WORKING PAPER

PURPOSE

1. This paper summarizes the history of manned reconnaissance aircraft programs for peacetime overflight of denied territory with emphasis on the rationale, statements of need, and authority which led to their development and operation, as well as the management arrangements under which they were carried out. The present situation is then reviewed wherein the ISINGLASS effort has been terminated, the OXCART is in the process of being phased out, and the U-2 is considered as effective only in limited areas away from a Soviet-type defensive environment. The future role of manned reconnaissance aircraft systems, or even the need for them, when viewed with and compared to the rapidly improving capabilities of satellites and drones, then emerges as the fundamental issue which is to be resolved.

BACKGROUND

2. During the year 1954, as for some years previous, the urgent problem of defense against surprise attack by Soviet

HANDLE VIA BYEMAN CONTROL SYSTEM

TOP SECRET

Russia continued to occupy the attention of all those in Washington who bore the responsibility for the National Security. A high level committee, whose membership represented the best minds in the country, continually met in Washington to study every facet of cold war strategy and to advise the President. There was no lack of brain power available for the task, and the shortage which was recognized by all concerned came to be known as the "Intelligence Gap."

3. The existence of the iron curtain and the growing hostility of Soviet Russia toward the West made it increasingly difficult to mount classic intelligence collection operations against the USSR. In the summer of 1954, the U.S. intelligence community had come around to the view that the only prospect of gaining the vital intelligence was through systematic aerial reconnaissance of the USSR.

4. The special study group of the Hoover Commission, set up under the Chairmanship of General James H. Doolittle to investigate CIA's covert activities, in its report of 30 September 1954, expressed the belief that: "every known technical scheme be used and new ones developed to increase our intelligence

by high altitude photo reconnaissance and other means and that no price would be too high to pay for the knowledge to be derived therefrom."

5. On 5 November 1954, Dr. Edwin H. Land, Chairman of the "Project 3" Technical Capabilities Panel (a subgroup under the Office of Defense Mobilizations "Surprise Attack Committee"), wrote to Mr. Allen Dulles, Director of CIA, proposing a program of photo reconnaissance flights over the Soviet Union and recommending that CIA, with Air Force assistance, undertake to carry out such a program. The Land Panel's proposal, entitled "A Unique Opportunity for Comprehensive Intelligence," recognized the risks of provocation toward war that such an intensive program of overflights might run, as well as the danger involved should one of our military arms engage in such activity, especially in view of the tense political situation vis-a-vis Soviet Russia. "On the other hand," the proposal continued, "because it is vital that certain knowledge about industrial growth, strategic targets, and guided missile sites be obtained at once, we recommend that the CIA, as a civilian organization, undertake (with Air Force assistance) a covert program of selected flights."

6. The airplane that the Land Panel had in mind for the overflights was the CL-282 (later designated the U-2) which Lockheed had proposed to the USAF in 1952 and which the Panel came across in 1954 during their search for a technical capability of collecting intelligence over the USSR. The Panel concluded that the program was feasible and should be pursued by the Government.

7. In Dr. Land's letter to Mr. Dulles submitting the proposal, he made it clear on the Panel's belief that the activity was appropriate for CIA (always with Air Force assistance) and recommended "immediate action" through the CIA covert means, to produce the aircraft and equipment and set up a task force. He stated further that "the opportunity for safe overflights may last only a few years because the Russians will develop radars and interceptors or guided missile defense for the 70,000 ft. regime," and that the aircraft itself was "so obviously unarmed and devoid of military usefulness that it would minimize affront to the Russians, even through some remote mischance it were detected and identified."

8. Dr. Land and Dr. Jim Baker, of the President's Advisory Council, had continually reviewed all advances made in the optical field for application to the photo reconnaissance overflights. Dr. Baker emphasized that the Air Force was already years ahead in the development of suitable camera systems as a result of their many years of experience gathered from sponsorship of basic research and development programs; "this is particularly true of the electronic computation of optical systems. The development of these complicated optical systems would have taken years in Germany by the older methods--but now is about to be accomplished in 16 working days with our IBM/CDC computers."

9. In the two weeks following the Land Panel's proposal to CIA, discussions took place between the Air Force and CIA as to the feasibility of undertaking the recommended program. On 19 November 1954, a meeting was held in the office of the Secretary of the Air Force, Harold E. Talbott. It was agreed that the CL-282 proposal was practical and desirable and should be contracted for (along with the modified Canberra recommended by the Air Force). It was further agreed that the project

should be a joint Air Force/CIA effort and that regardless of a source of funds to support it, CIA unvouchered channels should be employed for passing the funds.

10. Later in November 1954, Mr. Dulles and General John Samford (USAF) met, and it was agreed that the DCI would prepare a memorandum seeking Presidential approval for the program. This memorandum, dated 24 November 1954, recommended Presidential approval of a National requirement for the reconnaissance overflights, asked that the Air Force and CIA be directed to implement the development of the aircraft, and requested that the overflights be conducted at the earliest possible time. This memorandum was approved by the President verbally.

11. A face to face meeting of Mr. Dulles and the top Air Force officials concerned reached a joint agreement on the organizational and management responsibilities of the program, and on 3 August 1955, in a memorandum entitled "Organization and Delineation of Responsibility--Program Oil Stone," signed by General Twining and Mr. Dulles, responsibility was given for general direction and control of the project to the Director of

CIA and the Chief of Staff, USAF, to be exercised jointly. The agency appointed project director and the Air Force appointed deputy project director would be responsible for conduct of the project through all its facets, subject to guidance from higher authority. The Air Force project group (headed by Colonel Russell A. Berg) would act in the name of the Chief of Staff, and SAC would perform a supporting (not a controlling) role in the training and operational facets. The essential guidelines under which the program would be operated were that it would be a clandestine intelligence gathering operation to be conducted in such a way, as to minimize the risk of detection and of plausible attribution to the U.S. Government.

The first U-2 overflight of the Soviet Union took place on June 20, 1956, passing directly over Moscow. Several successive flights occurred that same week and, on July 11th, the first Soviet protest was delivered to the State Department. Requests for subsequent flights were more closely scrutinized before receiving final approval. The overflights continued, although less frequently, and in ever shrinking areas due to

the Soviets improving air defense systems, for four years, well past all predictions on longevity.

12. As the CIA/Air Force overflights continued, the Strategic Air Command acquired its own fleet of U-2s which were assigned the peripheral photo and SIGINT missions.

On May Day 1960, with the downing of Mr. Powers' U-2 over Sverdlovsk, the overflights of the Soviet Union came to an end. At that time, a Presidential ban on further manned overflights of the USSR was imposed and remains in effect.

The U-2 has continued, by the addition of electronic countermeasures, the J-75 engine, modification for aircraft carrier operation, and a variety of other improvements, to perform a successful and useful role in intelligence collection in those areas, such as China, Southeast Asia, and Cuba, where its presence or even loss, is of less political consequence.

13. With these continuing U-2 operations and the attendant attrition, it became apparent that there would be a need to replace these losses in order for this vehicle to continue to fill its special reconnaissance role and, accordingly, on 21 June 1965, in a joint memorandum to the NRO, the Director, Program B,

and the Director, Program D, recommended that the Air Force and CIA, in joint enterprise, initiate a new buy of an improved U-2 (U-2R) as a means of realizing the maximum benefit from the newer and other reconnaissance systems which could not be profitably diverted to those tasks handled by the U-2 and as a means of replenishing the U-2 fleet. The U-2R, now in flight tests, will be operational by the summer of 1968 and should remain a useful intelligence tool at least through the early 1970's, albeit in the non-Soviet environment.

(partial) 14. Early in 1957, while the overflights of the Soviet Union were underway with the U-2, and it will be recalled that the period during which overflight would be possible was to be relatively short-lived, and with the understanding that photographic satellite systems were well into the future, the CIA, in reaction to the improved ability of the Soviets to track the U-2, and as a means of prolonging the overflights, began research in radar camouflage as a means of hiding the U-2 from the radars. It quickly became apparent that only limited and temporary success could be hoped for through the application of the passive camouflage of an aircraft of conventional structure since the

materials themselves were either too heavy or narrow banded, and further degraded aircraft performance. Already the Russian radar systems were characterized by a considerable degree of frequency diversity. These circumstances suggested the need for a much more radical approach in order to obtain satisfactory results. Preliminary consideration led to the conclusion that any such radical approach would involve the use of unconventional material, structures, and configurations of aircraft and most probably a combination thereof. Accordingly, an exploration of possible design approaches was set in motion in August 1957. Two basic designs resulted from this effort: The GUSTO concept of a supersonic vehicle using a drone powered by ram-jet engines launched from a B-58 mother aircraft and the other approach, OXCART, for an unstaged aircraft with roughly the same performance specifications. On 15 November 1958, the Land Panel, in response to the need for such an advanced system, recommended the GUSTO system to Dr. Killian. Further consideration by those involved in carrying out this development program came to the conclusion that only the OXCART was technically feasible in the immediate

future and, accordingly, in the summer of 1958, members from the DOD, Air Force, CIA, and with the President's Scientific Advisory Council obtained the necessary Presidential approval to implement the OXCART program. A Joint Source Selection Board was established which chose the Lockheed proposal over the one from General Dynamics.

During the very early stages of the OXCART design, radar cross section goals were chosen which were felt could be achieved in an operational aircraft and which would permit a near covert penetration of the Soviet radar defense net or at a sufficiently reduced detection range to permit a safe transit. A program was also implemented to assess the OXCART vulnerability. Simultaneously, a special ELINT measurements program was begun to assure the vulnerability studies would be based upon actual measurements of the Soviet threat radars rather than estimates. By 1963, it became apparent from the vulnerability studies, which were receiving data on the newer and improved Soviet radars, that the OXCART would not be able to covertly penetrate the radar net undetected and tracked, and accordingly, recommended the development of a "Supermarket" of electronic countermeasures systems.

This ECM program was carried out and produced the variety of threat warning and jammer systems now available for operational use.

14a Although the OXCART achieved its design goals by flying at specified altitude and speed 48 months after the contract date, it did not receive the necessary authority for overflights and in 1966, while being held in a state of operational readiness, and at a considerable cost, came under increasing scrutiny by the Bureau of the Budget. The decision was subsequently made to phase out the program by December 1967. Later, however, in response to an urgent USIB requirement, the OXCART, as the only practical vehicle for the job, was deployed to Okinawa for overflights of North Vietnam in search of possible surface-to-surface offensive missile sites. The decision to phase out the OXCART has been extended three months to allow additional time for the Air Force's SR-71 to prepare to take over these missions.

15 In 1964 and again in response to the continuing increase in the capabilities of the Soviet air defense net against aircraft operating in the OXCART regime, the CIA, in anticipation

of a need to develop a more advanced manned reconnaissance system, initiated a study which led to the definition of the ISINGLASS boost-glide concept. The Agency had set forth those performance specifications that would be required to successfully penetrate the Soviet environment during the next decade. The objective of the ISINGLASS effort was to conduct covert photographic reconnaissance of those geographical areas normally denied U.S. overflight. The vehicle envisioned relied entirely on its operational characteristics for survival; it would enter denied territory at Mach 21 and 200K ft altitude, and exit at Mach 7 and 120K ft. The proposed launch method was from a B-52 near the periphery of the USSR with recovery planned at ZI bases. The program as proposed would cost in excess of one billion dollars.

15a In March 1967, in recognition of the magnitude of undertaking the ISINGLASS program, and the expense which would be required to bring the program to an operational stage, the

Director of CIA Reconnaissance Programs recommended that this effort be terminated.

16. In review, it is seen that the development of the manned aircraft reconnaissance systems has been based on deduced need and agreement thereto, and has preceded the statement of a formal requirement delineating this need. Stated requirements against which the manned systems have been targeted have always followed. These joint CIA/Air Force enterprises have worked and worked well, reducing duplication while making maximum use of each organization's assets and abilities; such as the Air Force world-wide operational capabilities and the CIA's "Skunk Works" approach to the research and development.

It is not possible to adequately review manned reconnaissance in proper perspective without going back to another date in 1960. In that year, on August 20th, the first photography of denied territory from a satellite was successfully recovered by the DISCOVERER program which was the forerunner of the present CORONA. This initial reconnaissance satellite operated for one day, and returned 4000 ft. of film. The photography obtained was

monoscopic and had a ground resolution of 20 ft. Since that time, about 100 CORONA vehicles have been launched, lifetime has increased to 15 days, and 30 to 40 thousand feet of film are returned from each mission. Most photography acquired is in stereo and resolution has improved to less than 10 feet.

In addition to the CORONA search capability, spotting systems have been developed and are now producing photography of resolution between 1 and 2 feet, [redacted]

PRESENT SITUATION

17 a The present situation then can be summed up as one in which satellite photographic resolution is rapidly approaching that of present aircraft systems. Satellite photographic systems for search and surveillance which will achieve resolutions of 2-3 feet and will remain on orbit for 30 days or more. The advanced technical intelligence systems will remain on orbit an equal length of time and should achieve [redacted] Technology for reading out images from satellites in near real time has been developed and could be flown in the early 1970's.

At the same time, the operational concepts for advanced aircraft are taking on many of the characteristics of satellites. To achieve the speeds necessary to survive in denied territory such aircraft would operate at very high altitudes well above all weather and near the limit of the sensible atmosphere, and would provide only minimal maneuverability. Such systems would tend to operate on the basis of a single pass over the target area. Thus, the fundamental issue which must be considered concerns the need for future manned reconnaissance systems and what efforts, if any, should be undertaken in this direction at this time.

The question arises as to the direction and scope of the NRO effort in the area of advanced reconnaissance aircraft.

Many questions come to mind when considering this issue; not the least of which concerns whether satellites (or drones) can ever completely replace the manned system. If overflight by either system can be accomplished at will, the manned system is in general by far the more cost effective. What are the unique attributes of the future manned system when compared with other future sensor systems on a cost effectiveness basis? Will the

present ban imposed on manned overflights be lifted? If future overflights by manned systems are indicated, is it necessary that the mission, as in the past, be carried out as a "clandestine intelligence gathering operation to be conducted in such a way as to minimize the risk of detection and of plausible attribution to the U.S. Government" and can such a mission be truly covert? Could other organizations, therefore, be called upon to fill these future National needs on a more or less overt basis?

The present situation is also one in which there is concern over the vulnerability of the satellite programs as well. During the past year the Soviet technical capability to interdict our satellites has become most clearly defined. The HEN HOUSE radars at Sary Shagan and Angarsk are identified as satellite acquisition and tracking radars of a very sophisticated nature. Coupled with DOG HOUSE, ABM HEN HOUSE radars and possible modified TALL KINGS, the Soviets will have an excellent and rapid orbit capability very soon. The GALOSH missile has the acceleration, payload, and accuracy required for intercept, and the TRIAD radars are considered adequate for the target and missile tract

functions. Although the NRO has enjoyed a considerable amount of freedom in the conduct of its space programs to date, the future is not so certain when weighed against this ominous defensive environment.

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