the requirement for this continues. In this connection, I have reviewed the history of the U-2 and OXCART overflight experience from 1956 to the present. This record shows that the government has consistently chosen to exercise a civilian overflight option, particularly in pre-crisis periods in such areas as Cuba and the Middle East or in Southeast Asia before our military build up there in 1965. With the many current or potential trouble spots around the world today it seems to me probable that we will face situations in the future where the option of a civilian capability would indeed be exercised if available.

6. I continue to believe that the OXCART represents a better vehicle for general reconnaissance purpose than the SR-71, particularly because of what I believe to be its superior camera system. I would note, moreover, that in the one-year period since deployment of the OXCART it has successfully completed twenty-eight overflights of denied areas, and I believe we all agree has

demonstrated an unusually high reliability and has produced valuable intelligence. I am convinced that we should continue the Program and see no merit to changing from a proven management system which in fact represents a unique joint CIA/Air Force undertaking. I recommend that we select Option 4 and maintain the OXCART fleet at Area 51 under CIA management. In this connection I believe that Area 51 represents a useful intelligence resource apart from its use in connection with the OXCART. We would, of course, continue to stress economy and believe that we can operate for an annual cost somewhat below that projected in the NRO memorandum.

(Signed)
Richard Helms
Director

cc: Dr. Flax

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## TABLE II

## FY 1970 Estimated Costs of OXCART Program Options
(thousands)

| | Option 1 | Option 2 | Option 3 | Option 4 |
|---|---|---|---|---|
| OXCART Program Operating Cost: | | | | |
| Air Force Funds | $47,600 | $54,800 | $ - | $ - |
| NRP Funds | - | - | 50,700 | 57,100 |
| Air Force Support | 10,000 | 10,000 | 7,400 | 3,400 |
| CIA Support | - | - | 6,500 | 6,500 |
| TOTAL | $57,600 | $64,800 | $64,600 | $67,000 |
| Reduction in SR-71 Program Cost | - | (25,000) | - | - |
| NET TOTAL | $57,600 | $39,800 | $64,600 | $67,000 |

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ANNEX 165

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HEXAGON [redacted] GAMBIT
OXCART/TAGBOARD

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## NRP EXECUTIVE COMMITTEE

Minutes of Meeting Held April 29, 1968
Office of Deputy Secretary of Defense
Room 3E 928, The Pentagon
3:30 p.m. - 4:50 p.m.

### Members Present

| | |
|---|---|
| Mr. Paul H. Nitze | Deputy Secretary of Defense |
| Mr. Richard Helms | Director of Central Intelligence |
| Dr. Donald F. Hornig | Special Assistant to the President for Science and Technology |

### Others Present

| | |
|---|---|
| Dr. Alexander H. Flax | Director, National Reconnaissance Office, Ex Officio |
| Mr. James Q. Reber | Secretary, NRP Executive Committee Ex Officio |
| Dr. John S. Foster, Jr. | DDR&E |
| Vice Adm. Rufus Taylor | DDCI |
| Mr. Carl E. Duckett | CIA |
| Mr. John A. Bross | Deputy to the DCI |
| Dr. Donald Steininger | PSAC Staff |
| Mr. Fred S. Hoffman | Assistant Director, BOB |
| Mr. C. William Fischer | BOB |
| [redacted] | [redacted] |
| Col. Frank W. Hartley, Jr. | Director, NRO Program D |
| Col. Robert G. Welch | NRO Program D |
| Col. Bernard L. Bailey | NRO Program D |
| Col. Paul E. Worthman | NRO Staff |

This meeting of the NRP Executive Committee was called specifically to review the situation and developments since the deployment of the SR-71 to Kadena where

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OXCART/TAGBOARD
HEXAGON [redacted] GAMBIT

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the OXCART has been on standby pending its planned return to the United States and phaseout by June 30, 1968, and to consider issues which might affect that planned phaseout.

Operational Briefing on SR-71

Dr. Flax requested Colonel Hartley, Director of NRO Program D, to brief the Executive Committee on the deployment and operational status of the SR-71.

Colonel Hartley reported on the SR-71 overseas deployment which was concluded without incident. The total complement of personnel deployed is approximately 400. To date there have been six operational missions flown, totaling about 29 hours. Of these missions there were three aborts, one ground and two air. The former was caused by malfunction of the Astroinertial Navigation System (ANS) and the latter aborts were because of generator difficulties. The ground abort was flown one hour later and Mission S 010 which was an air abort had already completed approximately one half of its mission. To date there has been no requirement to use the OXCART backup.

Of the six missions flown, the film has been received in the National Photographic Interpretation Center (NPIC) and a technical evaluation made on four. Two missions, S 010 and S 011, were made on April 28 and 29 but the product had not yet been received in Washington.

Colonel Hartley pointed out that the Aircraft in Commission rate was 76.9 percent which slightly exceeds the anticipated rate. He also indicated that the rate in Non-Operational Ready Supply (NORS) of 1.1 percent is better than the average NORS rate for the F-4, Century Series, and B-66 aircraft in Southeast Asia.

Colonel Hartley then reviewed for the members the cross section of the aircraft showing the position of the operational objective camera, the technical objective camera, the electronic countermeasures gear, and the side-looking radar equipment, indicating possible alternate installations of the electromagnetic radiation recorder system and the ECM.

ExCom-M-14

Colonel Hartley reviewed the routes of three of the missions--S 002, S 007, and S 008. In each of these cases the reports showed tracking by the North Vietnamese. However, there were no SAM firings and accordingly no ECM response. In the case of S 007 there was virtually 90 percent cloud cover. The first mission, S 002, was evaluated by NPIC technically as being from fair to poor; and in the case of the best mission to date, S 008, it was rated as from fair to good. In the case of S 007 there was side-looking radar photography acquired, samples of which Colonel Hartley showed along with photographic displays selected from the other missions.

In conclusion Colonel Hartley reported that the Deputy Director for Reconnaissance, JCS, has stated that, weather permitting, it appears that the SR-71 can satisfy and be responsive to the national objectives.

## Consideration of OXCART

The discussion of the Executive Committee centered upon the options which had been outlined with costs in the memorandum which the DNRO had prepared for the Deputy Secretary of Defense on March 7 (BYE-12721-68) and which had subsequently been distributed to the ExCom as an attachment to BYE-12948-68.

The following summarizes the substance of the Executive Committee's discussion:

a. The differences in vulnerability of the SR-71 and the OXCART as Dr. Flax pointed out are probably not significant although the formal simulation and analysis showed the SR-71 ECM to give one third the vulnerability of the OXCART. However, Dr. Flax did not feel that the analyses and simulations could be expected to give precise answers applicable to the operational situation.

b. The wider camera swath width of the OXCART does provide a capability for coverage of SAM protected targets from outside the SAM range as indicated by an exhibit presented by Mr. Duckett. The SR-71, because of its narrower swath width, would, if it covered the same targets, expose itself more to SAM attack. Dr. Flax and Dr. Foster pointed out that this mode of operation could only be used if the locations of occupied SAM sites were known and if the other side did not react by relocating the SAMs to counter the tactic. Except for this point, however, the SR-71 could, by flying more missions at some small cost, obtain the target coverage required. A redesign of the SR-71 camera to obtain a wider swath width would be a matter of a year and a half in time.

c. Option 4, which is the continuation of current OXCART operations at Area 51, and which the DCI preferred, would cost about $10 million more for FY 1969 than Option 1 which provides for the transfer of OXCART to SAC at Beale AFB.

d. Option 4 would cost about $30 million more than Option 2 which provided for the transfer of the OXCART to SAC and reduction of eight in the SAC SR-71 inventory.

e. Option 3, which provided for the OXCART's remaining under CIA management but located at Beale AFB and which would cost approximately the same as Option 4, was unacceptable to Mr. Helms from a security point of view.

f. Dr. Flax stated that under any "extension" option FY 1969 costs could be reduced by such policies as limiting the number of aircraft flying, reducing R&D and improvement programs, or reducing flying hours and that if an extension were determined then careful consideration should be given to logical approaches for lower costs.

g. It was recognized that the TAGBOARD had not yet reached operational status and could not at present be considered a practicable alternative to the OXCART to accomplish covert missions. Furthermore, depending on the number of missions required to accomplish a given assignment, it could be considerably more expensive.

h. In response to a query from Mr. Nitze as to whether satellite reconnaissance could not be a substitute for aircraft reconnaissance, Dr. Flax mentioned a study he had made of South China in which, to some extent by fortuitous circumstances, the GAMBIT had obtained the most target coverage of the various photographic reconnaissance systems during the winter months when there was a high expectation of cloud cover in that area. However, he emphasized that the lack of responsiveness of satellite photography makes it an unlikely prospect to accomplish the kind of tasks which the OXCART and SR-71 could accomplish with particular regard to quick reaction, frequency of coverage, and responsiveness to weather opportunities.

Mr. Helms stated that after giving the matter a great deal of thought he felt that the question of the OXCART really hinged on whether it makes a difference to the President if indeed a reconnaissance aircraft comes down in hostile territory. The aircraft is so advanced that it can only have come from one country in the world. If the pilot is civilian and if the plane is unmarked, then that hostile country is not forced to make an issue of the incident. He also felt that it is highly desirable for the Government to retain the use of Area 51 for doing exotic testing such as in the case of the recently acquired Mig-21 which could not have been done secretly at any other base. Dr. Hornig noted that there are missions other than in the Far East which the OXCART could serve.

The Deputy Secretary of Defense indicated that he did not believe that the civilian pilot argument was compelling, feeling instead the central issue was a budgetary one. His concern was whether what we buy with the additional $30 million required by Option 4 is worth it; and if it is, he queried where the money for an option would come from. In response to a question from Mr. Nitze, Mr. Helms indicated that he could not reprogram CIA funds to meet the $30 million additional required for Option 4 for 1969. In regard to the NRO, Dr. Flax indicated that the funds (up to $72 million for Option 4) could be taken from [redacted] but he believed that this program should not be slipped and called attention to some views that the pace of this program was unsatisfactorily slow. If the money were taken from the HEXAGON Program, Dr. Flax indicated that the impact would be severe. Mr. Hoffman of the Bureau of the Budget said that if there were an effort to change the present decision to phase out the OXCART the Director of the BOB wished to present his case to higher authority.

At this point, Secretary Nitze indicated that he would like to discuss the matter further with Mr. Helms and Dr. Hornig in executive session. All participants except the three Executive Committee members adjourned.

James Q. Reber

James Q. Reber
Secretary

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DDS&T Historical Paper
No. OSA-1
Vol. XVI of XVI

# DIRECTORATE OF SCIENCE & TECHNOLOGY HISTORY

(TITLE OF PAPER)
History of the Office of Special Activities
Appendices I and II
and Index
(PERIOD)
From Inception to 1969

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DDS&T
Date prepared : 1 April 1969
Written by : Helen Kleyla
: Robert O'Hern

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DDS&T Historical Paper
No. OSA-1
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# DIRECTORATE OF SCIENCE & TECHNOLOGY HISTORY

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History of the Office of Special Activities
Appendices I and II
and Index
(PERIOD)
From Inception to 1969

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Controlled by : DDS&T
Date prepared : 1 April 1969
Written by : Helen Kleyla
: Robert O'Hern

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APPENDIX I

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# INDEX

# INDEX

## OSA History

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* Promoted to Dep. C-in-C, CAF, 25 July 1967

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# Report – OXCART A-12 Aircraft Experience Data and Systems Reliability

15 Jan 1968

CENTRAL INTELLIGENCE AGENCY
UNITED STATES OF AMERICA

DIRECTORATE of SCIENCE & TECHNOLOGY
Office of Special Activities

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# INTRODUCTION

This document contains experience data of the OXCART A-12 as of 31 December 1967, including its BLACK SHIELD deployment and operations commencing in, and continuing since, May 1967.

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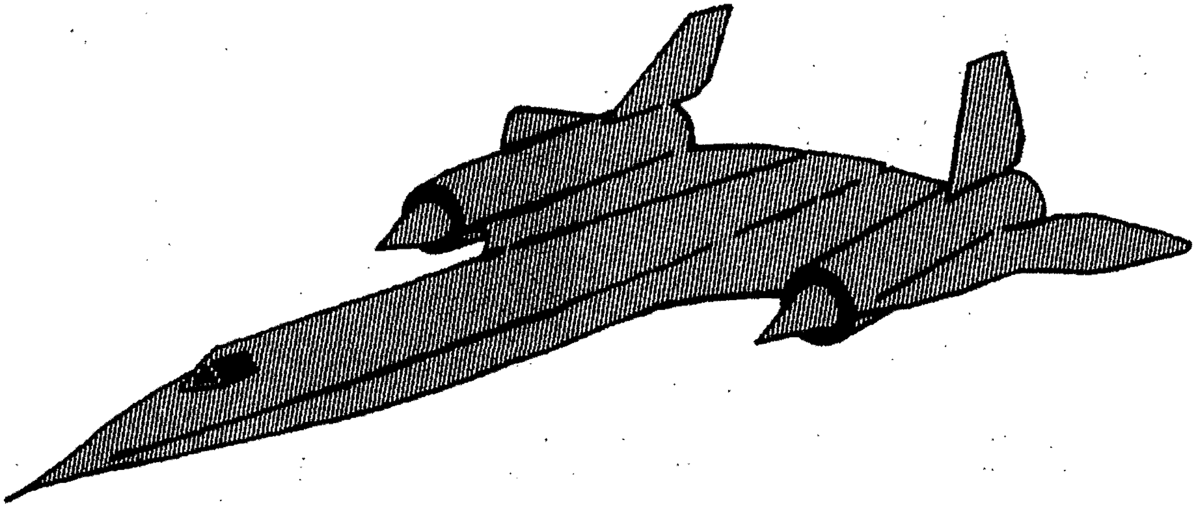
## TABLE OF CONTENTS

# A-12



| AIRFRAME DATA | ENGINE DATA | PERFORMANCE |
|---|---|---|
| 1. LENGTH: 99 FEET<br>2. SPAN: 56 FEET<br>3. WEIGHT (BASIC) 52,700 LBS.<br>4. WEIGHT (FUELED) 122,500 LBS. | 1. TWO P&W JT11D20A AFTERBURNING TURBO-JET WITH BYPASS<br>2. MAX. THRUST: 32,500 LBS.<br>3. OPERATING LIMIT: MACH 3.2 @ 100,000FT. | (STANDARD DAY)<br>1. SPEED: MACH 3.2 (1860 KNOTS)<br>2. ALTITUDE: 87,000+ FT.<br>3. RANGE: 3600 NM W/O AIR REFUELING, (CURRENT OBJECTIVE) |

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## EXPERIENCE RECORD

### AIRCRAFT

| | |
|---|---|
| First Flight | 26 April 1962 |
| Total Flights | 2670 |
| Total Hours | 4438:00 |
| Total Flights at Mach 3.0 | 900 |
| Total Hours at Mach 3.0 | 571:06 |
| Longest Flight at Mach 3.0 | 3:50 Hours |
| Longest Mach 3.2 Time on a Single Flight | 3:30 Hours |
| Longest Single Flight Duration | 7:40 Hours |
| Speed - Max | Mach 3.29 |
| Altitude - Max | 90,000 Feet |

### J-58 ENGINES

| | |
|---|---|
| Total Engine Flights | 9412 |
| Total Engine Hours | 19,738 |
| Total Engine Flights at Mach 3.0 | 4294 |
| Total Engine Flight Hours at Mach 3.0 | 2690 |
| Total Ground Test Hours | 26,135 |
| Total Mach 3.0 Environmental Ground Test Hours | 6497 |
| Total 150 Hour Qualification Tests | 6 |

### INS

| | |
|---|---|
| Total Flights | 1616 |
| Total Flight Operating Hours | 3715 |
| Total Operating Time | 45,739 |

### SAS - AUTO PILOT

| | |
|---|---|
| Total Flights | 2669 |
| Total Flight Hours | 4437 |
| Total Operating Hours | 42,850 |

### CAMERAS

| | I | IV |
|---|---|---|
| Total Flights | 262 | 67 |
| Total Flight Operating Hours | 194 | 37 |
| Total Flights Above Mach 3.0 | 159 | 47 |
| Total Hours at Mach 3.0 | 94 | 32 |
| Longest Flight at Mach 3.0 | 1.5 | 1.3 |

## PILOTS (6)

| | |
|---|---|
| Average Pilot Experience | 15 Years |
| Average Total Flight Time (All Aircraft) | 4110 Hours |
| Time in A-12 (Least/Avg/Most) | 144/413/483 Hours |
| Time in Project | 1.3/5 Years |
| Average A-12 Flights | 257 |

## LIFE SUPPORT

| | |
|---|---|
| Total Suit Flights (Detachment) | 1751 |

## EWS

| | |
|---|---|
| Total Flight Tests | 110 |

## DETACHMENT

| | |
|---|---|
| Activated | 1 October 1960 |
| Time in Training as a Unit | 60 Months* |
| Average Time in Project (Personnel) | 46/50 Months |

*Detachment 1, 1129th began training as a unit coincident with delivery of first aircraft (trainer) in January 1963. Prior to that it had been supporting LAC flight test effort.

## OXCART A-12 AIRCRAFT INVENTORY

| | |
|---|---|
| Operational Aircraft | 6 |
| Two-Seater Trainer | 1 |
| Flight Test Aircraft | 1 |

## FLIGHT DEVELOPMENT STAGES

The single most important problem pacing the flight development (opposite page) of the A-12 has been the air inlet and its control system. This system which provides the proper amount of ram air to the engines at all flight conditions must minimize shock expulsions (unstarts), automatically recover (restart) when shock expulsions do occur, and at the same time operate at optimum efficiency in order to maximize engine performance and aircraft range. The notations under development stages I through IV A all refer to problems and components of this system. Resolution of these has lead to a reliability commensurate with the operational readiness established in December 1965.

Fuselage Station 715 Joint Beefup (Stage IV B) involved strengthening fuselage structure at the wing joint because of heavier electronic warfare systems payload weight requirements.

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# FLIGHT DEVELOPMENT STAGES

I. Mach 2.35 (To July 1964)

- A. Duct Roughness at Mach 2.4
- B. Unacceptable Restart Capability
- C. Inlet Instability and Unstarts

II. Mach 2.8 (July 1964 - March 1965)

- A. Inlet Mice Corrected IA
- B. Aft Bypass Incorporation Corrected IB
- C. Inlet Instability and Unstarts Still Encountered

III. Mach 3.0 (March 1965 - August 1965)

- A. Spike Static Probe and "J" Cam Inlet Control Improved IIC But Did Not Correct Condition

IV. Mach 3.2 (26 August 1965 - 20 November 1965)

- A. Retrofit to Lockheed Electronic Inlet Control Corrected IIC
- B. Fuselage Station 715 Joint Beefup

V. Operational Alert (December 1965 On)

- A. Operational Capability
- B. Aircraft Performance Optimization and Envelope Extension

VI. Phase Out (December 1966)

- A. On 29 December 1966 a decision was made by higher authority to terminate the OXCART program as of 31 December 1967. An orderly phase-out program was implemented to carry out this decision.

VII. Operational Deployment (May 1967)

VIII. Operational Deployment extended through 30 June 1968 (December 1967).

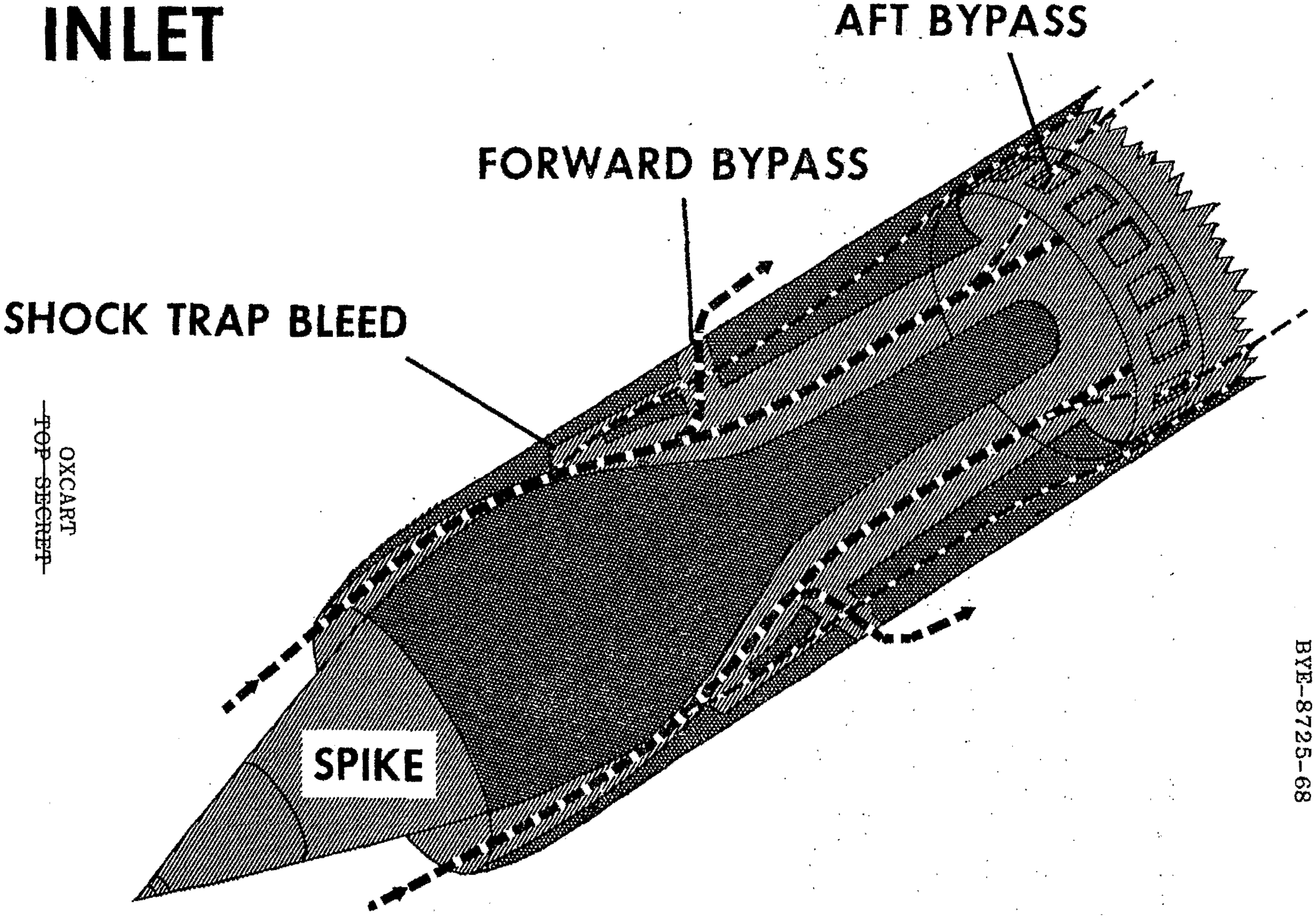
## FUNCTION OF THE A-12 INLET

A supersonic inlet or air induction system is designed to provide best possible aerodynamic performance over a range of supersonic Mach numbers with a stable and steady flow of air to the engine. However, due to constraints imposed by supersonic aerodynamics, truly optimum performance with an ideal shock pattern and an inlet airflow exactly matched to the engine airflow requirement can only be provided at one flight condition. Since the OXCART aircraft must cruise for considerable periods of time at a Mach 3 speed, maximum possible range is realized by providing this optimum inlet performance at the Mach 3 cruise condition. The basic geometry and airflow characteristics of the inlet are then varied to provide a minimum compromise of aerodynamic performance and efficiency at lower flight speeds. Some of this needed flexibility is provided by varying the position of the inlet spike. Since the airflow which can be admitted by the inlet is in excess of that which can be accepted by the engine at other than the design condition, this excess airflow is dumped overboard through a series of forward bypass doors or passed down the nacelle airflow passage around the engine through a series of aft bypass doors.

In addition to those airflow passages shown on the accompanying sketch, a system is also provided for bleeding off the low energy boundary layer air which forms along the surface of the spike. This improves inlet efficiency by making the entire main inlet flow passage available to the high energy, high velocity air.

A rather complicated automatic electronic control system senses aerodynamic environment to provide the proper scheduling of spike and forward bypass door positions at all flight conditions. Aft bypass door positions are selected manually by the pilot.

# INLET



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## A-12 SORTIES/PROFILES ABOVE MACH 3.0 - DETACHMENT AIRCRAFT

This chart depicts a breakout of those Detachment sorties flown from 25 March 1965 through 31 December 1967 wherein the A-12 aircraft flew above Mach 3.0. The profiles column lists the number of times the aircraft accomplished the high/fast operational profile during the sorties flown in the period, i.e., high and fast after takeoff, descend for air refueling, climb back up to high and fast again, etc.

The A-12 major/minimum modification program got underway in the latter part of August 1965. Sorties flown during the period outlined in Section A were in non-modified aircraft.

## A-12 SORTIES AND PROFILES ABOVE MACH 3.0 - DETACHMENT ACFT/SORTIES

(Through 31 December 1967)

| | Sorties | Profiles |
|---|---|---|
| A. 25 Mar 65 - 31 Aug 65: | | |
| Total Sorties | 52 | |
| Total Profiles | | 57 |
| B. 31 Aug 65 - 31 Dec 67: | | |
| Total Sorties | 600 | |
| Total Profiles | | 920 |
| C. Summary (25 Mar 65 - 31 Dec 67): | | |
| Total Sorties | 652 | |
| Total Profiles | | 977 |

First Detachment A-12 flight above Mach 3.0 on 25 March 1965 by Aircraft 128.

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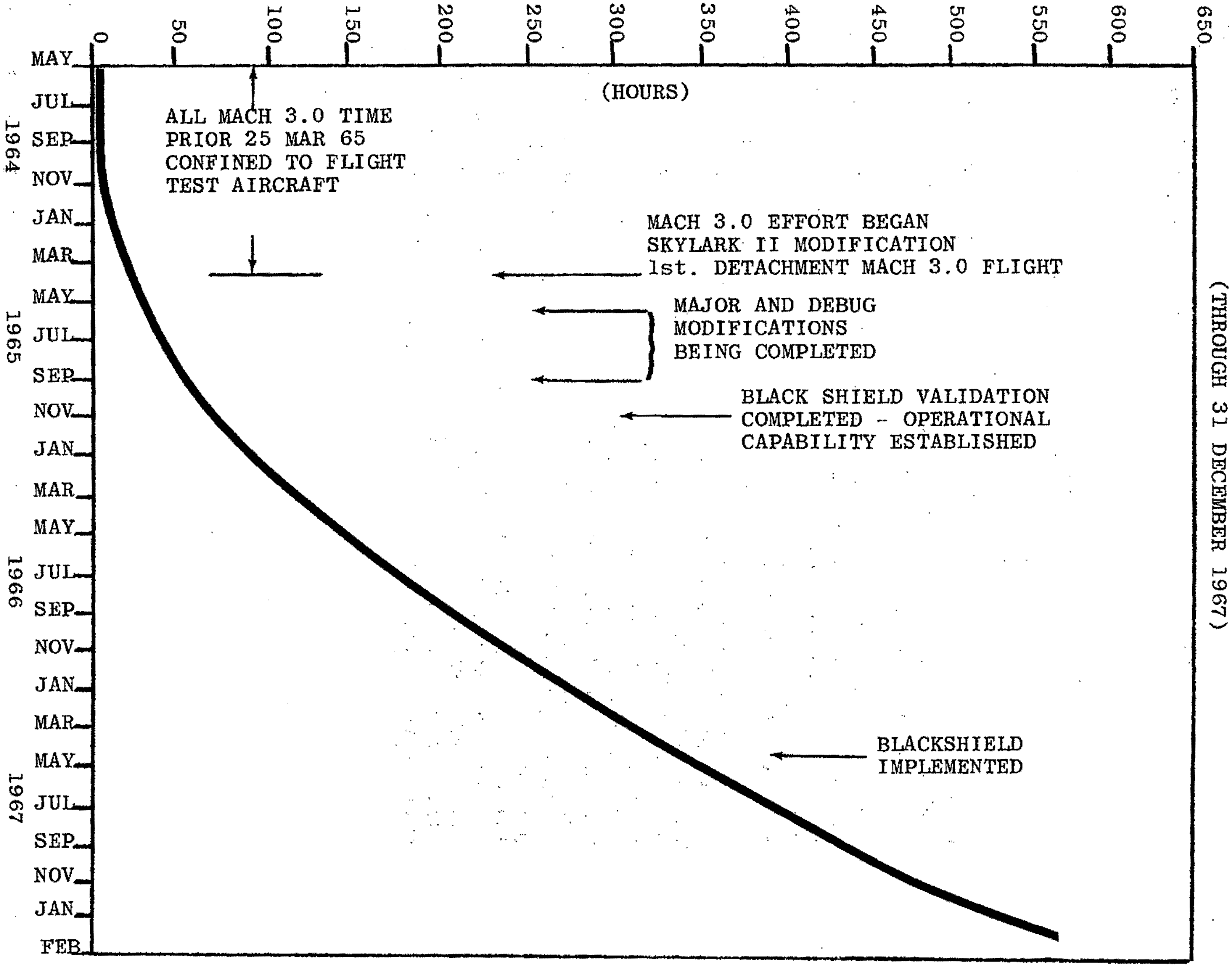
## CUMULATIVE TIME AT MACH 3.0 AND ABOVE

The rate of accumulation of Mach 3.0 time as shown by the slope of the curve (opposite page) began to substantially increase in March 1965. Prior to this time, Mach 3.0 flight was confined to the three flight test aircraft only. After March 1965 each of the seven detachment (operational) aircraft as they completed necessary modifications began to fly at Mach 3.0 and above on a routine basis.

The significance of this data is that during the past thirty-three months since 25 March 1965, 571 flight hours at Mach 3.0 and above have been accumulated as compared to only 15 Mach 3.0 hours accumulated during the three years from first flight in April 1962 to 25 March 1965.

CUMULATIVE TIME AT MACH 3.0 AND ABOVE - ALL AIRCRAFT



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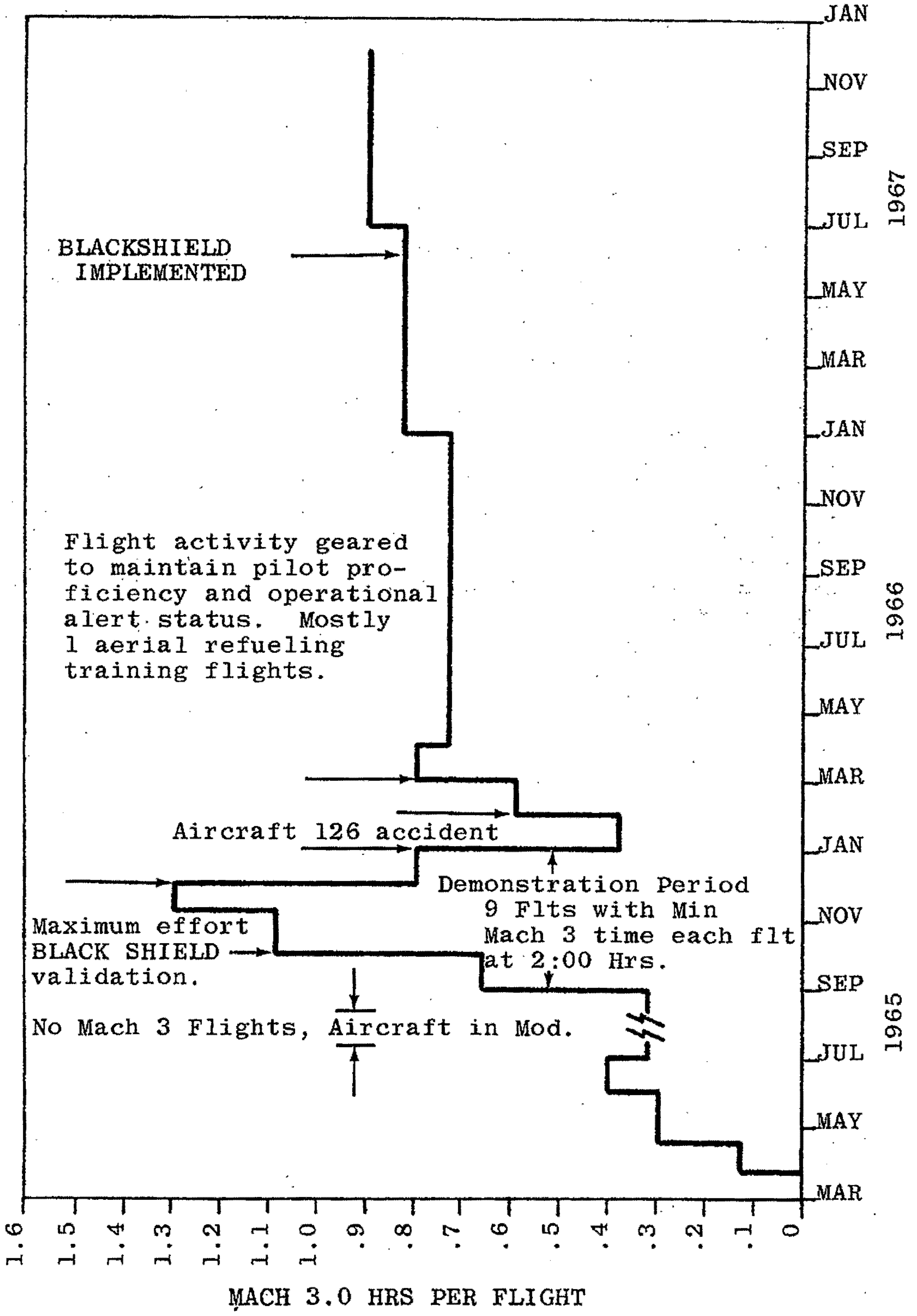
## DETACHMENT AIRCRAFT
## AVERAGE MACH 3 HOURS PER FLIGHT

The chart opposite shows the average time spent at Mach 3 and above for each flight. It is based upon all Mach 3 flights of detachment aircraft for the period examined including the relatively short Lockheed and detachment operated functional check flights as well as the longer multiple refueling training flights and simulated missions. Prior to 25 March 1965 there were no Mach 3 flights on detachment aircraft. The peak of 1.28 Mach 3 hours per flight during the fall of 1965 reflects the validation or demonstration period wherein three refueling simulated missions were performed. During January 1966 flight activity was substantially curtailed during the investigation of aircraft 126 accident with only some of the short functional check flights lasting a very few minutes at Mach 3. This is normal procedure after a period of inactivity wherein it is necessary to recheck all systems during short periods at Mach 3 prior to resuming the longer Mach 3 training flights. By spring 1966 a normal level of training activity was resumed reflecting about 3/4 hours at Mach 3 per flight. The period between January and July 1967 reflected training flights with usually one or sometimes two refueling(s) rather than the longer and more costly three refueling simulated missions performed during the fall of 1965. The slight increase in average Mach 3 time per flight for the current reporting period reflects the BLACK SHIELD activity.

**DETACHMENT AIRCRAFT AVERAGE MACH 3 HOURS PER FLIGHT**

(THROUGH 31 DECEMBER 1967)

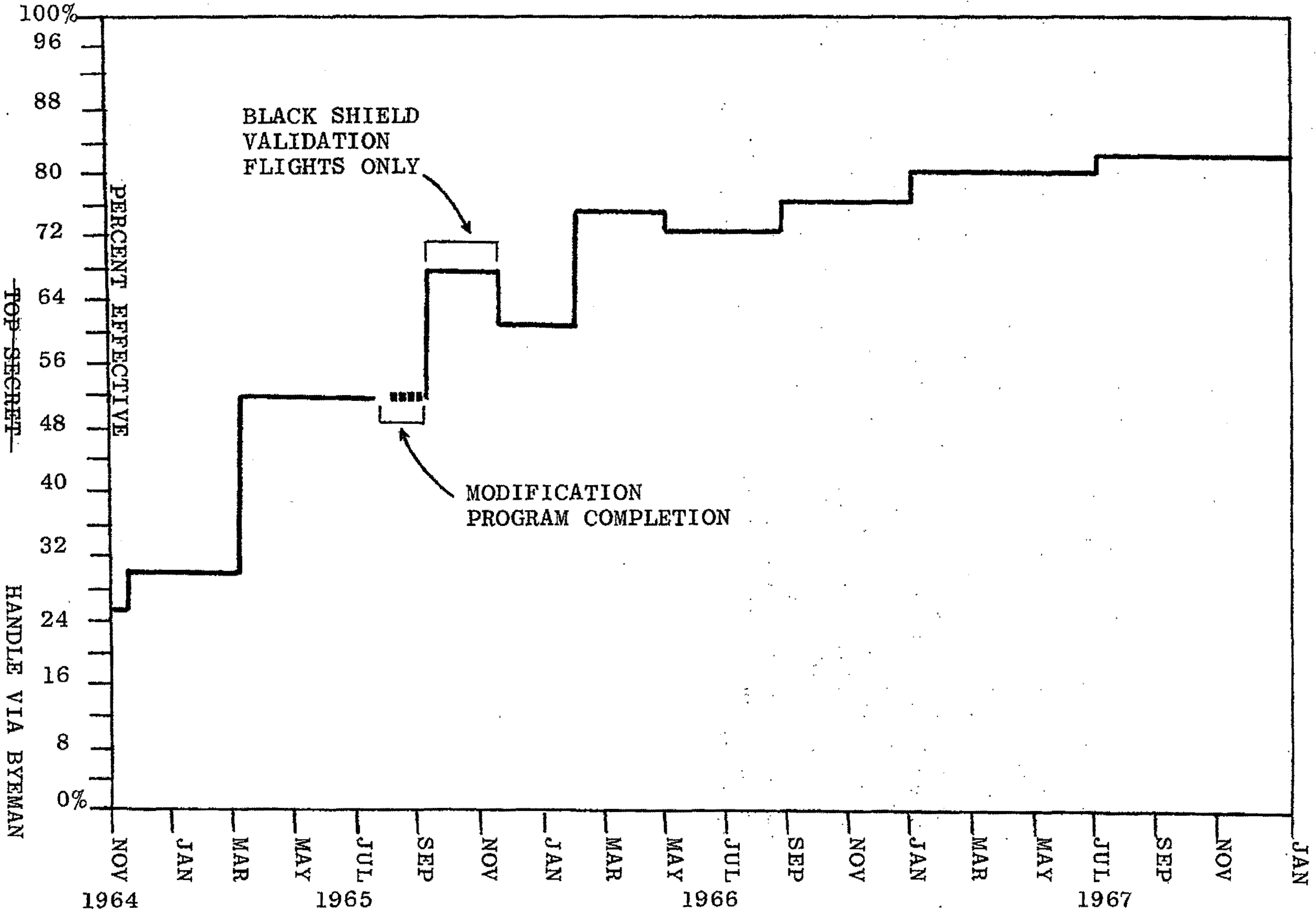


## DETACHMENT FLIGHTS
## SORTIE EFFECTIVENESS

The chart opposite shows the trend of sortie effectiveness from a low of 25% in 1964 to the low eighties during 1967. Each flight or sortie is rated either effective or not effective on the basis of all subsystems performing properly such that all planned objectives of the sortie were satisfactorily accomplished. The total sorties flown are divided into the number rated effective to arrive at the percent effective figure. The sorties rated not effective do not mean that all such sorties were prematurely terminated or aborted. Certainly all premature terminations or aborts which did occur are included in these data as are those sorties which were fully completed but on which all planned objectives could not be accomplished. Premature terminations assignable to each subsystem are reflected subsequently under Subsystem Sortie Reliability. Hence the difference in Sortie Effectiveness and Sortie Reliability.

## DETACHMENT FLIGHTS SORTIE EFFECTIVENESS

(THROUGH 31 DECEMBER 1967)



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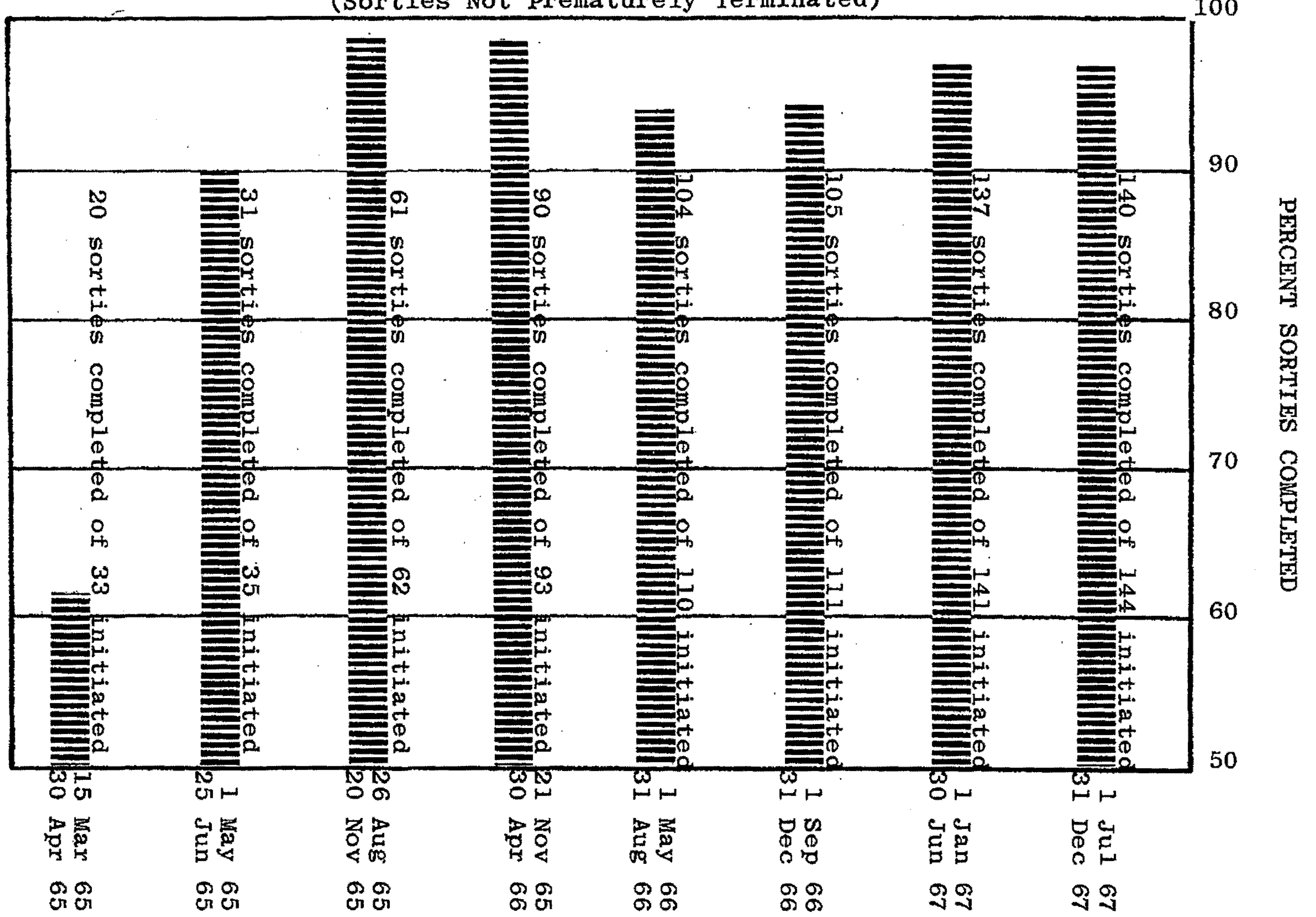
## INLET SORTIE RELIABILITY TREND

The chart opposite presents the inlet sortie reliability trend and indicates a general improvement of inlet reliability. For the period 21 November 1965 to 30 April 1966, only three of all attempted sorties were prematurely terminated due to problems with the inlet system. These three flights were prematurely terminated due to inlet unstarts or other problems associated with actuation or scheduling of the inlet spike and/or bypass doors. A slightly less reliable rate obtained over the period 1 May to 31 August 1966 during which six sorties were terminated out of 110 initiated, all for reasons similar to those mentioned for the period 21 November 1965 to 30 April 1966. The rate remained almost constant through the 1 September to 31 December 1966 period when six sorties were terminated out of 111 initiated, again for the same reasons as cited earlier. There was considerable improvement in inlet performance between 1 January 1967 and 31 December 1967 when only eight sorties were terminated out of 285 initiated.

## INLET SORTIE RELIABILITY TREND

(Sorties Not Prematurely Terminated)



BYE-8725-68

## ENGINE SORTIE RELIABILITY TREND

The facing chart presents the engine reliability trend and indicates a generally very high current level of reliability for the engine with an overall average level of reliability for the time period covered on this chart of better than 98% (779 flights successfully completed of 795 initiated). Of 653 sorties attempted in the period 21 November 1965 to 31 December 1967 which represents more than 24 months of operations, only twelve sorties were prematurely terminated due to a problem with the engine. One engine problem occurred as a result of a failure in the system which injects fuel into the afterburner, specifically a loss of an afterburner spraybar threaded-end plug. The other premature terminations due to engine problems were caused by an inlet guide vane failure which caused a compressor inlet temperature sensor failure, an independent compressor inlet temperature sensor failure, exhaust gas temperature and RPM fluctuation, two engine electrical harness deficiencies, lack of ability to trim exhaust gas temperature on an engine due to a burned out trimmer motor, and two afterburner fuel control malfunctions. Design changes have been developed to correct the hardware problems which caused the first six described failures. The other six failures are considered to be of a random nature.

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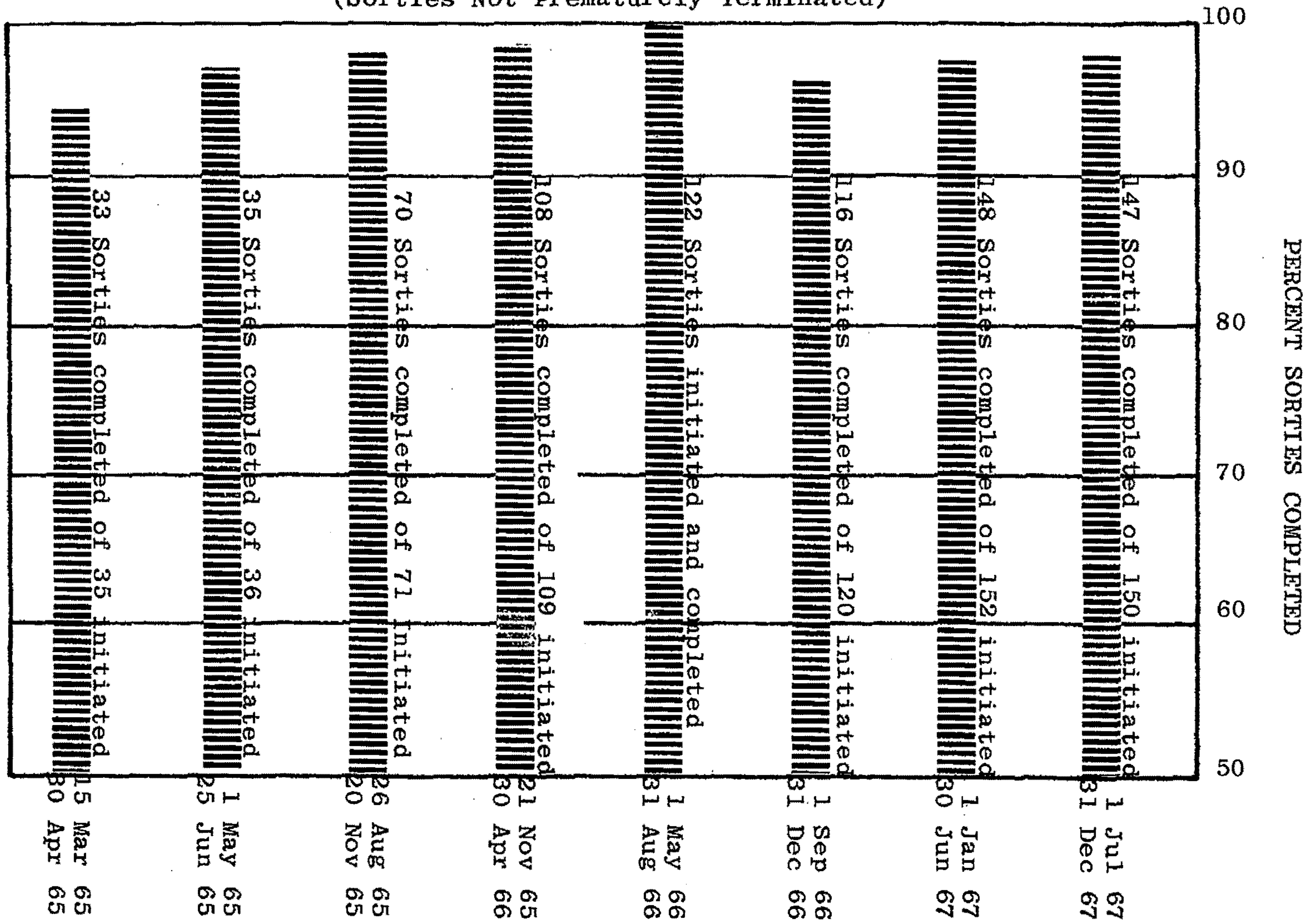
# ENGINE SORTIE RELIABILITY TREND

(Sorties Not Prematurely Terminated)



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CONTROL SYSTEM

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## NAVIGATION SYSTEM RELIABILITY TREND

During this reporting period, two sorties were prematurely terminated due to apparent INS malfunctions. One of the terminations resulted from a bad steering motor in the repeater circuit. The other, upon more extensive ground checking, was due to a broken wire on Phase A of the number 3 inverter and was, in fact, an interface malfunction. Although the in-flight reliability of the INS has remained at a very high level, the mean-time-between-failure hours have been decreasing steadily, primarily because of the very large number of operating hours already on the systems. On rare occasions even diligent ground maintenance is unable to prevent an air abort. Under present OXCART phasedown ground rules no funds have been made available for an INS IRAN program which is necessary to raise the mean-time-between-failures up to the original level.

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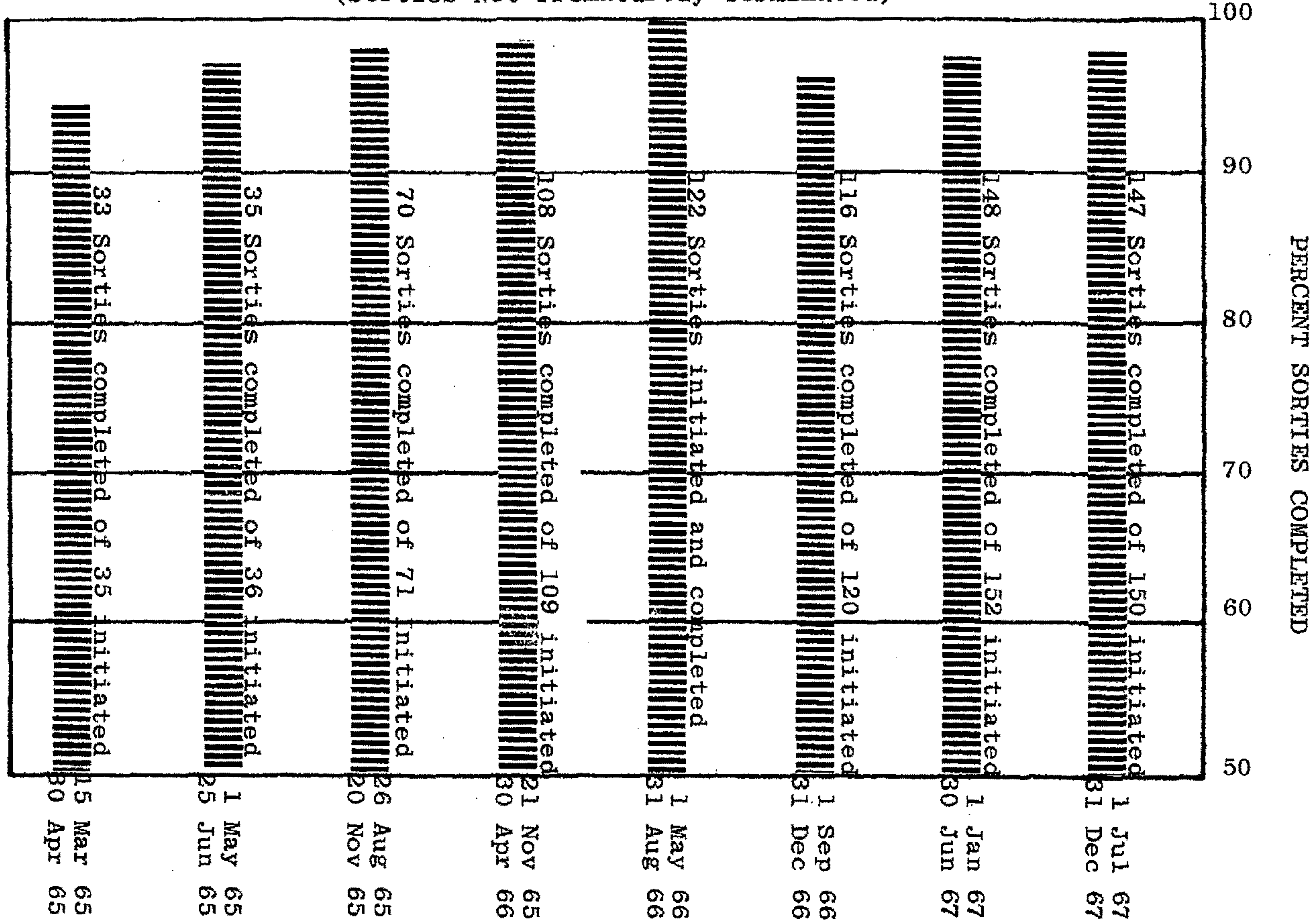
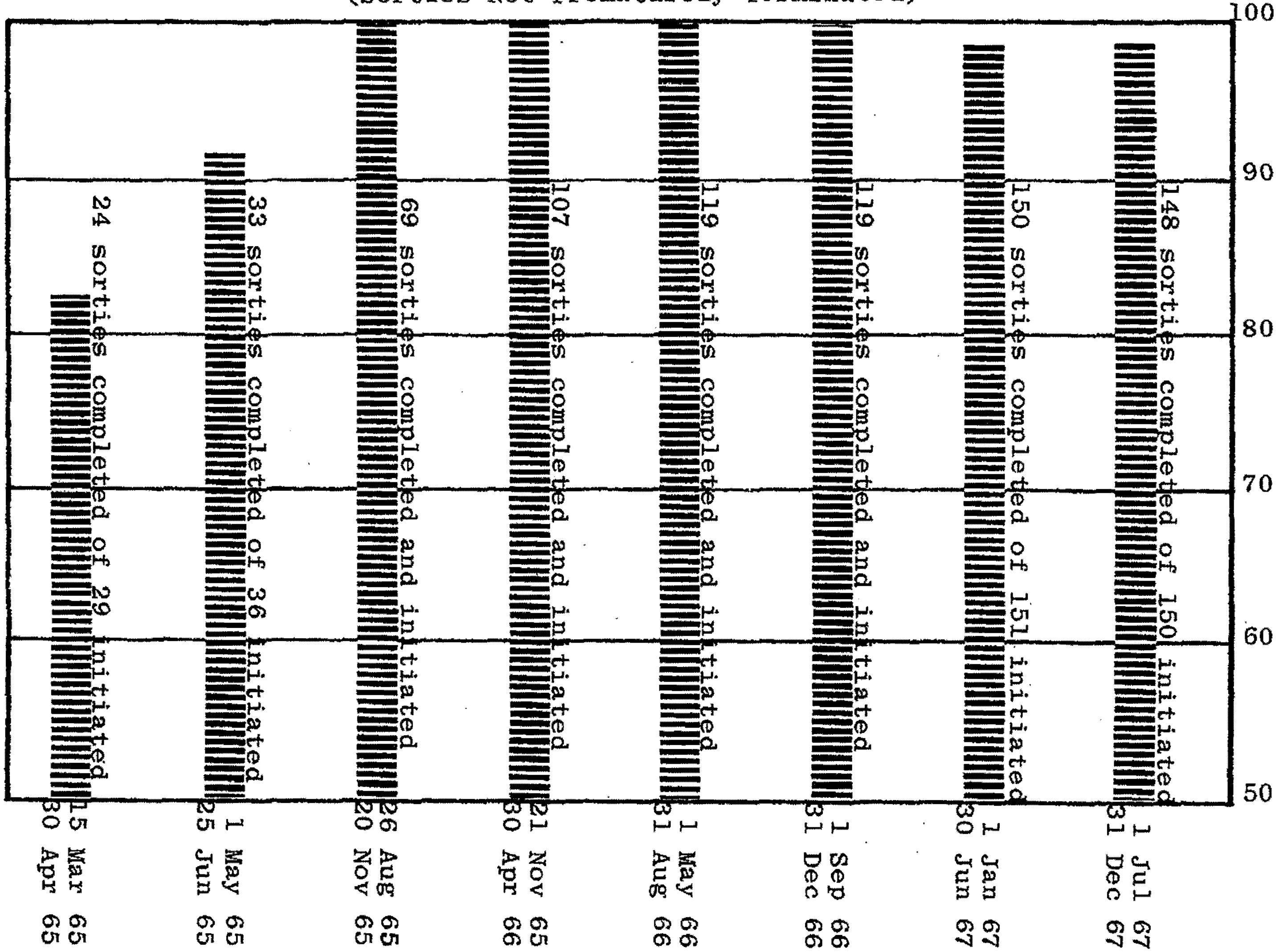
## ENGINE SORTIE RELIABILITY TREND

(Sorties Not Prematurely Terminated)



# NAVIGATION SORTIE RELIABILITY TREND

(Sorties Not Prematurely Terminated)



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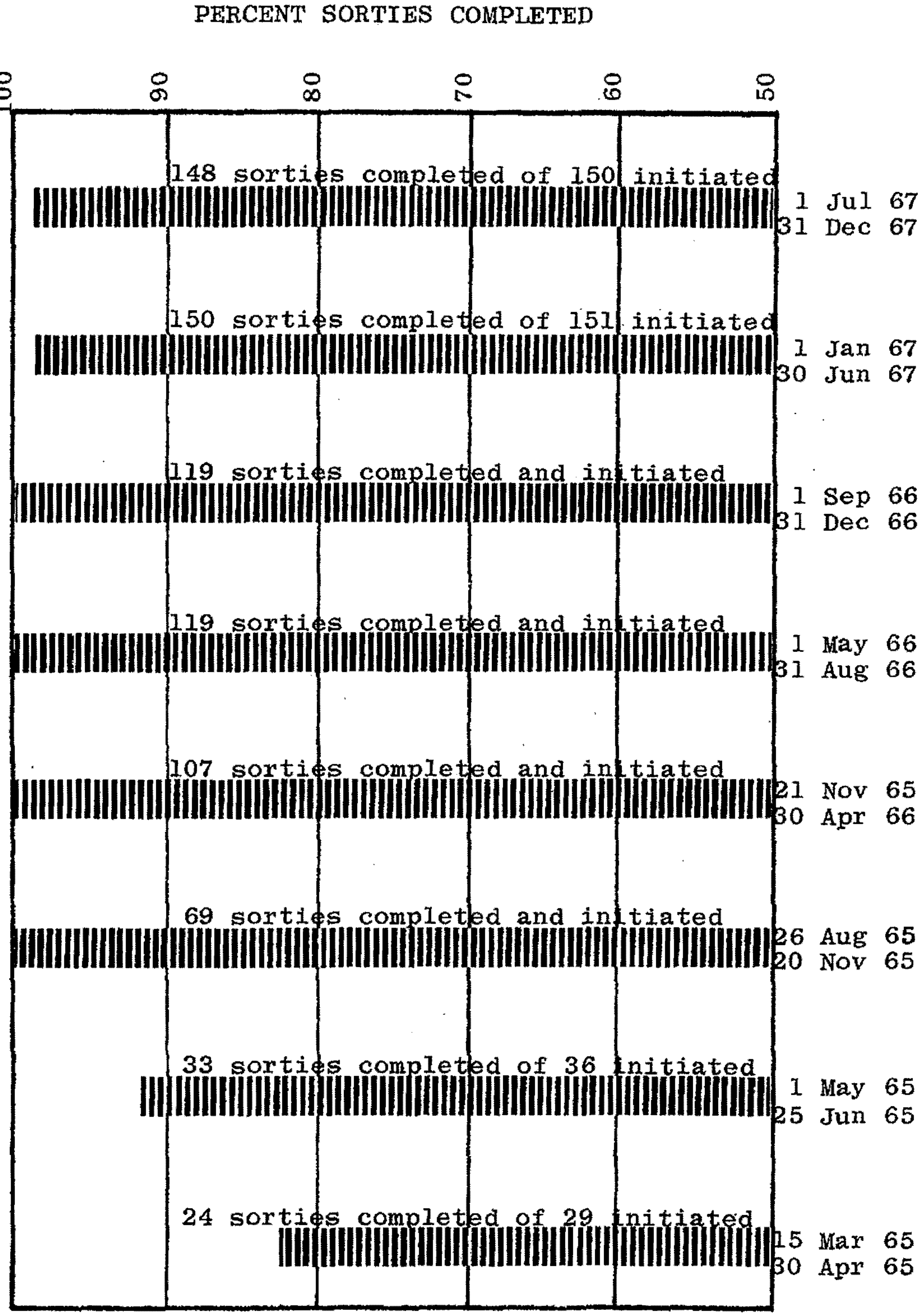
HANDLE VIA BYEMAN
CONTROL SYSTEM

# NAVIGATION SORTIE RELIABILITY TREND

(Sorties Not Prematurely Terminated)



## AUTO FLIGHT CONTROL SORTIE RELIABILITY TREND

During this reporting period only one sortie was prematurely terminated due to a flight control system malfunction. Specifically, a roll transfer valve in the roll channel of the stability augmentation system opened intermittently with hot oil applied. This was a random "one of a kind" malfunction.

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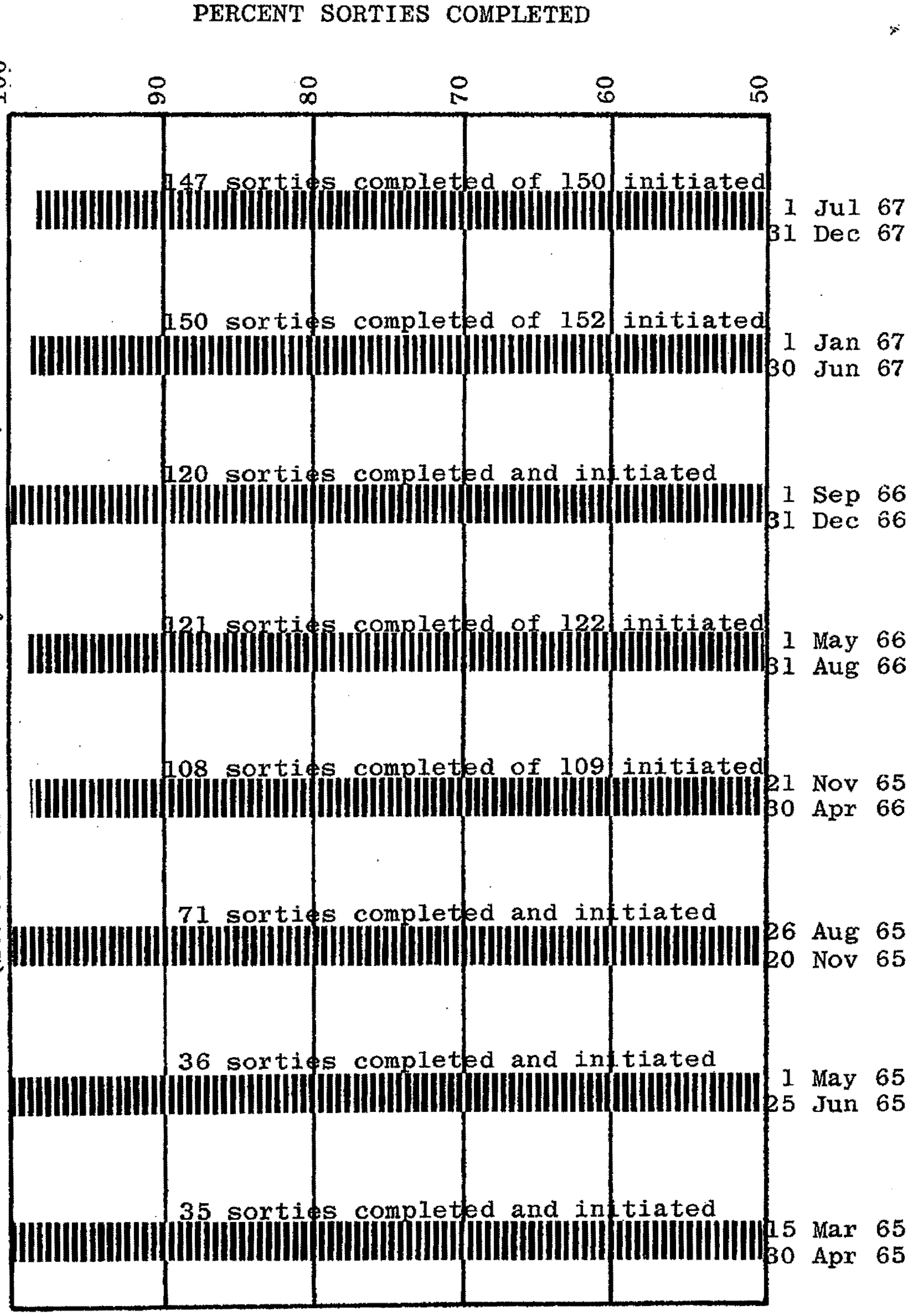
## AUTO FLIGHT CONTROL SORTIE RELIABILITY TREND

(Sorties Not Prematurely Terminated)



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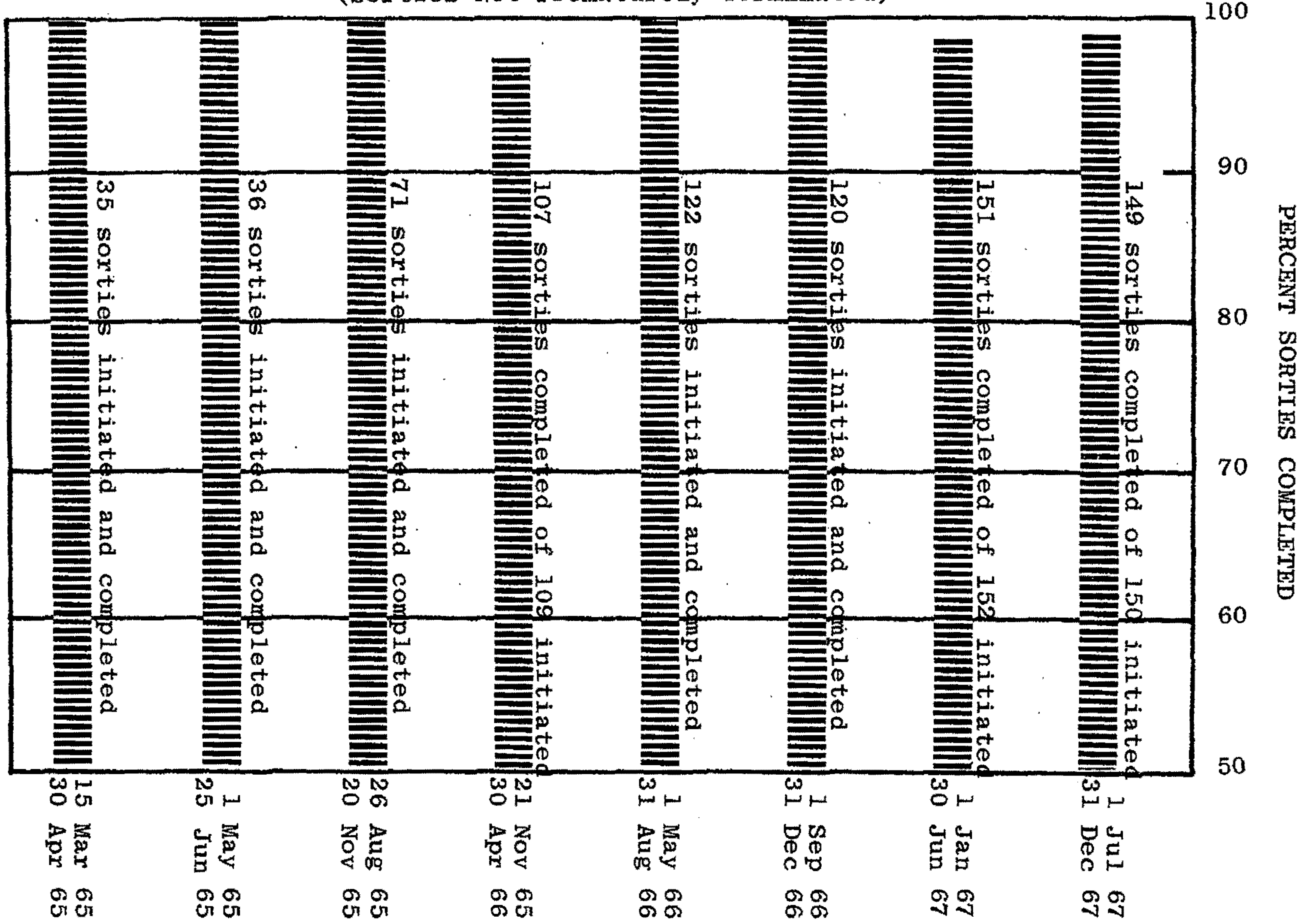
## HYDRAULIC SYSTEM SORTIE RELIABILITY TREND

The aircraft hydraulic system sortie reliability level has remained steadily high, between 98-100% since March 1965. Four flights were terminated prematurely due to hydraulic system problems during the period 21 November 1965 to 30 December 1967, out of a total of 791 sorties initiated.

## HYDRAULIC SYSTEM SORTIE RELIABILITY TREND

(Sorties Not Prematurely Terminated)



[redacted]

## "OTHER" SYSTEMS RELIABILITY

"Other" systems referred to cover a wide variety of systems and events. A detailed listing is contained on the page following the facing chart. There was marked improvement in the number of premature terminations during the period 1 July through 31 December 1967 when only eleven flights out of 150 initiated were terminated for "other" systems or events. Special emphasis is being placed on higher quality control and closer supervision to achieve continued improvement.

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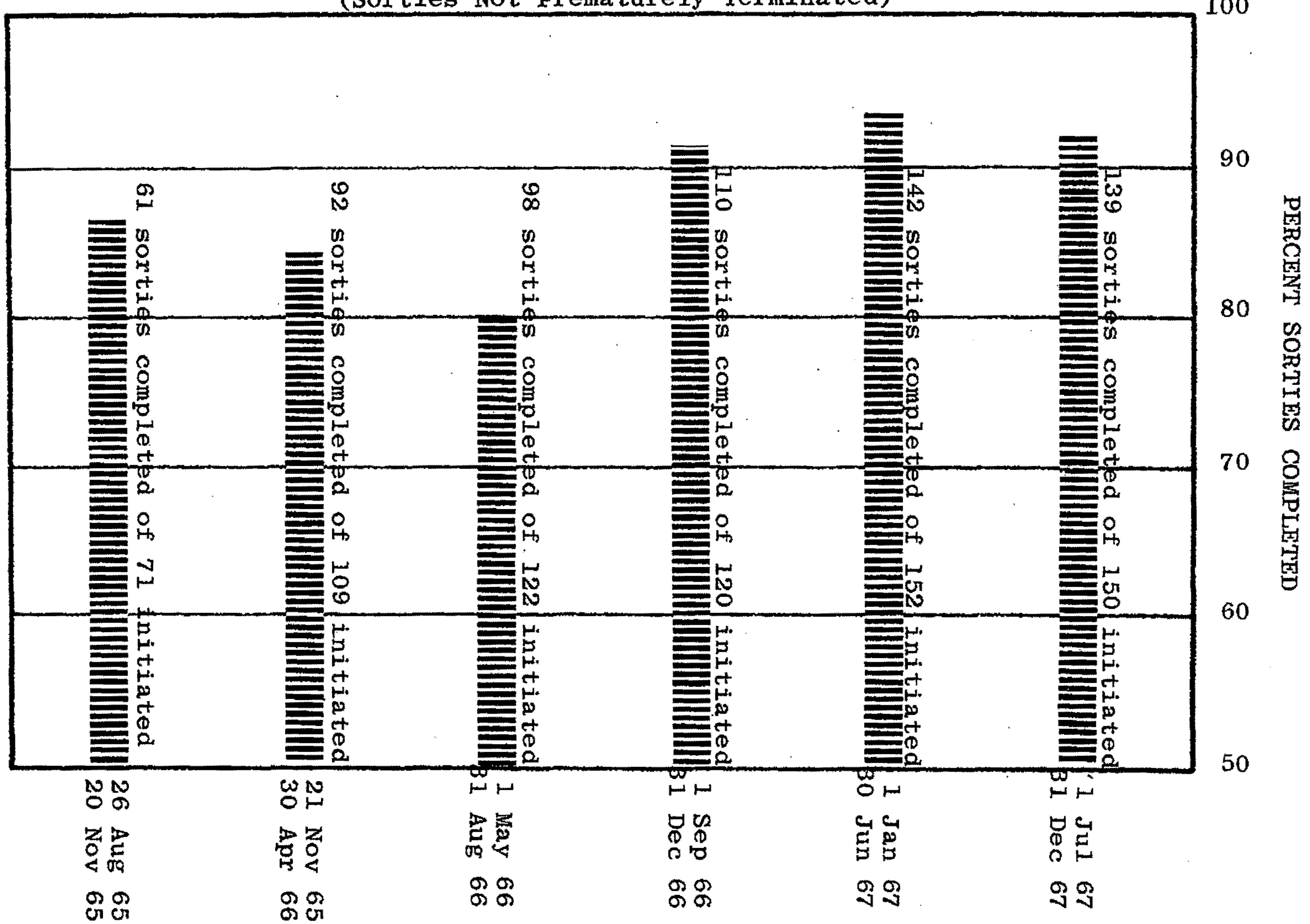
## "OTHER" SORTIE RELIABILITY

(Sorties Not Prematurely Terminated)



HANDLE VIA BYEMAN
CONTROL SYSTEM

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## SUMMARY - PREMATURE TERMINATIONS

The opposite table first summarizes the prematurely terminated sorties assignable to each of the foregoing subsystem charts for the latest period examined from 1 July 1967 through 31 December 1967. The number of sorties initiated for each subsystem may differ because only the sorties on which that particular subsystem was used is counted. The engine, being used on every sortie, reflects the total number of 150 sorties initiated during the period.

"Other" includes all other premature terminations assigned to the indicated problems or components which are not part of the foregoing major subsystems examined.

Total premature terminations for the period 1 July 1967 through 31 December 1967 are 24 out of a total of 150 sorties initiated.

## SUMMARY - FOREGOING MAJOR SYSTEMS AND OTHER PREMATURE TERMINATIONS OF AIRCRAFT FLIGHTS

1 July Through 31 December 1967

Major Systems:

| | | | |
|---|---|---|---|
| 1. | Inlet : | Unstarts, Spike, Fluctuations | 4 |
| 2. | Engine : | ENP, Fuel Flow Nozzle Fluctuations and Oil Pressure Fluctuations Due Engine Harness Problem* | 3 |
| 3. | AFCS : | SAS Pitch Control, SAS Roll | 3 |
| 4. | Hydraulic: | Left System Failed | 1 |
| 5. | INS : | Large Terminal Error and Bad Steering | 2 |
| | | | 13 |

"Other"

| | | |
|---|---|---|
| 1. | Faulty Fuel Pressure Indicator | 1 |
| 2. | Roll SAS Malfunction, Due Faulty Servo's | 1 |
| 3. | INS Failure, Due #3 Inverter Inoperative | 1 |
| 4. | Autonav Steering Error, Due Pilot Error | 1 |
| 5. | HF/SSB Inoperative | 1 |
| 6. | ARC-50 Failure | 1 |
| 7. | Camera Failed | 1 |
| 8. | SAS Yaw Transients and Rudder Oscillations, Due Power Interruption | 1 |
| 9. | Fillet Panel Loss | 1 |
| 10. | Pitch Trim Malfunction | 1 |
| 11. | Fuel Leak | 1 |
| | | 11 |

*See Para 13, Page 45, BX-6727

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## CAMERA SYSTEMS

Type I cameras are built by Perkin-Elmer. There are five Type I "C" series in the inventory. With the phase-down of the OXCART program the two Type I "A" series were placed in storage.

Type IV cameras are built by Hycon. There are three of these in the inventory. Two of these have been validated and declared operationally ready. The third is scheduled for prevalidation and validation flights on or about 15 January 1968.

The first summation (opposite page) includes only test flights at Mach 3 and 80,000 feet altitude plus the twenty-two operational missions. The second summation includes all flights including operational missions since the beginning of the program.

## CAMERA PERFORMANCE

(As of 31 December 1967)

### Test Flight Time at Mach 3 and 80,000 feet

| Type I "A" Series | Type I "C" Series |
|---|---|
| 980 Min. | 5667 Min. |

**Type IV**

1903 Min.

## TOTAL FLIGHT EXPERIENCE

| Type I "A" Series | Type I "C" Series |
|---|---|
| 98 Flights | 164 Flights |
| 75 Hours | 119 Hours |
| 6 Failures | 9 Failures |

**Type IV**

67 Flights
37 Hours
11 Failures

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## ELECTRONIC WARFARE SYSTEM

A brief functional description of the Electronic Warfare Systems follows:

### DEFENSIVE:

BIG BLAST - Denies target range from SA-2 radar to force the missile into a three point guidance mode and early arming of the fuze.

BLUE DOG - Recognizes missile guidance activity and actively transmits false commands to the SA-2 missile guidance systems.

PIN PEG - Passively intercepts SA-2 radar frequency signal. Locates and positions SA-2 radar site in azimuth within vulnerable zone.

MAD MOTH - Denies SA-2 tracking radar accurate angle information resulting in large missile miss distances.

A redundancy exists between the recognition and jamming systems employed, thus giving a lower degree of vulnerability to the aircraft and accounting for the high degree (100%) of total system reliability.

### ELINT COLLECTION:

SIP - Signal Intercept Package - A small unattended ELINT collection system which covers the frequency spectrum from 50 $MH_z$ to 11,000 $MH_z$. It was used on three operational missions and all were successful.

System 6S - An advanced ELINT collection system capable of signal monitoring over a frequency range of 50 $MH_z$ to 12,500 $MH_z$ and providing analog recording of the signals. It was successful on 18 of 19 missions. The one unsuccessful mission was due to a drive belt failure.

## ELECTRONIC WARFARE SYSTEM RELIABILITY

## BLACK SHIELD OPERATIONAL MISSIONS

| TYPE SYSTEM | MISSIONS | SUCCESSES | PERCENT |
|---|---|---|---|
| DEFENSIVE | 22 | 22 | 100% |
| ELINT COLLECTION | 22 | 21 | 95.5% |

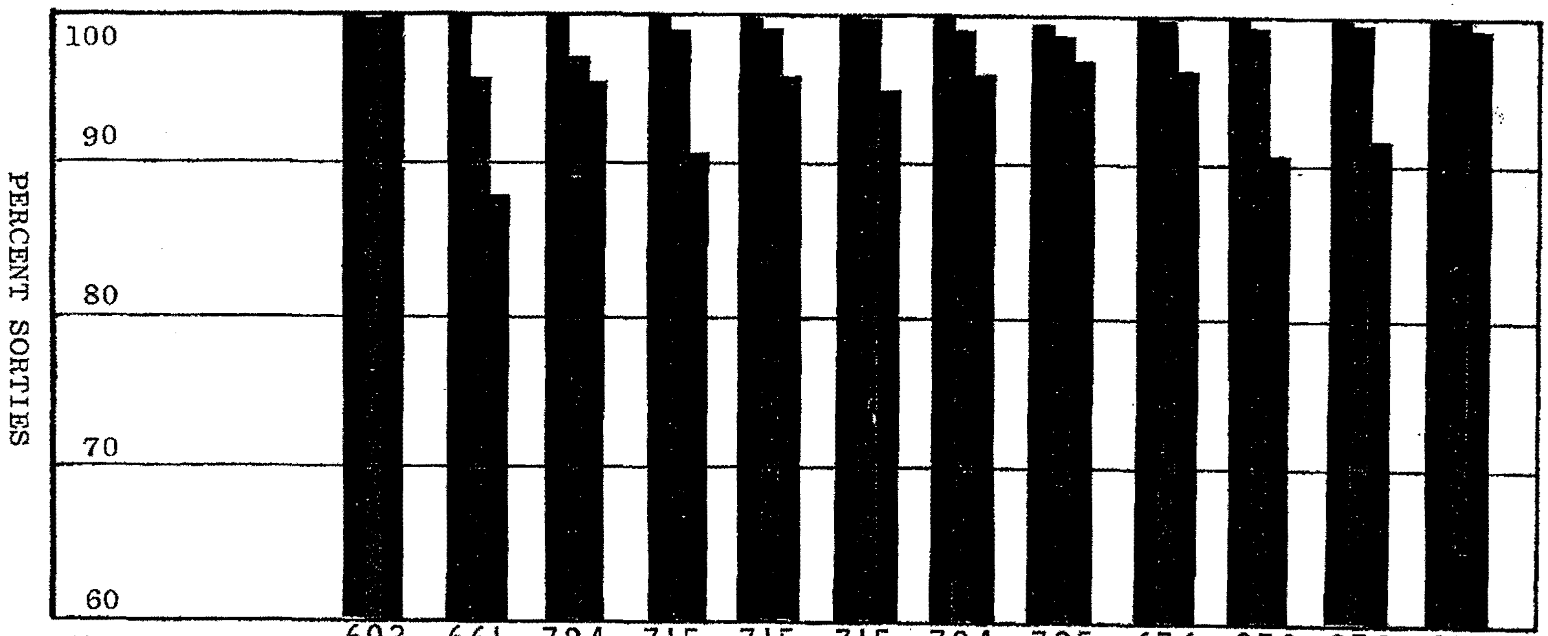
## SYSTEM RELIABILITY

The chart opposite summarizes three levels of reliability for each major system from 26 August 1965 through 31 December 1967. The first (red) barometer for each system reflects the percent of sorties completed safely by that system relative to the total sorties initiated for that system. The second or green barometer reflects the percent of the sorties initiated which were not prematurely terminated or aborted because of that system. The third (black) barometer reflects the percent of sorties initiated during which that system operated completely satisfactorily. Numerical figures used in the percentages are shown below each barometer.

"Interface" refers to the system listed to the left of "interface" and accounts for malfunctions which are not assignable as a fault of the system itself but which affected the system's overall operation. Typical examples are aircraft generated electrical power or cooling air interruptions to such systems as the cameras, navigation and stability systems.

## SYSTEM RELIABILITY

### ALL FLIGHTS SINCE DEBUG MOD WITH DETACHMENT AIRCRAFT 26 AUGUST 1965 - 31 DECEMBER 1967



| | LIFE SUPPORT SYSTEM | INLET SYSTEM | ENGINE | NAVIGATION | INERTIAL NAVIGATION SYSTEM | INTERFACE | STABILITY AUGMENTATION SYSTEM | INTERFACE | AUTOPILOT | PHOTOGRAPHIC | CAMERAS I, II, IV | INTERFACE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SORTIES FLOWN | 693 | 661 | 724 | 715 | 715 | 715 | 724 | 725 | 676 | 270 | 270 | 270 |
| ■ SAFE FLT RETURN | 692 * | 661 | 724 | 715 | 715 | 715 | 724 | 724 * | 676 | 270 | 270 | 270 |
| ■ NOT ABORTED | 692 | 637 | 711 | 712 | 712 | 715 | 719 | 720 | 676 | 269 | 269 | 270 |
| ■ SYSTEM SATISFACTORY | 692 | 590 | 690 | 652 | 689 | 678 | 701 | 705 | 660 | 248 | 250 | 268 |

*See page 40 for Aircraft 125 & 126 Accidents

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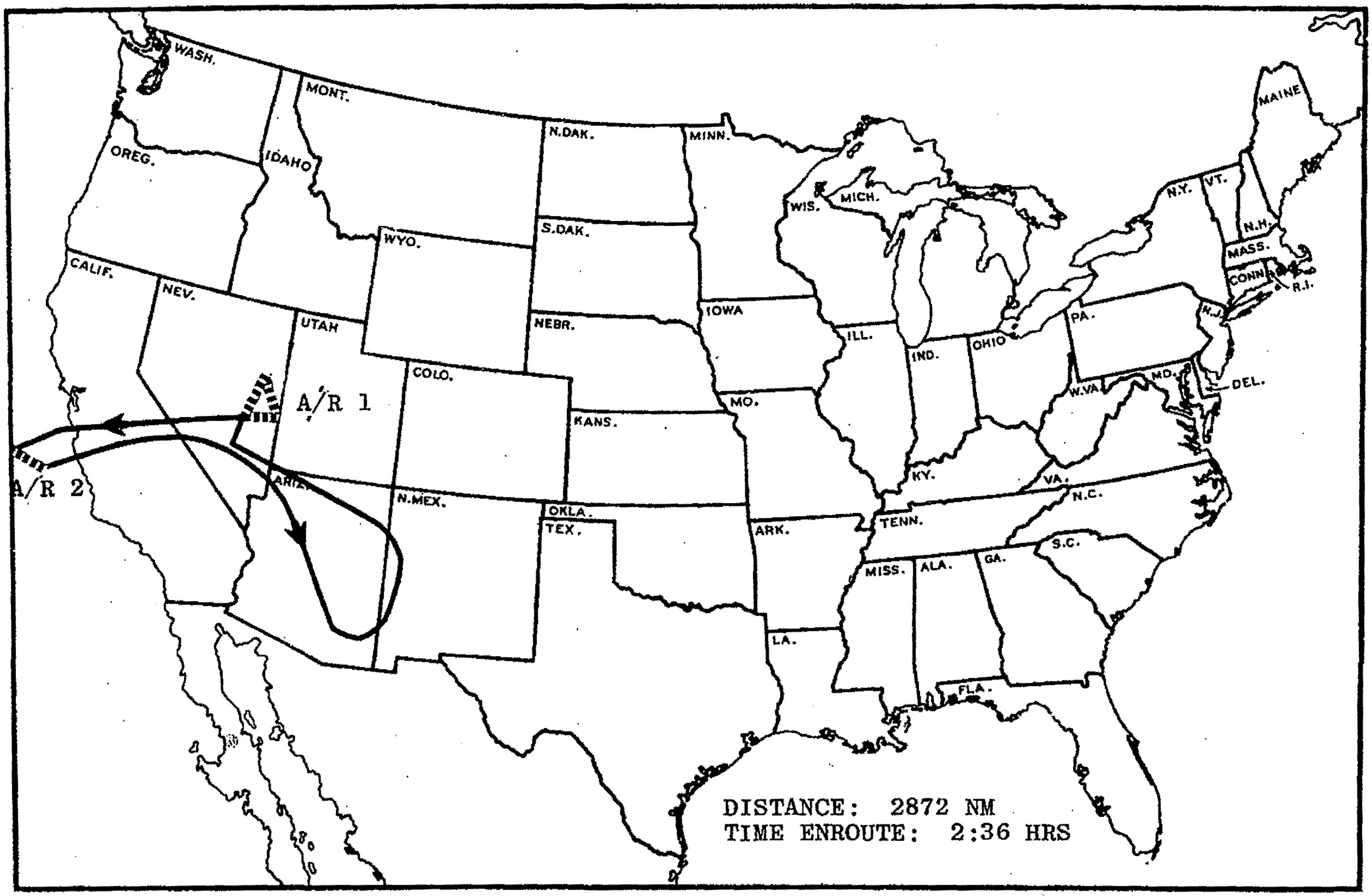
## SCOPE CROWN "E" (2 AIR REFUELING MISSION)

This mission was developed as a camera package evaluation route. Resolution targets at Phoenix, Arizona, and Area 51 are covered. The route also incorporates an over-water air refueling 450 N.M. off the coast of California. Route was first flown in June 1967.

## SCOPE CROWN "E" (TWO AIR REFUELING MISSION)



DISTANCE: 2872 NM
TIME ENROUTE: 2:36 HRS

## SCOPE CROWN "F" (3 AIR REFUELING MISSION)

This mission was developed from SCOPE CROWN "E". An additional air refueling and cruise climb leg was added to simulate an operational mission for pilot training. Mission was first flown in June 1967.

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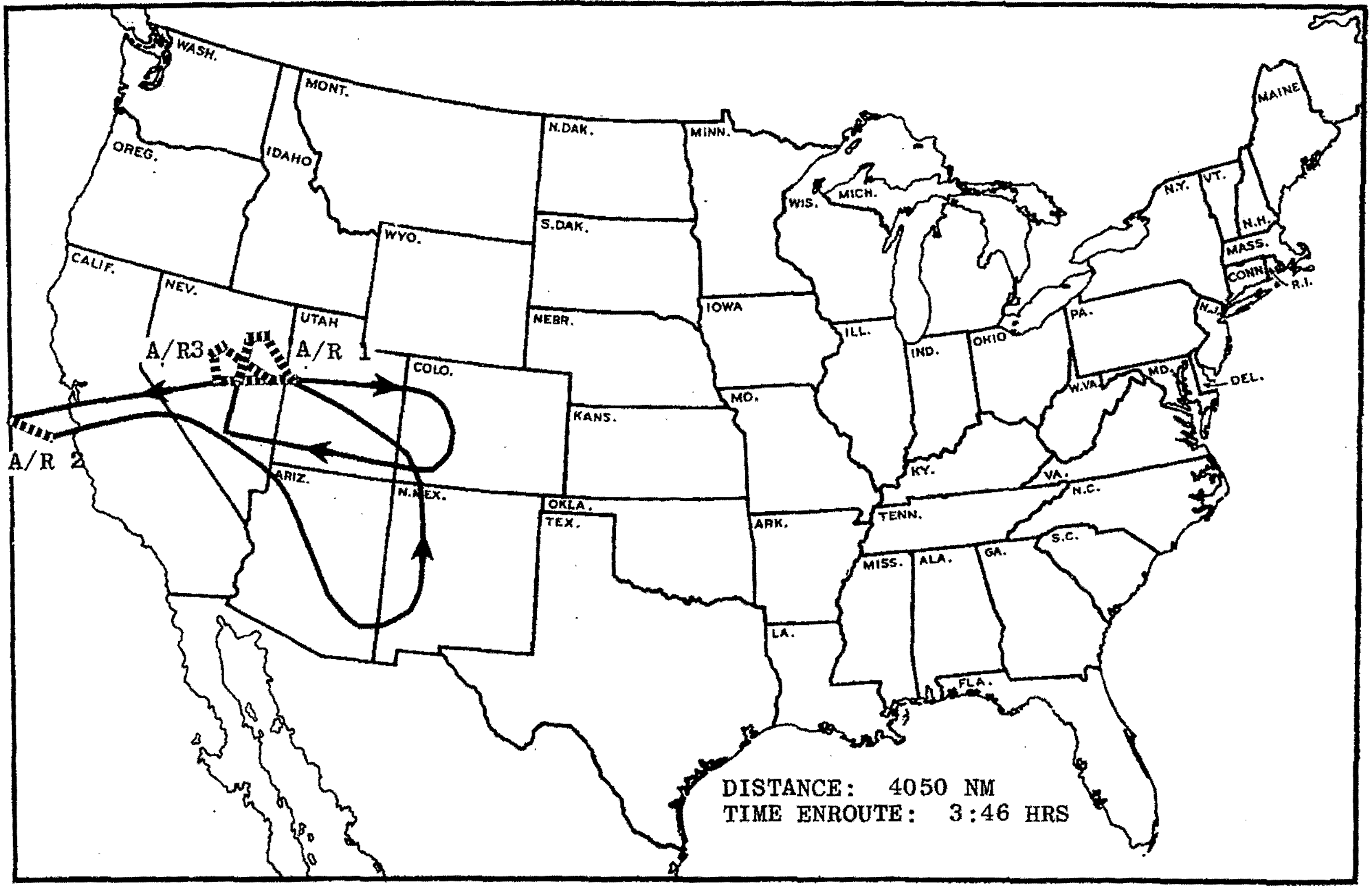
SCOPE CROWN "F" (3 AIR REFUELING MISSION)



DISTANCE: 4050 NM
TIME ENROUTE: 3:46 HRS

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CONTROL SYSTEM

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## A-12 AIRCRAFT ACCIDENT RELIABILITY

The chart opposite reflects the four aircraft accidents which have occurred during the program through 31 December 1967.

Of interest is the fact that not any of these accidents involved the high Mach number-high temperature regime of flight in which this program has spearheaded the state-of-the-art. Also of interest is that two of these accidents occurred in the local home base area within feet of the runway. All of these accidents involved traditional problems inherent in any aircraft.

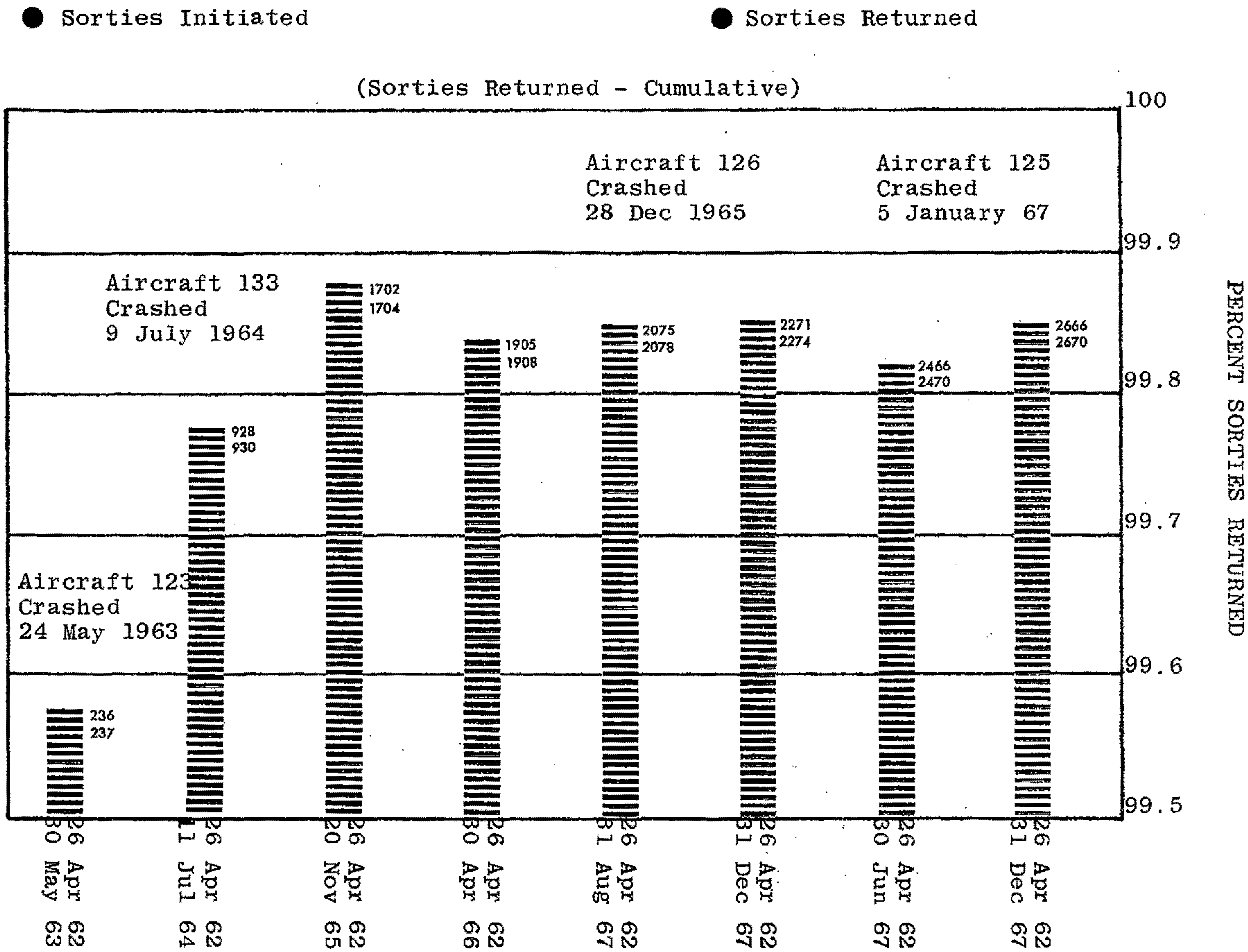
Aircraft 123's accident occurred on 24 May 1963 away from the base on a routine training flight. It involved a plugged pitot static tube during icing conditions resulting in erroneous cockpit instrument indications of air speed. The pilot was ejected safely.

Aircraft 133's accident occurred on 9 July 1964 during landing approach. It involved a malfunction of the flight control surface actuating system resulting in a continuous and uncontrollable roll. The pilot was ejected safely.

Aircraft 126's accident occurred on 28 December 1965 during take-off climb-out. It involved a human error wherein the flight line electrician connected the wiring for the yaw and pitch gyros of the stability system in reverse. This resulted in complete uncontrollability of the aircraft. The pilot was ejected safely.

Aircraft 125's accident occurred on 5 January 1967 during descent about 85 miles from the base. It involved a fuel system gaging malfunction resulting in a higher than actual indicated fuel quantity reading. Because of this, the aircraft was out of fuel before reaching the base. The pilot was killed on impact with the ground because of a malfunction precluding man-seat separation after ejection from the aircraft.

# A-12 AIRCRAFT ACCIDENT RELIABILITY



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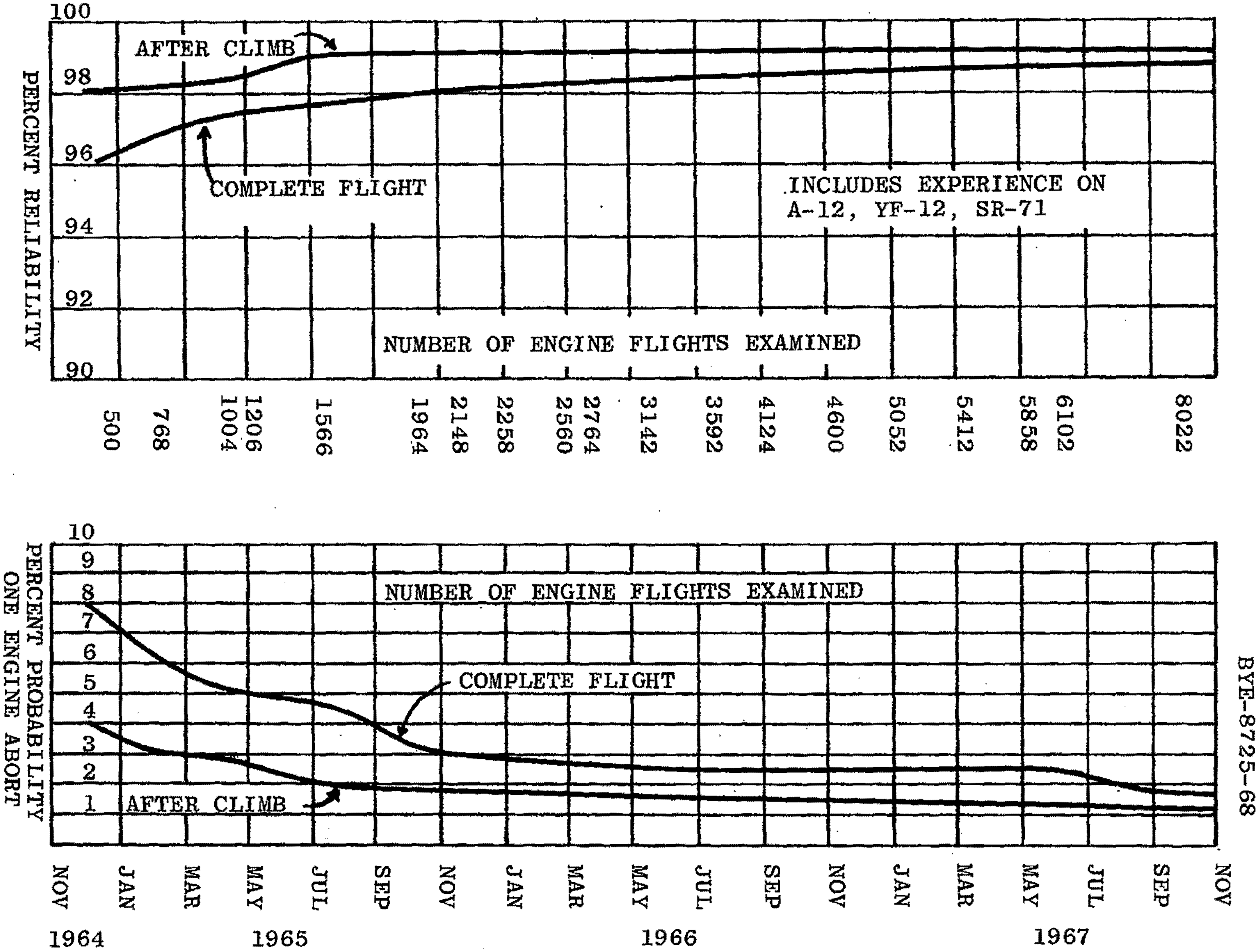
## ENGINE RELIABILITY

The accompanying chart presents J-58 engine abort reliability. A differentiation is made between aborts which occurred at any time during a flight (complete flight) and those which occurred after climb. The aborts which occurred after climb are considered to be more representative of those which might occur over denied territory. The abort reliability on an after climb basis is better than 99%. This level of reliability is computed on the basis of 8022 J-58 engine flights which have taken place since the development of an operable aircraft inlet system on all programs including the A-12, YF-12, and SR-71.

## J-58 ENGINE (ABORT) RELIABILITY FOR ENGINE CAUSE

CUMULATIVE THROUGH 31 DECEMBER 1967)



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## BLACK SHIELD
## DEPLOYMENT AND OPERATIONAL SUMMARY

### A. DEPLOYMENT

1. 22 May 1967 ACFT NO 131 flew non-stop from Area 51 to Kadena AB, Okinawa in 6:10 hours. The flight required top-off and 3 aerial refuelings and attained 79,000 feet during cruise at Mach 2.9 for two legs and 3.1 for one leg.

2. 24 May 1967 ACFT NO 127 flew non-stop from Area 51 to Kadena AB, Okinawa in 6:00 hours. The flight was similar to that of ACFT NO 131 above except an altitude of 81,000 feet was reached during cruise.

3. 26 May 1967 ACFT NO 129 flew from Area 51 to Wake Island in 4:30 hours. Landing at Wake Island was precautionary due to a malfunctioning navigation system. The flight was made at Mach 2.9 at 76,000 feet altitude. The aircraft proceeded uneventfully to Kadena on 27 May 1967.

### B. OPERATIONAL SORTIES

(All missions employed the Type I camera) (altitudes and Mach numbers represent maximum attained during mission).

1. BSX-001, 31 May 1967. Mission was flown at Mach 3.1 and 80,000 feet for a duration of 3:45 hours. Imagery quality: Good.

2. BSX-003, 10 June 1967. Mission was flown at Mach 3.1 and 81,000 feet for a duration of 4:30 hours. Imagery quality: Good.

3. BX-6705, 20 June 1967. Mission was flown at Mach 3.1 and 82,000 feet for a duration of 5:30 hours. Imagery quality: Excellent.

4. BX-6706, 30 June 1967. Mission was flown at Mach 3.1 and 81,000 feet for a duration of 5:00 hours. Imagery quality: Good.

5. BX-6708, 13 July 1967. Mission was flown at Mach 3.15 and 82,100 feet for a duration of 3:40 hours. Imagery quality: Good.

6. BX-6709, 19 July 1967. Mission was flown at Mach 3.17 and 82,000 feet for a duration of 4:58 hours. Imagery quality: Excellent.

7. BX-6710, 20 July 1967. Mission was flown at Mach 3.16 and 82,450 feet for a duration of 4:55 hours. Imagery quality: Good, despite haze problem.

8. BX-6716, 21 August 1967. Mission was flown at Mach 3.2 and 80,000 feet for a duration of 3:55 hours. Imagery quality: Good to Excellent.

9. BX-6718, 31 August 1967. Mission was flown at Mach 3.20 and 81,000 feet for a duration of 5:12 hours. Imagery quality: Good until camera malfunctioned.

10. BX-6722, 16 September 1967. Mission was flown at Mach 3.15 and 80,000 feet for a duration of 4:01 hours. Imagery quality: Good.

11. BX-6723, 17 September 1967. Mission was flown at Mach 3.16 and 81,000 feet for a duration of 4:00 hours. Imagery quality: Excellent.

12. BX-6725, 4 October 1967. Mission was flown at Mach 3.14 and 81,000 feet for a duration of 4:09 hours. Imagery quality: Excellent.

13. BX-6727, 6 October 1967. Mission was flown at Mach 3.19 and 81,000 feet for a duration of 2:20 hours. Imagery quality: Good. Mission was prematurely terminated due to a faulty oil pressure indicator.

14. BX-6728, 15 October 1967. Mission was flown at Mach 3.19 and 81,000 feet for a duration of 3:41 hours. Imagery quality: Good.

15. BX-6729, 18 October 1967. Mission was flown at 3.21 and 81,000 feet for a duration of 4:01 hours. Imagery quality: Good.

16. BX-6732, 28 October 1967. Mission was flown at Mach 3.15 and 83,500 feet for a duration of 3:49 hours. Imagery quality: Good.

17. BX-6733, 29 October 1967. Mission was flown at Mach 3.23 and 82,000 feet for a duration of 3:56 hours. Imagery quality: Good.

18. BX-6734, 30 October 1967. Mission was flown at Mach 3.20 and 85,000 feet for a duration of 3:44 hours. Imagery quality: Good.

19. BX-6737, 8 December 1967. Mission was flown at Mach 3.20 and 82,500 feet for a duration of 3:59 hours. Imagery quality: Good.

20. BX-6738, 10 December 1967. Mission was flown at Mach 3.17 and 81,000 feet for a duration of 3:51 hours. Imagery quality: Good.

21. BX-6739, 15 December 1967. Mission was flown at Mach 3.20 and 86,000 feet for a duration of 4:09 hours. Imagery quality: Good.

22. BX-6740, 16 December 1967. Mission was flown at Mach 3.20 and 86,200 feet for a duration of 3:56 hours. Imagery quality: Good.

ANNEX 2

[redacted]

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# ADVANCED RECONNAISSANCE AIRCRAFT STUDY

November 1966

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IDEALIST/OXCART/CORONA
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## Introduction

This report is submitted by the study group designated by the Secretary of Defense, the Director of the Central Intelligence Agency and the Director of the Bureau of the Budget to make an appraisal of the A-12 (OXCART) and SR-71 aircraft fleets. The report includes a discussion of: (a) the characteristics and capabilities of these fleets; (b) the requirements for planned and potential missions of the fleets; and (c) five alternative configurations of the two fleets including consolidation of the assets and storing some aircraft.

The report is organized as follows:

The findings of the study group in each of the main sections are summarized in a Highlights section of the report which is supported by the more detailed sections and appendices.

## I. HIGHLIGHTS

The purpose of this section of the report is to set out the general findings and conclusions of the report with regard to the

- II. Resources
- III. Mission Requirements
- IV. Evaluation of the need for a separate OXCART fleet
- V. Alternatives

These major areas make up the main sections of the more detailed body of the report and are supported by the Appendices.

### Resources

This section of the report addresses the relative technology, the operational capabilities, plans and schedules, support facilities and the costs of the A-12 and the SR-71 aircraft. The general conclusions are presented here.

### 1. The Aircraft Systems

The two aircraft systems, the CIA A-12 and the USAF SR-71 are almost equal insofar as general aircraft performance is concerned. The A-12 flies two or three thousand feet higher at any point along the flight profile for a particular range, although the altitude of both aircraft will vary five to ten thousand feet during the course of flight over denied territory. Intelligence gathering potential is similar in the two systems. The SR-71 has a capability for simultaneous operation of several sensors responding to different parts of the spectrum; the A-12 has a number of interchangeable single-sensor systems. The A-12 is the predecessor program; it is further along, having been declared operationally ready by the CIA in December 1965. The SR-71 is a later model and has the slight advantage of more standardization and slightly greater growth potential. The SR-71 currently offers an interim operational capability for Cuba, with 45 days prior notice, and Southeast Asia from

Kadena, Okinawa with 90 days prior notice. SAC has informally forecasted that the SR-71 fleet of aircraft will be fully operationally ready by August 1967.

2. Costs

This table summarizes the total programmed costs including costs for tanker support, cargo and support aircraft sorties, Air Force supply issue. Figures are in millions of dollars by FY.

| | FY65 & prior | FY66 | FY67 | FY68 | FY69 | FY70 | FY71 | FY72 |
|---|---|---|---|---|---|---|---|---|
| A-12 | 610 | 89 | 97 | 110 | 102 | 95 | 93 | 88 |
| SR-71 | 579 | 461 | 147 | 187 | 157 | 148 | 140 | 132 |
| Engine R&D | 270 | 64 | 57 | 45 | 35 | 25 | 15 | 5 |
| Total | 1,459 | 614 | 301 | 342 | 294 | 268 | 248 | 225 |

The total from FY 1966 through FY 1972 for both programs is 2,292

## Mission Requirements

This section discusses the requirement for the advanced aircraft and compares current and projected capabilities of the advanced aircraft with those for satellites and unmanned drones. For the purposes of this study, we have found it useful to consider four basic mission requirements:(1)

1. Strategic reconnaissance is peacetime reconnaissance, primarily

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(1) This categorization does not have formal approval by either USIB or the Department of Defense.

of the USSR, China, and their allies. It provides routine intelligence on technical, military and economic developments and capabilities. To a much more limited extent, this reconnaissance is also conducted against neutral powers.

2. Force mobilization reconnaissance would be directed primarily against China and the European satellites in case of indications that preparations were under way for attack against other nations. This reconnaissance might also be needed against neutrals.

3. Reconnaissance for general war crisis would be directed against the Soviet Union (and in a number of years against China) in case of a very intense crisis or of intelligence warning that the Soviet Union might be preparing for strategic attacks against the United States or Europe.

4. SIOP reconnaissance would be aimed at the Soviet Union, after a general war broke out, and be against targets that were planned to be struck by U.S. strategic forces.

Although these categorizations are useful for analyzing the role of the advanced aircraft, there is no sharp dividing line between them. Rather each successive mission requirement reflects reconnaissance under increasing international tension, broadening conflict, a growing readiness to take risks, a lessening need for covert reconnaissance, a growing need to cover more targets simultaneously and to provide results more quickly, and an increasing requirement for reconnaissance to support both national decision-making and tactical commanders.

In terms of these four mission requirements we have reached the following conclusions:

1. Strategic Reconnaissance. The advanced aircraft can play at best a minor role in strategic (routine peacetime) reconnaissance of the Soviet Union, China, and their allies. Satellite capabilities now exceed the normally required amount of target coverage for a given time period, and the KH-8 and KH-9 systems can greatly increase this capability. Because of their current acceptability as reconnaissance vehicles, satellites

present the lowest risk of incident. The major weakness of the satellites is their relative inability to provide efficient coverage of a small number of isolated targets or events. After mid-1968, advanced drones will probably provide this capability for well defended areas. At present, losses of unmanned drones are high unless they are limited to use in areas without sophisticated air defenses.

The advanced aircraft would be useful in strategic reconnaissance of areas outside of the Sino-Soviet bloc where SA-2 type defenses had been deployed. Cuba and parts of South America or the Middle East might become such areas. In the absence of sophisticated air defense the U-2 provides some capability.

If the Soviet Union or the Chinese should attempt to neutralize or destroy reconnaissance satellites, then the OXCART and the SR-71 aircraft do not promise to be attractive substitutes. The level of technology and the effort required for anti-satellite operations are greater than would be required against the Mach 3 aircraft. In fact, one of the roles of the Tallinn type defensive system may well be air defense against the advanced aircraft.

In summary, for peacetime strategic reconnaissance, there does not seem to be a strong requirement for the high performance aircraft. A small fleet of less than half a dozen would be sufficient.

2. Reconnaissance of Force Mobilization. For the mission of detecting and reconnoitering mobilization and force buildup, the advanced aircraft can play a much greater role. The aircraft systems can provide intense coverage of large border areas and this intense surveillance can be maintained almost indefinitely. The satellite systems are now very limited in their ability to be launched on short notice, in their effectiveness for reconnoitering small or oddly shaped geographical areas, and in the timeliness of their return. The KH-9 system will provide much greater potential coverage with high resolution but current plans will not provide a capability with rapid response time that endures for more than two months.

A MOL system or a real-time readout for the KH-8 system would provide additional capabilities. For this mission, we have not analyzed the cost tradeoffs between these advanced satellite systems and the OXCART/SR-71 aircraft; however, the need for a large fleet of OXCART and the SR-71 aircraft will be somewhat reduced to the extent that such systems are deployed.

The unmanned drones currently provide useful intelligence but only about 60 percent survive and are recovered. The future drone programs, particularly the TAGBOARD drone, will be significantly less vulnerable than the current drones.

In those situations where conflict has already escalated to the point that tactical reconnaissance is under way (such as in North Vietnam today), then this reconnaissance can go far to supplement the advanced aircraft. Also, there could be situations where the need for extensive reconnaissance would force escalation to tactical reconnaissance (and it would therefore be available for national needs) even before other tactical air operations were undertaken. Cuba was an example.

In summary, we conclude that the force mobilization mission will continue in the early seventies to be an important mission for the advanced aircraft no matter what developments are incorporated in the satellite programs. The size of the fleet should provide for this type of reconnaissance in two theaters and should be able to support the intelligence needs of both national decision authorities and of U.S. and allied tactical commanders in the theater. In the worst case as many as a dozen aircraft could be needed for these missions.

3. Reconnaissance for General War Crisis. For brink-of-war reconnaissance of the Soviet Union in the next several years, the collection capabilities of the advanced aircraft systems are much superior to satellites or drones. Six aircraft could cover hundreds of targets in the Soviet Union and return their product within a day. Current satellites are limited in their response time, and current drones in their range and survivability. In the next several years, satellites will become more competitive for the brink-of-war reconnaissance role if quick readout is developed with the KH-8, or if an enlarged quick reaction capability is

provided for either the KH-8 or the KH-9, or possibly if the MOL is deployed. Similarly, the TAGBOARD drone will have the range of the advanced aircraft and may have somewhat better survivability. Finally, the future of the advanced aircraft and drones is clouded by potential current or future developments in Soviet air defense.

As yet, there has been no thorough analysis or conclusive evidence that indicates how useful or feasible crisis reconnaissance would be against Soviet strategic forces. There is no data base that allows a comprehensive comparison of the normal and crisis appearance of these forces, of the degree to which such changes can be detected photographically, and of the frequency and time urgency of these flights.

Current plans call for six simultaneous sorties over the Soviet Union in a crisis situation. Since these sorties might be interpreted as an attack, they might present a high risk of escalating the crisis. The extent of this risk would depend heavily on the previous conduct of the crisis and on other indications by the United States at the time the aircraft were committed.

In summary, for brink-of-war reconnaissance of the Soviet Union, the aircraft systems have considerable value at present and in the immediate future. This value will become somewhat less as advanced drones become operational, or if quick reaction capabilities are incorporated in advanced satellites, or if it becomes apparent that the Soviet Union or the Chinese have deployed defensive systems that are especially capable of dealing with manned aircraft. Finally, the numbers of aircraft planned for this mission requirement should be conditioned by possible enemy reactions.

4. SIOP Reconnaissance. For the SIOP reconnaissance mission, side-looking radar is the most useful sensor because it is unaffected by weather, lighting conditions, and clouds produced by nuclear detonations or fire storms. The SR-71 fleet carries such a radar; the OXCART will have a three aircraft capability; and the earliest satellite capability could only be available in 1970.

However, a satellite system, with side-looking radar, appears to compete very favorably with the SR-71. Pre-launch and initial penetration capability of the satellites appear significantly higher than for the aircraft system and its tankers. For both the satellites and the aircraft, there would be a serious problem in recovering the data, interpreting results, and transmitting the finished intelligence to decision makers. There needs to be further study of the relative capabilities of satellites, aircraft, and other sensors in assessing SIOP strike effectiveness. If a satellite capability is developed for the SIOP reconnaissance role, then the main value of the advanced aircraft in a general war might be post-attack photographic reconnaissance after diminution of the disrupting effects of the early nuclear exchanges.

In the worst case, three of the above-mentioned requirements might need to be satisfied simultaneously: reconnaissance of force mobilization, crisis reconnaissance of the Soviet Union, and maintenance of the SIOP "hard alert" force. This would require a fleet of about thirty aircraft. However, in a crisis situation, aircraft could be diverted from routine strategic reconnaissance missions. If the fleet of advanced aircraft were reduced (for example, by attrition), some aircraft could be diverted, at a time of crisis, from force mobilization reconnaissance to the crisis reconnaissance of the Soviet Union.

Finally, during the next several years, the advanced aircraft are uniquely capable in all four of these mission areas subject to the deployment of improved Soviet or Chinese air defenses. However, the development of certain satellite and drone capabilities could supplant some of the aircraft capabilities by the late 1960's. In particular, the future satellites and drones may play an increasing role in surveillance of the Soviet Union during crisis or general war.

## Evaluation of the Need for a Separate OXCART Fleet

This section considers the need for and value of the special covert and civilian characteristics of the separate OXCART fleet. The most significant aspects of the question are:

1. If the fleet is under military sponsorship the President may be

more reluctant to approve its use initially in peacetime or a potential crisis.

2. One of the greatest potential difficulties of maintaining a separate fleet and dual management is that in an escalating situation, principal advisors to the President may be required to resolve detailed questions of schedules, targeting and support associated with the need to coordinate the resources.

3. If the military sponsorship of a detected overflight is established, the Soviets or Chinese might consider the flight more provocative. These reactions may be minimized by the use of civilian crews and unmarked aircraft, under military sponsorship.

Other relevant considerations are:

4. The value of the covert characteristics of the separate OXCART fleet is limited by the officially exposed SR-71 military aircraft with a very similar configuration so that the risk of incident through public declarations by the Soviets or the Chinese is not reduced to any great extent by maintaining the separate fleet.

5. In the event of an incident using the aircraft, established military sponsorship would probably reduce the ability and disposition of friendly or neutral governments either to avoid comment or to support the United States need for the reconnaissance.

6. The command and communications channels would be equally responsive and rapid under either an all military or a CIA command structure.

7. The CIA intelligence channels for dealing with foreign governments are more rapid and direct in matters of basing and after-the-fact cover stories. However, these probably could be used in arrangements for "black" flights under a military command.

## Alternatives

This section discusses a number of alternatives for the future of the OXCART and the SR-71 programs. Specifically, the section provides a general analysis of (1) possible actions to curtail the combined programs; (2) factors affecting the size of both fleets; and (3) costs of alternative fleet structures and sizes (including combined basing). This section also identifies three principal alternatives for decision including: (1) continuing both fleets at the currently approved levels; (2) mothballing the OXCART aircraft but maintaining a separate fleet by sharing SR-71 aircraft between SAC and CIA; and (3) terminating the OXCART program and transferring mission responsibilities to SAC.

Principal conclusions of this section are as follows:

1. The major decision issue is whether or not the projected total number of aircraft in the combined fleets will be needed once the entire SR-71 fleet becomes fully operational in the fall of 1967. Storing all the A-12 aircraft and maintaining only the SR-71 fleet will reduce five-year costs by 26.5 to 18.3 percent or $365 to $252 million, and only slightly reduce the numbers and types of reconnaissance missions that could be conducted simultaneously. The higher savings result from using a single SAC-operated fleet for all missions; and the lower, by allocating eight SR-71 aircraft to the CIA and retaining the separate base and covert characteristics of the OXCART fleet.

2. The four major factors that most affect fleet size are: (1) the attrition rate from normal operations of both aircraft; (2) the need for the types of manned reconnaissance missions for which these aircraft are suited; (3) the probability of having to conduct these missions simultaneously; and (4) the ability of satellites, U-2 aircraft and drones to perform some of the various missions now and in the future. None of these factors can be precisely determined without much more study or experience.

3. If both the OXCART and the SR-71 aircraft types are to be continued, it is very questionable that the size of either or both fleets should be reduced at this time since savings achieved by fleet reduction tend to be small in relation to the resulting reduction in activity.

4. The five-year savings from any form of base consolidation are small -- less than five percent of the five-year costs. Compared to more conventional aircraft programs, base support for the OXCART and SR-71 contributes relatively little to the over-all expense of the program. Also because of current crowding at Beale, consolidation there at this time would incur high one-time costs.

5. If the size of the combined fleet is to be reduced at this time it would be wise to store rather than to destroy aircraft. As pointed out in (2), there is still significant uncertainty as to the factors affecting fleet size. Mothballing costs little and provides an important hedge during the next several years at least.

6. Five alternatives with variations were considered by the study group and are described in the detailed narrative, but due to the findings stated above, the group has identified three principal alternatives for decision:

(1) Maintain the status quo and continue both fleets at the currently approved levels. This provides for two bases and:

| | |
|---|---|
| Total approved aircraft | 41 |
| Less: Training and test aircraft | -6 |
| Aircraft under major overhaul | -3 |
| Assumed attrition through 1970 | -3 |
| Available operational aircraft through the end of 1970 | 29 |

| Costs: ($ in millions) | FY 1968 | FY 1969 | FY 1968-72 |
|---|---|---|---|
| | $341 | $295 | $1,377 |

| Possible Mission Coverage | Operational Aircraft | | |
|---|---|---|---|
| | OXCART | SR-71 | Total |
| A. Strategic Reconnaissance | 3* | 2* | 5 |
| B. Force Mobilization Reconnaissance | 4* | 5* | 9 |
| C. General War Crisis/Brink | | 7* | 7 |
| D. SIOP | | 8 | 8 |
| | 7 | 22 | 29 |

*These aircraft could be used interchangeably between the three missions (A, B and C) as priorities dictate.

(2) Mothball all A-12 aircraft but maintain OXCART capability by sharing SR-71 aircraft between SAC and CIA; make primary assignments of missions A and B to the OXCART fleet and missions C and D to the SR-71 fleet. This provides for two bases and:

| | |
|---|---|
| Total approved aircraft | 41 |
| Less: Mothballed A-12's | -11 |
| Training and test aircraft | -4 |
| Aircraft under major overhaul | -2 |
| Assumed attrition through 1970 | -2 |
| Available operational aircraft through the end of 1970 | 22 |

| Cost Savings: ($ in millions) | FY 1968 | FY 1969 | FY 1968-72 |
|---|---|---|---|
| | -$28 | -$64 | -$252 |

Percent reduction of costs - 18%  Percent reduction of activity - 26%

| Possible Mission Coverage | Operational Aircraft | | |
|---|---|---|---|
| | OXCART (SR-71's) | SR-71 | Total |
| A. Strategic Reconnaissance | 3* | -0- | 3 |
| B. Force Mobilization Reconnaissance | 5* | -0- | 5 |
| C. General War Crisis/Brink | -0-* | 6* | 6 |
| D. SIOP | -0- | 8 | 8 |
| | 8 | 14 | 22 |

*These aircraft could be used interchangeably between the three missions (A, B and C) as priorities dictate.

(3) Terminate the OXCART fleet in January 1968 four months after the SR-71 fleet becomes fully operational, and assign all missions to the SR-71 fleet. This provides for a single base and:

| | |
|---|---|
| Total approved aircraft | 41 |
| Less: Mothballed A-12's | -11 |
| Training and test aircraft | -4 |
| Aircraft under major overhaul | -2 |
| Assumed attrition through 1970 | -2 |
| Available operational aircraft through the end of 1970 | 22 |

| Cost savings ($ in millions) | FY 1968 | FY 1969 | FY 1968-72 |
|---|---|---|---|
| | -$45 | -$88 | -$365 |

Percent reduction of costs - 27%  Percent reduction of activity - 26%

| Possible Mission Coverage | Operational Aircraft SR-71 |
|---|---|
| A. Strategic Reconnaissance | 3* |
| B. Force Mobilization Reconnaissance | 5* |
| C. General War<br>Crisis/Brink | 6* |
| D. SIOP | 8 |
| | 22 |

*These aircraft could be used interchangeably between the three missions (A, B and C) as priorities dictate.

Although it is difficult to equate sortie rates to numbers of aircraft, the following table displays possible rates for the three decision alternatives. The rates shown assume: (1) one to two sorties per week for a three aircraft deployment; (2) one sortie per day for a four to five aircraft deployment; and (3) one to one and a half sorties per day for a six to eight aircraft deployment.

## Possible Sortie Rates

| | I - Status Quo | | II - Share SR-71 | | III - Terminate OXCART | |
|---|---|---|---|---|---|---|
| | A/C | Sorties | A/C | Sorties | A/C | Sorties |
| A. Strategic Reconnaissance | 5 | 1 per day | 3 | 1 - 2 per week | 3 | 1 - 2 per week |
| B. Force Mobilization Reconnaissance | 9 | 2 per day | 5 | 1 per day | 5 | 1 per day |
| C. General War Crisis/Brink | 7 | 1.5 per day | 6 | 1 - 1.5 per day | 6 | 1 - 1.5 per day |
| D. SIOP | 8 | 6 one time | 8 | 6 one time | 8 | 6 one time |

## II. RESOURCES

This section of the paper addresses the relative technology, operational capabilities, plans and schedules, support facilities, and the costs of the A-12 and the SR-71 aircraft.

The two aircraft systems, the CIA A-12 and the USAF SR-71 are almost equal insofar as general aircraft performance is concerned. The A-12 flies two or three thousand feet higher at any point along the flight profile for a particular range, although the altitude of both aircraft will vary five to ten thousand feet during the course of flight over denied territory. Intelligence gathering potential is similar in the two systems. The SR-71 has a capability for simultaneous operation of several sensors responding to different parts of the spectrum; the A-12 has a number of interchangeable single-sensor systems. Finally, the A-12 is the predecessor program; it is somewhat further along, having been declared operationally ready in December 1965. The SR-71 currently offers an interim operational capability for Cuba, with 45 days prior notice, and SEA, from Kadena, Okinawa with 90 days prior notice. SAC forecasts that the SR-71 fleet of aircraft will be fully operationally ready by August 1967.

### BACKGROUND

The A-12 (OXCART) was conceived and designed as a successor to the U-2. Developed, procured and operated by the CIA, it is a single seat aircraft. The SR-71 is a successor aircraft designed and procured for SAC. It is a heavier, two-seat aircraft which carries a pilot and a reconnaissance systems operator. The programmed flight capabilities of the two aircraft are so similar that they can be treated as interchangeable.

In a typical flight profile, the aircraft would enter denied territory at an altitude of over 76,000 feet, flying at Mach 3.1. It would cruise at this speed, steadily climbing until exiting at maximum altitude, above 84,000 feet.

The SR-71 is based at Beale Air Force Base in California. The A-12 is based at Area 51, a classified facility in Nevada. Kadena Air Base, Okinawa has been provisioned for the A-12, for use in operations against Southeast Asia; some of this provisioning would be usable by the SR-71 if it were to be deployed to Kadena. Common fuel dumps have been established at five U.S.

and five overseas locations for operational and emergency use. There is about 60% commonality in AGE and base facilities.

AVAILABILITY

Readiness of the A-12 for reconnaissance operations with defensive EWS for operations over Cuba (from Nevada) and over Southeast Asia (from Okinawa) has been established. The SR-71 also can accomplish such missions with an interim operational capability for Cuba, with 45 days prior notice and Southeast Asia, from Kadena, Okinawa with 90 days prior notice. Specially developed EWS equipment for the SR-71 is scheduled for test within six months and forecast ready for operational use in about a year. Meanwhile, if a decision is made to use A-12 or U-2 EWS on an interim basis, a limited number of SR-71 aircraft probably could be so equipped within two to six months. An Okinawa deployment of the SR-71 would partially use prepositioned assets of the A-12 program. The table below indicates the current status of the various equipments:

AIRCRAFT SYSTEMS

| | Planned | | Ready 10/1/66 | | Ready 5/1/67 | Ready 8/1/67 |
|---|---|---|---|---|---|---|
| | A-12 | SR-71 | A-12 | SR-71 | SR-71 | SR-71 |
| Operational Aircraft | 8 | 26 | 7 | 8 | 18 | 23 |
| Technical Objective Camera | 13 | 18 | 7 | 0(1) | 9 | 18 |
| Operational Obj. Camera | 0 | 18 | – | 11 | 18 | 18 |
| Terrain Objective Camera | 0 | 18 | – | 16 | 18 | 18 |
| Infrared Sensor | 1 | 8 | 0(2) | 2 | 7 | 8 |
| Side Looking Radar | 3 | 24 | 0(2) | 9 | 19 | 24 |
| [redacted] 50X1, E.O.13526 | 1 | 0 | 1 | – | – | – |
| [redacted] | 1 | 0 | 0(3) | – | – | – |
| Electro-Magnetic Recording or Signal Intercept Package | 8 | 8 | 8 | 0 | 3 | 6 |
| Maintenance Recording System or Birdwatcher | 14 | 35 | 14 | 8 | 12 | 23 |
| Electronic Warfare System | 8 | not estab | 8 | – | – | – |
| System XVII | 2 | – | 0(4) | – | – | – |

In the above table, the three different types of A-12 cameras are lumped as "technical objective" cameras.

(1) Available Apr. 1967
(2) Available Jan. 1967
(3) Available Mar. 1967
(4) Available Oct. 1967

## Capabilities

1. Sensor Systems: The A-12 is essentially a single sensor technical reconnaissance system; the SR-71 is a multi-sensor system with capability for simultaneous collection of photographic, high resolution radar, and infrared intelligence. Both aircraft can carry auxiliary ELINT/COMINT collection systems.

Sensor Parameters

| System | Specif Reso feet | | Achieved Resolution-ft | | Linear Coverage Mi | | Lateral Coverage Mi | |
|---|---|---|---|---|---|---|---|---|
| | A-12 | SR-71 | A-12 | SR-71 | A-12 | SR-71 | A-12 | SR-71 |
| Tech Obj | 1.0-1.5 | 0.63ft | 0.9-1.25 (3 diff Sys.) | *1.64 | 1600 to 3400 | 2140 | 39-63 | 2@5** |
| Oper Obj | - | 1.75 | - | 3.0 | - | 4000 | - | 26 |
| Ter Obj | - | 16.5 | - | 16.5 | - | 8500 | - | 21 |
| Infrared | 40 | 85 | 60 | not meas | 4250 | 10,200 | 20 | 28 |
| Radar | 10x20 | 50<br>30 | 12x21 | 50<br>30 | 1500 | 4000 | 20 | 20<br>10 |

*Expect 0.63 ft. resolution by April 1967

**Two 5 nm swath widths located up to 19.5 nm on either side of track.

With the SR-71, both the Technical Objective (TO) Camera and the SLR can be operated at various range offsets, under the control of the Sensor Officer on board the aircraft. The A-12 has three different cameras, equivalent in mission to the TO camera, any one only of which can be carried on a photographic mission as needed. Detailed performances and modes of operation and interpretation of the photography from these cameras are different, and the choice will need be made on the particular needs of the mission. The A-12 has the capability of carrying a gamma spectrometer and particulate samplers as auxiliary equipments.

2. Range: Planned original objective range for the A-12/SR-71 aircraft was about 4000 nautical miles. Both aircraft are expected to achieve, in near term (within 12 months), an unrefueled range of 3200 nautical miles, with an eventual (2-3 years) extension of 3600 to 3750 nautical miles, extrapolated from a range of about 3000 nautical miles currently demonstrated in both programs with flight test aircraft. The extrapolation considers improvements planned in equipments and flight techniques. The A-12 has demonstrated a range of 2580 nautical miles on a simulated operational mission profile; the SR-71 has not yet attempted such demonstration in operational aircraft, but is expected to have a similar capability whenever operational mission simulations are exercised. The total range of both aircraft can be extended by aerial refueling. The A-12 has a capability for five refuelings and has currently demonstrated four. The SR-71 has an equivalent potential capability but currently is being limited temporarily to three refuelings because of nitrogen depletion and wing fuel tank sealant problems. The A-12 aircraft does not have wing fuel tanks. A new sealant is under development and is to be tested between now and June 1967. Tentatively, it is planned to incorporate the improved tank sealant in the SR-71 during IRAN's, expected to commence in the second half of 1967.

3. Altitude: At the current maximum-range flight operational mission profiles for the A-12, the altitude varies from 76,000 feet to 84,500 feet during the Mach 3.1 cruise. With higher gross weight, the SR-71 generally will be about 2,000 to 3,000 feet lower in altitude during a similar range profile. It is expected that long-term developments will give the A-12 a maximum altitude capability of about 94,000 feet at the end of cruise and the SR-71 about 91,000 feet. The maximum altitude demonstrated on flight test aircraft to date has been 90,000 feet.

VULNERABILITY

1. Non-Soviet Areas of Operations: Both the A-12 and the SR-71 aircraft are considered to be virtually invulnerable to current, known deployed fighters, AAA, and the S-band SA-2. The more advanced C-band SA-2 has a very low probability of success against the A-12 equipped with its current EWS and a limited capability against the SR-71 or A-12 aircraft without

its EWS. It is expected that the SR-71 will have at least an equivalent EWS for operations by the end of 1967 unless a decision is made to use A-12 or U-2 EWS sooner on an interim basis.

2. Soviet Union Area of Operation: With developing improved SA-2 and advanced fighter systems within the Soviet Union, it is expected that the Soviets have a higher but as yet undefined probability of success against both the A-12 and the SR-71 in case of attempted overflight. As hard evidence becomes available, particularly about improved SA-2, vulnerability assessments will be updated.

COSTS

This table summarizes the total programmed costs including costs for tanker support cargo and support aircraft sorties and Air Force supply issue. Figures are in millions of dollars by FY.

| | FY 65 & Prior | FY 66 | FY 67 | FY 68 | FY 69 | FY 70 | FY 71 | FY 72 |
|---|---|---|---|---|---|---|---|---|
| A-12 | 610 | 89 | 97 | 110 | 102 | 95 | 93 | 88 |
| SR-71 | 579 | 461 | 147 | 187 | 157 | 148 | 140 | 132 |
| Engine R&D | 270 | 64 | 57 | 45 | 35 | 25 | 15 | 5 |
| Total Program | 1459 | 614 | 301 | 342 | 294 | 268 | 248 | 225 |

SUPPORT

1. Base facilities: About 1500 persons, including military and CIA civilian employees, support the OXCART project at Area 51, Nevada. Of these, 650 are in direct support of launching operations and 850 are in indirect support such as logistics, fire-fighting, guards, etc. A total of twenty-one million dollars has been invested in Area 51 for runways, buildings, housing, navigational aids, water supply, etc. This base is now self-sufficient and no further investment is planned.

The SR-71 aircraft are assigned to the 9th Strategic Reconnaissance Wing at Beale Air Force Base, California. This wing has 1,300 persons assigned for direct support of the aircraft. Indirect support consists of 400 personnel at Edwards Air Force Base and 333 in base support augmentation at Beale AFB with activation of the SR-71 program there. Fifteen million dollars has been invested in construction of additional facilities to support the SR-71 wing.

Aerospace Ground Equipment (AGE) investment is $47 million for the SR-71 and $30 million for the A-12. Approximately 60% of AGE and base facilities are common or interchangeable.

2. Training: The A-12 pilot is fully responsible for operation of aircraft, sensors, and navigation. His basic training consists of a ground school course and 21 sorties in the A-12 for a total of 56 hours. Continuation training in the A-12 consists of 18 sorties per quarter; collateral training is in a F-101 aircraft. He also has 148 hours of academic and field training annually.

The SR-71 is operated by two officers: a pilot operates the aircraft, and a reconnaissance systems operator is responsible for navigation and systems operation. Training consists of 13 weeks of ground school, nine simulator rides, and 13 SR-71 sorties. Aircrew proficiency training continues with a minimum of 12 SR-71 sorties per quarter. Collateral flight training for the pilot is in a T-38. Simulator training is available at Beale AFB for both A-12 and SR-71 aircrews.

3. Tanker Support: The 903rd Air Refueling Squadron with 20 UE KC-135 modified aircraft stationed at Beale AFB is responsible for tanker support to both the SR-71 and the A-12. Each aircraft requires the support of one tanker for each training refueling. Deployment to Kadena, by either aircraft, would require three refuelings enroute. Each deployment of operational air refueling is supported by a primary and an air-spare tanker.

Fifty-two tanker sorties per month are required for A-12 training, 283 tanker sorties per month for SR-71 training. Each tanker aircraft is capable of 11 refueling sorties per month.

The planned tanker complement:

| | |
|---|---|
| Beale AFB, Calif. | 20 UE aircraft - 15 for support of A-12 and 5 UE for support of SR-71 |
| McCoy AFB, Fla. | 20 UE aircraft primarily for support of the SR-71 |
| Little Rock AFB, Ark. | 15 UE aircraft primarily for support of the SR-71 |

4. Film Processing and Interpretation Support: A-12 sensor films would be processed at Eastman Kodak Company in Rochester, New York. This facility is staffed with 211 people and is presently being used for other NRO programs; readout would be at NPIC.

The SR-71 program has a processing and interpretation squadron attached and in-place at Beale AFB. Manned with 400 personnel, it has a capability of deploying detachments to overseas bases. Coverage can be provided in six hours and initial photo interpretation reports can be provided by this unit 12 hours after a landing at Beale AFB. Similar timing capability is available for the A-12 at Eastman Kodak Company or the 67 Recce Tech Squadron Unit at Yakota AFB, if deployed to Kadena.

In general, photographic product from either program could be processed at the SR-71 facility (at Beale or where deployed), at Eastman Kodak or at the 67 Recce Tech Squadron. Timing for initial and final readout is dependent upon location of the SR-71 facility, operational aircraft landing base and/or flying time to transmit product to Eastman Kodak Company and to Washington, D.C.

5. Support Aircraft: The A-12 program uses eight F-101 aircraft for pilot proficiency training and A-12 chase. A C-130 aircraft is provided for personnel movement and classified cargo such as cameras, etc. An H-43B aircraft is used at Area 51 for search and rescue and paramedic jump training. There are two T-33 aircraft for rapid transportation and jet qualification of pilots. One U-3B aircraft is available for emergency air evacuation, search and security patrol of the area.

The SR-71 wing has six T-38 aircraft in direct support of pilot proficiency training. Two T-29 and two T-33 aircraft plus base assigned aircraft are shared by the SR-71 program. Both programs use MAC aircraft as needed for additional logistic support.

6. Kadena Support: The A-12 program has pre-positioned 1,000,000 pounds of equipment at Kadena Air Base. Construction necessary to support operational missions is completed. Nineteen persons are in place to maintain equipment and facilities for immediate use.

A-12 operations from Kadena would be commanded and controlled from Headquarters in Washington. Operational missions can be flown from Kadena ~~ten~~ 13 days after mission approval.

The A-12 program plans 225 persons deployed to Kadena during operations. The A-12 program can support ~~twelve~~ NINE operational missions per month with three deployed aircraft. Use of these facilities by the SR-71 would require small extension to the hangar and pre-positioning of some additional supplies and AGE. The SR-71 program would have one sortie per day with 4 aircraft or one sortie per week with 2 aircraft. SAC estimates an operational capability about 90 days after notice to deploy. The SR-71 is programming 363 persons to Kadena (for one sortie per day rate of operation) for support of the SR-71 and photo lab.

## III. MISSION REQUIREMENTS

This section discusses the requirement for the advanced aircraft and compares current and projected capabilities of the advanced aircraft with those for satellites and unmanned drones. For the purposes of this study, we have found it useful to consider four basic mission requirements:

1. Strategic reconnaissance is peacetime reconnaissance, primarily of the USSR, China, and their allies. It provides routine intelligence on technical, military and economic developments and capabilities. To a much more limited extent, this reconnaissance is also conducted against neutral powers.

2. Force mobilization reconnaissance would be directed primarily against China and the European satellites in case of indications that preparations were under way for attack against other nations. This reconnaissance might also be needed against neutrals.

3. Reconnaissance for general war crisis would be directed against the Soviet Union (and in a number of years against China) in case of a very intense crisis or of intelligence warning that the Soviet Union might be preparing for strategic attacks against the United States or Europe.

4. SIOP reconnaissance would be aimed at the Soviet Union, after a general war broke out, and be against targets that were to be struck by U.S. strategic forces.

### A. Strategic Reconnaissance

Strategic reconnaissance is the routine collection of intelligence data during peacetime on technical progress, industrial and urban development, military force deployment, and military readiness of foreign nations. The principal target areas for this mission are the Soviet Union, China, and their allies. Currently, the strategic reconnaissance mission against these areas is being conducted primarily by satellites with unmanned drones and U-2's being used against China.

In the table below, we compare the relative capabilities of the advanced aircraft to conduct strategic reconnaissance against central China. The USSR is the other primary area where there is an extensive strategic reconnaissance requirement. A comparison for the Soviet Union between the high performance aircraft and satellite and drone capabilities is essentially the same except that the following additional factors favor satellites over the aircraft:

1. The area of the Soviet Union is almost twice that of China.

2. The more northerly location of the Soviet Union favors more rapid coverage from satellites in polar orbits.

3. There are currently more than ten times as many intelligence targets in the Soviet Union as in China.

4. Soviet air defenses are a generation ahead of the Chinese.

5. The risk of incident through loss of an aircraft over the Soviet Union is high.

6. The USSR has tacitly acquiesced to satellite overflights.

At Present, USIB has established 340 high resolution targets in central China to be covered yearly with 50% coverage required every 6 months. On a monthly basis, the requirement and current and projected coverage are as follows:

| | Target Looks/Month | Targets Accessible |
|---|---|---|
| Current USIB requirement | 28 | - |
| Current satellites (normal operation) | 32 | 100% |
| Current drones (10 flights/month using 147H) | 260 | about 80% |
| Current U-2 (4 flights/month) | 400 | 100% |
| Advanced satellites (normal operations in 1969) | 300 | 100% |
| Advanced drones (5 flights/month in late 1968) | 280 | 80-90 % |
| OXCART/SR-71 (4 flights/month) | 240 | 70-80 % |

For current drones and the U-2, the above represent estimated capabilities, not the results of actual operations.

Use of the OXCART or SR-71 aircraft over China for strategic reconnaissance in the next several years seems to be contingent upon:

1. A many-fold increase in the required rate of target reconnaissance; or
2. An unwillingness to use the more vulnerable 147H series drones or the U-2 aircraft over the Chinese Mainland; or
3. The need for the spot targeting capability of the aircraft to cover small areas and special events; or
4. Confidence that the advanced aircraft are almost invulnerable against current defenses.

Beyond 1969, additional factors will probably argue against use of the aircraft:

1. Satellites with improved coverage and resolution;
2. Drones with increased range and survivability;
3. Improved Chinese air defenses.

Accordingly, the requirement for using the aircraft for strategic reconnaissance seems limited to two situations:

1. Reconnaissance of Communist or neutral nations outside of the Soviet or Chinese Bloc (such as Cuba or, for example, in the Middle East.)
2. High priority spot targeting in China.

Neither of these uses creates a high demand for sorties.

## B. Force Mobilization Reconnaissance

This requirement is to detect and survey the mobilization and the build-up of conventional or nuclear forces in major areas other than the Soviet Union itself. Areas and situations that might be targeted include:

1. South China and North Vietnam if there were indications that a massive intervention were under way by the Chinese;

2. Manchurian China and North Korea if a threat seemed to be developing against South Korea and U. S. forces stationed there;

3. Cuba if current reconnaissance indicated that the Soviets were introducing new weapons;

4. East Germany, Poland and Czechoslovakia if there were indications of a Warsaw Pact build-up, or if there were an East German uprising and Soviet intervention;

5. Sino-Indian border at the request of the Indian Government for both warning and tactical intelligence;

6. Middle East or South America.

A requirement for such reconnaissance could be characterized as follows:

1. In the early phases of the reconnaissance, the collection would be targeted against national needs for broad situation assessment and strategic warning. If the conflict continued or escalated, the tactical intelligence requirements of U. S. or allied commanders would be added so that coverage would need to become more frequent, to be directed at additional targets, and to produce more detailed data on most targets. For example, after the initial detection of offensive missiles in Cuba, the preponderance of reconnaissance in Cuba (from high level U-2's and from low level TAC and Navy aircraft) supported planning of air

interdiction and invasion. Similarly, most of the current reconnaissance in Southeast Asia is used by MACV, CINCPAC and SAC. In short, a situation requiring CIA missions for national intelligence such as BLACK SHIELD using three aircraft for nine sorties a month could develop into one requiring a six aircraft SAC effort for both national and tactical needs providing 30 sorties a month.

2. The area to be covered is liable to be oddly shaped and smaller than continental areas for which satellites are most efficient.

3. Reconnaissance may be needed suddenly (initial coverage in a day or two), frequently (daily), and up-to-date (only several days at most from an event to an informed decision maker).

4. The target system will be ill-defined at first and dynamic throughout the period. There will be a constant need for both search and spotting.

5. The area may be defended by quite sophisticated air defenses that would argue against using U-2's or current unmanned drones. It may be very much in the U.S. interest to avoid losses of reconnaissance vehicles.

6. In the early stages of the crisis, tactical intelligence might be necessary but use of the advanced aircraft to satisfy this need might be preferable to tactical aircraft which might disclose U.S. intentions.

One typical situation is the South China - North Vietnamese area. The following table compares the advanced systems, satellites and drones against the current USIB list of 178 targets with respect to three criteria:

| | Target Looks/ Day | Endurance (Mos) | Minimum Response Time (Days)* |
|---|---|---|---|
| OXCART/SR-71<br>(one sortie/day) | 32 | indefinite | 1 |
| Current Satellites<br>(one KH-4 and one KH-8 continuously aloft) | 4 | 1 - 2 | 3 - 7 |
| Current Drones<br>(one sortie/day) | 30 | 6+ | 1 |
| Future Satellites<br>(one KH-9 continuously aloft) | 15 | 2 | 2 - 3 |
| Future Drones<br>(Whitehawk, 1 sortie/day; TAGBOARD, 1 sortie/week) | 20 | 12+ | 1 |

*Time from order to national intelligence product. Assumes that the aircraft and drones are deployed and satellites have 20 days of warning before order.

For the other areas against which this type of reconnaissance might be needed, the numerical comparisons are somewhat different since weather, latitude, target composition and area all vary. However, the major conclusions are about the same:

1. Today, the advanced aircraft are unique because of their high survivability, short response time, and long endurance. The drones come next closest to meeting the needs but are currently very vulnerable against sophisticated defenses.

2. The future drones will match or exceed the aircraft in survivability. At that point, the main disadvantages of the drones will be less reliable

recovery and somewhat shorter range (although this is not a major problem in peripheral areas).

3. In those situations where conflict has already escalated to the point that reconnaissance by tactical aircraft is underway (such as in North Vietnam today), then this capability can go far to supplement the advanced aircraft.

4. Current satellites fall far short of the manned aircraft except for survivability. The future satellites will provide much improved target coverage at high resolution. If additional quick reaction capability is provided in the KH-8 and KH-9 programs, or if a real-time readout is developed for the KH-8 system, or if MOL is developed, the satellites will be more competitive but still fall short of the flexible, intense, rapid, and enduring capabilities of the advanced aircraft.

### C. General War Crisis and Brink

This is that requirement situation in which there is an intense international crisis or strong warning that the Soviets (or later the Chinese) are alerting their strategic forces for a possible attack.

A major justification of the SR-71 fleet at the currently approved level has been its capability to overfly the Soviet Union in such a situation with six or more aircraft simultaneously and on very short notice. The Cuban missile crisis could have become an outstanding example of such a situation if escalation had proceeded several more steps. Although our information on activities within Cuba and adjacent waters was almost complete, we were virtually ignorant at the time of the posture of Soviet strategic offensive and defensive forces, ground forces, nuclear weapons, and in-port naval activities.

The specific targets to be reconnoitered in such brink-of-war situations would depend upon the particular cause and nature of the crisis. If at a time of relative calm intelligence indicated the strong possibility that the Soviets were preparing to launch a "bolt out of the blue" attack, then the reconnaissance targets would probably be limited to long-range air staging bases, fighter dispersal bases, submarine ports, nuclear storage sites, soft missile sites, and similar targets. However, if the need for crisis reconnaissance of the Soviet Union stemmed from a major international crisis, such as a Berlin crisis accompanied by threats of Warsaw Pact aggression against NATO, then some overflight reconnaissance capabilities would be diverted from the strategic target system and applied to tactical air, ground forces, and transportation and marshalling centers. The value of such reconnaissance would depend on many conventional factors such as weather and survivability. Most important, for many of the targets, the value of cloud free, high resolution photography would depend on developing beforehand a data base that correctly predicted the existence and meaning of different activity indicators for different classes of targets.

In one representative SAC analysis of this type of crisis reconnaissance, 87 targets in the Soviet Union are used. Six SR-71 sorties launched simultaneously from Beale have access to about 80 percent of these targets using their photographic and IR systems. These missions use three aerial refuelings (assuming a 3300-3600 mile tanker-to-tanker range) and require about 10 hours. After completion of the mission, first complete readout can be available 12 hours after landing. This yields a national intelligence product in about 38 hours or 1 1/2 days after the order to "go" is given.

Because of the somewhat limited range of the SR-71's, some areas of the Soviet Union are not readily covered. The area west of the Urals can be covered by north/south flights that are refueled on entering and departing the Soviet land mass. The eastern quarter of the country can be reached by aircraft refueling over Alaska which then either penetrate and return or continue on to the Sea of Japan for additional refueling. The central third of the Soviet Union is not practicably accessible. However, the primary crisis targets in this sector are ICBM sites and heavy bomber bases and these can be sampled with overflights of the east and west USSR.

Brink-of-war reconnaissance of the Soviet Union by the OXCART or in conjunction with the SR-71 is possible. High resolution photography would be the major product of such sorties (COMINT and ELINT would be less valuable; side-looking radar would be much less useful except in providing a view of undamaged targets for comparison in case of general war). The important point is that the OXCART possesses the brink-of-war capability without any developments other than those currently planned.

SAC has estimated that it will have a limited operational capability to generate six brink-of-war sorties by May 1967. This estimate assumes that SR-71 aircraft are not being maintained on SIOP alert and it provides a limited recycle capability. By late 1967 these limitations should be eliminated.

With regard to the availability of other means of overhead reconnaissance for the crisis or brink situation, the following points should be noted:

The limited range, high vulnerability and uncertain recoverability of current drones virtually disqualified them for this role. However, the future TAGBOARD will have a range almost equal to that of the advanced aircraft and a somewhat higher survivability. Accordingly, this vehicle can play a useful role in brink reconnaissance if reliable recovery can be achieved.

Using current satellites, the most competitive capability would be achieved by launching one or two KH-8 satellites in orbit such that each satellite covered the entire Soviet Union in two days. If one satellite were used, it could sample half the targets in one day and return its casette. (After the KH-8 has a two bucket capability, the second half of the target could be covered on the second day.) If two satellites were used, all targets could be covered within one day. However, development of a two-satellite, quick reaction capability for the KH-8 would require more than a year since an additional pad is necessary and ground station capacity must be increased. Resolutions of 3-4 feet should be possible.

With current KH-8 capability using one satellite and one bucket for example, half the SAC targets would be covered and intelligence produced in 48-60 hours versus the SR-71 covering about 80 percent of the targets in less than 24 hours. If two satellites were used, all of the SAC targets could be covered in about 30 hours.

Future satellite capabilities can be improved by:

1. Obtaining two-bucket, two launch-pad capability for the KH-8.

2. Putting real-time readout on the KH-8 so that response time is reduced to 2-10 hours (assuming favorable lighting conditions) for one hundred targets per day.

3. Using the MOL.

We have not performed the trade off studies that support the development or adaptation of any of these capabilities for brink-of-war reconnaissance. The investment has been made in the OXCART and SR-71 aircraft--it has not been made in these additional capabilities. However, the size of the fleet of the advanced aircraft that is needed in the future will depend on the extent to which these capabilities are developed.

A potential added advantage of the satellites relates to vulnerability and lower provocation in the current political environment of satellite acceptability. Depending on the particular history of the crisis including the role of reconnaissance and the use of signals, the simultaneous penetration of six aircraft would probably be extremely provocative and risk much greater escalation. Sudden launching of one or two satellites should be less provocative. Similarly, the aircraft may well be more vulnerable.

## D. SIOP or General War

A major role planned for the SR-71 is reconnaissance during a general war with the Soviet Union. Operational concepts for this role are currently being developed in detail and being reviewed by the Air Force and the Joint Chiefs of Staff. In addition, operational capabilities must be developed and tested for maintaining these aircraft on a "hard" alert (ready for take off within fifteen minutes) and for operating with tanker aircraft at dispersed bases also on a "hard" alert. Accordingly, the capabilities detailed below represent best estimates at this time. The feasibility of providing a "hard" alert capability has not yet been demonstrated.

The specific targets and timing of the SR-71 fleet during and after execution of SIOP forces will depend upon a number of factors. Under current plans, a basic force of six aircraft will be maintained on "hard" alert at Beale with 18 tankers supporting this force on alert at four overseas bases. If strategic warning is received and if additional SR-71 aircraft are available at Beale, then these aircraft will be dispersed to Edwards, Palmdale and Area 51 as a back up force; 18 associated tankers will be dispersed to up to eighteen secondary bases overseas.

The post-SIOP reconnaissance by the SR-71 serves both national and tactical needs. It might provide national authorities with the only hard intelligence on how well the SIOP is being executed, how well weapons systems are performing, how effective are Soviet defenses, what damage is being inflicted. As such, the SR-71 can validate other indirect forms of situation and system assessment. Tactically, the SR-71 data would primarily be used for retargeting.

50X5, E.O.13526

Almost 80 percent of these are accessible to six SR-71 sorties (even though, as discussed above, the central third of the Soviet Union is not reconnoitered). The optimum use of the six primary alert aircraft is launch under positive control upon receipt of tactical warning or in case of pre-emptive execution. The SR-71 would then overfly the Soviet Union from the third to the sixth hour after execution. This tactic provides the earliest possible reconnaissance and places the hard alert force over the Soviet Union at a time when [redacted] 50X5, E.O.13526 (Even this level of activity presents some threat to the SR-71.)

If the primary alert force is used in this way, the side-looking radar will provide the most valuable intelligence. This radar can provide intelligence independent of lighting and weather conditions and it would be only slightly affected by the heavy clouds caused by nuclear explosions and fires. Its 50' resolution would be adequate to pinpoint to within 150' actual ground zero of surface burst weapons. This resolution should also be adequate to indicate major damage to soft installations that have been attacked with airburst weapons. The photographic camera would provide much less information during this first wave of reconnaissance; the value of the COMINT and ELINT collection would be somewhat greater.

The information collected would be returned to the ZI with the aircraft landing at one of a number of pre-planned bases. A number of processing centers might be used. The Air Force is currently considering a proposal for a survivable reconnaissance data processing center to be located in a hardened TITAN missile complex near Denver. Also SAC's current operational concept calls for dispersal [redacted] upon receipt of a strategic warning (assuming these centers have not been deployed overseas during a preliminary crisis). Finally, it is possible that a number of soft processing and interpretation centers will survive Soviet strikes.

50X5, E.O.13526

The time required to process and transmit finished intelligence from first wave aircraft will depend on where the aircraft are recovered and what processing capability survives. In the best case, this time is probably about 12 hours after initiation of the SIOP for first flash reports.

If the secondary back up SR-71 force had survived, it could be used either on pre-planned missions reconnoitering targets not covered by the first force or it could fill in for those first wave aircraft that had aborted or not survived. Six to fifteen aircraft might be available at Beale or the three dispersal bases.

With regard to other means of collecting SIOP intelligence data, the following points should be noted:

Although there is general agreement that a satellite-borne side-looking radar is technologically feasible today, no satellite system is under development. There have been numerous studies that define such a system, describe its performance, and establish its likely cost. There have been no detailed studies that compare satellite radar systems with the SR-71; that analyze the cost-effectiveness of different levels of SIOP reconnaissance; that compare radar reconnaissance with other systems such as 266, TAPS and MSR; or that evaluate different satellite systems including ground-launch-on-tactical-warning, sea-based launch after initial exchanges, or launch 50X1, E.O.13526 during crisis. Satellite side-looking radar will not be operational before 1970.

Those studies that have been made of satellite capabilities suggest several factors.

1. The satellites would be somewhat more survivable than the aircraft assuming no concerted anti-satellite defense aimed at these vehicles (rather than at other satellites used for reconnaissance, communications, navigation and weather). The aircraft have support tankers which must survive. In both cases, there are similar problems in recovering data, processing it, and transmitting finished intelligence to decision makers.

2. The satellite system could cost a billion dollars over five years. After a large initial investment yearly operating costs would still be significant in order that training and proficiency launches could be made yearly.

3. The response time for significant target coverage in the satellite system would be several hours faster than the aircraft.

4. The satellite could provide a dual capability for strike assessment against both the Soviet Union and the United States. The domestic capability would be virtually free--only improved ground handling would be required.

## IV. NEED FOR A SEPARATE OXCART FLEET

One of the principal questions that must be considered as a part of this study is the present and future need for the special covert and civilian characteristics of the separate OXCART fleet. As the analysis of alternatives demonstrates, termination of that fleet and closing its base would produce the greatest cost reduction both absolutely and relative to the decrease in possible mission coverage.

The special civilian and covert characteristics of the OXCART fleet affect:

(A) the foreign relations of the United States;

(B) the management of fleet operations.

The study group does not presume to have the overview necessary for a full analysis of the value of these characteristics of their effects. However, in the course of this study these matters have been discussed with persons who have been closely associated with both the OXCART and the U-2 programs and the following material has been gathered. It is presented to identify the question and to provide whatever assistance it may in the decision process.

### A. Characteristics Affecting Foreign Relations

The covert characteristics of the OXCART fleet are those which have the major affect on the foreign relations of the United States with friendly, neutral or hostile nations.

In order to discuss the need for a covert fleet of manned reconnaissance aircraft, that covert capability must be defined by its present characteristics. The characteristics of the present capability are:

(1) An unknown operational aircraft reconnaissance capability at a highly secret and secure desert base. This must be qualified as follows:

(a) The presence of the base is probably known to the Soviets through their reconnaissance satellites as well as the purpose of the base as an operational site;

(b) The fact that the U.S. has a substantial number of aircraft with the necessary speed and altitude capabilities for reconnaissance under a military command is a matter of publicly confirmed record;

(c) The "exposed" military aircraft and the "covert" aircraft are of essentially the same configuration, especially at the level of public discernment (except for the single versus dual cockpits);

(d) Overseas deployment of the "covert" fleet at Okinawa (planned deployment site) would generate press inquiries and increase the number of individuals who would learn about the existence of the special aircraft fleet.

(2) Civilian sponsorship of the aircraft fleet which minimizes the chance of an overflight being labelled as an aggressive military act and permits:

(a) The pilot and the Government to legitimately maintain an assertion of civilian status and character in the event of capture (as in the Powers/U-2 case);

(b) The U.S. Government to maintain "plausible denial" in the event of an accident or "shoot-down" in which there is no survivor; and

(c) Friendly or neutral governments to assume a "no comment" posture.

The plausibility of denial is seriously limited by the fact that if the general configuration of the offending aircraft becomes known, the system will probably be identified as the latest known U.S. military aircraft asset. Also, in the Powers case, the fact that the CIA pilots are converted Air Force officers was a matter of public declaration by the Soviets.

These same conditions limit the "no comment" option for U.S. response to a foreign charge. However, civilian sponsorship does provide a better basis for friendly and neutral nations to maintain a "no comment" posture or to support the activity if it becomes a matter of serious international debate.

Other Covert Possibilities - Short of a Separate Fleet and Base. Under the alternative fleet structures, the characteristics discussed above would be lost or compromised by either: transferring some of the OXCART fleet to Beale Air Force Base; or assigning the SR-71 aircraft to perform covert peacetime reconnaissance missions.

There are some steps which could be taken to maintain as much of the existing cover as possible. For example, it would be desirable to retain some of the civilian crews as flight test crews to fly the covert missions.

The key factor in weighing the value of (and, hence the need for) the existing covert characteristics of a separate fleet and base is to decide what will be lost in:

(a) Penetrability of the existing cover;

(b) The ability of the opponent to exploit politically U.S. sponsorship (military or civilian);

(c) The likelihood that the Soviet or Chinese leadership would subjectively react with more alarm to a military pilot than to a civilian pilot in the event of capture; and

(d) The ability and disposition of friendly or neutral nations to avoid reacting publicly to an incident or to support the activity by the United States.

The probable loss in these areas of foreign relationships through terminating the OXCART fleet is limited by the following factors;

(1) The general aircraft configuration is reasonably attributable to the U.S. military alone;

(2) The deployment of the covert fleet to advanced bases (as planned for some missions) exposes and establishes the use of a military base and involves many more people;

(3) Civilian pilots reporting to military superiors could be used (as has been true in the case of the U-2). This should minimize, to the extent possible, subjective reactions of alarm on the part of Soviet or Chinese leadership. However, it would not be plausible in this case for the U.S. to assert that the operation was a civilian undertaking.

### B. Characteristics Affecting the Management of Fleet Operations

The civilian management and control of the OXCART fleet has the major effect on fleet operations both outside and inside the United States. The civilian character of the OXCART fleet management structure must be qualified by the fact that many of the key personnel in the OXCART operating program are military, although on detail to a civilian agency.

1. The CIA has a unique ability to deal with foreign governments through intelligence channels in matters such as basing arrangements and after-the-fact cover stories. For example, in the event of foreign deployments certain foreign governments would be apprised of CIA sponsorship. There is little reason to think that the CIA could not exercise its unique abilities to arrange for the use of aircraft under a military command if the covert nature of the mission was retained through the use of civilian pilots in unmarked aircraft. However, it would be more difficult to secure foreign basing for a program under military sponsorship.

2. The degree of command authority and control by national leadership may be more direct and less diffused in the case of the civilian management structure.

3. The channels for the flow of intelligence to the decision-makers may be more direct and timely in the case of a civilian command structure.

Concerning the last two points, the relative degree of control and timely communication between the highest national authorities and the two military and civilian command structures in question (CIA and SAC) can only be assessed by persons who have been directly involved in those processes. However, the "303" committee would probably be the approval channel for clearing the use of both of these aircraft. Once the Presidential approval has been granted, either command structure would be equally responsive.

4. The CIA-contractor management relationship is reportedly more capable of responding quickly and with greater flexibility to the need for "quick fixes" and design changes which have been legion on what has been a development aircraft in an operating deployment. Military command structures are usually more "standards" bound. This "quick reaction capability" should not be as necessary in the future as the fleets become more operational. Also, the fact that the reconnaissance satellite programs, which have the same development/operational characteristics, have been placed under military management and control indicates that the military are capable of unusual administrative arrangements.

5. The CIA-contractor management techniques have permitted the maintenance of the aircraft with contractor crews which have the value of a high level of experience and continuity on experimental-type aircraft in general and with specific flight vehicles in particular. This could be achieved to a large extent in the unique SAC Wing through the selection and retention of Air Force maintenance crews with the highest qualifications. This would take exceptional orders from the normal military personnel system in the fact of other operational demands. However, some special arrangements have been made already.

## V. ALTERNATIVES

In considering the possible alternatives for merging the assets and/or reducing the programs of the two aircraft fleets, this section of the report provides:

A General Analysis of:

1. Actions to Curtail the Combined Programs
2. Factors Affecting Fleet Size
3. Costs of Alternative Fleet Structures

Alternatives for Decision including:

1. Continue the Currently Approved Structure
2. Mothball OXCART Aircraft and Share SR-71 Fleet
3. Terminate the OXCART Fleet

### General Analysis

### Actions to Curtail the Combined Programs

Three approaches to curtailing the programs have been considered.

1. The fleets can be consolidated at one base. They can be operated under separate management, or with varying degrees of common management, or all aircraft can be assigned to SAC to serve both covert and military requirements.

With regard to the economic advantages of consolidating the full or reduced OXCART fleet at Beale, estimated savings are small--$30 to $40 million over five years. Three factors contribute:

a. In moving to Beale, there are one-time construction and moving costs of $15 to $20 million. Beale is currently overcrowded and growing.

b. Savings are not achieved in tanker operations since tanker support is already consolidated at Beale.

c. The OXCART and SR-71 aircraft are sufficiently different so that only minor savings are realized in consolidating maintenance; extensive costs are required to train blue-suit personnel and a high turnover of these personnel is assumed.

2. The tempo of the program can be slackened. Flying hours can be decreased. Flying at high mach numbers can be curtailed. Flight test activities can be reduced with concomitant reduction in aircraft modification and overhaul frequency. Development and supporting programs (such as sensors, navigation systems, or processing) can be reduced. And, in the case of the SR-71, the crew-to-aircraft ratio can be reduced.

The economic advantages of these steps are very questionable since the programmed flying hours are reduced by 28% while costs are reduced only 9%. Also, reliability, proficiency, and endurance would suffer since the aircraft are modernized at a slower rate and since there are fewer trained crews.

3. The size of the fleets can be reduced. Aircraft can be destroyed and cannibalized, or stored in "mothballs", or grounded and maintained in near flyable condition, or assigned to other programs.

We have considered four ways of reducing the size of the fleet.

a. Dispose of aircraft. There does not seem to be any requirement to utilize OXCART or SR-71 aircraft in the YF-12 program or to reconfigure some of the aircraft as manned bombers. NASA and FAA have shown some interest in utilizing one or two of the aircraft but this use would have a very minor effect on costs. A strong disadvantage in destroying aircraft at this stage of the program is the uncertainty as to future needs and attrition and the possible political repercussions in Congress or in the press.

b. Cannibalize aircraft and utilize spare parts. We estimate that about $3 million one-time savings could be achieved per aircraft if they were used as a source of spare parts. These savings are low because of two factors. First, spare parts for the aircraft are already very expensive since there is low demand for these rare parts. If additional spares are generated by cannibalizing aircraft, then the already high unit costs would increase even more due to the reduced volume. Second, the operational aircraft and engines are still undergoing fairly high rates of modification since the programs are still in an early stage and are on the forefront of the state-of-the-art. Many of the spare parts made available through disposal of aircraft become obsolete.

Considering the small savings in utilizing the aircraft for spare parts, and the low cost of "mothballing" aircraft, we recommend against either destruction or spare parts use and have not included aircraft destruction in any of the specific alternatives below.

c. Maintain aircraft in a "grounded-but-flyable" status. Under this alternative, some aircraft would be maintained at a near operational capability but not flown. Savings would be realized in fuel, spares, and overhaul costs. Modification kits and occasional overhauls would be needed to keep these aircraft abreast of the flying fleet. The grounded aircraft would be converted to flying status if attrition of the flying fleet became excessive or if requirements grew. The savings per aircraft year average 12-14 percent; for example, cost of one SR-71 plane-year is $5.08 million and this is reduced by $.72 million if the aircraft is maintained in a grounded-but-flyable status. Since comparable savings can be achieved by flying all aircraft at a lower utilization rate, none of the alternatives below include reductions by placing aircraft in the grounded-but-flyable status.

d. Store aircraft. The cost of storing aircraft (including security and inspection) is small. For example, the five-year cost of mothballing ten aircraft is less than $1 million per year. On the other hand, the cost of removing one aircraft from storage and making it operational increases at about $1-1 1/2 million per year (at least initially) so that by 1972 it costs about $7 million to restore a mothballed aircraft to the fleet. This cost assumes that the other aircraft are being flown, that modifications are being developed, and that the operating fleet is being improved so that at the time of demothballing, the removed aircraft must be extensively overhauled and updated.

There is a risk associated with mothballing that the aircraft and parts will deteriorate over time so that demothballing may prove much more expensive than anticipated. Also, if a block of aircraft are demothballed, it will become increasingly difficult over time to assemble engineers and technicians to update and check out the aircraft.

In the alternatives below where we reduce the size of the fleet, we have mothballed aircraft rather than destroying them or maintaining them in a "grounded-but-flyable" status. However, considering the costs and risks of removing the aircraft from storage, particularly in the out years, we conclude that mothballing makes sense only if there is reasonably high probability that the mothballed aircraft will not be brought back into the fleet. In other words, mothballing is a hedge against unanticipated increases in requirements or unexpectedly high attrition.

## Factors Affecting Fleet Size

By July 1967, the combined fleet assets will be 11 OXCART aircraft (including 1 test aircraft and 1 trainer) and 30 SR-71 aircraft (including 2 test aircraft and 2 trainers). This estimate assumes no attrition between now and July 1967. According to an informal Air Force and SAC estimate, all SR-71 aircraft and sensor systems will be fully operational by August 1967.

There are four major factors that determine the size of the fleet required: (1) attrition; (2) requirements; (3) feasibility of satisfying requirements with other vehicles and (4) advantages and inefficiencies related to maintaining separate fleets.

1. Attrition. It is impossible to project with certainty the attrition to either fleet during the next five years. The initial aircraft have been operational for only a year and the program represents an extremely advanced and unique technology. Current plans assume that three SR-71 and two OXCART aircraft will be lost by 1972 so that the total fleet of operationally configured aircraft will be reduced from 35 to 30 at that time. These estimates assume an attrition rate that is about the same as that experienced by Air Force fighter aircraft over the past ten years. If attrition should unexpectedly double or triple, then the SR-71 fleet might drop from 26 to 14-18 operational aircraft and the OXCART fleet might drop from nine to five. However, we consider it very unlikely that these high losses will occur.

2. Requirements. Obviously, the size of the fleet depends on the number of different types of missions that must be flown, the number of operationally configured aircraft that must be available to support each mission, and the probability that a number of these missions would have to be simultaneously conducted under the worst case. These factors are discussed in the Requirements section and under Alternatives for Decision below.

3. The Use of Other Vehicles. As pointed out in the requirements section, satellites and drones can perform some reconnaissance in place of the OXCART and the SR-71. We expect that the ability of the satellites to substitute for the advanced aircraft will increase during the early seventies as new systems are introduced. For example, any one of the following systems could have a significant effect on the need for the advanced aircraft in situations short of general war: increased numbers of satellites and launchers maintained for quick reaction, real time readout of photographic intelligence, the MOL, quick reaction capability with the KH-9, or TAGBOARD. For SIOP reconnaissance, satellites with side-looking radar appear especially attractive.

4. Maintaining a Separate Fleet. The advantages of a separate, civilian, and covert fleet are discussed in Section IV. If a separately managed covert capability is maintained, then the total number of available aircraft will probably be less effective than if the fleet had been operated under a single management. This would be particularly true in an escalating situation where reconnaissance targets and procedures were changing rapidly. OXCART aircraft and crews can be turned over to SAC under a condition of high tension or war. But if the OXCART capability is really going to be effective, the OXCART pilots must have trained for their missions before the crisis arises. And even with good coordination and planning, when the fleet is turned over, it will still possess some specialized capabilities and have been trained for some unique functions. Accordingly, in order to make the best coordinated use of both fleets at that time, there will probably have to be some readjustment of aircraft assignments and concomitant degradation in fleet effectiveness.

## Costs Comparison of Alternative Fleet Structures

We have costed five basic alternatives:

Table 1 compares the costs and activity levels for each of these alternatives. The costs include estimates of cost for support aircraft, tanker support and basing. The activity levels are based on numbers of operationally configured aircraft except in Alternative V where flying hours are used. In cases where aircraft are mothballed, the costs include security and inspection costs for the stored aircraft but do not include any costs for removing the aircraft and updating them. This cost is estimated to be about $4 million per aircraft if the aircraft is removed in three years and about $7 million per aircraft if removed in five years.

Table 1 compares percent cost reduction with percent fleet reduction. These reductions are commensurate in Alternatives III and IV, where the OXCART aircraft are stored. In the other cases, the cost reductions are relatively small for two reasons:

1. The ratio of fixed costs in both programs is high; and

## TABLE I

## COMPARISON OF ALTERNATIVES

| Alternative | No. of Stored A/C | No. of Operational A/C 2/ | Costs ($ Millions)1/ | | | Diff. in 5-Yr Costs | Percent Reduction of Costs | Percent Reduction of Activity |
|---|---|---|---|---|---|---|---|---|
| | | | FY68 | FY69 | FY68-72 | | | |
| I.- Status Quo | | | | | | | | |
| a. Separate Basing | 0 | 35 | 341 | 295 | 1377 | -0 | - | - |
| b. Consolidate at Beale | 0 | 35 | 346 | 287 | 1335 | -42 | 3.1 | 0.0 |
| II.-Reduce OXCART | | | | | | | | |
| a. Separate Basing | 5 | 30 | 323 | 276 | 1302 | -75 | 5.4 | 14.3 |
| b. Consolidate at Beale | 5 | 30 | 339 | 270 | 1272 | -105 | 7.6 | 14.3 |
| II.-Mothball all OXCART | 11 3/ | 26 | 296 | 207 | 1012 | -365 | 26.5 | 25.7 |
| IV.-Mothball OXCART and Share SR-71's | 11 3/ | 26 | 313 | 231 | 1125 | -252 | 18.3 | 25.7 |
| V.-Tighten Belt | 0 | 35 | 314 | 264 | 1247 | -130 | 9.4 | 28.3 4/ |

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/ Costs include estimates of support aircraft, tankers, and mothballing. They do not include costs for removing from mothballs.

/ As of 1 July 1967 assuming no aircraft lost before then. Numbers do not include 1 OXCART trainer, 1 OXCART test, 2 SR-71 trainers and 2 SR-71 test.

/ Include OXCART test and trainer aircraft.

/ Based on flying hour reduction.

2. The volumes entailed in variable costs are so small and the items so unique in the industry that a reduction in volume of purchase is substantially offset by an increase in unit cost.

Alternative I - The status quo. Under this alternative, both fleets would be maintained so that by July 1967 there would be about 35 operationally configured aircraft; and, assuming planned attrition, about 30 in 1972. Two variations of this alternative have been developed.

I-a. Current basing arrangements are continued at Area 51 and Beale.

I-b. Area 51 is closed in July 1968, at which time all OXCART aircraft are transferred to Beale. As soon as possible thereafter, the OXCART is placed under SAC management and some aircraft maintenance becomes "blue suit". All major airframe and engine overhaul for the SR-71 and the OXCART continue to be contracted.

If the OXCART were placed under SAC management at Beale, it would still be possible, at little difference in cost, to train and use civilian flight crews for "covert" missions.

Alternative II - Reduce the size of the OXCART fleet. Under this alternative, five OXCART aircraft would be stored by July 1968. During FY 1968 flight activity would be reduced by almost one-fourth. Two variations of this alternative, similar to those for Alternative I, have been developed. Under Alternative II-a, separate basing would continue for the OXCART. Under Alternative II-b, Area 51 would be closed by July 1968 and the remaining operational OXCART aircraft would be transferred to Beale and consolidated under SAC management. Similar to Alternative I-b, under Alternative II-b it would be possible to maintain civilian crews for the OXCART aircraft at little difference in cost.

Under this alternative, the SR-71 fleet would be maintained as currently planned.

The major reason for selecting Alternative II would be to maintain an austere option for employing "covert" reconnaissance. If only one or two of the remaining OXCART aircraft were lost before 1970, then the mothballed aircraft would not be withdrawn. If the attrition of the remaining OXCART aircraft should be much higher than planned, for example, if three or four of the remaining aircraft were lost, then the mothballed aircraft would be withdrawn. As indicated above, this cost would depend on when it was incurred. In 1970 it would be about $14 million for three aircraft; in 1972 this cost would be $21 million. However, we estimate that the likelihood of such demothballing is less than 10-15 percent.

Alternative III - Store the OXCART fleet. Under this alternative, by January 1968 all of the OXCART aircraft would be stored and Area 51 would be closed. The OXCART capability would start being reduced in July of 1967 so that by October 1, 1967, the capability would be reduced to five operational aircraft with termination of the program by January 1, 1968. This would produce the maximum net savings of $365 million including $45 million in FY 1968.

The rationale behind Alternative III - store the OXCART fleet follows the analysis in the requirements section and assumes that aircraft will only be removed from mothballs in large blocks--say five aircraft--in one of the following cases:

1. The requirement for SR-71 capabilities remains about the same as today but the fleet suffers high attrition so that, by 1972, more than six aircraft have been lost and less than 20 operationally configured aircraft remain.

2. The attrition of the SR-71 fleet remains as currently projected (with 3 aircraft lost by 1972) but the number of aircraft available to perform currently defined or newly assigned missions is judged inadequate. If it were planned that one OXCART aircraft would be removed from storage for every SR-71 aircraft lost, it would probably be preferable to mothball only about half of the OXCART fleet, to transfer the remaining aircraft to Beale under SAC's command, and to fly the transferred aircraft as little as possible until anticipated attrition of other aircraft developed.

This alternative is a hedge against high SR-71 losses or increased requirements. Under these conditions, the expected cost of demothballing six aircraft is $24-40 million but we estimate that the likelihood of incurring this cost is only 10-15 percent.

Alternative IV - Mothball OXCART Aircraft and Share SR-71 Aircraft. Alternative IV is a variation of Alternative III. Under this alternative the operational SR-71 fleet would consist of 21 aircraft (including two test aircraft and one trainer). Instead of closing Area 51 in Fiscal Year 1968, eight operational SR-71's and one SR-71/B trainer are transferred to CIA control and maintained at Area 51. The total flying time on all SR-71's was assumed to be approximately 6,000 hours per year (4,500 hours per year at Beale AFB and 1,500 hours per year at Area 51). It was further assumed that the SR-71 test program would be maintained at Beale AFB under SAC management. Modifications resulting from this program would apply to all SR-71 aircraft.

Under this alternative, a separate fleet would be maintained at Area 51 with the principal advantage being related to the retention of the separate fleet. (See Section IV.)

Alternative V - Maintain both fleets but reduce the tempo of the program. Under this alternative, all OXCART and SR-71 aircraft would be retained and flown but the program would be curtailed by such means as:

1. Reduce SR-71 flying hours by 30 percent and reduce the crew-to-aircraft ratio from 2:1 to 1.5:1.

2. Reduce the flying hours for the OXCART program by 20 percent.

3. For both programs, reduce the level of flight testing and consequently the frequency and extent of major overhauls.

4. For both programs, do not procure additional sensors. Under this alternative, the aircraft would remain separately based at Area 51 and Beale.

A major motivation for developing Alternative V was to indicate that, as long as both fleets are maintained, savings achieved by reducing activity levels are as great as the savings achieved by mothballing aircraft.

The operational impact of this alternative is much more difficult to express. Since the number of aircraft would remain as high as in Alternative I, The status quo, it can be argued that the four basic missions could still be undertaken simultaneously during the time of crisis or general war. However, reliability, proficiency, and endurance would surely suffer since the aircraft are modernized at a slower rate and since there are fewer trained crews.

## Alternatives for Decision

In light of the general analysis above, the following three alternatives emerge as the most relevant options in the major policy decision to be made at this time.

I. Continue both fleets at the currently approved levels.

II. Mothball the OXCART aircraft and share the SR-71 fleet at separate bases. (In the general analysis this is discussed as Alternative IV.)

III. Terminate the OXCART fleet at the time the SR-71 fleet becomes fully operational.

Each alternative with its costs and possible mission coverage is described below. General arguments for and against continuing the presently approved levels of aircraft are presented first followed by the two reduced fleet alternatives with arguments for each.

### Alternative I

Maintain the status quo and continue both fleets at the currently approved levels. This provides for two bases and:

| | |
|---|---|
| Total approved aircraft | 41 |
| Less: Training and test aircraft | -6 |
| Aircraft under major overhaul | -3 |
| Assumed attrition through 1970 | -3 |
| Available operational aircraft through the end of 1970 | 29 |

| Costs: ($ in millions) | FY 1968 | FY 1969 | FY 1968-72 |
|---|---|---|---|
| | $341 | $295 | $1,377 |

| Possible Mission Coverage | Operational Aircraft | | |
|---|---|---|---|
| | OXCART | SR-71 | Total |
| A. Strategic Reconnaissance | 3* | 2* | 5 |
| B. Force Mobilization Reconnaissance | 4* | 5* | 9 |
| C. General War Crisis/Brink | | 7* | 7 |
| D. SIOP | ___ | 8 | 8 |
| | 7 | 22 | 29 |

*These aircraft could be used interchangeably between the three missions (A, B and C) as priorities dictate.

For the SR-71 fleet, some variations on the mission assignment above are possible.

1. Deploy six aircraft to a third theater with the result that the crisis or SIOP-alert capabilities are significantly degraded.

2. In order to generate more crisis sorties, use the strategic reconnaissance, force mobilization or SIOP fleets for a second wave of crisis reconnaissance with the possible result that a SIOP posture could not be resumed until the crisis aircraft were recycled.

3. Generate a second-wave, dispersed SIOP capability by dispersing the crisis alert aircraft or by recalling the theater deployed aircraft. If the combined capabilities of the OXCART and the SR-71 are included, then any one of these three additional capabilities can be achieved without the full restrictions or degradations that are indicated.

The major arguments in favor of the currently approved fleet size are:

1. The presently planned fleet will insure a simultaneous capability for:

a. Strategic, force mobilization and tactical reconnaissance in at least two theaters.

b. Crisis reconnaissance of the Soviet Union with at least six simultaneous sorties every three or four days for at least several weeks.

c. At least six aircraft continuously on SIOP hard alert for SIOP access.

We feel that the strongest argument in favor of a larger fleet is that if both the Soviet Union and the U. S. continue to preserve their capabilities for assured destruction, then crises can become more intense and prolonged (as there is less inclination to escalate to a general war). The global, prolonged, intense crisis may require simultaneous reconnaissance capabilities of the kind indicated above.

2. The presently planned fleet presents a more readily available hedge against sudden, unexpectedly high attrition. If such attrition should develop, and if the requirement for manned reconnaissance by advanced aircraft is still high, the additional aircraft will be needed to compensate for losses only after three years. (This argument assumes that aircraft stored as a hedge against high attrition would take too much time to reconstitute.)

## Fleet Reduction Alternatives

The two fleet reduction alternatives which follow are both supported by the following general arguments in favor of reducing the total number of operational aircraft. In the first part of this section, we examined ways in which the fleet size could be decreased. In the two alternatives which decrease fleet size the aircraft removed from the operating fleet are mothballe rather than destroyed. Also, in both alternatives a five month overlap is provided between estimated full operational capability of the SR-71 fleet and mothballing of the last five A-12 aircraft.

The general arguments in favor of decreasing the fleet size are:

1. At present, and increasingly in the coming years, satellites and unmanned drones, U-2's and tactical aircraft will be able to perform many of the strategic, force mobilization and tactical support missions as well as being able to provide a more limited capability in the crisis reconnaissance functions for which the OXCART and the SR-71 were developed.

2. While some advanced aircraft capability is needed for the purpose of crisis or brink reconnaissance, it is very questionable whether six aircraft would ever be launched against the Soviet Union at a time of intense crisis. Such a launch would be extremely provocative and might be interpreted as an attack. Also, there has been no conclusive demonstration that such reconnaissance would produce meaningful intelligence.

3. Interchangeability of aircraft between missions A, B and C is possible so that it cannot be argued that it is necessary to provide maximum possible aircraft for coverage of all missions simultaneously. There is no need for an expensive capability for simultaneously conducting covert and military reconnaissance. If a crisis or a conflict becomes sufficiently intense so that most of the SR-71 capabilities are needed, then covert missions will no longer be required. Conversely, if covert missions are required at a lesser level of crisis, then SR-71 resources could be used for these missions.

Alternative II (Discussed as Alternative IV in the General Analysis)

Mothball the OXCART aircraft and share the SR-71 fleet by transferring eight operational aircraft and one trainer to Area 51 under CIA management. This provides for two bases and:

| | |
|---|---|
| Total approved aircraft | 41 |
| Less: Mothballed A-12's | -11 |
| Training and test aircraft | -4 |
| Aircraft under major overhaul | -2 |
| Assumed attrition through 1970 | -2 |
| Available operational aircraft through the end of 1970 | 22 |

| Cost Savings: ($ in millions) | FY 1968 | FY 1969 | FY 1968-72 |
|---|---|---|---|
| | -$28 | -$64 | -$252 |

Percent reduction of costs - 18% Reduction of activity - 26%

| Possible Mission Coverage | Operational Aircraft | | |
|---|---|---|---|
| | OXCART | SR-71 | Total |
| A. Strategic Reconnaissance | 3* | -0- | 3 |
| B. Force Mobilization Reconnaissance | 5* | -0-* | 5 |
| C. General War Crisis/Brink | -0-* | 6* | 6 |
| D. SIOP | -0- | 8 | 8 |
| | 8 | 14 | 22 |

*These aircraft could be used interchangeably between the three missions (A, B and C) as priorities dictate.

Arguments for Alternative II

1. The covert and civilian characteristics of a separate fleet would be retained.

2. The proposed division of primary mission responsibilities would be essentially in line with the planning and use patterns as they now exist.

3. This would provide flexibility of use between SAC and CIA due to essentially single aircraft configuration.

Alternative III

Terminate the OXCART fleet at the time the SR-71 fleet becomes fully operational and assign all missions to the SR-71 fleet. This provides for a single base and:

| | |
|---|---|
| Total approved aircraft | 41 |
| Less: Mothballed A-12's | -11 |
| Training and test aircraft | -4 |
| Aircraft under major overhaul | -2 |
| Assumed attrition through 1970 | -2 |
| Available operational aircraft through the end of 1970 | 22 |

| Cost Savings: ($ in millions) | FY 1968 | FY 1969 | FY 1968-72 |
|---|---|---|---|
| | -$46 | -$88 | -$366 |

Percent reduction of costs - 27% Percent reduction of activity - 26%

| Possible Mission Coverage | Operational Aircraft SR-71 |
|---|---|
| A. Strategic Reconnaissance | 3* |
| B. Force Mobilization Reconnaissance | 5* |
| C. General War Crisis/Brink | 6* |
| D. SIOP | 8 |
| | 22 |

*These aircraft could be used interchangeably between the three missions (A, B and C) as priorities dictate.

Arguments for Alternative III

1. The cost savings are higher than Alternative II. ($365 million as against $252 million.)

2. The operational flexibility of switching aircraft between missions should be somewhat higher under a single command.

## Appendix A

## Fleet Characteristics

I. Introduction

II. Airborne System Characteristics
   A. Range and Altitude (Table 1)
   B. Fuel Load
   C. Engine Thrust
   D. Crew Size
   E. Navigation Aids
   F. Payload Capacity
   G. Sensor Systems (Table 2)

III. Experience and Status
   A. Milestones
   B. Component Availability (Table 3)
   C. Flight Experience
      1. Supersonic Time
      2. Mach 3.0 + Sorties
   D. Aerial Refuelings
   E. Attrition
   F. Reliability

IV. Support
   A. Base Facilities
   B. Maintenance
   C. Engines
   D. Crews
   E. Tanker Support
   F. AGE Equipment
   G. Command Control and Communications
   H. Fuel Storage
   I. Sensor Processing
   J. Support Aircraft
   K. Kadena Support
   L. Commonality and Interchangeability

## FACT ANNEX

### I. Introduction to Annex

This Annex is intended to present factual data about the A-12 and SR-71 programs. Only areas in which the two programs or their respective vehicles are significantly different will be highlighted. No attempt is made in this Annex to discuss the relevance of these differences; for this discussion the reader is referred to the summary of this Annex contained in the main section of this report.

### II. Airborne System Characteristics

#### A. Range and Altitude.

Table 1 gives altitude and range parameters for various profiles. Ranges are given in nautical miles and are unrefueled range from tanker to tanker in a refueling mission. Two altitude figures are given in thousands of feet. The first altitude figure indicates the beginning of the cruise climb while the second figure indicates the end of the cruise climb. The figures in columns entitled "long range" are for profiles designed to maximize range. The figures in columns entitled "high altitude" are for profiles designed to maximize altitude. All of the data are based on an assumed fuel reserve of 6000 pounds at second refueling.

#### B. Fuel Load.

| | |
|---|---|
| A-12 | 69,800 lbs. |
| SR-71 | 78,200 lbs. |

#### C. Engine Thrust.

| | |
|---|---|
| A-12 | 32,000 lbs. or 32,500 lbs. |
| SR-71 | 32,500 lbs. or 34,000 lbs. |

Table 1

| | Demonstrated as of 1 Oct 1966 | | | | Future Objectives | |
|---|---|---|---|---|---|---|
| | Test Conditions | | Operational Cond. | | Operational Cond. | |
| | Long Range | High Alt. | Long Range | High Alt. | Long Range | High Alt. |
| A-12 | | | | | | |
| Range (nm) | 3080** | N.A. | 2690 | 2450 | 3750 | 3200 |
| Altitude (000 ft) | 75.4-81.3 | N.A. | 76-84.5 | 79-85 | 76.7-87 | 84.8-94. |
| SR-71 | | | | | | |
| Range (nm) | 3031** | 2880 | * | * | 3725 | 3048 |
| Altitude (000 ft) | 74-84.5 | 80-85 | * | * | 74-85 | 81-91 |

*Not presently flying missions which can be categorized as "operational".

**Corrected for no turns and standard day conditions.

### D. Crew Size.

| | |
|---|---|
| A-12 | One (1); pilot |
| SR-71 | Two (2); pilot and reconnaissance systems operator |

### E. Navigation Aids.

| | |
|---|---|
| A-12 | Inertial navigation with demonstrated error of 1 nm/hour |
| SR-71 | Inertial and Stellar updatable with average performance of: .75 nm Stellar-Inertial Mode<br>2.0 nm/hour Inertial Mode |

### F. Payload Capacity.

| | |
|---|---|
| A-12 | 2500 lbs. and 84 cubic ft. |
| SR-71 | 3400 lbs. and 98 cubic ft. |

### G. Sensor Systems.

Table 2 gives the sensor systems and their specifications for each of the two programs.

The A-12 is essentially a single sensor technical reconnaissance system having the capability to carry on a mission one of three high resolution cameras, or a side looking radar, or an infrared sensor.

The SR-71 is a multiple sensor reconnaissance system having the capability to carry on a mission simultaneously the following sensors: three photographic cameras of varying resolution, a side looking radar, an infrared sensor and an electromagnetic recorder for COMINT and ELINT collection.

## III. Experience

### A. Milestones.

Below are milestone dates for both programs:

| Sensor System | Linear Coverage in Nautical Miles | Lateral Coverage in Nautical Miles | Resolution Specification in Feet | Resolution Achieved in Feet |
|---|---|---|---|---|
| Tech Intell Camera I (A-12) | 2500 | 63 | 1.0 | 0.9 |
| Tech Intell Camera II (A-12) | 3400 | 56 | 1.5 | 1.25 |
| Tech Intell Camera IV (A-12) | 1687 | 39 | 1.5 | 1.07 |
| Tech Objective Camera (SR-71) | 2140 | 10 1/ | .63 | 1.64 |
| Operation Obj Camera (SR-71) | 4000 | 26 | 1.75 | 3.0 |
| Terrain Obj Camera (SR-71) | 8500 | 21 | 16.5 | 16.5 |
| Infrared Camera (A-12) | 2.5 hours | 20 | 40 | 60 |
| Infrared Camera (SR-71) | 6.0 hours | 28 | 85 | 2/ |
| Side Looking Radar (A-12) | 1500 | 20 3/ | 10-20 | 12-21 |
| Side Looking Radar (SR-71) | 4000 | 10-20 4/ | 30-50 | 30-50 |
| Signal Intercept Package (A-12) | | | | |

[redacted] (A-12)

[redacted] (A-12)

50X1, E.O.13526

System XVII (A-12) - ELINT - Covers 50 MCS to 12 GC

Electromagnetic Recording (SR-71) - COMINT - Records 100-400 MCS
ELINT - Collect and record 30-40,000 MCS
Location Find 116-12,400 MCS

1/ Two 5 nm swath widths located up to 19.5 nm on either side of track.
2/ No targets tested to date.
3/ Located up to 40 nm outboard left side of track.
4/ Located up to 80 nm outboard either side of track.

| | A-12 | SR-71 |
|---|---|---|
| First Test Flight | Apr 62 | Dec 64 |
| First Supersonic Test Flight | May 62 | Dec 64 |
| First Mach 2.0 Test Flight | Nov 62 | Jan 65 |
| First Mach 3.0 Test Flight | Jul 63 | Feb 65 |
| First Mach 3.2 Test Flight | Nov 63 | Feb 65 |
| First Detachment Mach 3.0 Flight | Mar 65 | Jul 66 |
| Validation Operational Capability | Dec 65 | ---- |

B. Availability of Components.

Table 3 gives the number of components planned and the number of components rated as operationally ready as of 1 October 1966 for both programs.

C. Flight Experience.

1. Supersonic Time.

Below are the number of hours as of September 1966 at or above various supersonic points for both programs.

Time, in Hours, at or above Various Mach Numbers

| Mach | 2.0 | 2.6 | 2.8 | 3.0 |
|---|---|---|---|---|
| A-12 | 832 | 531 | 416 | 269* |
| SR-71 | 453 | 289 | 249 | 179* |

| * | Total | Test a/c | Operational a/c |
|---|---|---|---|
| A-12 | 269 | 39 | 230 |
| SR-71 | 179 | 147 | 32 |

2. Supersonic Sorties.

Below are the number of sorties for each program with a given duration at or above Mach 3.0. These data are as of September 1966.

## Table 3

## Availability

| | Planned | | Operational | |
|---|---|---|---|---|
| | A-12 | SR-71 | A-12 | SR-71 |
| Test Aircraft | 1 | 3 | 2 | 6 |
| Training Aircraft | 1 | 2 | 1 | 2 |
| Operational Aircraft | 8 | 26 | 7 | 8 |
| Flight Crews | 8 | 50 | 6 | 10 |
| Cameras | | | | |
| Type I | 8 | - | 5 | - |
| Type II | 2 | - | 2 | - |
| Type IV | 3 | - | 0 | - |
| Technical Objective | - | 36* | - | 0 |
| Operational Objective | - | 36* | - | 21* |
| Terrain Objective | - | 18* | - | 16 |
| Infrared | 1 | 8 | 0 | 2 |
| Side Looking Radar | 3 | 23* | 0 | 9 |
| [redacted] 50X1, E.O.13526 | 1 | - | 1 | - |
| [redacted] | 1 | - | 0 | - |
| EWS/ECM Systems | 8 | ** | 8 | ** |
| Electromagnetic Recorder | - | 8 | - | 0 |
| Signal Intercept Package | 8 | - | 8 | - |
| Maintenance Recorder System | - | 35 | - | 8 |
| Birdwatcher | 14 | - | 14 | - |
| System XVII | 2 | | - | |

* 2 cameras = 1 set

** Numbers not established.

## Sorties above Mach 3.0 by Duration

| Duration in Hours | A-12 Sorties | SR-71 Sorties |
|---|---|---|
| 0 - 1.0 | 374 | 200 |
| 1.0 - 2.0 | 55 | 43 |
| 2.0 - 3.0 | 9 | 0 |
| 3.0 - 4.0 | 1 | 0 |

### D. Aerial Refuelings.

Below are the total number of sorties flown by each program. This total is then displayed as number of sorties having 1, 2, 3 or 4 aerial refuelings.

The data for the A-12 are for the time period from January 1963 through August 1966. The data for the SR-71 are for the time period from April 1965 through September 1966.

| | Total Sorties | 1-AR* Sorties | 2-AR Sorties | 3-AR Sorties | 4-AR Sorties |
|---|---|---|---|---|---|
| A-12** | 1872 | 549 | 71 | 18 | 4 |
| SR-71 | 624 | 275 | 40 | 1 | 0 |

*AR - Aerial Refueling
**Since August 1966 the A-12 has flown two sorties with four (4) aerial refuelings

### E. Attrition.

To date the A-12 program has lost 3 vehicles: Numbers 123, 126 and 133. To date the SR-71 has lost 1 vehicle: Number 2003.

The planning factor attrition rate for the A-12 and the SR-71 is .1 aircraft per 1000 flying hours.

### F. Reliability.

Based on 373 A-12 operational type sorties rated from March 1965 through August 1966, all systems examined indicate satisfactory performance on 85% or more of the sorties. Data not available for the SR-71.

## IV. Support

### A. Base Facilities.

The OXCART aircraft program is based at Area 51, a restricted area in the Nevada Test Site, which has the necessary facilities and staffing to support the test, training operations and operational deployment of the A-12. There is an average of 1500 persons, including military and CIA civilian employees, on station to support the OXCART and TAGBOARD projects. About 650 of these are in direct support of launching operations and approximately 611 are involved in indirect support such as logistics, firefighting, guards, etc. Most of these people are under contract to Lockheed Aircraft Company or its sub-contractors, and are on permanent duty at this area. The military personnel and CIA civilian employees are on a basic three year tour.

The SR-71 aircraft are assigned to the 9th Strategic Reconnaissance Wing at Beale Air Force Base, California. This wing has 1,278 persons assigned for direct support of the aircraft and 56 contractor representatives to aid in their systems maintenance. Indirect support consists of 400 personnel at Edwards Air Force Base, and 333 additional persons specially authorized at Beale AFB with the activation of the SR-71 there to augment normal base support.

A total of $21 million has been invested in Area 51 for runways, buildings, housing, navigational aids, water supply, etc. This base is now self-sufficient and no further investment is planned. Base support and maintenance is supervised by CIA personnel. Reynolds Engineering and Electrical Company, a contracting company from Las Vegas, has 239 persons engaged in base maintenance work. Total cost per year for salaries and necessary equipment is 5.5M.

At Beale AFB approximately $15M dollars has been invested in constructing additional facilities to support the SR-71 wing. There were also 333 additional base operating support personnel assigned upon activation of the wing, in addition to the normal base facilities and services.

B. Maintenance.

OXCART aircraft are maintained by contract personnel who follow the maintenance philosophy expressed in Air Force Manual 66-1. They are supervised by military maintenance officers who are detailed to CIA and who are directly responsible to the Commander, Area 51.

The SR-71 is maintained under similar organizational and field maintenance concepts by Air Force enlisted men. Their training is acquired through a course held at Lockheed Aircraft Company with continued on-the-job training at Beale AFB.

C. Engines.

The A-12 is powered by a J-58 engine, with 32,500 lbs. of thrust. It is presently rated at 100 hours (military time) between overhauls and has a growth potential to 150 hours between overhauls.

The SR-71 engine is an improved J-58 with 34,000 lbs. of thrust. It is presently rated at 100 hours (military time) and has a growth potential to 200 hours between overhauls. It should be noted that these are effective TBO's based on assumed flight time for return to overhaul for all causes whereas scheduled TBO's would be expected to be somewhat better.

D. Crews.

The A-12 is operated by one pilot who is responsible for piloting the aircraft, using sensor & EWS equipment and navigating to his destination. His training consists of a ground school course at Lockheed Aircraft, followed by 21 missions in the A-12, for a total of 56 hours. This gives him an operational readiness status. His continuation training in the A-12 consists of 18 sorties per quarter and includes a minimum of seven aerial refuelings. His collateral training is accomplished in a F-101 aircraft. He also has 148 hours of academic and field training annually.

The SR-71 is operated by two officers. A pilot operates the aircraft, and a reconnaissance systems operator is responsible for navigation and reconnaissance systems operation. The crew's training consists of 13 weeks of ground school, nine simulator rides, and 13 SR-71 sorties. Aircrew proficiency training continues with a minimum of 12 SR-71 missions per quarter. Collateral flight training is in a T-38. Simulator training is available at Beale AFB for both A-12 and SR-71 aircrews.

E. Tanker Support.

The 903rd Air Refueling Squadron with 23 KC-135 modified aircraft stationed at Beale AFB is responsible for tanker support to both the SR-71 and the A-12. Basically, each aircraft requires the support of one tanker for each refueling in the ZI. A deployment to Kadena, by either aircraft, would require three air refuelings enroute. Each deployment or operational air refueling is supported by a primary and an air-spare tanker. During operational periods, the tanker support would be dictated by mission frequency.

There are 52 tanker sorties per month required for A-12 aircrews. The SR-71 plans 283 tanker sorties per month for training, plus necessary tankers for deployment and operational missions. Each tanker aircraft is capable of 11 refueling sorties per month, but maintenance and varied mission assignments preclude a division of sorties required, by 11, to determine numbers of aircraft required.

The ultimate plan for tanker support is as follows:

| | |
|---|---|
| <u>Beale AFB, Calif.</u> | 20 UE aircraft - 15 for support of A-12 and 5 for support of SR-71. |
| <u>McCoy AFB, Fla.</u> | 20 UE aircraft primarily for support of the SR-71. |
| <u>Little Rock AFB, Ark.</u> | 15 UE aircraft primarily for support of the SR-71. |

F. AGE Equipment.

Each project requires a myriad of AGE support equipment for the aircraft, the sensors and the pilots. Estimate of the dollar value of this equipment is $47 million for the SR-71 and $30 million for the A-12. This equipment is in being, and approximately 60% of it is interchangeable.

G. Command, Control and Communications.

Targeting, flight planning and command of the OXCART vehicle is centered at CIA Headquarters in Washington, D. C.

Flight plans are prepared at Headquarters and transmitted via the 1004 high-speed secure digital data circuit to Area 51 or Kadena, as required. Coordination with the necessary ground facilities and tanker aircraft is accomplished through high frequency single sideband radio, UHF radio links, KW-26 secure teletype circuit and secure telephone and hot line telephone. While airborne, the A-12 is monitored by a high frequency BIRDWATCHER system with the capability of flight following and recall if desired.

Mission preparation time allows for aircraft, sensor and crew generation and requires approximately 24 hours. If a canned mission were pre-planned, and aircraft and crews were in the countdown stage, a shorter generation time would be required.

The SR-71 has a similar command and control system. The Joint Reconnaissance Center and the SAC Reconnaissance Center command and control the aircraft through their land and radio facilities. Flight plans are prepared at Headquarters SAC and transmitted via high speed data lines. Current planning calls for a 16½ hour generation period to launch a mission. If canned routes are used a shorter generation period is envisioned.

H. Fuel Storage.

Storage facilities for PF-1 fuel, which is used by both the A-12 and the SR-71, have been established at selected points in the ZI and overseas. U.S. facilities are at Beale AFB in California, McCoy AFB in Florida, Edwards AFB in California, Area 51 in Nevada, and Palmdale, California. Overseas storage facilities are located at Eielson AB in Alaska, Kadena AB on Okinawa, Thule AB in Greenland, and Adana AB in Turkey. These sites are stocked with fuel and facilities adequate to support either training or operational missions.

I. Sensor Processing.

Present planning is that OXCART sensor processing will be accomplished at Eastman Kodak Company in Rochester, New York. This facility is staffed with 211 people and is presently being used for other NRO programs.

The 9th SRW has a Recce Tech squadron attached and in-place at Beale AFB. It is manned with 400 personnel. It also has a capability of deploying detachments to overseas bases. An initial photo interpretation report can be provided by this unit 6 hours after a landing at Beale AFB and final readout in 12 hours. In general, take from both programs could be processed either at the Recce Tech squadron or Eastman Kodak, with the timing for IPIR and final readout being dependent upon location of the Recce Tech squadron, on flying time to Eastman Kodak Company and NPIC in Washington, D.C.

The Recce Tech Squadron presently at Beale has a complete automatic system in operation with the following capabilities:

1. Fixed and mobile facilities - 10 aircraft - 24 hour operation
2. Fixed only - 6 aircraft - 24 hour operation
3. Mobile only - 4 aircraft - 24 hour operation

J. Support Aircraft.

The OXCART program uses eight F-101 support aircraft for pilot proficiency training and chase of the A-12. A C-130 is provided for personnel movement and classified cargo such as cameras, etc. An H-43B is used at Area 51 for search and rescue and paramedic jump training. There are two T-33s for rapid transportation and jet qualification of pilots. One U-3B is available for emergency air evacuation, search and security patrol of the area.

The SR-71 wing has six T-38s in direct support of pilot proficiency training. Two T-29s and two T-33s, plus base assigned aircraft, are shared by the SR-71 program. Both programs use MAC as needed for additional logistic support.

K. Kadena Support.

The OXCART Project has prepositioned 1,000,000 pounds of equipment at Kadena Air Base. Construction of the operations buildings, hangars, and the POL fuel farm necessary to support operational missions is completed. There are 19 persons in place to maintain equipment and facilities for immediate use.

OXCART operations from Kadena would be commanded and controlled from Headquarters in Washington. Operational missions can be flown from Kadena ten days after mission approval.

These facilities are available for use by the SR-71. A small extension to the hangar and prepositioning of peculiar pieces of supplies and AGE to support the SR-71 will be required. The OXCART program can support nine operational missions per month with three deployed aircraft. The SR-71 concept envisions one sortie per day with 4 aircraft or one sortie per week with 2 aircraft. SAC estimates an operational capability about 90 days after notice to deploy. The OXCART plans 225 persons deployed while the SR-71 is programming 363 persons per 1 sortie per day and 231 for 1 sortie per week, for support of the SR-71 and photo lab. Tanker support for both Projects would be as required. OXCART communications facilities are in being and include a 1004 computer which could be used by the SR-71 program. Sensor processing for the OXCART would be at Eastman Kodak or the Recce Tech Squadron if deployed.

# APPENDIX B

## COSTS

### Introduction

This Annex is intended to provide more detailed costing data than are available in the main body of the report.

The Annex contains three major sections and five attachments. Section One discusses the cost of the currently planned programs. Section Two discusses various actions that could be taken and how they would affect program costs. Section Three discusses specific program alternatives. The attachments provide more detailed costs for the various alternatives.

SECTION ONE:

Attachment 1 to this Annex gives FY 1968, FY 1969, and five year total costs by major cost category for both programs. These data are the approved programmed amounts except for allocated categories. The allocated categories are best estimates.

The table below indicates the total cost of each program as presently planned in millions of dollars.

| FY | 68 | 69 | 70 | 71 | 72 | Total |
|---|---|---|---|---|---|---|
| SR-71 | 186.7 | 157.1 | 148.4 | 140.2 | 132.4 | 764.8 |
| OXCART | 109.5 | 102.4 | 95.3 | 92.7 | 87.5 | 487.4 |
| Total | 296.2 | 259.5 | 243.7 | 232.9 | 219.9 | 1252.2 |

These costs are to support the following aircraft inventories.

| FY | 68 | 69 | 70 | 71 | 72 | Total Aircraft Years |
|---|---|---|---|---|---|---|
| SR-71/1 | 29 | 29 | 28 | 27 | 27 | 140 |
| OXCART/2 | 11 | 11 | 10 | 10 | 9 | 51 |

/1 Includes 2 trainers and 2 test vehicles.
/2 Includes 1 trainer and 1 test vehicle.

The above costs and Attachment 1 assume separate basing of the two programs.

A major cost not included in the above totals is the J-58 Engine development program. The development program supports both the SR-71 and the A-12. The programmed amounts for the J-58 Engine development are:

| FY | 68 | 69 | 70 | 71 | 72 | Total |
|---|---|---|---|---|---|---|
| Millions | 45 | 35 | 25 | 15 | 5 | 125 (Alternatives I and II) |
| of | 41 | 31 | 23 | 13 | 5 | 113 (Alternatives III and IV) |
| Dollars | 40 | 30 | 20 | 12 | 4 | 106 (Alternative V) |

It was decided that because these funds support both programs no attempt should be made to allocate them separately. Thus, all attachments to this Annex show the J-58 costs separately.

## SECTION TWO:

Using these status-quo programs as a base-line case, various areas were investigated for their affect on costs. The following areas will be discussed briefly: reduction in fleet size, consolidated basing, and reduction of flying hours.

## REDUCTION IN FLEET SIZE

Three methods of reducing fleet size are discussed: "Cannibalize" planes, mothball planes, and ground planes.

### Cannibalization

Below is the estimated savings to be realized over a five year period resulting from salvaged parts of one OXCART vehicle. It is estimated that similar figures would result from analysis of an SR-71.

| | |
|---|---|
| Engines | $ 705,000 |
| Airframe | 1,840,000 |
| Other | 400,000 |
| Total | $2,945,000 |

### Mothballing

The following estimates were developed in connection with mothballing:

Approximate cost to place vehicle into mothballs in thousands of dollars.

| | |
|---|---|
| SR-71 | $300/plane |
| OXCART | $200 - $400/plane |

Cost of inspection and preventive maintenance while in mothballs in thousands of dollars.

| | |
|---|---|
| SR-71 | $60/plane/year |
| OXCART | $60/plane/year |

Cost in millions of dollars to remove from mothballs and update to current configuration.

| Time Stored | 6-9 months | 2.5-3 years | 4.5-5 years |
|---|---|---|---|
| OXCART<br>SR-71 | 1.2 | 3.8 | 6.7 |

Grounded

The concept of grounding vehicles was costed on the following assumptions:

(1) All grounded vehicles would be periodically overhauled and modified to current configuration.

(2) All grounded planes would be warmed-up periodically but not flown.

Several operational concepts were developed which included grounded vehicles.

For the SR-71 it was determined that grounding 12 vehicles reduced the five year costs by approximately $96 million from the status-quo.

For the OXCART it was determined that grounding 5 vehicles reduced the five year costs by approximately $36 million from the status-quo.

The following comparison was made of grounding versus mothballing: The cost of operating an OXCART fleet with five mothballed planes was subtracted from the cost of operating an OXCART fleet with five grounded flyable planes. The difference was divided by five to indicate the cost of maintaining a grounded flyable vehicle.

| FY | 68 | 69 | 70 | 71 | 72 | Total |
|---|---|---|---|---|---|---|
| Difference (in millions of $) | 9.8 | 10.6 | 7.8 | 9.3 | 7.9 | 45.4 |
| Cost/aircraft grounded | 1.96 | 2.12 | 1.56 | 1.86 | 1.98 | * |

*Average yearly cost for five year period:

$$\frac{45.4}{25} = \$1.8 \text{ million per aircraft.}$$

## CONSOLIDATION

All estimates of consolidation costs were made under the assumption that Area 51 would be closed and the programs consolidated at Beale AFB.

Two general comments can be made about Consolidation:

(1) Significant costs were incurred to construct additional facilities for OXCART vehicles and personnel. The table below indicates estimates of construction costs and one time moving costs under various types of moves.

| Type of OXCART Program Moved | Construction Costs in Millions | Transportation Costs in Millions |
|---|---|---|
| 6 flying vehicles & 5 grounded | 12.9 | 7.2 |
| 6 flying vehicles & 5 mothballed | 10.2 | 5.5 |
| 11 vehicles mothballed | 5.4 | 1.6 |
| 6 grounded vehicles & 5 mothballed | 5.4 | 1.6 |

(2) In the five year period operating savings offset this initial one time cost but by a small amount. Thus, total savings relative to the status-quo programs were small.

## REDUCTION OF FLYING HOURS

Cost savings were anticipated in the following major categories if flying hours were reduced: airframe support, engine support, and fuel.

Below is a table indicating the status-quo costs of the SR-71 program and the costs of SR-71 programs where the flying hours were reduced by 10, 20, and 30 percent.

| FY | 68 | 69 | 70 | 71 | 72 | Total |
|---|---|---|---|---|---|---|
| Planned | 176.0 | 146.3 | 136.9 | 129.6 | 122.4 | 711.2 |
| 10% Reduction | 173.1 | 142.8 | 132.8 | 125.7 | 118.6 | 693.0 |
| 20% Reduction | 170.6 | 139.4 | 129.0 | 122.1 | 114.5 | 675.6 |
| 30% Reduction | 168.1 | 136.6 | 125.1 | 118.0 | 110.8 | 658.6 |

SECTION THREE:

Several alternatives were developed and total program costs were determined for these alternatives.

Alternative I was the status-quo. The yearly costs for this alternative are presented on page 1 of this Annex and a more detailed costing of this alternative is shown in Attachment 1. This alternative provided for an eleven aircraft OXCART program operating from Area 51 and a thirty aircraft SR-71 program operating from Beale. Attrition for the SR-71 was assumed to be .1 aircraft per 1000 flying hours and a flying program of approximately 6000 hours/year was assumed. The OXCART attrition rate was assumed to be 1 aircraft every two years and a flying program of 1760 hours per year was assumed.

The table below compares the status-quo program with separate basing to the status-quo with consolidated basing at Beale AFB. It was assumed that the move was made at the beginning of FY69 and both programs would be managed by SAC from that date on. Also, Air Force personnel would perform field maintenance on both programs, however, contractors were maintained for major airframe and engine overhaul and for modifications. These figures do not include engine development costs nor some of the allocated costs.

| FY | 68 | 69 | 70 | 71 | 72 | Total |
|---|---|---|---|---|---|---|
| Separate | 285.6 | 248.7 | 232.1 | 222.5 | 209.9 | 1198.8 |
| Consolidated | 291.0 | 241.0 | 217.0 | 209.0 | 199.0 | 1157.0 |
| Difference | +5.4 | -7.7 | -15.0 | -13.5 | -10.9 | -41.8 |

Alternative number IIa called for mothballing five OXCART vehicles but maintaining separate bases for the two programs. Alternative IIb called for mothballing five OXCART vehicles and consolidating both programs at Beale AFB under SAC management. Attachment 2 gives cost details on Alternative IIa and Attachment 3 gives cost details on Alternative IIb. Neither attachment includes cost of demothballing aircraft, since this cost is a function of when vehicles are removed.

In both of these alternatives the SR-71 program was assumed to be the same as the status-quo.

In Alternative IIa it was assumed that the four remaining operational vehicles, the test vehicle, and the trainer would fly 960 hours per year. Attrition vehicles were not replaced but the remaining flyable vehicles maintained the 960 hour program. It was assumed that this reduced program would begin in July 1967.

The same flying program was assumed for Alternative IIb, however the mothballing costs were incurred at the beginning of FY 1969 when the move to Beale was accomplished. During FY68 it was assumed that the five planes to be mothballed would not be flown.

Alternative III called for mothballing the entire OXCART fleet. The detailed costing for this alternative is shown in Attachment 4. In this alternative it was assumed that the OXCART program would be cut from 1760 hours to 420 hours in FY 1968. The schedule for this decrease is as follows:

First Quarter FY 1968

1. Mothball five operational vehicles.
2. Fly remaining four operational vehicles 45 hours each.
3. Fly test and trainer 30 hours each.

Second Quarter FY 1968

1. Mothball test and trainer vehicle. (2 vehicles)
2. Fly remaining four operational vehicles 45 hours each.

Third Quarter FY 1968

1. Mothball remaining operational vehicles.
2. Close Area 51.
3. Move useful assets to Beale.

It was further assumed that this major reduction in the OXCART program would cause the unit price of spares and overhauls to increase in the SR-71 program. This cost increase in the SR-71 was assumed to be approximately $75 million over the five years. It was assumed that with the elimination of the entire OXCART fleet the J-58 Engine development costs would be reduced by ten percent.

Alternative IV is a variation of Alternative III. The assumptions mentioned in the above paragraph hold for Alternative IV; however, instead of closing Area 51 in Fiscal Year 1968, eight operational SR-71's and one SR-71/B trainer are transferred to CIA control and maintained at Area 51. The total flying time on all SR-71's was assumed to be approximately 6000 hours per year. Approximately 4500 hours per year at Beale AFB and 1500 hours per year at Area 51. It was further assumed that the SR-71 test program would be maintained at Beale AFB under SAC management. Modifications resulting from this program would apply to all SR-71 aircraft.

Alternative V was considered a reduction in tempo of the current program, but no reduction in number of vehicles. No detailed attachment was developed for this alternative, however, the table below indicates the reduced program costs by year.

| FY | 68 | 69 | 70 | 71 | 72 | Total |
|---|---|---|---|---|---|---|
| SR-71 | 178.8 | 147.4 | 136.6 | 128.6 | 120.8 | 712.2 |
| OXCART | 95.9 | 86.4 | 85.7 | 83.3 | 78.1 | 429.4 |
| J-58 Engine | 40.0 | 30.0 | 20.0 | 12.0 | 4.0 | 106.0 |
| Total | 314.7 | 263.8 | 242.3 | 223.9 | 202.9 | 1247.6 |

The reduced SR-71 costs were developed by assuming a reduction of 30% in status-quo flying hours. The OXCART reduced costs were developed by assuming a 20% reduction in status-quo flying hours. It was assumed that for both programs additional sensor purchases were eliminated and the level of flight testing was reduced.

## Attachment 1

### Alternative I; Status Quo - Separate Basing

| | SR-71 | | | A-12 | | |
|---|---|---|---|---|---|---|
| Fiscal Year | 68 | 69 | 68-72 | 68 | 69 | 68-72 |
| Flying Hours | 5233 | 5920 | 30,423 | 1760 | 1760 | 8800 |
| Airframe | 55.4 | 54.2 | 258.2 | 37.9 | 35.2 | 168.0 |
| Engine | 72.2 | 45.9 | 221.4 | 21.5 | 19.2 | 90.4 |
| Fuel | 15.6 | 17.1 | 88.3 | 6.8 | 6.8 | 34.0 |
| Guidance | 11.0 | 10.0 | 45.0 | 4.9 | 3.4 | 17.7 |
| Cameras | | | | 8.6 | 8.3 | 33.7 |
| A/B Elec | 4.3 | 0.7 | 7.1 | 5.6 | 5.5 | 26.4 |
| Anti-Radar | 0.0 | 0.0 | 0.0 | 1.8 | 1.6 | 7.4 |
| Others | 3.7 | 2.4 | 13.4 | 1.2 | 1.2 | 5.6 |
| Base Op. | 18.8 | 18.8 | 93.7 | 8.4 | 8.4 | 40.2 |
| Support a/c* | 0.7 | 1.0 | 4.7 | 2.2 | 2.2 | 11.0 |
| Tanker* | 5.0 | 7.0 | 33.0 | 1.9 | 1.9 | 9.5 |
| Air Force Issue* | 0.0 | 0.0 | 0.0 | 2.2 | 2.2 | 11.0 |
| Admin. Overhead* | 0.0 | 0.0 | 0.0 | 6.5 | 6.5 | 32.5 |
| Total | 186.7 | 157.1 | 764.8 | 109.5 | 102.4 | 487.4 |

| Totals: | FY68 | FY69 | FY68-72 |
|---|---|---|---|
| SR-71 | 186.7 | 157.1 | 764.8 |
| A-12 | 109.5 | 102.4 | 487.4 |
| J-58 Engine | 45.0 | 35.0 | 125.0 |
| | 341.2 | 294.5 | 1377.2 |

*Allocated costs
Costs in millions of dollars.

## Attachment 2

### Alternative IIa; Mothball 5 A-12's - Separate Basing

| | SR-71 | | | A-12 | | |
|---|---|---|---|---|---|---|
| Fiscal Year | 68 | 69 | 68-72 | 68 | 69 | 68-72 |
| Flying Hours | 5233 | 5920 | 30,423 | 960 | 960 | 4800 |
| Airframe | | | | 30.3 | 27.8 | 141.2 |
| Engine | | | | 18.7 | 17.4 | 82.3 |
| Fuel | | | | 3.7 | 3.7 | 18.5 |
| Guidance | | | | 4.2 | 3.0 | 15.9 |
| Cameras | | | | 7.7 | 7.7 | 30.3 |
| A/B Elec | | | | 4.8 | 4.8 | 22.8 |
| Anti-Radar | | | | 1.8 | 1.6 | 7.4 |
| Other | | | | 0.9 | 0.8 | 4.1 |
| Base Op. | | | | 7.8 | 7.3 | 37.6 |
| Support a/c* | | | | 1.2 | 1.2 | 6.0 |
| Tankers* | | | | 1.0 | 1.0 | 5.0 |
| Air Force Issue* | | | | 1.2 | 1.2 | 6.0 |
| Admin. Overhead* | | | | 6.5 | 6.5 | 32.5 |
| Subtotal | 186.7 | 157.1 | 764.8 | 89.8 | 84.0 | 409.6 |
| Mothballing | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 1.0 |
| Inspection | 0.0 | 0.0 | 0.0 | 0.2 | 0.3 | 1.4 |
| Total | 186.7 | 157.1 | 764.8 | 91.0 | 84.3 | 412.0 |

| Totals: | FY68 | FY69 | FY68-72 |
|---|---|---|---|
| SR-71 | 186.7 | 157.1 | 764.8 |
| A-12 | 91.0 | 84.3 | 412.0 |
| J-58 Engine | 45.0 | 35.0 | 125.0 |
| | 322.7 | 276.4 | 1301.8 |

*Allocated costs
Costs in millions of dollars

## Attachment 3

### Alternative IIb; Mothball 5 A-12's - Consolidated Basing

| | SR-71 | | | A-12 | | |
|---|---|---|---|---|---|---|
| Fiscal Year | 68 | 69 | 68-72 | 68 | 69 | 68-72 |
| Flying Hours | 5233 | 5920 | 30,423 | 960 | 960 | 4800 |
| Airframe | | | | 34.4 | 26.5 | 130.6 |
| Engine | | | | 16.9 | 15.8 | 73.3 |
| Fuel | | | | 4.0 | 3.7 | 18.8 |
| Guidance | | | | 4.9 | 3.4 | 17.7 |
| Cameras | | | | 6.1 | 6.1 | 28.1 |
| A/B Elec | | | | 5.6 | 5.5 | 26.4 |
| Anti-Radar | | | | 1.8 | 0.0 | 1.8 |
| Other | | | | 0.6 | 0.6 | 3.0 |
| Base Op. | | | | 8.5 | 8.4 | 40.3 |
| Support a/c* | | | | 1.2 | 1.2 | 6.0 |
| Tankers* | | | | 1.0 | 1.0 | 5.0 |
| Air Force Issue* | | | | 1.2 | 1.2 | 6.0 |
| Admin. Overhead* | | | | 6.5 | 0.0 | 6.5 |
| Subtotal | 186.7 | 157.1 | 764.8 | 92.7 | 73.4 | 363.5 |
| Close Area 51 | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 | 1.5 |
| Moving Costs | 0.0 | 0.0 | 0.0 | 2.8 | 2.8 | 5.6 |
| Const. at Beale | 0.0 | 0.0 | 0.0 | 10.2** | 0.0 | 10.2** |
| Mothballing | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 1.0 |
| Inspection | 0.0 | 0.0 | 0.0 | 0.2 | 0.3 | 1.4 |
| Total | 186.7 | 157.1 | 764.8 | 106.9 | 78.0 | 383.2 |

Totals:

| | FY68 | FY69 | FY68-72 |
|---|---|---|---|
| SR-71 | 186.7 | 157.1 | 764.2 |
| A-12 | 106.9 | 78.0 | 383.2 |
| J-58 Engine | 45.0 | 35.0 | 125.0 |
| | 338.6 | 270.1 | 1272.4 |

*Allocated costs
**Includes $3.0 million for TAGBOARD
Costs in millions of dollars

~~TOP SECRET~~

Handle via BYEMAN,
TALENT-KEYHOLE,
COMINT Controls

IDEALIST/OXCART/CORONA
HEXAGON/GAMBIT/DORIAN

BYE 2856-66

## Attachment 4

### Alternative III; Mothball all A-12's

| | SR-71 | | | A-12 | | |
|---|---|---|---|---|---|---|
| Fiscal Year | 68 | 69 | 68-72 | 68 | 69 | 68-72 |
| Flying Hours | 5233 | 5920 | 30,423 | 420 | 0 | 420 |
| Airframe | | | | 11.6 | 0.0 | 11.6 |
| Engine | | | | 17.8 | 0.0 | 17.8** |
| Fuel | | | | 1.6 | 0.0 | 1.6 |
| Guidance | | | | 1.9 | 0.0 | 1.9 |
| Cameras | | | | 2.1 | 0.0 | 2.1 |
| A/B Elec | | | | 2.0 | 0.0 | 2.0 |
| Anti-Radar | | | | 0.7 | 0.0 | 0.7 |
| Others | | | | 0.4 | 0.0 | 0.4 |
| Base Op. | | | | 3.9 | 0.0 | 3.9 |
| Support a/c* | | | | 0.6 | 0.0 | 0.6 |
| Tankers* | | | | 0.5 | 0.0 | 0.5 |
| Air Force Issue* | | | | 0.0 | 0.0 | 0.0 |
| Admin. Overhead* | | | | 2.0 | 0.0 | 2.0 |
| Subtotal | 186.7 | 157.1 | 764.8 | 45.1 | 0.0 | 45.1 |
| Const. at Beale | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 | 3.6*** |
| Mothballing | 0.0 | 0.0 | 0.0 | 4.4 | 0.0 | 4.4 |
| Inspection | 0.0 | 0.0 | 0.0 | 0.2 | 0.6 | 2.6 |
| Area Closing | 0.0 | 0.0 | 0.0 | 1.5 | 0.0 | 1.5 |
| Movement | 0.0 | 0.0 | 0.0 | 3.6 | 0.0 | 3.6 |
| Add-ons due to Volume Reduction | 10.0 | 17.9 | 73.6 | 0.0 | 0.0 | 0.0 |
| Total | 196.7 | 175.0 | 838.4 | 57.8 | 0.6 | 60.8 |

Totals:

| | FY68 | FY69 | FY68-72 |
|---|---|---|---|
| SR-71 | 196.7 | 175.0 | 838.4 |
| A-12 | 57.8 | 0.6 | 60.8 |
| J-58 Engine | 41.0 | 31.0 | 113.0 |
| | 295.5 | 206.6 | 1012.2 |

*Allocated costs

**Includes approximately $10 million in unbudgeted termination costs.

***TAGBOARD program

Costs in millions of dollars

IDEALIST/OXCART/CORONA
HEXAGON/GAMBIT/DORIAN

Handle via BYEMAN,
TALENT-KEYHOLE,
COMINT Controls

~~TOP SECRET~~

## Attachment 5

### Alternative IV; Mothball A-12's and Share SR-71's at Separate Bases

| | SR-71 | | | A-12 | | |
|---|---|---|---|---|---|---|
| Fiscal Year | 68 | 69 | 68-72 | 68 | 69 | 68-72 |
| Flying Hours | 5233 | 5920 | 30,423 | 420 | 0 | 420 |
| Airframe | 74.1 | 74.7 | 354.4 | 11.6 | 0.0 | 11.6 |
| Engine | 81.4 | 53.8 | 258.8 | 17.8 | 0.0 | 17.8** |
| Fuel | 15.6 | 17.1 | 88.3 | 1.6 | 0.0 | 1.6 |
| Guidance | 11.0 | 10.0 | 45.0 | 1.9 | 0.0 | 1.9 |
| Cameras | | | | 2.1 | 0.0 | 2.1 |
| AB/Elec | 4.3 | 0.7 | 7.1 | 2.0 | 0.0 | 2.0 |
| Others | 3.8 | 2.4 | 13.5 | 1.1 | 0.0 | 1.1 |
| Base Op. | 20.0 | 24.3 | 115.0 | 3.9 | 0.0 | 3.9 |
| Support a/c* | 2.3 | 3.2 | 14.7 | 0.6 | 0.0 | 0.6 |
| Tankers* | 5.0 | 7.0 | 33.0 | 0.5 | 0.0 | 0.5 |
| Admin. Overhead* | 4.5 | 6.5 | 30.5 | 2.0 | 0.0 | 2.0 |
| Subtotal | 222.0 | 199.7 | 960.3 | 45.1 | 0.0 | 45.1 |
| Mothballing | | | | 4.4 | 0.0 | 4.4 |
| Inspection | | | | 0.2 | 0.6 | 2.6 |
| Total | 222.0 | 199.7 | 960.3 | 49.7 | 0.6 | 52.1 |

Totals:

| | FY68 | FY69 | FY68-72 |
|---|---|---|---|
| SR-71 | 222.0 | 199.7 | 960.3/1 |
| A-12 | 49.7 | 0.6 | 52.1 |
| J-58 Engine | 41.0 | 31.0 | 113.0 |
| | 312.7 | 231.3 | 1125.4 |
| /1 SAC SR-71 | 169.1 | 126.6 | 636.2 |
| Agency SR-71 | 52.9 | 73.1 | 324.1 |

*Allocated costs.
**Includes approximately $10 million in unbudgeted termination cost

Costs in millions of dollars.

~~TOP SECRET~~/BYEMAN/TALENT/KEYHOLE

BYE-8888-69
31 March 1969

Copy 1 of 2

# HISTORY

# OF THE

# OFFICE OF SPECIAL ACTIVITIES

# DD/S&T

Prepared by:

Helen H. Kleyla
Helen Hill Kleyla

Robert D. O'Hern
Robert D. O'Hern

~~GROUP 1
Excluded from automatic
downgrading and
declassification~~

Handle via BYEMAN
Control System

~~TOP SECRET~~/BYEMAN/TALENT/KEYHOLE

Annex 2, a report by Lockheed on the CL-282 High Altitude Aircraft, is printed on an 8-1/2 X 11 inch format. Therefore, for ease of binding this history, it has been included with the Appendices at the end of the study.