~~TOP SECRET~~ HANDLE VIA BYEMAN CONTROL SYSTEM

NATIONAL RECONNAISSANCE PROGRAM
Washington, D. C.

January 27, 1971

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NRP EXECUTIVE COMMITTEE

AGENDA

Office of Deputy Secretary of Defense
Room 3E 928, The Pentagon
Friday. January 29, 1971
2 - 5 p.m.

1. ZAMAN Phase II Issue

   A. Scenarios
   B. Results of Source Selection
   C. Status of Film Readout and Tape Storage Camera Systems Studies

If time permits, the following will be discussed:

2. PINE RIDGE Drone

3. GAMBIT [redacted] Capability

4. HEXAGON Status

F. Robert Naka
F. Robert Naka
Secretary
NRP Executive Committee

Attachments
Background Material: EOI,
Film Readout and TSC
[redacted]
[redacted] CORONA (R -1), GAMBIT
HEXAGON

BYE-12562/71

CORONA GAMBIT HEXAGON

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ELECTRO-OPTICAL IMAGING

The Electro-Optical Imaging (EOI) system initial system definition effort was completed in December 1970. The final part (Phase II) of system definition is scheduled to begin in February 1971 and last through early FY-1972. The following comments and description refer to the system design resulting from the Phase I definition effort as recommended by the EOI program office.

The system is configured to return imagery in [redacted] via relay satellite to a [redacted] ground station. Some of this imagery is to be available for viewing within [redacted] of acquisition. The imaging satellite near-polar orbits are to be elliptical with a perigee altitude of 188 NM and an apogee altitude, yet to be selected, of 283 to 424 NM. The ground sampled distance (GSD) varies with altitude, with the best value being [redacted] The nadir frame size varies similarly with the smallest frame, about 2 NM on a side, corresponding to the [redacted]

[redacted] imaging satellite system can obtain [redacted] per day total with some stereo coverage. Imaging satellite design life is [redacted] with an expected useful life of [redacted] Availability is presently planned to be April-June 1975.

ELECTRO-OPTICAL IMAGING

Cycle Times:	
Tasking Decision Through Target Acquisition	[redacted]
Data Acquisition Through Imagery Viewing	[redacted]
Operational Lifetime	[redacted]
Representative Orbit	188 X 283 to 424 NM elliptical
Ground Sampled Distance (Best)	[redacted]
Frame Size (Minimum)	[redacted]
Capacity: Per day	[redacted] (some stereo)
Earliest Availability	April 1975

FILM READOUT AND TAPE STORAGE CAMERA

The Film Readout System (FRO) and the Tape Storage Camera (TSC), presently under study by the NRO, are being designed to use the GAMBIT-3 R-5 (175 inch focal length) optical subsystem. With the FRO approach imagery would be recorded on film, developed on-board, stored, and later scanned by a laser to produce a video output signal. With the TSC approach, a somewhat more advanced concept, the camera would convert a photon image to an electron image which would be stored on tape and later read out by a scanning electron beam to produce the video output signal.

A number of data return options are available for either approach. A relay satellite could be used but would not be required. Direct readout to a [redacted] ground station would accommodate [redacted] frames (three-by-three nm) a day from a [redacted] with image return times ranging from [redacted] Readout also could be accomplished by existing ground stations (with modification) to decrease the image return times. Use of a high latitude ground station with subsequent retransmission to Washington, D.C. would provide data return times on the order of [redacted]

Either system would provide monoscopic coverage (stereo on demand) and, if operated in a 170 nautical mile circular orbit, normally would produce nadir strips three nautical miles wide and of arbitrary length, and with a ground resolved distance (GRD) of two feet. Both systems would have alternative strip widths--5.8 nautical miles for the FRO and 8.75 nautical miles for the TSC--which could be used as necessary. Expendables for [redacted] systems (including film for the FRO system) could support operations for [redacted] at the daily rate of [redacted] three-by-three nautical mile images.

Earliest availability of an FRO system would be approximately three years from contract initiation. The TSC system could be available approximately three years after camera demonstration (anticipated during late CY 1971).

FILM READOUT AND TAPE STORAGE CAMERA

Cycle Time:	[redacted]
Tasking Decision through Target Acquisition	
Data Acquisition through Imagery Viewing	
Operational Lifetime	
Representative Orbit	170 nm circular
Ground Resolved Distance	2 ft (nadir)
Swath Width	
FRO	3 or 5.8 nm
TSC	3 or 8.75 nm
Swath Length	Variable
Capacity: Per Day	[redacted] satellite systems)
Earliest Availability	
FRO	3 yrs
TSC	4 yrs

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CORONA (R-1)

The CORONA system, which consists of a panoramic photo satellite with two recovery vehicles, is being phased out as an operational search system. The capability exists to procure additional hardware and maintain a CORONA at an R-1 status. This would involve hiring another launch crew and reopening a second launch pad. The R-1 status would be alternatively maintained at each launch site on about a three week cycle. Mission times could vary from a minimum of three days to a maximum of 21 days based on the assumption of one day (R-1) on pad, one day on orbit to include recovery, and one day for processing and interpretation. The average operational life of 19 days could provide a second recovery vehicle as soon as the second day after launch or as late as 19 days after launch. The system provides a 6 foot stereoscopic ground resolved distance (nadir) and a swath of 8.0 x 124 nautical miles while flying an elliptical orbit with an 85 nautical mile perigee. Total mission capacity at this altitude is about 7,000,000 nm^2 gross coverage. Orbits with perigees between 80 and 120 nautical miles can be flown with resulting variations in resolution and coverage. Earliest availability involving new procurements would be approximately 20 to 24 months.

CORONA (R-1)

Cycle Time: Launch Warning through Imagery Viewing	3-21 days
Operational Lifetime	1-19 days
Representative Orbit	85 nm perigee (elliptical)
Ground Resolved Distance (stereo)	6 ft (nadir)
Swath Width/Length	8.0 x 124 nm
Capacity: Per Msn	7,000,000 nm^2 (gross)
Earliest Availability	20-24 months (new procurements)

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GAMBIT

Operational Lifetime		18-30[1] days
Recovery Vehicles		2
Representative Orbit		75 x 240 nm (Elliptical)
Ground Resolved Distance: (Stereo)	160"FL	[redacted] 12" (nadir-96 nm alt)
	175"FL[2]	[redacted] 12" (nadir-124 nm alt)
Swath Width:	160"FL	3.7 nm (72 nm alt)
	175"FL[2]	3.4 nm (72 nm alt)
Swath Length		Arbitrary
Capacity:	CY 70 Ave. Per Msn	17,000 tgts 10,000 frames

1. Present mission lifetime is 18 days. Thirty day life is programmed for late 1972.

2. Present missions utilize a 160 inch focal length optics. A 175 inch focal length optical system will be introduced in mission number 4332 scheduled for the summer of 1971.

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HEXAGON

Operational Lifetime	30 days
Recovery Vehicles	4
Representative Orbit	82 x 144 nm (Elliptical)
Ground Resolved Distance (Stereo)	2.5' (nadir-82 nm alt)
Swath Length	8.4 nm (82 nm alt)
Swath Width[1]	44-294 nm (82 nm alt)
Capacity Per Msn (Stereo)	20×10^6 sq nm gross

1. Swath widths across track vary dependent on the scan sectors which vary from 30 to 120 degrees.