

ATTACHMENT 7PROGRAM PLAN

## 1.0 INTRODUCTION

The Electro-Optical Imaging (EOI) Program objective is the development of a reconnaissance satellite system yielding continuous and responsive flow of imagery data to the intelligence community. The system is to provide a major new capability with applications over a broad range of intelligence problems.

The system involves Imaging Satellites, Relay Satellite(s) and CONUS ground facilities including a Receiving Facility, Operations Facility and a Processing Facility. The Imaging Satellites will provide continuous on-orbit availability for data acquisition. The Relay Satellites will provide a  communications capability between the Imaging Satellites and the Receiving Facility for data and commands. The Processing Facility will reconstruct the image data into interpretable pictures, and the complete system will be controlled by the Operations Facility.

The primary goal of the program is the orderly

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development of a reconnaissance capability based on Electro-Optical Imaging Readout. To achieve that goal the following guidelines are noted:

- a) A two phase System Definition Phase will be carried out.
- b) Two system configurations will be studied during Phase I System Definition
- c) One configuration will be selected for detailed design in Phase II System Definition.
- d) A high confidence System Acquisition Phase with balanced considerations for schedule and cost will be implemented.

Since the results of Phase I System Definition will determine subsequent plans, the following ground rules should be considered:

- a) In-depth preliminary designs and performance analysis of Configuration A and Configuration B described in Attachment 6 are to be completed during Phase I.
- b) Contractors are encouraged to study variations from these baseline configurations, but any changes selected are to be fully substantiated.

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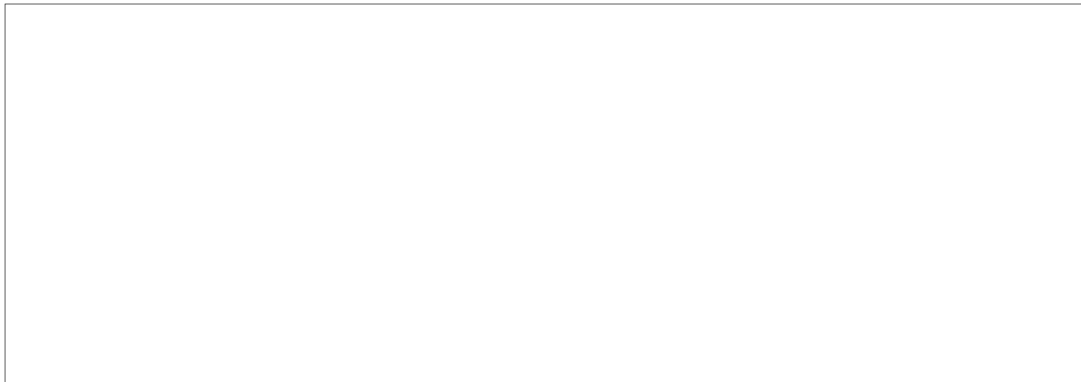
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c) A complete concept for Phase II System Definition, System Acquisition, System Operation and any system modifications must be presented for both Configuration A and B.

d) It is important that schedule and cost variations be identified and that both Configuration A and B be based on realistic estimates.

e) Good image quality and continuous system availability are essential to both system configurations.

f) The primary consideration for both system configurations is a good balance between the Initial Operational Capability (IOC) date and cost.



h) Realistic assessments of cost and schedules are essential to the completion of Phase I System Definition studies.

Table I presents a brief schedule of the program plan phases.

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## 2.0 IMAGING SATELLITE

### 2.1 Phase I System Definition

The guidelines of Section 1 are to be used in conducting Phase I System Definition studies which will begin in August 1970. Four contractors will define alternative design approaches for system Configuration A and alternative design approaches for system Configuration B that meet the applicable requirements of the attachments to the Statement of Work. Preliminary designs will be developed for the Imaging Satellite, the Receiving Facility and the Operations Facility, including all subsystems. Each contractor will submit a preferred Configuration A preliminary design and a preferred Configuration B preliminary design. The Program Office will evaluate these designs and specify a single configuration design for Phase II studies.

### 2.2 Phase II System Definition

Two contractors will be selected in January 1971 to conduct Phase II System Definition studies to develop a detailed Imaging Satellite, Receiving Facility and Operations Facility design by September

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1971. These designs will be sufficient in detail, including equipment and interface specifications, to establish a complete system configuration. All subsystems and subcontractor relationships will be identified in detail. Contractor submissions will include firm cost and schedule proposals and a comprehensive management plan.

### 2.3 System Acquisition

The evaluation of the two contractor proposals will be conducted during October-November 1971 to select a prime system contractor for System Acquisition. Emphasis will be placed on system performance evaluation, design approach, management capability, cost, schedule, and reliability in this evaluation.

Calendar dates discussed in the following paragraphs are for reference only. System Definition outputs are to define specific milestones.

After the contract is awarded, the prime system contractor will prepare the necessary drawings and documentation to conduct a Preliminary Design Review (PDR) for the Imaging Satellite, Receiving Facility and the

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Operations Facility in early 1972. Detailed design of the Imaging Satellite, Receiving Facility and Operations Facility will be performed during the subsequent period in preparation for the Critical Design Review (CDR) in 1973.

The fabrication and assembly of the I/S qualification vehicle will begin after the CDR and will be completed prior to initiating the qualification test program. A compatibility test of the Imaging Satellite, Relay Satellite and Receiving Facility is to be conducted prior to an I/S launch.

[ ] I/S flight vehicle [ ] is scheduled to be fabricated and assembled, including the installation of components, in order to allow for an Operability Assurance Testing (OAT) prior to shipment to WTR. The check-out of [ ] at the Western Test Range will be conducted prior to the launch of [ ] in the 1974-1975 period.

### 3.0 PROCESSING FACILITY

#### 3.1 Phase I System Definition

The guidelines of Section 1 are to be used in conducting Phase I System Definition studies which will begin in August 1970. Three contractors will define alternative

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design approaches for system Configuration A and alternative approaches for Configuration B that meet the applicable requirements of the attachments to the Statement of Work. Each contractor will submit a preferred P/F preliminary design for Configuration A and a preferred P/F preliminary design for Configuration B. The Program Office will evaluate these designs and specify a single configuration design for Phase II studies.

### 3.2 Phase II System Definition

Two contractors will be selected in January 1971 to conduct Phase II System Definition studies to develop a detailed design of the Processing Facility by September 1971. These designs will include analyses, circuit and equipment description and interface documentation. All subsystems and subcontractor relationships will be identified in detail. Contractor submissions will include firm cost and schedule proposals, and a comprehensive management plan.

### 3.3 System Acquisition

The evaluation of the two contractor proposals will be conducted during October-November 1971 to select a P/F contractor for System Acquisition. Emphasis will be placed

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on system performance evaluation, design approach, management capability, cost, schedule and reliability in this evaluation. After the contract is awarded, the P/F contractor will proceed with implementation on a schedule coordinated with the overall system activities. Installation and check-out of the equipment will be completed prior to activation of the complete capability for launch of [ ] I/S.

#### 4.0 RELAY SATELLITE

A draft functional requirements document has been prepared for the Relay Satellite (R/S) segment, with a final document to be completed prior to initiation of Phase II System Definition. Technology Programs for critical subsystems and components were initiated in FY 70. The System Definition Phase for the R/S began in July 1970 to allow the design evaluation and contractor selection process to be completed during 1971. The R/S Preliminary Design Review will be held in early 1972 and the Critical Design Review is planned for late 1972.

Fabrication and assembly of the first R/S flight vehicle [ ] is currently scheduled to be completed in 1973 for Operability Assurance Testing (OAT). Delivery of R/S [ ]

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and R/S [ ] will be made in 1974 to the Eastern Test Range (ETR) for mating with the boosters and for conducting prelaunch operation. The initial two Relay Satellites are currently scheduled for launch in 1974.

#### 5.0 TRANSDUCERS

Transducer development, fabrication and test programs will be conducted in FY 71 for both the [ ]

[ ] Modular arrays of each type will be tested extensively in the Image Processing Laboratory (IPL) in 1971. Chip pilot production lines were established in FY 70 and will be operated to make large numbers of modules for extensive testing. Design and development work will be continued into FY 72 until selection of a contractor for System Acquisition is completed. After the transducer Preliminary Design Review, the selected transducer contractor will proceed with the detailed design, fabrication and assembly of an engineering model transducer. Following the transducer Critical Design Review, work will be initiated on the transducer qualification. The fabrication, assembly and test of the transducer for the qualification vehicle will be completed in 1973. The first flight transducer will be ready by CY 73-74 for delivery to the prime system contractor.

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## 6.0 OPTICS

Design and analysis work will be performed during the first half of FY 71 for [ ] focal length optical system in order to define optical subsystem configurations and vehicle interfaces that satisfy system requirements and fabrication constraints for Configurations A and B. The [ ] focal length will be emphasized due to previous design efforts for the [ ] focal length. After selection of the I/S configuration in February 1971, detailed optical subsystem design will be initiated. Parallel with the optical subsystem design activities, the optical subsystem contractor will be continuing the optical element fabrication demonstration program. The objective of this program is to insure that the fabrication and testing techniques will be developed to meet the requirements of the Electro-Optical Imaging Program. The [ ] mirror now at  $2\lambda$  peak-to-peak will be completed by December 1970. Work is underway to assemble it with the completed [ ] ( $.02\lambda$  rms) for subsystem test and evaluation in FY 71.

The optical subsystem contractor will proceed with the detailed design of the flight hardware at initiation of System Acquisition. The optical subsystem Preliminary Design Review

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and the Critical Design Review should be scheduled in advance of the I/S PDR and CDR.

An engineering model of the optical subsystem should be completed during FY 72. The qualification vehicle optical system will be fabricated, assembled and tested by 1973, while the optics component qualification is being performed. The optical subsystem for the [ ] flight vehicle [ ] should be completed and a test performed prior to integration with [ ] in the 1973-1974 time frame.

#### 7.0 IMAGE PROCESSING LABORATORY

The primary function of the Image Processing Laboratory (IPL) is to provide a single location where the transducer modules and sub-arrays can be tested. It enables the candidate transducers to be tested and evaluated under identical conditions. The IPL includes a simulated ground scene, appropriate optical systems and a data processing/image reconstruction system. Additional hardware and software capability is being provided for modular array testing during FY 71.

The test programs to be conducted at the IPL supplement the Image Chain Analysis Program, the flight test work, and the photoelectrical testing of the solid state devices which is conducted

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TABLE I

PROGRAM PLAN SCHEDULE

Aug 70 - Dec 70	Phase I System Definition
Dec 70 - Jan 71	Evaluation and Contractor Selection
Jan 71 - Sept 71	Phase II System Definition
Oct 71 - Dec 71	Evaluation and Contractor Selection
Jan 72	Initiate System Acquisition
Jan 75	Earliest <input type="text"/> I/S Launch

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