[redacted]

STATUS AND RECOMMENDATIONS FOR SATELLITE RECONNAISSANCE

SUMMARY

During the last two years the Government has conducted a continuing program of photographic reconnaissance from satellites. Although there have been several different development programs for photographic systems, Itek Corporation has provided nearly all of the operational units used. Because of successive cancellation of other programs, nearly all cameras used successfully during 1962 were Itek-designed and produced.

Itek has delivered these cameras to the Government ahead of schedule and at a cost substantially below contract. Reliability has been so great that there have been no failures of the primary camera systems in the last twenty-two successive shots. Performance has steadily improved: resolutions as high as seven feet are reported, although 12 feet is the specified requirement. During 1963, and possibly well into 1964, we understand, Itek will provide all the cameras to be used in satellite reconnaissance, although other development programs are in progress.

Thirty-eight Itek cameras placed in orbit to-date have already covered nearly all denied areas once; and many areas have been covered more often.

We understand that future programs will be directed to three objectives:

A. Re-coverage on a regular basis of critical areas using both present and improved area-coverage cameras;

B. Surveillance of already-identified targets using high-resolution spotting cameras; and

C. Availability of small-area coverage during critical periods by means of read-out to ground stations. Present time delays may amount to one month from decision-to-launch to physical recovery.

Itek has been asked to propose solutions to each of these problems and has responded with specific proposals. Because of certain key personnel shifts in the Government, action with respect to these proposals has been understandably delayed. However, we believe the necessary decisions should be promptly taken because:

A. The number of presently programmed area-coverage cameras appears to be inadequate for re-coverage every six months as now appears necessary.

B. No reserve of cameras has been provided to permit immediate step-up in coverage or to compensate for possible Soviet counter-measures.

C. Area-coverage cameras, embodying improvements that will double the current resolution, have been designed by Itek and can be

C. (Cont'd.) delivered in 14 months and in operation within 17 months after authorization.

D. Ultra-high-resolution spotting cameras of one- to two-foot resolution are urgently required for technical intelligence. Such cameras have been designed by Itek and operational units can be available in one year after go-ahead.

E. Immediate read-out systems are required for both area coverage and spotting camera systems. Itek's proposal for an initial capability within one year will be submitted by 1 February 1963.

We believe the following actions should be taken now so that in the months and years ahead the high quality coverage now possible can be obtained at the earliest date:

A. Delivery of the Mural camera systems should be accelerated to provide more complete area re-coverage beginning in April 1963 and to provide sufficient on-the-shelf units to meet emergency requirements. Six additional units will cover this latter requirement. In addition, a quantity of 11 units would assure a continuous launch rate of two per month during the first six months of 1964. The product-improvement program should be authorized and modifications inorporated into flight units without prejudicing delivery schedules.

Approximate Unit Cost [redacted]

Product-improvement program approximate cost - [redacted]

Increased Unit Cost - [redacted]

B. The Mural II system (40-inch focal length) which will provide 5 foot resolution levels and large-area coverage should be authorized. Mural II camera systems can replace Mural systems operationally in 1964 if prompt action is initiated.

Test Equipment - [redacted]

Development Unit plus Three Flight Units Cost - [redacted]

Operational Unit Cost Approximately - [redacted]

C. Nine additional Lanyard units should be ordered now to provide specific target coverage at four-foot resolution until the Mural II or the Technical Intelligence System becomes operational.

Operational Unit Cost Approximately - [redacted]

D. The proposed Technical Intelligence System that yields resolution of two feet should be authorized so that initial operational units will be available within 14 months. This system will provide intelligence detail from satellite altitudes comparable to U-2 photography from its normal operational altitude. Additional studies are being performed to determine system design characteristics for one-foot resolutions.

Developmental and Test Equipment Cost - [redacted]

Operational Unit Cost Approximately - [redacted]

The economics of these proposals are extremely favorable. All Itek-proposed systems can be used on the thrust-augmented Thor-Agena vehicle, which is the cheapest and most reliable available. Moreover, since the cost of the cameras is a small proportion of the total vehicle cost some excess of cameras is tolerable. Such an excess provides the needed flexibility in mission and the required stockpile to meet emergency intelligence needs.

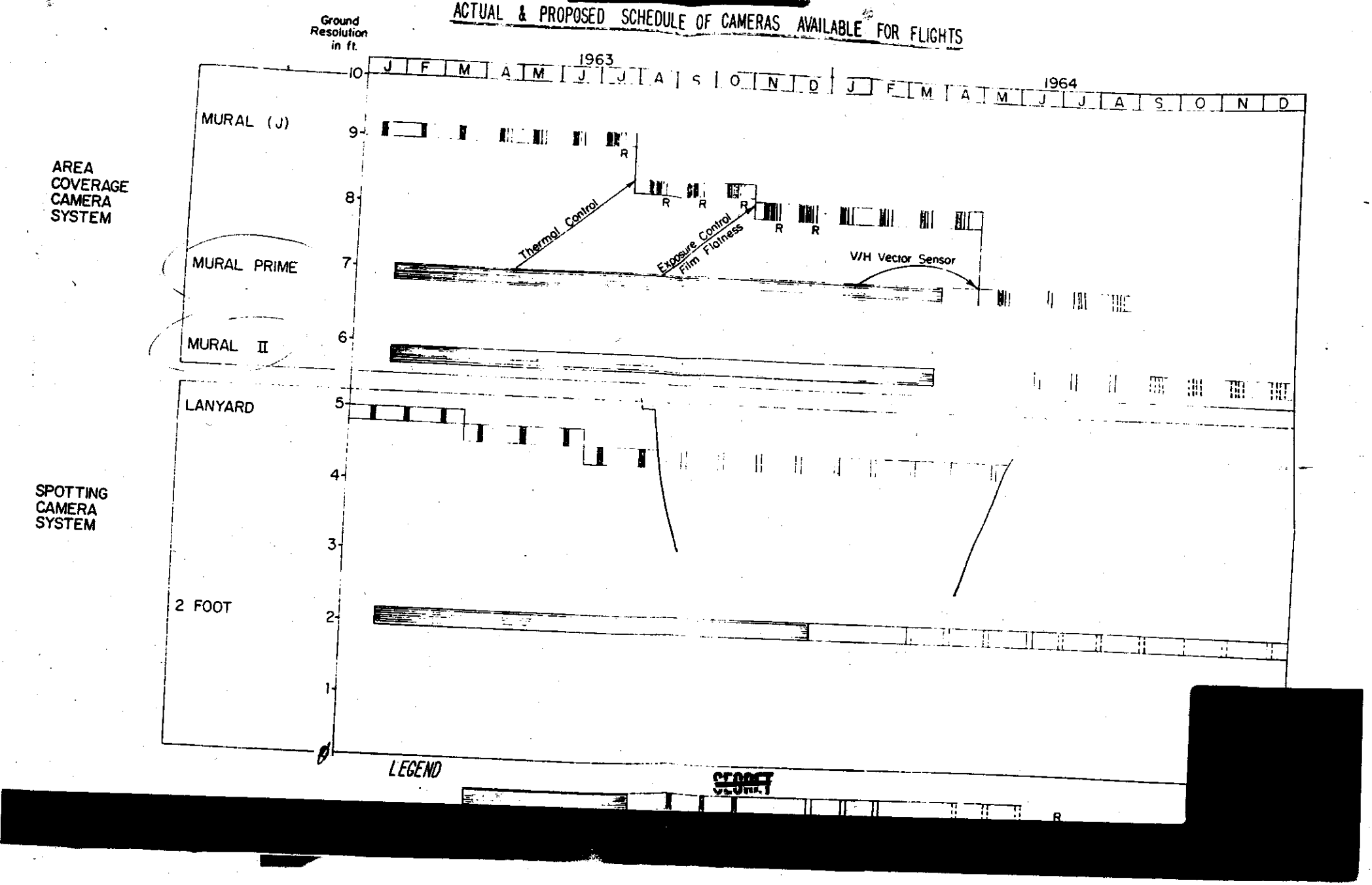
By the substitution of Mural II for the Mural system, detail levels may be increased by a factor of two over the total denied area. The initial development cost of this equipment is [redacted] and the incremental camera cost is [redacted] Vehicle and launch costs remain the same. The two-foot spotting camera can be introduced for an initial cost of about [redacted] and the cost of operational units will be equal to the current Lanyard camera cost.

If the development of a read-out system is to be timely it must make use of existing components. Such a system will necessarily be restricted by the resolution of the sensor (if non-silver halide) and by the bandwidth of the transmission system. Initial systems, consequently, should be aimed at moderate ground resolution of specific target areas. A proposal on a read-out system comprised of existing components will be submitted by 1 February 1963.

We have no firm knowledge of the availability of Thor and Agena but we understand that during the months immediately ahead additional units of each can be made available by diversion from other (in some cases, non-defense) programs. We understand that this was done during the Cuban crisis.

Because of these factors, and because of the dependence of our national security on satellite reconnaissance, we believe that action should be taken quickly on all these programs.

The attached chart summarizes the proposed development programs and flight schedules of operational units. To maintain continuity of the intelligence take, it is recommended that both the Mural program (with improvements phased in) and the Lanyard program continue until mid-1964. Authorization for additional operational units of both Mural II and the Technical Intelligence System will be required in early 1964 (at the time of the test of the prototypes) if operations are to continue uninterrupted.


ACTUAL & PROPOSED SCHEDULE OF CAMERAS AVAILABLE FOR FLIGHTS
Ground Resolution in ft.
1963
1964
J F M A M J J A S O N D
J F M A M J J A S O N D
10
9
8
7
6
5
4
3
2
1
0
AREA COVERAGE CAMERA SYSTEM
SPOTTING CAMERA SYSTEM
MURAL (J)
MURAL PRIME
MURAL II
LANYARD
2 FOOT
R
Thermal Control
Exposure Control
Film Flatness
V/H Vector Sensor
LEGEND