

~~SECRET~~

Handle via BYEMAN  
Control System



PART I - STATEMENT OF WORK

1.1. BACKGROUND

The primary payload for the MOL System is a very high resolution photo-optical reconnaissance capable of operating in either a manual/automatic mode in a manned system or a fully automatic mode in an unmanned system.

To facilitate programming, budgeting, and advanced planning activities, the MOL Program and Systems Offices have defined three "block" procurements of MOL systems as follows:

a. Block I: The present baseline seven-launch MOL Program which includes two unmanned sub-system qualification launches (no prime payload aboard), three all-up 30 day manned reconnaissance missions, and two all-up 30-56 day unmanned reconnaissance missions. These vehicles are fully defined in appropriate MOL documentation and contracts.

b. Block II: Procurement of 3-4 systems as an immediate follow-on to the Block I Program. The mix of manned and unmanned systems has not yet been determined. Consistent with the payload capability of the Titan IIIM, it is anticipated that the on-orbit duration of the manned system will be extended to approximately forty days. A read-out system might also be added to the manned system to increase operational flexibility. Modest changes are anticipated in various subsystems to eliminate deficiencies, increase flexibility, peak-out performance, and--in the case of the camera--to maximize quality.

WORKING PAPERS

DORIAN  
Handle via BYEMAN  
Control System

~~SECRET~~

Page  $\frac{1}{2}$  of  $\frac{7}{10}$  pages  
Copy  $\frac{2}{10}$  of  $\frac{10}{10}$  copies  
SAFSL Control Bye 68344

for Agy 1

c. Block III: Various concepts have been considered for Block III, ranging from increased booster performance for extended-duration integral launches, to space rendezvous/resupply operations for a continuous on-orbit DORIAN capability. For the purpose of this study, it should be assumed that the duration of the Block III manned system will be extended to 50-60 days and the unmanned system to 70-90 days via integral launches. This also implies that the weight of the camera system could be increased by a few thousand pounds, if desirable, as long as the additions were consistent with the general present Laboratory and Mission Module configurations. Moderate to major internal Laboratory and Mission Module changes may be incorporated to accommodate a Mark II DORIAN camera system.

This Work Specification describes Phase I of a two phase study to be performed by EKC to investigate improvements to the DORIAN baseline configuration which could be incorporated in the Block II or Block III MOL/DORIAN flights. The conceptual studies performed under Contract AF 18(600)-2102, the contract definition work performed under Contract AF18(600)-2843, the transition work, long lead item procurement and Phase II effort performed under AF18(600)-2864 form the basis of the program to be described in this work specification.

1.2 Program Objectives

The primary objective of this study is to identify, define and initially determine the effectiveness of modifications to the baseline DORIAN camera system considered most likely to provide measurable improvements in performance, quality, reliability, etc. In addition,

DORIAN  
Handle via DYEMAN  
Control System

~~SECRET~~

Page 2 of 7 pages  
Copy 10 of 10 copies  
SAFSL Control Eye 68344

for A-01

~~SECRET~~

Handle via BYEMAN  
Control System

necessary future study efforts and/or technology projects are to be proposed which will more firmly establish the validity, definition and effectiveness and technical priorities of the selected modifications.

The Phase I effort should be oriented to evaluation of technical concepts affecting:

- a. Assurance and Improvement of Quality and Coverage
- b. Versatility
- c. Life and Reliability
- d. Areas Related to EK System Performance

### 1.3 Scope

The contractor will conduct analytical studies, conceptual designs and limited experiments to identify, define and initially prove the feasibility of modifications of the baseline camera system (contract AF 18(600)-2864) that can be logically incorporated into future phases of the MOL program. This effort may be considered as initial study toward the development of a MKII DORIAN camera system.

Proposed changes may consider payload weight increases of not more than a few thousand pounds but should be compatible with the current orbiting vehicle external configuration. Moderate internal configuration changes may be considered--for example, the internal laboratory changes necessary to accommodate a "relay lens and sequence camera".

The contractor will identify those areas requiring early study, for possible inclusion into Block II orbiting vehicles to sequentially follow the baseline program and those areas where conceptual design

**DORIAN**

Handle via BYEMAN  
Control System

~~SECRET~~

Page 3 of 7 pages  
Copy 2 of 10 copies  
SAFSL Control Bye 68344

*Ser Fey 1*

~~SECRET~~

Handle via DVEMAN  
Control System

studies should be continued after the conclusion of this study as considerations for inclusion into Block III.

In general the work will include the following:

- a. Studies to identify the most promising camera system modifications and establish a rational technical priority for each.
- b. Preliminary system analyses of selected concepts to the degree necessary to prove feasibility and to establish logical order of implementation.
- c. Modest laboratory experiments as required and feasible to support the system analysis.
- d. Assessment of the recommended improvements in quantitative and qualitative terms, both individually and in conjunction with each other to derive a cumulative improvement in resolution or general photographic quality.
- e. A proposal for a Phase II follow on study program to include identification or requirements for laboratory experiments, production of test breadboards as well as determination of new or modified test equipment and methods to demonstrate or evaluate the proposed concepts as defined in Phase I. The Phase II proposal should identify appropriate interface exchanges and other requirements associated with the modifications proposed.

The Phase I effort should give priority to those aspects which will materially improve resolution and general photographic quality. It should, however, also consider a rather wide spectrum, evaluating technical areas affecting:

**DORIAN**  
Handle via DVEMAN  
Control System

~~SECRET~~

Page 4 of 7 pages  
Copy 6 of 10 copies  
SAFSL Control Bye 68344

*In A cy 1*

~~SECRET~~

Handle via BYEMAN  
Control System

A. Assurance and Improvement of Quality and  
Coverage

1. Optical Quality

Tighter tolerances  
Better testing  
Better focus control  
Reduced obstruction  
Increased aperture (bigger flat)

2. Smear

Platen motion image velocity compensation  
Structural dynamics  
Camera dynamics

3. Exposure

Exposure sensor  
Cloud sensor  
Selectable filters

4. Use of Advanced Films and on orbit  
Processes

5. Extendible Focal Length (Relay Lens  
& Sequence Camera-Optional and/or  
Fixed Mode)

B. Versatility

1. Timely data return

Automatic processor & readout interface  
R/V film transport & handling

2. [REDACTED]

3. Automatic Operation after Crew Leaves

DORIAN  
Handle via BYEMAN  
Control System

~~SECRET~~

See A. 1

~~SECRET~~

Handle via BYEMAN  
Control System

4. 

C. Life and Reliability

1. More efficient automatic configuration
2. Design for longer life

Thermal  
Film storage and handling

3. Longer life requirements on safety and cleanliness
4. Testing
5. Back-up Modes of Operation
6. Redundancy of Critical Devices
7. Improve Design for On-Orbit Maintenance and Repair

D. Other MOL Factors Related to Camera

1. Dynamics and Smear

Vehicle vibrations  
Mirror drive  
Image velocity sensor  
Attitude control

2. Pointing
3. Attitude

This study program will conclude immediately after customer review of final study report and Phase II study proposal in accordance with the major milestones. Due consideration will be provided to the requirements and content of the Phase II study proposal, to allow EK to initiate such work within 90 days as desired by the Government.

**DORIAN**  
Handle via BYEMAN  
Control System

~~SECRET~~

Page 6 of 7 pages  
Copy 8 of 10 copies  
SAFSL Control Bye 68344

*See A cy 1*

~~SECRET~~

HANDS VIA DORIAN  
Control System

PART II - DELIVERY SCHEDULE

Documentation

Title

1. Status Report (Briefing acceptable--charts & narrative) 20 Sep 1968
2. Detailed Briefing (Charts & Narrative) 22 Nov 1968
3. Final Report NLT 31 Dec 1968

PART III - MAJOR MILESTONES

- Study Go Ahead 22 Jul 1968
- Concept Identification & Priority  
(EK and Air Force) 22 Aug 1968
- Detailed Study Briefing 22 Nov 1968
- Phase II Study Proposal 22 Nov 1968
- Air Force Review of Final Study Report NLT 31 Dec 1968

DORIAN

Handle via BYEMAN  
Control System

~~SECRET~~

Page 7 of 7 pages  
Copy 4 of 10 copies  
SAFSL Control Bye 68344

*See A cy 1*