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MISSION DEVELOPMENT SIMULATOR

PHASE 0

SYSTEM TEST REQUIREMENTS

REVISION A

C O N T E N T S

1.0 SCOPE

The purpose of this document is to describe the requirements for the demonstration of phase 0 capability of the MDS, and to delineate those portions of the Mission Development Simulator Performance Design Requirements, SAFSL Exhibit 34003 which will be demonstrated to the customer prior to phase 0 operations.

1.1 PHASE 0 CAPABILITY

The specific capabilities of the simulator in the phase 0 configuration are described in Appendix A. Appendix B shows the level of compliance of the phase 0 MDS with the phase 3 MDS specification.

1.2 ALLOCATION OF TEST LEVEL

Allocation of tests between subsystem level, system level and demonstration orbital pass are indicated in the system test plan.

1.3 DOCUMENT TREE

Figure 1-1 shows the system test document tree for the phase 0 demonstration of the MDS.

1.3.1 Phase 0 System Test Requirements

This document defines the requirements for the phase 0 demonstration. The document reflects the level of compliance to SAFSL Exhibit 34003 for phase 0.

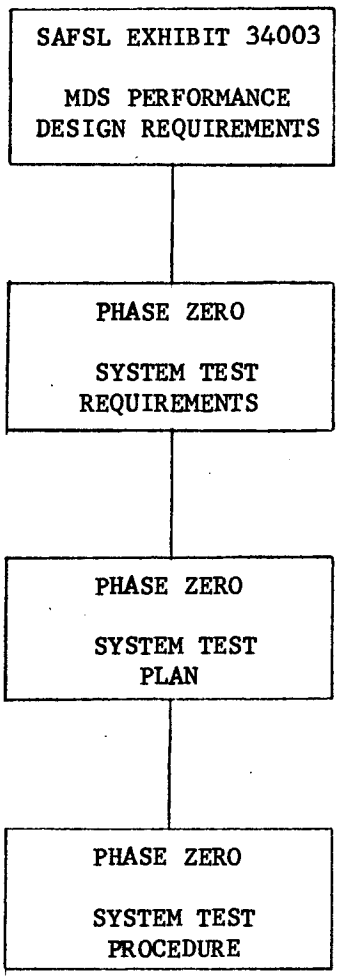

FIGURE 1-1

PHASE 0 SYSTEM TEST DOCUMENT TREE

1.3.2 Phase 0 System Test Plan

The system test plan defines the allocation of test level for the demonstration. The tests are distributed between subsystem level, system level and demonstration orbital pass.

1.3.3 Phase 0 System Test Procedure

This document describes the procedures to be used for the system demonstration. The procedures will define the test description, measurements to be evaluated and required test equipment. The procedure will define where tests are to be performed.

1.4 DEFINITIONS

Demonstration Orbital Passes (DOP) are mission oriented simulation runs which shall be utilized to demonstrate portions of the phase 0 MDS capabilities.

Subsystem Test - Subsystem tests shall be limited to the SVS acceptance test at the vendor's location.

System Test - For purposes of the phase 0 demonstrations, all tests other than the SVS and DOP's shall be conducted at the system level. For system

level testing all phase 0 components will be in place. For those requirements under test all elements whose interaction could possibly effect the characteristic being tested shall be active. Example: resolution will be measured with all SVS servos powered.

1.5 MDS PHASE 0 DEMONSTRATION TEAM

The Air Force shall convene the phase 0 Demonstration Team, hereinafter referred to as the Air Force team, during all formal system demonstration activities. The purpose of the Air Force team is to witness all system demonstration testing and to approve the satisfactory completion of the GE phase 0 MDS demonstration test.

Air Force Team Membership

The Air Force team shall consist of but not be limited to any of the following personnel:

a. Chairman:

The chairman shall be an Air Force Officer designated by the Director of Mission Module, MOL Systems Office (SAFSL-14). The chairman shall serve as spokesman for the Air Force team and prime point of contact

with the GE test director during the demonstration. Based on the advice and recommendations of other team members, the chairman shall notify the GE test director of all formal Air Force team decisions on matters of demonstration objective accomplishment, failure, retest, and test completion. The chairman will be responsible for insuring availability of demonstration team personnel during verification, demonstration and crew demonstration tests.

b. Aerospace Corp. Adviser(s):

Aerospace adviser(s) shall observe tests, assist in interpreting test results, and advise the chairman in all matters relating to demonstration requirement accomplishment.

c. Flight Crew (SAFSL-7) Representative(s):

Flight Crew Representative(s) shall observe tests and assist in interpreting results. As prescribed in the System Test Plan, he shall review the operational script and shall participate in simulator operation during the crew demonstration portion of the test.

d. Air Force Quality Assurance Representative(s):

The AFQA representative(s) shall witness all formal System Demonstration test operations, shall monitor that the test is performed in accordance with the approved test procedures, and that good practice is observed in the recording of all test data and test log information. When authorized by the Air Force team chairman, the AFQA representative shall assure that deviations or changes to test procedures are recorded in the test log.

2.0 APPLICABLE DOCUMENTS

Mission Development Simulator Performance Design Requirements, SAFSL Exhibit 34003, 15 August 1968.

Phase Zero Configuration Presentation Made 6/26/68, BIN 50372-96-3.

Phase 0 - Simulation Software Requirements, Rev. 2, Oct. 15, 1968, BIF-055-1318-20-3-68.

3.0 PERFORMANCE DEMONSTRATIONS

The overall functional characteristics of the phase 0 MDS, its operability characteristics, and certain of the specific performance and hardware/software design requirements will be demonstrated. General capabilities to be demonstrated are:

a. Pre-test checkout program and procedure.

b. All controls and displays on panels 2C, 2D, 3B and 7B of the SLM.

c. All controls and displays on panels 1A, 1B, 2A, 2B, 5A and 5B of the SCC.

d. ATS/dual changer modes.

e. The single ATS mode and the single MO mode (peripheral display at 60^{o}).

f. Real time AVE actions.

g. Mission oriented tasks.

h. Test and operations, data collection and reduction capability.

i. Turn around capability (10 and 30 minutes).

j. Operational scripting capability.

3.1 PERFORMANCE CHARACTERISTICS

The following paragraphs, paragraph numbers and titles correspond to those of section 3.1.1 of SAFSL Exhibit 34003, Mission Development Simulator Performance Design Requirements.

(3.1.1)* Functional Characteristics

No specific demonstration requirement.

(3.1.1.1) Primary Performance Characteristics

Validate the adherence of the MDS to a mutually agreed AVE baseline established for phase 0 on May 1, 1968, except the SLM panels 2C and 2D which were established on June 30, 1968. The software for phase 0 will be frozen to the Phase 0 Simulation Software Requirements, Revision 2.

(3.1.1.1.1) Command, Communication, and Instrumentation

The phase 0 simulation shall accept data which is included in the command data message but no attempt shall be made to simulate uplink commanding. All data shall be inserted prior to the start of the simulation run. No command processing shall be provided.

* Paragraph numbers in parentheses refer to SAFSL Exhibit 34003.

The software shall not simulate the communication or instrumentation subsystem.

(3.1.1.1.2) Electrical Power and Signal Distribution

The electrical power system shall not be simulated in phase 0.

(3.1.1.1.3) LMSS Interface

(3.1.1.1.3.1) Attitude Control System

No attempt will be made to simulate the operation of the ACTS system or any vehicle disturbances.

(3.1.1.1.3.2) Timing Subsystem

One event timer located on panel 2C shall be driven.

(3.1.1.1.4) Controls and Displays

The controls and displays to be driven in phase 0 shall conform to the June 30, 1968 AVE baseline.

(3.1.1.1.5) Navigation and Control

(3.1.1.1.5.1) Star Tracker

The Star Tracker shall not be simulated in phase 0.

(3.1.1.1.5.2) Low G Accelerometer

The Low G Accelerometer shall not be simulated in phase 0.

(3.1.1.1.5.3) Image Velocity Sensor

The Image Velocity Sensor errors to be simulated are random errors. Saturation will be simulated in the event of clouds (when prescripted) in which case the saturate light will be turned on and the IVS output will limit. Normal IVS rate nulling will be simulated in the range of [redacted] and when the IVS is enabled the rate will be reduced to approximately [redacted]

(3.1.1.1.5.4) Stick Input

The stick polarity shall be reversible between runs. The stick shall allow low rates to be inserted into the drive system. The transfer function shall be provided by the Drive Correction Module of the On-Board software.

(3.1.1.1.6) Structure and Thermal Control

(3.1.1.1.6.1) Thermal Door

The thermal door and its interaction with the main optics shall not be simulated in phase 0.

(3.1.1.1.6.2) Environmental Door

The environmental door and its interaction with the ATS optics shall not be simulated in phase 0.

(3.1.1.1.6.3) Temperature Displays and Controls

The temperature displays and controls shall not be driven in phase 0.

(3.1.1.1.7) Acquisition Subsystem

(3.1.1.1.7.1) AVE ATS Hardware Parameters

The MDS shall provide magnification equivalent to 15.88X ± 5 percent to 31.76X ± 5 percent, and 63.5X ± 5 percent to [redacted] Demonstrate that the MDS shall follow operator commands and reach any commanded value within 0.5 second and that the step from 31.76X ± 5 percent to 63.5X ± 5 percent shall occur in 1.0 second or less. (See paragraph (3.1.1.1.7.1.5) for a discussion of presentation rates.) Verify that the simulated real field-of-view is 3.78 degrees at 15.88X, and 0.945 degree at 63.5X with the field varying inversely with zoom to the higher powers in each range.

(3.1.1.1.7.1.2) Eyepiece Properties

(3.1.1.1.7.1.2.1) Peripheral Display

Satisfaction of paragraph (3.3.2.1.4.6.1) of section 4 will satisfy the requirements of this paragraph.

(3.1.1.1.7.1.2.2) Reticle

Satisfaction of (3.3.2.1.4.6.3) of section 4 will satisfy the primary performance requirement.

(3.1.1.1.7.1.2.3) Other Characteristics

Demonstrate that the headrest is of the same configuration as the June 30, 1968 AVE baseline with dimensional changes to adapt it for use with the supplemental eyepiece. Apparent field of view and exit pupil diameter, eye relief, and manual focus will be satisfied by paragraph 3.3.2.1.3.4 of section 4.

(3.1.1.1.7.1.3) Output Image Quality

See paragraphs 3.3.2.1.3.5 and 3.3.2.1.3.6 in section 4 of this document.

(3.1.1.1.7.1.4) Light Transmission

(3.1.1.1.7.1.4.1) Optical Transmission of ATS

See paragraph (3.3.2.1.3.1) in section 4 of this document.

(3.1.1.1.7.1.4.2) Manual Filter Wheel

See paragraph (3.3.2.1.3.2).

(3.1.1.1.7.1.4.3) Other Obscurations

Not applicable to the phase 0 MDS.

(3.1.1.1.7.1.5) Target Loading and Coordination

Satisfaction of the requirements of paragraph (3.3.2.1.2) will satisfy the simulator hardware requirements of this section. Demonstrate target selection logic.

(3.1.1.1.7.1.6) Scene Dynamics

TBD 3

The requirements for this paragraph shall be defined when TBD 3 of SAFSL Exhibit 34003 is defined.

(3.1.1.1.7.2) Earth Phenomena

(3.1.1.1.7.2.1) Lighting

The hardware requirements for this paragraph are satisfied by paragraphs (3.3.2.1.3.1) and (3.3.2.1.4.6.2).

Demonstrate that scene illumination can be varied from target to target.

(3.1.1.1.7.2.2) Ground Scene Special Effects

No demonstration requirements.

(3.1.1.1.7.2.3) Initial Target Location

General Requirement:

It must be demonstrated that the simulator will accept stimulus material

from the specified ranges

	LPA	HPA
Scale Range A	128,000:1 to 160,000:1	32,000:1 to 40,000:1
Scale Range B	286,000:1 to 364,000:1	71,500:1 to 91,000:1

taken at obliquities of $\pm$ 15° in stereo angle and $\pm$ 45° in roll angle. The simulator shall adjust the scale of the scene along the intrack and crosstrack axes to scales representative of 75 to 85 nm altitude and initial target locations of +45° to -40° intrack with roll angles of $\pm$ 10° of the inherent roll angle in the stimulus slide. It is a further condition that simulated scene roll angles shall be limited to $\pm$ 45°, and also that forward intrack obliquity of up to +60° can be simulated with stimulus material of +15° or less stereo angle when the scale of the stimulus is such that the dimensionally adjusted ground scene is contained in the 9" X 9" stimulus slide.

(3.1.1.1.7.2.4) Dynamic Target Location

Demonstrate that the stimulus subsystem (paragraph 3.3.2) can simulate the apparent dynamic perspective, orientation and slant range of the target, in real time, from the initial intrack position to 40° aft and that the simulator

will accomplish the changes in scene appearance for both circular and elliptical orbits within the 75 to 85 nm band.

(3.1.1.1.7.2.5) Scan Area

Demonstrate that line of sight excursions are limited only by the stimulus material format size.

(3.1.1.1.7.2.6) Scene Streaming

Demonstrate that the ground scene is blocked from view during periods of ATS slew, and that the field of view is illuminated at an intensity comparable to the scene intensity at these times.

(3.1.1.1.7.3) Associated Controls and Displays

The requirements of this paragraph will be satisfied by the requirements for paragraph (3.3.3).

(3.1.1.1.7.4) Control Stick and Magnification Control During Freeze

Demonstrate that, at the option of the SCC operator, the pilot can scan the stimulus and change magnification during the freeze mode.

(3.1.1.1.8.1) AVE Visual Optics Hardware Parameters

(3.1.1.1.8.1.1) Magnification and Real Field of View

Demonstrate that the simulator will accomplish simulated magnification step changes between the values of 125X, [redacted] plus; and between the values of [redacted] The response times for full range step changes shall be one second or less. Demonstrate that the real field of view is 0.32 degree $\pm$ 5% at 125X and that it varies inversely with magnification.

(3.1.1.1.8.1.2) Eyepiece Properties

The eyepiece properties will be those for the acquisition subsystem with the exception that the image will be masked down to a $40^{o} \pm 1^{o}$ apparent field of view. The apparent field of view will be demonstrated.

(3.1.1.1.8.1.2.1) Peripheral Display

The VO peripheral display will be incorporated in the ATS pattern. The 32 timer lights will appear on the left hand side of the display.

(3.1.1.1.8.1.3) Output Image Quality

No image quality demonstration will be made for the MO.

(3.1.1.1.8.1.4) Light Transmission

Satisfaction of paragraphs 3.3.2.1.3.1 and 3.3.2.1.3.2 will satisfy the requirements of this paragraph.

(3.1.1.1.8.1.5) Target Coordination and Loading

It will be shown that targets selected by voting logic during the ATS/MO mode demonstration shall be available for viewing through the eyepiece for MO in the appropriate time sequence. The target will appear at a time corresponding to the end of slew and remain in view until the commencement of slew to the next target.

(3.1.1.1.8.1.6) Scene Dynamics

TBD 3

(3.1.1.1.8.2) Earth Phenomena

(3.1.1.1.8.2.1) Lighting

(3.1.1.1.8.2.1.1) General

Show that the requirements of this paragraph in SAFSL 34003 are satisfied with the exception that no haze will be simulated for MO when in the ATS/MO mode.

(3.1.1.1.8.2.1.2) Scene Lighting

It will be demonstrated that the scene brightness will be variable over a range of 50:1 $\pm$ 10% up to 20 $\pm$ 2 foot lamberts as seen by the operator with no stimulus slide in the optical path.

(3.1.1.1.8.2.1.3) Haze

In the ATS/MO mode no haze will be provided for MO simulation.

(3.1.1.1.8.2.2) Ground Scene Special Effects

No demonstration requirements.

(3.1.1.1.8.2.3) Target Location Relative to Vehicle

Show that targets within the env lope of:

30 degrees forward to 40 degrees aft in track,

40 degrees left to 40 degrees right crosstrack,

and 75 to 85 nm altitude

can be simulated. Perspective and slant range associated with the above envelope are considered to be properties of the stimulus material and will not be altered by the MDS.

Show that altitudes beyond the range stated are possible if proper stimulus material is provided with scale factor proportional to the required altitude.

Show that the in track line on the ground scene is properly oriented for each target and fixed in time. This orientation shall be determined by the script

depending on the status of the derotation prism, orbit inclination and target latitude.

(3.1.1.1.8.2.4) Scan Area

Satisfaction of the requirements of paragraph (3.1.1.1.7.2.5) will have satisfied the requirements of this paragraph.

(3.1.1.1.8.2.5) Scene Streaming

Satisfaction of the requirements of paragraph (3.1.1.1.7.2.6) will have satisfied the requirements of this paragraph.

(3.1.1.1.8.3) Main Optics Alignment

This will not be demonstrated during phase 0.

(3.1.1.1.8.4) Associated Controls and Displays

Satisfaction of paragraph 3.0 b. will satisfy the requirements of this paragraph.

(3.1.1.1.8.5) Control Stick Magnification Control During Freeze

Satisfaction of the requirements of paragraph (3.1.1.1.7.4) will have satisfied the requirements of this paragraph.

(3.1.1.1.9) Cue Subsystem

The primary performance characteristic requirement of the cue subsystem will be demonstrated. See paragraph (3.3.2.1.4.6.4) of section 4.

(3.1.1.1.10) Photographic Section

No demonstration for phase 0.

4.0 HARDWARE VERIFICATION

The hardware design and construction characteristics of the phase 0 MDS will be verified as indicated in the following paragraphs.

(3.3.2) Stimulus Subsystem

(3.3.2.1) Acquisition

(3.3.2.1.1) General Description

This section of the document delineates the performance requirements to be demonstrated for the Slide Viewing Subsystem (SVS).

The equipment will consist of the source holding and selection system, an optical processing and relaying system and the electrical driving system.

(3.3.2.1.2) Source Holding and Selecting System

It will be demonstrated that the holders will hold 9" X 9" diapositive film plate source material. It will further be shown that there are two holder changers each capable of holding 70 9" X 9" diapositive film plates.

The following requirements shall be verified:

1. The adjacent slide position to the one in viewing position may be selected and viewed within one second.

2. It shall be demonstrated that five slide positions can be skipped and a slide from the sixth position can be viewed in 3 seconds or less.

3. Switching between HPA and LPA and vice versa shall occur within one second.

Demonstrations will be made to show that:

1. The changer may be commanded to any diapositive, forward or reverse of the present position, and to operate the two elevators independently.

2. An automatic restacking capability is provided.

(3.3.2.1.3) Optical Processing and Relaying System

It shall be demonstrated that the optical processing and relaying system of the SVS shall perform various optical functions on an input image and transmit the processed image to an eyepiece. The purpose of this system is to optically process an input image by dynamic change of image perspective, dynamic change in image orientation and dynamic optics center selection as defined in the following paragraphs.

(3.3.2.1.3.1) Image Intensity

It will be demonstrated that the color balance of the light is between 3000° and 6000° Kelvin.

It will be demonstrated that:

1. The image intensity can be varied through a range of 50:1 ± 10% with the upper level 500 foot lamberts ± 10%.

2. The intensity of the image 5 degrees from the edge is no less than 50 percent of the on axis intensity. Note: These numbers will be measured at the eyepiece without diapositives in the holder.

3. The color change shall not vary more than ± 25 mireds over the intensity range.

3.3.2.1.3.2 Manual Filter Wheel

It will be demonstrated that the manual filter wheel insertion simulates the optical path transmittances at 100%, 50% and 25%.

Furthermore, it will be demonstrated that it is readily possible to change these transmittances to other values.

3.3.2.1.3.3 Obscurations

Not applicable to the phase 0 MDS.

3.3.2.1.3.4 Image Size

It will be demonstrated that the angular magnification is by continuous zoom techniques.

It will be demonstrated that:

1. The magnification has a range of 7.2:1.
2. The field of view subtends an apparent 60 degrees $\pm$ 1 degree at the eye.
3. Lowest power the exit pupil is 4mm $\pm$ 0.2mm.
4. Highest power the exit pupil is 2mm $\pm$ 0.1mm.
5. The exit pupil size will vary inversely with magnification within the limits of item 3 and 4 above.
6. Manual focus will have $\pm$ 3 diopter adjustment.

3.3.2.1.3.5 Resolution Requirement from (3.1.1.1.7.1.3)

It will be demonstrated that when using a standard white on black bar chart of 2:1 contrast as an input, the device when simulating [redacted] at nadir from orbit shall provide at least 30 LP/mm for 32K scale stimulus and 67LP/mm for 72K scale stimulus. This performance shall be provided on axis as viewed through the

supplemental eyepiece by the unaided eye, with optical drives operating, the target centered in the FOV and scene drifts nulled by the computer. The resolution variation from the center to the edge of the apparent field shall not vary by more than a factor of 2 from the on axis performance.

The resolution under the above conditions shall not degrade by more than a factor of 2 from the performance at a simulated [redacted] where the device is configured to simulate a magnification of 63.5X.

3.3.2.1.3.6 Field Curvature Requirement from (3.1.1.1.7.1.3)

It will be demonstrated that the curvature of the apparent field from center to edge under static conditions at 1:1 anamorph setting using the supplemental eyepiece is no greater than 3.5 diopters.

3.3.2.1.3.7 Eyepiece Properties Requirement from (3.1.1.1.7.1.3)

Phase 0 will include a supplemental eyepiece. See also (3.3.2.1.3.4), (3.3.2.1.4.6.4) and (3.3.2.1.4.6.3).

3.3.2.1.3.8 Image Perspective from (3.3.2.1.3.3)

The anamorphic optics, which provide image perspective by distorting an input

to simulate various slant angles of view, will be demonstrated.

3.3.2.1.3.9 Optical Center Selection from (3.3.2.1.3.4)

It will be demonstrated that the center of the optical axis can be continuously varied to at least ± 4 inches in the two orthogonal directions with respect to the center of the diapositives.

(3.3.2.1.4) Electrical Drive System

This section covers the response requirements for various optical components to meet the dynamic time and accuracy specifications.

(3.3.2.1.4.1) Brightness Control

It will be demonstrated for the filter modulator that:

1. Any position within the brightness range can be set within 1 second.
2. Control accuracy is within ± 10 percent of a commanded foot lambert setting.

(3.3.2.1.4.2) Magnification Control

It will be demonstrated that the spherical zoom control will cause any required

2:1 magnification change within 0.5 seconds and will reset to any position within one second. Furthermore, it will be demonstrated that the control is continuous over the operating range as specified in paragraph (3.3.2.1.3.4).

(3.3.2.1.4.3) Anamorphic Control

It will be demonstrated that:

1. Anamorphic azimuth is continuously variable from 0 to 360 optical degrees.
2. Positional accuracy is $\pm$ 15 arc minutes.
3. Any position can be accomplished within 1 second.

(3.3.2.1.4.4) Image Rotation

It will be demonstrated that:

1. The image rotation is continuously variable from 0 to 360 optical degrees.
2. Any position can be accomplished within 1 second.
3. Positional accuracy is $\pm$ 30 arc minutes.

(3.3.2.1.4.5) Position Selection

It will be demonstrated that:

1. The center of the optics chain has a position accuracy of ± 0.00590 inches.

2. Any position, within the operating range, has a repeatable accuracy of ± 0.00040 inches.

3. The minimum position change is 0.00040 inches.

4. The position change is capable of a change rate between 0 and 4.61 inches per second.

5. During position change, position commands may contain accelerations between 0 and 38 inches per second squared.

(3.3.2.1.4.6) Ancillary Acquisition Optical Inputs

(3.3.2.1.4.6.1) Acquisition Peripheral Display

It will be demonstrated that:

1. All peripheral lights are displayed against a dark background in the outer three degrees in the periphery of a 60 degree field of view.

2. All lights subtend one-half degree in the field of view.

3. All lights have the capability of being switched on singly, in any combination or sequence.

4. There are 35 lights in the wipe out display and the design has a capacity for 45 lights.

5. There are 25 lights equally spaced within a 120 degree arc in the left hand field of view 60 degrees above and 60 degrees below the horizontal centerline.

6. There are 5 lights equally spaced and centered in a 30 degree arc centered in the upper right quadrant.

7. There are 5 lights equally spaced and centered in a 30 degree arc centered in the lower right quadrant.

8. There is a means provided to color the peripheral lights individually.

9. There is sufficient flexibility to simulate a wide variety of potential AVE configurations.

10. The brightness is variable over a 50:1 $\pm$ 10 percent range.

11. The maximum brightness is 500 foot lamberts $\pm$ 10%.

3.3.2.1.4.6.2 Haze Requirement from (3.1.1.1.7.2.1.3)

The haze brightness (atmospheric luminance) will be demonstrated to show that:

1. The brightness is variable over a 50:1 ± 10% range.

2. The upper level is 500 foot lamberts ± 10%.

The scene brightness and haze brightness will give proper appearance of the overall scene as seen from orbit.

3.3.2.1.4.6.3 Reticle Requirement from (3.1.1.1.7.1.2.2)

The reticle display will be demonstrated to show that:

1. The brightness is variable over a 50:1 range within ± 10 percent.

2. The upper level is 500 foot lamberts ± 10%.

It will be demonstrated that:

1. The reticle is illuminated.

2. The reticle will grow and contract with change in magnification.

3. The reticle configuration can be changed.

(3.3.2.1.4.6.4) Cue Subsystem

The Cue Subsystem will be presented by rear projection screen display on panel 2C. Four operating modes shall be simulated in the rear projection display.

1. Manual mode, single step

2. Manual mode, random access

3. Auto-Prepass Mode

4. Auto-During Pass Mode

In the manual mode the ability to advance, backup, or random access shall be demonstrated. It shall be demonstrated that consecutive cues can be accessed in one second. Furthermore, it will be demonstrated that any cue in the cue file shall be accessible within 4 seconds.

In the auto-prepass mode it will be demonstrated that the dwell time can be changed manually.

Demonstrate that the auto-during pass mode will provide a computer controlled dwell time.

It will be demonstrated that the cue system can provide the capability to present one cue per acquisition target in the during pass mode, and one cue of different content per acquisition target in the pre-pass mode. It will be further demonstrated that the cue film storage system uses 35mm full frame slides with a holding capacity of 80 slides.

(3.3.3) Simulated Laboratory Module (SLM)

Verify panels 2C and 2D to insure that these two panels reflect the AVE configuration as presented on:

Drawing 711-03063	2 July 1968 for panel 2C
Drawing 711-03064	2 July 1968 for panel 2D

Panels 3B and 7B will also be active. Panels 6C and 3C contain simulation peculiar switches. All other panels of the SLM will be blank for phase 0.

(3.3.4) Simulation Control Console (SCC)

Phase 0 will have panels 1A, 1B, 2A, 2B, 5A and 5B active. All other panels will be blank.

(3.3.5.1) Digital Interface Unit (DIU)

The DIU will be validated that it does perform the requirements of the following paragraphs.

(3.3.5.1.1) Functional Characteristics

The DIU shall interface and provide for data transfer in either direction between the SDS 930 digital computer and the SCC, the SLM, and the Stimulus Subsystem.

(3.3.5.1.2) Performance Characteristics

The DIU shall interface with the SDS 930 and the other simulator subsystems.

(3.3.5.1.2.1) Data Transfer

Digital data shall be transferred between the DIU and the SDS 930 in 24-bit words at a rate commanded by the SDS 930.

Data from the SCC, the SLM and the Stimulus Subsystem to the DIU are received on a random basis as discrete inputs and stored in the input registers for later transfer to the computer as commanded by the SDS 930. Data to the SCC,

the SLM and the Stimulus Subsystem are transferred at the same rate as the SDS 930 to DIU data rate.

(3.3.5.1.2.2) Decode Matrix

Register addresses received from the computer are decoded by a matrix within the DIU. A total of 127 addresses are available. The instruction word shall be decoded in a matrix which enables selection of the addressed output or input register.

(3.3.5.1.2.3) Output Register

The output registers store the digital data received from the SDS 930. Each register contains 24-bits and may be used for storing any of the data transferred by selection the appropriate address.

The DIU shall initially have 48 output registers. The total capability of the DIU is 54 output registers.

(3.3.5.1.2.4) Input Registers

The DIU shall deliver data to the SDS 930 through the input registers. These registers are sampled by the computer on a predetermined basis. All registers may be reset by computer command. The DIU shall have 30 addressable input registers of 24-bits each.

5.0 SOFTWARE CAPABILITY

The MDS phase 0 software capability is reflected in the ability of the phase 0 system to meet all the other requirements defined in this document.

APPENDIX A - DESCRIPTION OF PHASE 0 MDS

1.0 CONFIGURATION

Phase 0 hardware will consist of:

a. SLM - The active panels will be 2C, 2D, 3B and 7B. All other panels will be blank. Sound attenuation will not be provided.

b. SCC - The active panels will be 1A, 1B, 2A, 2B, 5A and 5B. All other panels will be blank.

c. DIU and System Junction Box- The DIU and system junction box will be complete.

d. Stimulus Subsystem - The stimulus subsystem will consist of:

1) A dual SVS A system with supplemental eyepiece

2) A2 Power Conditioning Racks

3) A2 Special Effects

The dual SVS A system will contain all driven elements in both legs for all modes of operation.

e. Computers - 360/44, 930/2200 and 360/930 Adapter will be complete.

2.0 IMPLEMENTATION

With a dual SVS system installed, the simulator may be operated from bay 2 in

any of three modes - all ATS with dual changer capability, or as a single changer ATS with a single changer MO, or as single changer MO. When operating in the ATS - MO mode, a mask on the reticle plane of the MO leg would be used to achieve the correct field of view for main optics while maintaining the correct field of view for ATS. The same eyepiece would be used for both ATS and MO. The special effects would normally be at the ATS field of view but could be changed for special experiments.

3.0 PERFORMANCE

When operating in the MO mode, the reticle mask will reduce the apparent field of view from 60^{o} to 40^{o}. The effect is to reduce the field on the stimulus and thereby reduce the total number of lines transmitted through the optical chain. (The SVS "T" system would accomplish the field of view change by changing the magnification of the system and would be able to transmit more lines within the same field of view.)

The optical power which can be simulated is a function of the stimulus scale. Table A-I outlines simulator field of view on the stimulus slides for scales of 20,000 and 10,000. Normally, only the high power arm would be used but the

TABLE A-I

FIELD OF VIEW VS MAGNIFICATION

Field of View Range:

Low Power Arm	4.75 to .66 in.
High Power Arm	2.11 to .293 in.

20,000 Scale Stimulus:

High Power Arm		Low Power Arm	
MAG	FOV	MAG	FOV
-	2.11	-	4.75
125	1.625	125	1.625
to		to	
700	.293	311	.66

10,000 Scale Stimulus:

High Power Arm		Low Power Arm	
MAG	FOV	MAG	FOV
		-	4.75
193	2.11	125	3.25
to		to	
1000	.408	622	.66
-	.293		

low power arm would be available if some unexpected scale became available.

The ATS peripheral display will be included as per the compliance document.

The MO peripheral display will be simulated using the ATS light configuration and any spare lights of the 45 provided.

Only one reticle can be used for both the ATS and the MO. Phase 0 reticle is located in the Special Effect Subsystem. It should not be confused with the "Reticle Plane" located in each arm of the SVS.

Magnification change items in the ATS shall be no more than one second when going from high power to low power since slides must be changed.

APPENDIX B - 106 PHASE O COMPLIANCE LEVEL

COMPLIANCE DOC. PARAGRAPH NUMBER	PARAGRAPH TITLE	PHASE O LEVEL OF COMPLIANCE	DEFINITION OF PHASE O COMPLIANCE
3.1.1.1.1	Communication Command and Instrumentation	Extremely limited	See sub-section discussions below for paragraphs 3.1.1.1.1.1, 3.1.1.1.1.2 and 3.1.1.1.1.3.
3.1.1.1.1.1	Command Processing	Extremely limited	The command processing for phase 0 will be partially simulated from a functional aspect. In phase 0 specially adapted command messages, formatted in a manner to enable using AVE software modules to access data directly from the command messages, will be generated by off-line non-real time prog. The phase 0 system will not dynamically simulate the LDAU, MDAU or AMU and will not contain the AVE software required to process the commands as they would be processed in the AVE system. In addition, the MOL Command Generation Programs will not be available for phase 0. The lack of these programs will necessitate the manual generation of all the required script data normally provided by these programs. The SLM Printers and Keyboard/Display Unit will not be driven in phase 0.
3.1.1.1.1.2	Instrumentation	None	
3.1.1.1.2	Electrical Power and Signal Distribution	None	

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APPENDIX B - 106 PHASE O COMPLIANCE LEVEL

COMPLIANCE DOC. PARAGRAPH NUMBER	PARAGRAPH TITLE	PHASE O LEVEL OF COMPLIANCE	DEFINITION OF PHASE O COMPLIANCE
3.1.1.1.3	LMSS Interface		See sub-sections discussed below; paragraphs 3.1.1.1.3.1, 3.1.1.1.3.2, 3.1.1.1.3.3, 3.1.1.1.3.4, 3.1.1.1.3.5, 3.1.1.1.3.6
3.1.1.1.3.1	Attitude Control and Translation System	Very Limited	The operation of the ACTS in the LVOP mode is functionally simulated in phase 0. The simulated vehicle maintains alignment with the Local Vertical Orbital Plane (defined by the relative velocity vector and the inertial position vector of the vehicle) automatically without any simulated jet firings. The main optics mirror torque effects are ignored. No ACTS controls and displays will be driven in phase 0. Finally, the AVE software package used for Attitude Determination will not be included in phase 0. Errors in Attitude Determination will be statically simulated.
3.1.1.1.3.2	Timing Subsystem	Limited	The event timer will be simulated to reflect the AVE system operation. The GMT clock and the Vehicle clock will not be incorporated in phase 0.
3.1.1.1.3.3	Data Computation Subsystem Group	Same as 3.1.1.1.1.1	
3.1.1.1.3.4	Command Subsystem	Same as 3.1.1.1.1.1	Same as 3.1.1.1.1.1
3.1.1.1.3.5	Monitor and Alarm Subsystem		Same as 3.1.1.1.1.2

SECRET/DORIAN
HANDLE VIA BYEMAN SYSTEM ONLY

APPENDIX B - 106 PHASE O COMPLIANCE LEVEL

COMPLIANCE DOC. PARAGRAPH NUMBER	PARAGRAPH TITLE	PHASE O LEVEL OF COMPLIANCE	DEFINITION OF PHASE O COMPLIANCE
3.1.1.1.3.6	Data Acquisition Subsystem Group		Same as 3.1.1.1.1.2
3.1.1.1.4	Controls & Display Subsystem		
	1) Reconnaissance Subsystem	Limited	Basic tracking function on 2C, 2D only
	2) Electrical Power and Signal Distribution Subsystem	None	
	3) Command and Control Subsystem	None	
	4) Navigation and Control	Limited	Only a simplified simulation of the IVS system is being performed and only the associated controls and displays (IVS) will be active in phase 0.
	5) Film Processing	None	
	6) Master Control Unit Switches	None	
	7) Keyboard Display Unit	None	
	8) Vehicle Printer	None	
	9) Camera, Film Status, Focus and Alignment	None	

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APPENDIX B - 106 PHASE O COMPLIANCE LEVEL

COMPLIANCE DOC. PARAGRAPH NUMBER	PARAGRAPH TITLE	PHASE O LEVEL OF COMPLIANCE	DEFINITION OF PHASE O COMPLIANCE
3.1.1.1.4 (continued)	10) Primary Film Handling	None	
	11) Secondary Film Handling	None	
	12) Monitor and Alarm	None	
	13) ACTS	None	
	14) Structure & Thermal Control	None	
3.1.1.1.5	Navigation and Control	None	
3.1.1.1.5.1	Star Tracker	None	
3.1.1.1.5.2	Low G Accelerometer	None	
3.1.1.1.5.3	IVS	Limited	The simulation of the IVS for phase O will be complete except that it will not reflect the AVE hardware response dynamics.
3.1.1.1.5.4	Control Stick	Complete	
3.1.1.1.6	Structure and Thermal Control		See sub-sections
3.1.1.1.6.1	Thermal Door	None	
3.1.1.1.6.2	Environmental Door	None	

SECRET/DORIAN
HANDLE VIA BYEMAN SYSTEM ONLY

APPENDIX B - 106 PHASE O COMPLIANCE LEVEL

COMPLIANCE DOC. PARAGRAPH NUMBER	PARAGRAPH TITLE	PHASE O LEVEL OF COMPLIANCE	DEFINITION OF PHASE O COMPLIANCE
3.1.1.1.6.3	Temperature Display and Controls	None	
3.1.1.1.7	Acquisition Subsystem		See sub-sections
3.1.1.1.7.1	AVE ATS Hardware Parameters		See sub-sections
3.1.1.1.7.1.1	Magnification and Real Field of View	Complete	
3.1.1.1.7.1.2	Eyepiece Properties		
	3.1.1.1.7.1.2.1 Peripheral Displays	Complete as defined	The simulation software will provide the ability to drive all 45 indicator lights, however, the drive signals will originate in the AVE software packages. The simulation software will in effect be a formatting program to drive the simulation hardware.
	3.1.1.1.7.1.2.2 Reticle	Complete	
	3.1.1.1.7.1.2.3 Other Characteristics	Complete	
3.1.1.1.7.1.3	Output Image Quality	Complete	
3.1.1.1.7.1.4	Light Transmission		See sub-sections

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APPENDIX B - 106 PHASE 0 COMPLIANCE LEVEL

COMPLIANCE DOC. PARAGRAPH NUMBER	PARAGRAPH TITLE	PHASE 0 LEVEL OF COMPLIANCE	DEFINITION OF PHASE 0 COMPLIANCE
3.1.1.1.7.1.4.1	Optical Transmission of ATS	Complete	
3.1.1.1.7.1.4.2	Manual Filter Wheel	Complete	
3.1.1.1.7.1.4.3	Other Obscurations	None	
3.1.1.1.7.1.5	Target Loading and Coordination	Complete for single ATS	
3.1.1.1.7.1.6	Scene Dynamics	Compliance is indicated as TBD 3 of 34003	See sub-sections
3.1.1.1.7.1.6.1	Line of Sight Dynamics	Complete as defined	The actual AVE software slew filter will not be used in phase 0 and the slew time will be computed by the simulation software as a function of gimbal angle to be slewed through.
3.1.1.1.7.1.6.2	Line of Sight Perturbations	Limited	The simulated perturbations for phase 0 are as follows: 1) Attitude measurement errors - limited 2) Ephemeris errors - comp. 3) Target location errors - complete 4) Misalignment errors - none 5) Gimbal bearing noise - complete 6) Main mirror slew effects on vehicle attitude - none 7) ACTS jet firings - none

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APPENDIX B - 106 PHASE O COMPLIANCE LEVEL

COMPLIANCE DOC. PARAGRAPH NUMBER	PARAGRAPH TITLE	PHASE O LEVEL OF COMPLIANCE	DEFINITION OF PHASE O COMPLIANCE
3.1.1.1.7.1.6.2 (continued)			Attitude measurement errors will be inserted as fixed non-varying attitude system alignment errors. These errors will be inserted as euler angle biases.
3.1.1.1.7.1.6.3	Overall Line of Sight Position Accuracy	Complete	The overall system tracking accuracy will degrade for simulated attitudes greater than 85 nm and for simulated forward and crosstrack look angles of greater than $\pm 45^{\circ}$. The accuracy degradation will be proportional to the increase in the length of the line of sight vector.
3.1.1.1.7.1.6.4	Stick Effects	Complete	
3.1.1.1.7.1.6.5	Image Derotation	Complete	
3.1.1.1.7.2	Earth Phenomena		See sub-sections
3.1.1.1.7.2.1	Lighting		See sub-sections
3.1.1.1.7.2.1.1	General	Complete	
3.1.1.1.7.2.1.2	Scene Lighting	Complete	Via the script
3.1.1.1.7.2.1.3	Haze	Complete	Via the script
3.1.1.1.7.2.2	Ground Scene Special Effects	N/A	
3.1.1.1.7.2.3	Initial Target Location	Complete as defined	See section 3.1.1.1.7.1.6.3

SECRET/DORIAN
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APPENDIX B - 106 PHASE O COMPLIANCE LEVEL

COMPLIANCE DOC. PARAGRAPH NUMBER	PARAGRAPH TITLE	PHASE O LEVEL OF COMPLIANCE	DEFINITION OF PHASE O COMPLIANCE
3.1.1.1.7.2.4	Dynamic Target Location	Complete	
3.1.1.1.7.2.5	Scan Area	Complete	
3.1.1.1.7.2.6	Scene Streaming	Complete	
3.1.1.1.7.3	Associated Controls and Displays	Limited	Only the ATS controls and displays on panels 2C and 2D will be driven for phase 0.
3.1.1.1.7.4	Control Stick and Magnification Control During Freeze	Complete	
3.1.1.1.8	Main Optics		See sub-sections
3.1.1.1.8.1	AVE Visual Optics Hardware Parameters		See sub-sections
3.1.1.1.8.1.1	Magnification & Real Field of View	Complete	
3.1.1.1.8.1.2	Eyepiece Properties		See sub-sections
3.1.1.1.8.1.2.1	Peripheral Display	Limited	The simulation will have the capability of driving up to 45 lights in the VO peripheral display. Only the 32 timer lights will be driven by simulation software. AVE software not included in phase 0 for this function.
3.1.1.1.8.1.2.2	Reticle	Limited	Only 2:1 variation

SECRET/DORIAN
HANDLE VIA BYEMAN SYSTEM ONLY

APPENDIX B - 106 PHASE O COMPLIANCE LEVEL

COMPLIANCE DOC. PARAGRAPH NUMBER	PARAGRAPH TITLE	PHASE O LEVEL OF COMPLIANCE	DEFINITION OF PHASE O COMPLIANCE
3.1.1.1.8.1.2.3	Other Characteristics	Limited	Same appearance as ATS. Exit pupil variation as specified.
3.1.1.1.8.1.3	Output Image Quality	Complete	
3.1.1.1.8.1.4	Light Transmission		See sub-sections
3.1.1.1.8.1.4.1	Light Path Switching	Complete	
3.1.1.1.8.1.4.2	Other Obscurations	None	
3.1.1.1.8.1.5	Target Coordination and Loading	Complete	
3.1.1.1.8.1.6	Scene Dynamics	Compliance is indicated as TBD 3 of 34003	See sub-sections
3.1.1.1.8.1.6.1	Line of Sight Dynamics	Complete as defined	The actual mirror slew is not simulated but the slew time is determined by the gimbal angle to be slewed through.
3.1.1.1.8.1.6.2	Line of Sight	Limited	Same as paragraph 3.1.1.1.7.1.6.2
3.1.1.1.8.1.6.3	Overall Line of Sight Position Accuracy	Complete	
3.1.1.1.8.1.6.4	Stick Effects	Complete	
3.1.1.1.8.1.6.5	Image Derotation	Complete	
3.1.1.1.8.2	Earth Phenomena		See sub-sections

SECRET/DORIAN
HANDLE VIA BYEMAN SYSTEM ONLY

APPENDIX B - 106 PHASE O COMPLIANCE LEVEL

COMPLIANCE DOC. PARAGRAPH NUMBER	PARAGRAPH TITLE	PHASE O LEVEL OF COMPLIANCE	DEFINITION OF PHASE O COMPLIANCE
3.1.1.1.8.2.1	Lighting		See sub-sections
3.1.1.1.8.2.1.1	General	Complete	
3.1.1.1.8.2.1.2	Scene Lighting	Limited	Controlled by script compliance in MO mode only.
3.1.1.1.8.2.1.3	Haze	Limited	Same as above.
3.1.1.1.8.2.2	Ground Scene Special Effects	N/A	
3.1.1.1.8.2.3	Target Location Relative to Vehicle	Complete	
3.1.1.1.8.2.4	Scan Area	Complete	
3.1.1.1.8.2.5	Scene Streaming	Complete	
3.1.1.1.8.3	Main Optics Alignment	None	
3.1.1.1.8.4	Associated Controls and Displays	Limited	Only panel 2C and 2D controls and displays will be driven in phase 0. Simulation peculiar switches will be on 8C.
3.1.1.1.8.5	Control Stick and Magnification Control During Freeze	Complete	Same as section 3.1.1.1.7.4
3.1.1.1.9	Cue Subsystem	Complete	The cue system operation for auto mode will be driven by AVE software.

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APPENDIX B - 106 PHASE O COMPLIANCE LEVEL

COMPLIANCE DOC. PARAGRAPH NUMBER	PARAGRAPH TITLE	PHASE O LEVEL OF COMPLIANCE	DEFINITION OF PHASE O COMPLIANCE
3.1.1.1.10	Photographic Section	Limited	Associated controls on 2C and 2D will be active.
3.1.1.2	Secondary Performance Characteristics		See sub-sections
3.1.1.2.1	Simulated Laboratory Module	Limited	Only panels 2C, 2D, 3B, 3C, 7B and 6C active.
3.1.1.2.2	Simulation Control Console	Limited	The CRT display system will be driven but the input formats must be pre-scripted because the alpha-numeric keyboard inputs will not be honored in phase 0. In addition, the following additional controls will not be active for phase 0: 1) Checkpoint 2) Recycle Panels 1A, 1B, 2A, 2B, 5A and 5B will be active.
3.1.1.2.3	Simulation Computer Subsystem		See sub-sections
3.1.1.2.3.1	Simulation Control	Limited	Simulation control limitations for phase 0 are defined by this document as a whole.
3.1.1.2.3.2	Data Computation	Limited	Same as 3.1.1.2.3.1
3.1.1.2.3.3	Data Transfer	Limited	Complete for signals being generated.

SECRET/DORIAN
HANDLE VIA BYEMAN SYSTEM ONLY

APPENDIX B - 106 PHASE O COMPLIANCE LEVEL

COMPLIANCE DOC. PARAGRAPH NUMBER	PARAGRAPH TITLE	PHASE O LEVEL OF COMPLIANCE	DEFINITION OF PHASE O COMPLIANCE
3.1.1.2.3.4	Data Recording and Display	Complete	
3.1.1.2.3.5	Malfunctions	None	
3.1.1.2.3.6	AVE Software Development	Limited	Limited to 6 AVE software programs operating in the 360/44 computer instead of the ADC. The six software programs in the phase 0 are: 1) POSC 2) Payload Mode Executive 3) Ephemeris 4) Drive Generation 5) Drive Correction 6) Decoupling matrix
3.1.1.2.3.7	Data Computation Subsystem Group (DCSG) Simulation		See sub-sections
3.1.1.2.3.7.1	ADC	None	
3.1.1.2.3.7.2	KDU and Printer	None	
3.1.1.2.3.7.3	AMU	None	
3.1.1.2.3.8	LDAU and CSC	None	
3.1.1.2.3.9	MDAU	None	
3.1.1.2.4	Interface Subsystem	Limited	Only the 930-360/44 interface unit, the DIU, and the 930/2200 interface equipment.

SECRET/DORIAN
HANDLE VIA BYEMAN SYSTEM ONLY

APPENDIX B - 106 PHASE O COMPLIANCE LEVEL

COMPLIANCE DOC. PARAGRAPH NUMBER	PARAGRAPH TITLE	PHASE O LEVEL OF COMPLIANCE	DEFINITION OF PHASE O COMPLIANCE
3.1.1.2.5	Stimulus Subsystem		See sub-sections
3.1.1.2.5.1	General	Complete	
3.1.1.2.5.2	Acquisition Displays	Complete	
3.1.1.2.5.3	Visual Optics Displays	Complete	
3.1.1.2.5.4	Cue Displays	Complete	
3.1.1.2.6	Simulation Executive Function	Limited	Designed to operate simulation system without the ADC.
3.1.1.2.7	Real World Tracking Function	Limited	All modules are present, however, the ACTS simulation will be as defined by section 3.1.1.1.3.1
3.1.1.2.8	Simulation Data Generation Function	Limited	Only a phase 0 version of the bulk data handling module and the script interpreter module will be provided for phase 0.
3.1.1.2.9	Hardware Simulation	Limited	Only the drive control response and position simulation module and a phase 0 version of the IVS simulator module will be included in phase 0.
3.1.1.2.10	Stimulus Control Function	Limited	All modules will be included but will not contain all the functions required for the final MDS. The number of hardware drive signals sent and received from the DIU will be in accordance with the simulation hardware available for phase 0.

APPENDIX B - 106 PHASE O COMPLIANCE LEVEL

COMPLIANCE DOC. PARAGRAPH NUMBER	PARAGRAPH TITLE	PHASE O LEVEL OF COMPLIANCE	DEFINITION OF PHASE O COMPLIANCE
3.1.1.2.11	Non-Real Time Functions	Limited	The phase O system will contain the following modules: 1) Script Preprocessor - Limited 2) Pre-simulation Data Generator - Complete - In addition, this program will have a phase O peculiar capability of formatting the AVE software required data for insertion into the real time simulation program. This data is normally entered into the system via command messages and the AMU. 3) Post-Operation Data Reduction and Evaluation - None in phase O. 4) Simulation Check - Complete.
3.1.1.2.12	On-Board Computer Programs	Limited	See 3.1.1.2.3.6
3.1.2	Operability	N/A	
3.1.3	Data Base Requirements	Complete	
3.2	System Definition	Limited	See Appendix A
3.3	Hardware Design and Construction		See subparagraphs
3.3.1	General	Limited	See Appendix A
3.3.2	Stimulus Subsystem		See subparagraphs

HANDLE VIA BYEMAN SYSTEM ONLY
SECRET/DORIAN

APPENDIX B - 106 PHASE O COMPLIANCE LEVEL

COMPLIANCE DOC. PARAGRAPH NUMBER	PARAGRAPH TITLE	PHASE O LEVEL OF COMPLIANCE	DEFINITION OF PHASE O COMPLIANCE
3.3.2.1	Acquisition		See subparagraphs
3.3.2.1.1	General Description	Complete	
3.3.2.1.2	Source Holding and Selection System	Limited	Only one dual SVS in phase O.
3.3.2.1.3	Optical Processing and Relay System	Complete	
3.3.2.1.4	Electrical Drive System	Complete	
3.3.2.2	Main Optics		See subparagraphs
3.3.2.2.1	General Description	Limited	MO uses one arm of ATS SVS.
3.3.2.2.2	Source Holding and Selection System	Complete	
3.3.2.2.3	Optical Processing and Relay Subsystem	Limited	SVS has anamorph which will be driven to 1X. Light level may be at ATS levels (500 FTL max.) depending on desirability of TV at SCC and simulation mode.
3.3.2.2.4	Electrical Drive System	Complete	
3.3.2.2.5	Main Optics Alignment	None	
3.3.2.2.6	Main Optics Timer Wipeout	Limited	Timer located along left hand side of field. Field of view of peripheral display is 60°.

APPENDIX B - 106 PHASE O COMPLIANCE LEVEL

COMPLIANCE DOC. PARAGRAPH NUMBER	PARAGRAPH TITLE	PHASE O LEVEL OF COMPLIANCE	DEFINITION OF PHASE O COMPLIANCE
3.3.2.3	Cue Presentation	Complete	Note: Eyepiece cue has been removed from the MDS configuration.
3.3.3	Simulated Laboratory Module	Limited	Only panels 2C, 2D, 3B, 3C, 6C, 7B. No photographic equipment.
3.3.4	Simulation Control Console		See subparagraphs
3.3.4.1	General	Limited	Only panels 1A, 1B, 2A, 2B, 5A and 5B.
3.3.4.2	Controls and Displays	Complete	Keyboard not active, Checkpoint and Recycle modes not active.
3.3.5	Interface Subsystem		See subparagraphs
3.3.5.1	Digital Interface Unit	Complete	
3.3.5.2	ADCAS	None	
3.3.5.3	PAKA	None	

SECRET/DORIAN
HANDLE VIA BYEMAN SYSTEM ONLY

APPENDIX B - 106 PHASE 0 COMPLIANCE LEVEL

COMPLIANCE DOC. PARAGRAPH NUMBER	PARAGRAPH TITLE	PHASE 0 LEVEL OF COMPLIANCE	DEFINITION OF PHASE 0 COMPLIANCE
3.3.5.4	360/930 Adapter	Complete	
3.3.5.5	Junction Box	Complete	
3.3.6	Computer System		See subparagraphs
3.3.6.1	Simulation Computer		See subparagraphs
3.3.6.1.1	IBM 360/44	Complete	
3.3.6.1.2	SDS 930/Beckman 2200	Complete	
3.3.6.1.3	DCSG Components	None	
3.3.7	Facilities	Complete	
3.4	Simulation Software Design		See sub-sections
3.4.1.1	MDS Executive	Limited	Will not be required to control the data interface with the ADC in phase 0. The program sequencing for phase 0 will not include a complete complement of simulation programs. In addition, the 6 AVE software programs contained in the 360/44 for phase 0 will be sequenced and controlled by the simulation executive. The simulation executive will not respond to the checkpoint and recycle mode commands from the SCC. The module will perform all its other functions as defined in 3.4.1.1.

SECRET/DORIAN
HANDLE VIA BYEMAN SYSTEM ONLY

APPENDIX B - 106 PHASE 0 COMPLIANCE LEVEL

COMPLIANCE DOC. PARAGRAPH NUMBER	PARAGRAPH TITLE	PHASE 0 LEVEL OF COMPLIANCE	DEFINITION OF PHASE 0 COMPLIANCE
3.4.1.2	Performance Data Collection Module	Limited	Limited only by the fact that all the final MDS variables will not be available in phase 0.
3.4.1.3	Script Interpreter	Limited	Operates only in the prescripted mode and, therefore, no real time script statements may be enter via the SCC keyboard. In the prescripted mode the following statements will not be available for use in the MDS phase 0 system. 1) Checkpoint - not mechanized for phase 0. 2) Recycle - not mechanized for phase 0. 3) Insert - phase 0 has no malfunctions. 4) Remove - used in conjunction with "Insert".
3.4.1.4	Post-Operation Data Reduction and Evaluation	None	
3.4.1.5	Simulation Check	Limited	Complete for phase 0 hardware.
3.4.1.6	Program Library Generate/Update Program	None	
3.4.1.7	Data Base Present/ Update Program	None	

SECRET/DORIAN
HANDLE VIA BYEMAN SYSTEM ONLY

APPENDIX B - 106 PHASE 0 COMPLIANCE LEVEL

COMPLIANCE DOC. PARAGRAPH NUMBER	PARAGRAPH TITLE	PHASE 0 LEVEL OF COMPLIANCE	DEFINITION OF PHASE 0 COMPLIANCE
3.4.1.8	Input Module	Limited	Inputs data from the DIU for only the hardware available in phase 0.
3.4.1.9	Output Module	Limited	Outputs data to the DIU to drive only the hardware available in phase 0.
3.4.1.10	Laboratory Data Adapter Unit Simulator	None	
3.4.1.11	MMSE Program Requirements	Limited	
	Reference Ephemeris Generator	Limited	This module is complete for MDS in phase 0 but does not reflect all the MMSE requirements.
	Attitude Reference Generator and ACTS Simulator	Limited	See section 3.1.1.1.3.1
	Star Tracker Simulator	None	
	Electrical Power and Signal Distribution	None	
	Mission Module Environment Simulator	None	
	Sun Angle Generator	None	
	Pre-simulation Data Generator	Limited	See section 3.1.1.2.11

SECRET/DORIAN
HANDLE VIA BYEMAN SYSTEM ONLY

APPENDIX B - 106 PHASE O COMPLIANCE LEVEL

COMPLIANCE DOC. PARAGRAPH NUMBER	PARAGRAPH TITLE	PHASE O LEVEL OF COMPLIANCE	DEFINITION OF PHASE O COMPLIANCE
3.4.1.11 (continued)	Script Preprocessor	Limited	The on-line preprocessor functions will not be available for phase 0. In addition, the phase 0 version does not process all the training language instructions in the off-line version. See 3.4.1.12 for details.
	MDAU Simulator	None	See section 3.1.1.1.1.1
	Drive Control Response and Position Simulator	Complete	
	Tracking Simulation Controller	Limited	Simulates the AVE function during the pre-pass briefing for cue system drives. Otherwise complete.
	Reference Target Generator	Complete	
	Reference LOS Generator	Limited	Does not compute the LOS from the vehicle to the stars in phase 0. Otherwise complete.
	Payload Simulator and Hardware Controls	None	
	Mission Module Variable Alignment Simulator	None	
	Display Position Driver	Complete	

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APPENDIX B - 106 PHASE 0 COMPLIANCE LEVEL

COMPLIANCE DOC. PARAGRAPH NUMBER	PARAGRAPH TITLE	PHASE 0 LEVEL OF COMPLIANCE	DEFINITION OF PHASE 0 COMPLIANCE
3.4.1.11 (continued)	IVS Simulator	Limited	See section 3.1.1.1.5.3
	Derotation Simulation	Complete	
	Bulk Data Handling	Limited	Does not input actual command messages, star pair data or AMU data for phase 0.
	Film Processor	None	
	TLM/MAS	None	
	Laboratory Decoder	None	
	Command Message Editor	None	
3.4.1.12	Training Language Requirements	Limited	Only the following training language capability will be available for phase 0: 1) GO TO 2) IF 3) ENTER 4) FREEZE 5) DISPLAY 6) SKIP 7) MONITOR 8) IDENT 9) STOP
3.4.2	Design Requirements		See sub-sections

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APPENDIX B - 106 PHASE O COMPLIANCE LEVEL

COMPLIANCE DOC. PARAGRAPH NUMBER	PARAGRAPH TITLE	PHASE O LEVEL OF COMPLIANCE	DEFINITION OF PHASE O COMPLIANCE
3.4.2.1	Programming Languages	Complete	
3.4.2.2	Planning for Program Checkout	None	
3.4.2.3	Subsystem Simulation Implementation Concepts	Complete	
3.4.2.4	Growth Capabilities	Complete	

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