

ASSETS FOR CRISIS MANAGEMENTSATELLITE SYSTEMS:

The GAMBIT system possesses several characteristics, in addition to high resolution, which enhance its usefulness as a crisis management system. The mission profile (inclination angle, apogee and perigee, period, etc.) of any mission can be changed routinely as late as three days prior to launch. On an emergency basis, if a new mission profile is desired early on launch day, it can be accomplished with at most a one-day slip in launch schedule. Camera operations are programmed after the vehicle is on orbit and are completely flexible. The system has the inherent design characteristics to hold at R-1 for approximately 20 days if desired.

On the other hand, there are certain characteristics of the GAMBIT system and aspects of the program which limit its effectiveness in a crisis management role:

1. The distance traversed while pointing the camera in the case of certain high density target areas, limits the number of targets which can be covered in such an area.

2. The single RV makes the GAMBIT a very costly operation if daily coverage is required.

3. The availability of launch facilities is a limiting factor if more than one launch is desired within a single 15-day period (normal turn-around time for consecutive launches from the same pad). The GAMBIT Project initially utilized two launch pads at Point Arguello; however, the second pad is now being modified for GAMBIT-3 launches (TITAN booster). To construct a new GAMBIT pad would require approximately \$35 million and 20-24 months. Arrangements could be made in about 8-10 months to share another launch facility with other DOD space programs; however, there are no plans at present to do so in view of the first GAMBIT-3 launch in the Summer of 1966, and the projected completion date of the GAMBIT Program approximately one year later.

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The availability of GAMBIT systems solely for crisis management purposes will be quite limited for the next fifteen months. A maximum of 15 systems is expected to be available for launch between now and January 1, 1967. Both the Secretary of Defense and the DCI have expressed serious concern over the lack of high resolution coverage of the Sino-Soviet Bloc. In view of the poor success record of the GAMBIT, both have expressed doubt that the 15 systems available in CY 1966 are adequate to provide the desired coverage. It is likely, therefore, that the NRO will launch all available systems and hold none in reserve.

Starting about July 1, 1966, it is anticipated that a GAMBIT system will always be available at the factory not more than 20 days from launch. Should a world crisis develop, the hold and orbit-change flexibilities of the system could be exploited then, as necessary, and as possible with a single launch facility.

The introduction of the GAMBIT-3, now scheduled for July 1966 may serve to increase the availability of GAMBIT for crisis management purposes as the NRO has planned essentially redundant GAMBIT and GAMBIT-3 launches during FY 1967 (15-16 GAMBIT's and eight GAMBIT-3's). Although full mission productivity is not anticipated immediately with GAMBIT-3, an appreciable intelligence return may be realized even on the initial flights. Thus, in those months when a successful GAMBIT-3 mission is conducted, the GAMBIT mission could be regarded as a spare and used for crisis management purposes.

The GAMBIT-3 will possess essentially the same crisis management capabilities and limitations as the present GAMBIT project. Only one launch pad will be available until early CY 1968; at that time present plans envisage use of the yet-to-be-constructed TITAN IIC launch facility at the Western Test Range in a back-up role.

The overlap of GAMBIT and GAMBIT-3 has been provided to assure high resolution coverage during the period of the initial launches of GAMBIT-3. When GAMBIT-3 demonstrates operational reliability, the present program envisages the phase-out of the GAMBIT program. However, if USIB requirements for high resolution photography necessitate the use of GAMBIT, as well as GAMBIT-3,

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the GAMBIT program could be extended beyond mid-1967. Based on USIB requirements, a decision must be made by the NRO approximately March 1, 1966 regarding an extended GAMBIT program to permit necessary adjustments to budget and financial plans.

Where KH-4 resolution is adequate to provide the desired information, the CORONA program is in an excellent position to respond to crisis management requirements. Approximately 5-6 systems are continually maintained at R-38, or less, days from launch. One CORONA system is always maintained at an R-7 to R-9 status, even on the launch date of another CORONA. In an emergency, it is estimated that CORONA systems could be maintained on orbit for approximately 60 consecutive days (barring catastrophic failures during launch or shortly after injection into orbit), returning a "bucket" of film each five days.

On the debit side in a crisis management role, the CORONA has several characteristics which limit or hinder its effectiveness. These limitations, plus plans to improve system capabilities, are:

1. The present J-1 CORONA provides about 10 foot resolution at nadir, varying occasionally in consistency. With the introduction of the J-3 model in early 1967, the KH-4 is expected to be more consistent (less random vibration-induced smear), and to have the capability to provide 3 foot resolution by orbiting at lower altitudes (perigee at approximately 80 miles which is not possible with the present KH-4

2. The present CORONA can be held at R-1 for approximately 7 days; however, by preparing two systems simultaneously and recycling their count-downs in a complementary fashion an almost continuous R-1 capability can be maintained.

3. A completely new orbit and camera program can be placed in the CORONA system at R-9. There are no plans to improve on this capability since major development efforts would be involved.

4. At the present time, CORONA camera program options for each revolution are preset in the vehicle prior to launch; then, when on orbit, any one of ten alternative operations for each revolution

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may be selected by the NRO. A more flexible camera programmer which permits additional alternatives will be available in 1967.

A new search/surveillance system, intended to replace both CORONA and the present GAMBIT systems, is planned for introduction in mid-CY 1968. When flown at nominal altitudes, this system will have the capability of photographing the entire Sino-Soviet Bloc in 6-7 days, providing approximately 8-foot resolution at nadir. When flown at higher altitudes, this system will be capable of photographing the entire Sino-Soviet Bloc in approximately 3 days, at ground nadir resolutions of about five feet.

The new search system will be designed to be held at R-1 for periods up to 30 days, and will be highly flexible once on orbit (orbit adjust, optional camera programming and operation, etc.). As of this date, it is uncertain whether the standard RV configuration will include two or four "buckets"; however, in view of its planned long on-orbit lifetime (up to 30 days per mission), detailed consideration is being given to a multiple-RV (up to as many as 16 "buckets") alternative configuration for crisis management purposes.

A significant limitation on the use of photographic systems is, of course, cloud cover (the Sino-Soviet Bloc averages approximately 60-65 percent cloud cover the year around). Another limitation is the need to return film to earth for processing prior to interpretation. The NRO has been investigating [] read-out photographic satellite systems for some time (experimental satellites [] have been flown). Although no specific systems are under development, or have been selected for development, [] it should be assumed such systems will be operational by the end of this decade or in the early 1970's. More limited read-out capability could be made available by late 1968.

AIRCRAFT SYSTEMS:

Depending on the area to be covered, the U-2 (IDEALIST) aircraft has considerable potential as a crisis management system. It is basically a simple airplane system and easy to maintain. It can be kept on ready alert for extended time periods; and when in this posture, a mission launch can take place approximately 2 1/2 hours

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after receipt of a directive. The flight path is completely flexible and repeated coverage of a small area can be made on a single flight. The normal camera system can photograph over 36,000 square miles of ground coverage with high resolution photography (1.5 to 3 feet). For ground resolution better than one foot, a modified satellite camera can be carried; however, this reduces the total area covered. Nominal 3,000 mile range of the U-2 can be extended by in-flight refueling. Two of the aircraft have been modified to operate from aircraft carriers to increase mission flexibility.

The disadvantage of the U-2 lies generally in the aircraft's vulnerability to the increased air defense capability. The IDEALIST aircraft flies sufficiently high (above 70,000 feet) to minimize the interceptor aircraft threat, but is vulnerable to SA-2 missile systems. Electronic countermeasures equipments for protection against both the aircraft and missile threats are installed. While these equipments enhance U-2 survivability, they are not completely effective. Thus, some constraints must be imposed in selecting flight paths in heavily defended target areas.

At the present time, there are twenty U-2 aircraft which could be used in crisis management situations. Nine of these are assigned to CIA, eleven to SAC. The SAC aircraft have slightly less capability in operational altitude and in electronic equipment; however, a modification program is under way to up-grade these aircraft so that all twenty U-2 aircraft will have like configuration for world-wide employment.

The A-12 (OXCART) aircraft offers a high potential for crisis management. This aircraft is in the final stage of test and development with operational utilization scheduled for early 1966. The reaction time for the A-12 aircraft is not as fast as that of the U-2. As with the U-2 the OXCART flight paths which can be selected are highly flexible although less adaptable to last minute and/or in-flight changes. Flight paths will normally be pre-selected and programmed in the aircraft guidance computer. The high speed of the aircraft does not permit a wide range of in-flight pilot options in target selection, and changes will be made more on the basis of external advice rather than on pilot observations.

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Ground target resolution of one foot has been obtained with two of the camera systems. A third camera system, still in development will produce resolutions of less than one foot. The aircraft will fly above 80,000 feet at Mach 3.1 and with a range of slightly less than 3,000 nautical miles. In-flight refueling provides flexible mission planning and range extension for increased target coverage.

The A-12 is equipped with modern electronic countermeasures equipments and techniques. The aircraft design concept included minimizing the aircraft radar return cross-section. The combination of minimum radar return, high altitude high speed performance, and sophisticated ECM equipment makes the aircraft relatively invulnerable to the presently known Sino-Soviet anti-aircraft defenses.

There are eight A-12 aircraft in the operational configuration. In addition, two aircraft are being used for continued testing and one two-seat version is being used for training. These latter three are not readily adaptable to operational missions. There are no plans to buy additional OXCART aircraft.

The SR-71 reconnaissance aircraft is an outgrowth of the OXCART development program. Although somewhat larger, its performance is very similar to that of the A-12, and the advantages and disadvantages to be applied to operational utilization in crisis management situations are the same. The SR-71 payloads, however, are quite different. The SR-71 has three camera systems -- all carried simultaneously. Large area coverage, high resolution photography, and cartographic information can be obtained on a single mission. In addition, the SR-71 has a side-looking radar photographic system for use during all-weather conditions. This aircraft has a broadband ELINT collection capability for Electronics Order of Battle reconnaissance.

SAC will receive twenty-five operational SR-71 aircraft. Six additional aircraft have been manufactured for the test program. Delivery of the first operational aircraft to Beale Air Force Base, California, is scheduled for January 1968. A limited operational capability will be available by May 1968 and a full capability by October 1968. No additional buys of SR-71 aircraft are anticipated at this time

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DRONE SYSTEMS:

In addition to the aircraft programs, there are two drone programs which could be used for crisis management. The 147 series drones have been employed in operational missions since August 1964. The present drone (147-G) cruises at 450 knots at approximately 65,000 feet and has a range capability of 1000 miles. The camera system produces resolutions of approximately three feet; ground coverage is 320 linear miles with a 20 mile swath width. Like conventional aircraft, the drone has the flexibility of mission route selection and the capability for rapid reaction to launch. Only a few hours are required to program the guidance computer.

The main disadvantages of the drone are the inability to alter the pre-programmed flight path, the restricted total photographic coverage, and the drone vulnerability. The flight path could be controlled manually by the DC-130 launch aircraft, but this technique would jeopardize the "mother ship" in most areas of operation. The technique could be used in an area such as Cuba where the launch aircraft could "stand off" while controlling the drone or pass control to another DC-130 on the other side of the island.

Vulnerability of the drone in heavily defended areas is a problem -- it is vulnerable to both MIG's and surface-to-air (SA-2) missiles. However, the small size of the drone makes it a difficult radar target and ground controlled positioning of the interceptor aircraft for a zoom climb maneuver is quite difficult. Most losses to MIG aircraft are believed to have occurred as a result of visual acquisition due to the tell-tale condensation trail. A contrail suppression system will be installed in all drones beginning early in 1965.

To increase operational capability, a new model (147-H) is under development. This new version will fly approximately 3,000 feet higher than the present G model and will have double the photographic coverage capability (20 miles by 700 miles). To increase mission flexibility, a helicopter air retrieval system will be used with the 147-H drone. For higher resolution photographic coverage of critical targets and for coverage below cloud decks, eleven drones are being modified for both high- and low-level operations.

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FILM PROCESSING/PRODUCTION:

NRP film processing facilities are located at Rochester, Westover AFB, Yokota AFB, Taiwan and Saigon. Occasionally, other DOI facilities are utilized, and in an emergency, many are available for use. Thus, ample processing/production capability is available for satellite, aircraft, and drone products.

A serious limitation on the ability to react quickly in a crisis situation is the time involved in carrying the film to a processing facility and thence to Washington for interpretation and evaluation. For example, satellite capsules are recovered in the Hawaii area. Under favorable conditions, approximately 34 hours are required to deliver the film to Rochester (via McGuire AFB), develop, produce minimum duplicates, and deliver to Washington. In an emergency, film could be delivered direct to Rochester, and the Photo Interpreter could begin reviewing it at Rochester as soon as it was developed. Using this technique, initial interpretation could commence approximately 16 hours after capsule recovery.

The NRO has considered establishing a national-level processing production facility in the Hawaii area for quick-reaction handling of satellite products. The quickest possible means of handling GAMBIT and CORONA products would be to both process and interpret in the Hawaii area and transmit the analyses to Washington.

However, believing that national authorities will desire to view the product directly, the NRO has also considered modifications to this approach. One technique might be to process and minimum-duplicate in Hawaii (would require approximately eight hours after capsule recovery), as indicated above, and airlift the take to Washington in a special C-135 or C-141, equipped with exploitation equipment and carrying a team of photo interpreters. During the 8-9 hours flight to Washington, the photo interpreters could accomplish a reasonably comprehensive analysis of the critical targets covered.

The most promising approach (for the relatively near term) appears to be a combination of in-flight processing, limited duplication, and initial interpretation in a single aircraft. Research and

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development is underway on the critical elements of an in-flight processor of acceptable quality. If these investigations prove out the feasibility of an all-viscous airborne processor, it is anticipated that development of two airborne processing/interpretation facilities (modified KC-135's) will be undertaken near the end of CY 68. This concept envisages the delivery of processed satellite film, along with initial interpretation, to Washington approximately nine hours after capsule recovery in the Hawaii area. When used for aircraft or drone photographic product, it would be possible to deliver processed film, along with initial interpretation, to Washington from any point on the world in approximately 20 hours or less.

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