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Rev. F
11 Jan. 1965

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REQUIREMENT SPECIFICATION

CORONA J SYSTEM

J-21 thru J-39

Approved: [redacted]
Payload Integration

Approved: [redacted]
Manager, Advanced Projects

Approved: [redacted]
PTSK

Approved: [redacted]

Approved: [redacted]

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REVISION D SUMMARY

PAGE	PARA.	DESCRIPTION
i thru iii		Added Table of Contents & Revision Summary
6	4.1.5 A1	Changed 4800 ± 60 seconds to 3840 ± 60 seconds
8	4.1.6	Changed 60 seconds to 75 seconds - last sentence.
9	4.1.6.3.2	Changed from - lens baffle shall be provided-----, to -- lens baffle shall be redesigned and provided-----.
9	4.2.1	Added sentence - "The pyro interface connector and associated circuitry shall be redesigned for improved reliability."
10	4.3	Added "including improved water seals," -- first sentence.
13	4.7	Added sentence - "Command circuits will be redesigned to eliminate buffer relays."
14	4.14	Removed sentence-"No consideration shall be given to individual components mounted to the space structure other than thermal shields." Added sentence-"Thermal shielding only shall be investigated and used as the thermal control mechanism for components mounted to the space structure." Revised-"Albedo shall range from .25 to .55 pk." - to "Average Albedo coefficient shall range from 0.25 to 0.55.
15	4.16.3	Revised "----during 60% of the A mode----" to read "---a minimum of 5% of the A mode----" Revised "----during 60% of the B mode----" to read "---during a minimum of 20% of the B mode----".
2	2.0	Added Itek 50400 Drawing.

[redacted]

REVISION E SUMMARY

Technical changes have been made or technical requirements added to the following paragraphs:

PARAGRAPH	
1.2	
2.0	
3.1	
3.2	
3.3.1	
3.3.2	
3.3.3	
4.0	
4.2.5	
4.3	
4.3.1	New Paragraph
4.3.1.1	New Paragraph
4.3.1.2	New Paragraph
4.3.2	New Paragraph
4.12	
4.16.1	
4.16.2	
4.17	New Paragraph
4.18	New Paragraph
4.19	New Paragraph

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REVISION F SUMMARY

PAGE	PARAGRAPH	DESCRIPTION
2	1.0	Removed GK501 Added GK21708 and G10
6	4.1.2 e	Changed Exposure Time from 1/250 - 1/300 sec to 1/400 - 1/500 sec
6	4.1.2 f	Added S/N shall be less than 30%
8	4.1.3.3	New paragraph
9	4.1.3 (3)	Removed "over a range of 40°F to 105°F" Added "at 75°F"
9	4.1.4	Removed "of resolution target diameter" from first sentence and used to describe spots.
10	4.1.5 ( )	Changed 1% to 5%
13	4.2	Added 198R78G2
13	4.2.3	Removed "Pressure Makeup System"
15 & 16	4.3.1 4.3.1.1 4.3.1.2	Modified paragraphs in accordance with C.E. [redacted]
18	4.4.2	Removed sentence "The A take-up cassette film footage monitors shall have increased sensitivity to facilitate transfer prior to exceeding spool capacity."
21	4.9	Removed "A telemetry system shall be provided."
21	4.10	Added S.E. SVS 3702 and SVS 3703
22	4.14	Removed "fourth power" two places.
25	5.1	Removed Itek and added Associate Contractors
25	4.18 4.19 4.20	Removed paragraphs: Weight Reduction Study Training Program Failure Mode Analysis

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1.0 SCOPE

This Specification defines the configuration for the "J" Satellite Reconnaissance System, serial numbers 21 through 39.

1.1. General

The term "J" System includes the Panoramic Camera, Double Frame Camera, Recovery, and Space Structure subsystems. The requirements for fabrication; test; preparation for delivery; design maintenance; pre-flight, in-flight, and post-flight operations support of the "J" System are included in this document.

1.2 The scope of this specification also includes the technical requirements applicable to J21 - 39 as described in the Technical Directives approved under the J1-20 contract prior to finalization of the J21 - 39 contract.

2.0 APPLICABLE DOCUMENTS

The following documents, of the exact issue shown, form a part of this specification to the extent specified herein:

SPECIFICATIONS

T3-415A	Acceptance Test Specification, Light Leakage
T3-3-002 Rev. B	Acceptance Test Specification, J System
T3-457 DRCG Rev. B DCS	Dual Parallel Output Clock Generator E prime type
LMSC-6117B	General Environmental Specification for Agena Satellite Program

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SVS 3701A	System Design Specification - SRV
LMSC-447969B	EMI Control Agena Systems Electrical Interface
LMSC-1412815C	Radiographic Inspection of Semiconductors
LMSC-1415131C	Programmer, Type VIII
Itek DCS 13-P	DCS - J Program Stellar-Index
Itek DCS 19	DCS - J Program Panoramic Camera Subsystem
SP62-65-0004 Rev. A	Process Specification Film 4404
SP62-65-0001 Rev. A	Process Specification Film 4401
SP62-65-0002 Rev. A	Process Specification Film 4400
LMSC 1417161	Model 39205 Vehicle, Program 241
LMSC T3-4-505	Storage and Handling

DRAWINGS

T22-800	Payload to Agena Final Assembly
T22-100	J System Inboard Profile
T22-600	Payload Assembly Complete
198R358G7 & G8	Vehicle Assembly - Satellite Recovery
6K617G8 & G10	Vehicle Assembly - Satellite Recovery
Itek 56545	Supply Spool Structure Assembly
Itek 50930	Take-Up No. 2
Itek 44276	Take-Up No. 1
Itek 44448	Format
Itek 42600	J Program Main Instrument #1, Main Assembly
Itek 42650	J Program Main Instrument #2, Main Assembly

[redacted]

[redacted]

Itek 63333	Intermediate Roller Assembly
Itek 50400	Double Frame Camera

MILITARY DOCUMENTS	TITLE
MIL-E-ID	Electron Tubes and Crystal Rectifiers
MIL-STD-150A	Photographic Lenses
TO-0025-203	Standard Functional Criteria for the Design and Operation of Clean Rooms

3.0 REQUIREMENTS

The requirements of this specification shall apply to the "J" System configuration noted in paragraph 1.1 and 1.2.

3.1 Functions

Following a launch and injection into orbit by an SLV-2A booster and LMSC 39205 Vehicle, the "J" System shall be capable of providing a minimum of nine days of photo reconnaissance ($4\frac{1}{2}$ days nominal for each recovery) within the first thirty days of planned orbital life. Controlled tumble and deactivate shall not be programmed prior to the A mission. After a prescribed number of orbits the "J" System shall eject, at separate times, the two recoverable portions of the reconnaissance system within a predetermined area.

3.2 System Design

The design of the "J" System is predicated upon the design provisions of drawing T22-600-539 of issue in effect on 20 December 1963, Revision "A" and any other approved changes specified herein. The total launch weight of the J system as specified herein shall be not more than 1446 pounds.

3.3 "J" System Operation

3.3.1 Operating Environment:

The "J" System shall operate in orbital vacuum conditions existing in altitudes ranging from 90 to 240 nautical miles under direct solar radiation. A pressure makeup system for corona discharge suppression shall be utilized. This system, located in the recovery barrel, shall be capable of maintaining pressures of 20 microns or higher in the instrument barrels during instrument operation.

3.3.2 Orbit Operations:

During active orbit life, the "J" system shall be capable of being programmed for any portion of the ground track on any orbit except during the recovery maneuver. Duty cycle limits specified in paragraph 4.1.1 shall apply. Such predetermined operation shall be independent of increasing or decreasing orbit

altitude. Capability for early "A" transfer shall be provided.

3.3.3 "J" System On-Orbit Power:

The "J" System shall receive the following electrical energy from the LMSC 39205 Agena vehicle power source measured at the "J" System/ LMSC 39205 Agena vehicle interface connectors. Power requirements shall be based on a nine day active mission with mission life limited only by the Agena vehicle electrical power. 30

(1) Unregulated DC +22 to +29 Volts: With an average load of 20 watts continuous and 250 watts during operation of the "J" System.

(2) Regulated DC +28 $\pm\frac{1}{2}$ Volt: With an average load of 10 watts continuous and 60 watts during operation of the "J" System.

(3) Regulated DC -28 $\pm\frac{1}{2}$ Volt: With an average load of 10 watts during the "J" T/M System operation.

(4) 400 $\pm$ .004 cycles, 115 $\pm$ 2 VAC: With a peak load of 10 watts during "J" System operation.

4.0 "J" SYSTEM DESCRIPTION

The "J" System shall conform to the applicable dash number of T22-600 and all other approved changes specified herein. The "J" System shall consist of the following major categories:

A. Two 70mm Panoramic Cameras

B. Two Double Frame Cameras

C. Space Structure Sub-system

D. Two Modified Mark 5A Recovery Sub-systems

4.1 Panoramic Camera Sub-system

The Panoramic Camera sub-system shall consist of two Panoramic Cameras mounted in 30° converging stereoscopic configuration, horizon cameras, film supply cassette, film take-up cassettes, and all film transport rollers, as per "J" System Inboard Profile drawing LMSC T22-100. The intermediate roller assembly shall incorporate commutators on the rollers. The signals shall be conditioned and telemetered by LMSC. The Panoramic camera sub-system shall weigh less than 330 pounds without film and radiation shielding. No radiation shielding shall be supplied. The Panoramic camera sub-system shall be furnished GFE to LMSC and shall utilize existing Corona "J" design as specified in Itek Drawing 42600 and 42650.

4.1.1 Panoramic Camera:

The two Panoramic cameras shall be capable of operating simultaneously to generate stereoscopic photography or separately to generate monoscopic photography. The cameras shall have a maximum sustained operational capability of 20 minutes operation per single orbit.

4.1.2 Resolution:

Each Panoramic camera shall demonstrate a minimum dynamic resolution of 90 lines per millimeter utilizing a USAF standard low contrast (2 to 1) test target and 100% FMC match. Other

requirements for this test are as follows:

a. Collimator: Focal length 60" (minimum), Aperture 10" (min.)

b. Film: Kodak Emulsion Type, 4404.

c. Filter: Wrattan - 21

d. Film Processing: Per SP62-65-0004, Rev. A

e. Exposure Time: 1/400 - 1/500 sec.

f. Temperature: Test specimen, test equipment, and ambient temperature shall be at 60°F minimum, 80°F maximum. The test specimen temperature shall be measured at the scan arm assembly. R/H shall be less than 50%

g. Lens: The lens shall be a Petzval type with the following characteristics: Aperature, f/3.5; focal length - 24" ± 2%: Field of view 5°.

4.1.2.1 Calibration:

The calibration of the lens by Itek Corporation shall be performed such that the axis of cell rotation will coincide with the rear nodal point of the lens system under simulated orbital vacuum conditions as specified in paragraph 3.3.1.

4.1.2.2 Lens Focus:

(1) - The lens system shall be focused for orbital vacuum conditions.

(2) - The lens shall have a focus shift of less than ± .001 inches over a temperature range of 60°F to 80°F when the

camera subsystem is in flight configuration. No demonstrations or testing for compliance is required in the flight system configuration.

4.1.2.3 Orbital Performance

Environments outside of the design and test temp. ranges of 60° to 80°F may result in proportional system performance degradation.

4.1.3 Horizon Cameras:

Two 55 millimeter focal length, f/6.8 horizon cameras shall be integrated with each Panoramic Camera. The horizon cameras shall be capable of recording the earth horizons to the port and starboard side of the vehicle from orbital altitudes. In addition the following requirements shall be met:

(1) Paired horizon cameras shall operate simultaneously on alternate panoramic cycles and expose horizon formats adjacent to Panoramic formats per ITEK Drawing No. 44448.

(2) Artificially illuminated fiducials shall be generated adjacent to each horizon format and shall be used to correlate optical and mechanical format centers.

(3) The format dimensions and fiducial locations shall be per ITEK Drawing No. 44448.

(4) The lens shall have characteristics as follows:

a. Focal Length 55 Millimeters ± 2%.

b. Field angle not less than 44°.

c. f/6.8 aperture with iris diaphragm control from f/6.8 to f/22.

(5) The focus shall be for vacuum conditions at 70°F measured on the Panoramic camera scan arm assembly.

(6) Shutters - Alphaxheavy duty, adjusted to 1/100 sec.

4.1.4 Data Block:

A binary data head shall produce well defined spots over a large range of block to film distances and shall be provided in each 70 mm Panoramic Camera. The block design shall be such that the spots shall not bloom into the format nor off the edges of the film.

4.1.5 Panoramic Camera Control:

The controls for the Panoramic Camera shall include:

A. Forward motion compensation (FMC) - An FMC control shall be furnished as part of the Panoramic Camera: the following elements shall be included:

1) FMC Programmer, a device, started on LMSC 39205 vehicle tape timer command, which produces a sinewave voltage over a period of 3840 (± 60) seconds, (ref. T3-3-002). Selectable reference voltage levels and output voltage levels shall be provided and be directly proportional to camera cycle rates. The levels shall be adjustable in the field since the flight settings shall be specified approximately 19 days prior to launch date.

2) A servo system shall regulate the camera cycle rates to within 5% of the corresponding FMC Programmer output voltage. Cycle periods shall be greater than 3.15 seconds or less than 6.5 seconds.

3) An FMC cam mechanism shall be attached to the lens cell to displace the image during scan. The cam design shall be such that the displacement when properly matched to ground angular velocity, shall yield 7.4% overlap. FMC controls shall satisfy the following test conditions to assure the desired inflight control, during the operational photographic flight operations: (a) The Panoramic cameras shall operate at a cycle rate within 3% of each other.

(b) The cycle rates shall be repeatable within 1% at any given reference level and amplitude settings of the FMC Programmer.

(c) The flight cycle rate adjustments made on approximately R-19 days by LMSC shall be within 5% of the assigned mission values.

B. Scanning Drive Mechanism - A scanning drive mechanism shall drive the lens and scan arm in synchronism over the 70° panoramic scan angle. Velocity of scan shall be controlled so as to produce no visible banding in ground scenes. The Geneva drive sub-assembly shall be of modular construction for ease of installation and replacement.

C. Reaction and Momentum Balance - The operation of a single

camera subsystem shall impart only minimum residual reaction and momentum to the basic vehicle.

D. Homing - Circuitry shall be provided to operate the camera at a "Homing" rate for 30 seconds upon receipt of a signal from the LMSC 39205 Agena vehicle. The lens/drum combination shall be in the "Home" position prior to LMSC 39205 Agena vehicle Deactivate.

4.1.6 Double Frame Camera Subsystem

The Double Frame camera subsystem shall be supplied GFE per ITEK Design Control Specification No. 1 (one) dated 2 July 1962. The subsystem shall consist of two Double Frame cameras with take-up cassettes designed so that the total weight is less than 37 pounds, excluding film.

Stellar and Index photography shall be generated intermittantly and concurrent with 70 mm Panoramic photography. Exposed film shall be transported to the cassettes within the recovery systems via independent film paths. Both stellar and Index film paths shall contain redundant film cutters. Fusing shall be provided in power circuits to protect the Panoramic Camera subsystem power. The camera shall be capable of transporting a minimum of 2.5 feet of 35 mm film in 75 seconds upon receiving a slew command (22 to 29 volts DC for 60 seconds).

4.1.6.1 Cycle Rate - The Double Frame camera shall expose

film to obtain 55 to 65 percent overlapping Index photography.

4.1.6.2 Angular Relationship - The Angular Relationship between the Stellar and Index Optical Axes shall be within the tolerances specified per ITEK DCS-13-P. Calibration of the angular relationship shall be conducted prior to delivery to LMSC.

4.1.6.3 Distortion - The Stellar lenses shall be calibrated for radial distortion prior to delivery to LMSC. The Index lenses shall be calibrated for tangential and radial distortion prior to delivery to LMSC. Both sets of data shall be supplied to LMSC for inclusion in the flight data book.

4.1.6.3.1 Index Unit - The 70 mm Index Unit shall provide photography to be used for indexing and correlation of Panoramic photography by the Government. The Index Unit shall be equipped with a calibrated reseau plate. Grid lines shall be approximately 5 microns wide. The center of grid shall be located within 500 microns of the lens principal ray. The Index Unit supply spool shall accommodate 130 feet of 70 mm 3.2 mil polyester base film. The time relationship between the opening of the Index Unit shutter and the Stellar Unit shutter shall be capable of being calibrated to within 10 milliseconds. An Index Unit photograph shall be made with

every 6th, 7th or 8th main instrument photograph.

4.1.6.3.2 Stellar Unit - 35 mm Stellar Camera shall provide photography to be used by the government to determine vehicle attitude. One Stellar photograph shall be generated for each Index format.
Four reseau grid intersections, outside the format, shall be exposed on each frame. The Stellar Unit shall accommodate 65 feet of 35 mm 3.2 mil polyester base film. The necessary lens baffling shall be provided in the space structure to minimize obscurations of stellar imagery due to earth haze layer illumination. A Space structure stellar lens baffle shall be redesigned and provided by LMSC. The Stellar lens shall look eastward on descending passes.

4.2 "J" System Structures

The "J" System structures shall include the payload frame as shown in LMSC Drawing T22-100 and the mechanical and electrical interfaces between subsystems.

4.2.1 Aft Conical Section:

The Aft Conical Section shall provide structural mounts for a Digital Clock, Panoramic Camera Film Supply Cassette, Telemetry and Power Junction Box, Aft Pyro Junction Box, Command

Box, and Vacuum Gage. The Aft Conical section shall provide the structural interfaces with the LMSC 39205 Agena vehicle and the number two (2) barrel. The pyro interface connector and associated circuitry shall be re-designed for improved reliability.

4.2.2 Barrel No. 2:

Barrel No. Two shall provide the structural mount for slave Panoramic Camera and the structural interface with the Aft Conic section and Barrel No. One.

4.2.3 Barrel No. 1:

Barrel No. One shall provide the structural mount for the master Panoramic Camera and the structural interface with Barrel No. Two and recovery subsystem "B" Barrel.

4.2.4 Recovery System "B" Barrel:

The recovery system "B" Barrel shall provide the structural mount for recovery system "B", Double Frame Camera No. Two, Film Chutes, Panoramic Intermediate Roller Assembly, Panoramic Camera Film Light Seal, and the Structural Interface with Barrel No. One and the Fairing Section.

4.2.5 Fairing Section:

The Fairing Section shall provide the structural mount for

Double Frame Camera No. One, Film Chute, and the Structural Interfaces with the Recovery System "A" and the Recovery System "B" Barrel.

4.2.6 Doors and Boots:

The "J" System structure shall provide detachable doors which shall be ejected on command during orbit injection. The structure shall also provide boots or other similar devices to seal the camera subsystems from external light.

4.2.7 Access panels shall be provided per LMSC Drawing T22-600.

4.3 Basic Recovery Subsystem

The basic Recovery subsystem shall be two (2) mark 5A recovery vehicles defined by GE RSD Drawing No. 198R358G7 & 8 "Vehicle Assemblies - Satellite Recovery," as modified by Drawings 6K617G8 and 6K617G10 and shall be furnished GFE to LMSC.

4.3.1 SRV Modifications for J Systems

The modifications shall include the following items:

1. Swing-down ballast
2. Thrust cone separation switch pads
3. Thrust cone interface ring painting
4. Rubber light shield - T/C ring
5. Chute guide

6. Improved water seals
7. Forebody lanyard
8. Safety wiring holes (Payload Area)
9. Battery temp sensor installation
10. Sink and drain valves
11. Capsule cover
12. Research Payload canister and bracket
13. Pyros for swing down ballast
14. Spin System Valves and Nozzles

4.3.1.1 A/P Responsibilities

A/P shall be responsible for systems integration, test, and launch. Modifications shown below shall be accomplished by A/P:

J21-24 All items, one (1) through thirteen (13)

J25-39 Item seven (7) forebody lanyard: Item nine (9) battery temp sensor installation: Item twelve (12), R.P. canister and bracket; and Item thirteen (13), pyros for swing down ballast.

4.3.1.2 G.E. Responsibilities

G.E. shall furnish all recovery subsystems as flight ready GFE, except as defined in paragraph 4.3.1.1 and except for pyros and other items shipped loose in accordance with drawings 198R358 and 6K617. G.E. shall provide mounting holes for Item seven (7).

4.3.2 SRV Capabilities

Up to 16,000 feet of 70 mm film shall be stored in the number

one Recovery subsystem during the first operational phase. At some time after completion of the first operational phase, the number one Recovery subsystem shall be ejected. After ejection of Recovery system number one, the LMSC 39205 Agena vehicle may be programmed into a control tumble for up to 21 days. All the power to the "J" System shall be turned OFF. The LMSC 39205 Agena vehicle shall be re-established prior to further reconnaissance operations. Approximately 16,000 feet of film shall be programmed, during a one (1) to five (5) day interval. Recovery system number two shall be recovered sometime between completion of first photo reconnaissance phase and the 30th day in orbit. The re-entry and recovery sequence of operations shall be initiated and recovery of number two Recovery subsystem shall be effected, thus completing one "J" mission.

4.4 "J" System Cassettes

4.4.1 Film Supply Cassettes:

The supply cassette for the Panoramic Camera subsystem shall consist of two film spools, mounting enclosure, and controls to assure film supply at proper tension required throughout normal operating range. Each supply spool shall have a nominal capacity of 15,600 feet of 3.2 mil thick 70 mm film. Spool core diameter shall be six inches.

Film supply cassette shall be structurally compatible with the "J" System structure supplied by LMSC. (ITEK Drawing 56545). The supply cassette shall operate from 22 to 29 volts DC Unregulated power measured at the Camera subsystem interface. The supply spools shall be capable of operating together or independently to supply film to the Panoramic Cameras.

4.4.2 Film Take-up Cassette:

The take-up cassette shall consist of two Panoramic camera film spools, one Index Unit Spool, one Stellar Unit spool, one structural mount, three powered film takeup drive systems, and spool control features that assure film takeup. Each Panoramic Camera takeup spool shall accommodate 7,800 feet of 3.2 mil 70 mm film. The Index takeup spool shall accommodate 130 feet of 3.2 mil 70 mm wide film. The Stellar takeup spool shall accommodate 65 feet of 3.2 mil 35 mm wide film. The design of the cassette shall conform to the basic configuration and space limitations of the Recovery subsystem, ITEK Drawing 50930 and 44276. The take-up cassette shall operate from a minimum of 27 volts DC Regulated power measured at its connector interface. The Panoramic Camera takeup spools shall be capable of operating together or independently.

4.4.2.1 Maximum Temperature Indicator - A passive method for indicating maximum temperature in excess of 200°F at the takeup spools shall be provided by LMSC.

4.4.2.2 Start Stop Capability - Each takeup spool shall be capable of being started and stopped at least three hundred (300) times in flight.

4.4.2.3 Anti-backup Device - Each Panoramic Camera takeup spool shall be designed to incorporate an electro mechanical anti-backup mechanism, in the spool drive system to prevent the take-up spool from unwinding. The anti-backup device shall be capable of being released for test and checkout purposes by applying 22 to 29 Volts DC on an appropriate pin connection at cassette connector interface. The anti-backup device shall be mechanically engaged when the voltage is removed.

4.4.2.4 Number Two (2) Cassette Special Feature - Panoramic film takeup spool in the number two cassette shall be held to a fixed operational position until the number two cassette is programmed to takeup panoramic film.
The number two cassette spools shall be released to turn immediately prior to their use as film takeup spools (Ref. Drawing 50930).

4.5 Film Paths

Film paths as described in drawing T22-600, in effect 20 October 1964 shall be maintained.

4.6 DRCG

LMSC shall provide and checkout the Digital Clock. The clock shall be capable of storing time unambiguously for a period of five days. Upon receipt of an interrogate command, the clock shall provide the signals required for auxiliary recording of binary time on the Panoramic Camera subsystem film. The clock error shall not exceed 2.5 milli-seconds in any twelve hour period after accounting for clock drift and offset. The Clock shall operate from the LMSC Agena vehicle +28 Volt DC Regulated power source.

4.7 Commands and Programming

The LMSC 39205 Agena vehicle orbital timer (Ref. Spec. 1415131C) shall contain punched mylar tapes which control both the vehicle orbital functions (such as Telemetry and Beacon operations) and J System program options. The latter shall provide camera operation commands, stored mono modes, stereo/mono mode, EMC programmer start, clock interrogate, other "J" System controls. Seven real time commands shall be available for selection of stored programs. Command circuits shall be redesigned to eliminate buffer relays.

4.8 Telemetry Transducers

LMSC shall coordinate instrumentation schedules and establish functions to be telemetered. The number of channels shall not exceed eight. The instrumentation functions shall provide information for "on" orbit analysis of "J" System operation. A low voltage excitation system shall be employed to reduce self heating of Thermal Transducers.

4.9 Telemetry Signal Conditioner

A signal conditioner capable of accepting instrumentation signals from the "J" System and conditioning them into suitable form for transmission by the LMSC 39205 Agena vehicle.

The signal conditioner shall be compatible with eight telemeter channels. One additional channel which is time shared between Research Payloads and the tape recorder shall be provided. The tape recorder shall record data from a .4 RPS Commutator.

4.10 Storage and Handling

Storage and Handling shall be in accordance with LMSC T3-4-505 and or G.E. SVS3702 and SVS3703.

4.11 Selection of Parts and Components

Parts and components shall be selected from any of the following sources preferably in the order listed:

A. LMSC Space Systems Preferred Parts Handbook

B. Military Standards/Military Specifications

C. Missile and Space Industry Standards

D. LMSC and ITEK Specification Controlled Drawings

E. Items Proven Satisfactory by Prior Flight Usage

F. Parts and Components which have been qualified prior to flight to Level Requirements by the Design Application.

4.12 Semi-Conductors

Requirements and characteristics of MIL-E-ID are minimum. No semi-conductors shall be used that are not vendor certified. All semi-conductors devices except for non-cavity devices (micro diodes) shall be inspected by the X-ray method in accordance with LMSC 1412815C.

4.13 Electro Magnetic Interference (EMI) Control

The provisions of specification LMSC 447969B are to be used as a guide for controlling EMI in electrical and electronic assemblies and conic components. No EMI testing of the "J" System to LMSC 447969B shall be required.

4.14 Thermal Design

Design Goal 70 ± 5°

Passive Thermal control means shall be employed in the "J" System. Structural surface optical properties and associated Mosaic geometry shall be adjusted to provide a computed time averaged temperature of 70° ± 30° F (at nominal space environmental conditions) for the optical train which consists of the lens assembly

field flattener, drum and scan arm. Temperature instrumentation will be provided for data inputs for thermal calculation purposes only. All temperature transducers shall be Micro Systems Type TE3-D with a low voltage excitation system as specified in paragraph 4.8. The "J" System Thermal Math model shall be used to predict inflight temperatures. Symmetrical and/or assymmetrical paint skin patterns will be developed, based on the analytical model predictions. Aluminum thermal shielding shall be used as required for components mounted to the space structure. Thermal shielding, improved undercoating and thermal finishes shall be the subject of investigation. Associate Contractors shall identify temperature sensitive components in their respective subsystems and establish temperature limits. The maximum-minimum and time averaged temperature will be predicted for all system components in a space environment range as follows:

Beta: -90° to $+90^{\circ}$

Period: 88 to 95 minutes

Eccentricity: .001 to .020

Perigee Height: 90 NM to 140 NM

Inclination Angles: 60°, 65°, 70°, 75°, 80° and 85°

Initial Perigee Latitude: 20° North to 85° North

Solar Constant shall include diurnal variations

Average Albedo coefficient shall range from .25 to .55. The internal power duty cycle shall be calculated on a range from 0 minutes to 20 minutes per orbit. The attitude during active phase shall be as specified for the LMSC 39205 Agena vehicle.

The deactive phase tumble shall have a pitch rate of .5 RPM, oscillatory roll motion having a period of twenty-minutes and a double amplitude of 60°.

4.15 Light Leaks

Light Leak Tests in accordance with LMSC Specification T3-415A shall be performed on the "J" System. All leaks located shall be corrected prior to final pre-launch assembly.

4.16 Corona Marking

4.16.1 Main Instruments

Corona marking shall be limited to the first five consecutive frames from the end of pass mark at each instrument startup. Tests shall be in accordance with paragraph 4.16.3.

4.16.2 Double Frame Camera

Corona marking shall be limited to 10% of the programmed formats and any such marking shall be at a density less than 0.4 above the base plus fog level. Tests shall be in accordance with 4.16.3.

4.16.3 System Altitude Test

The system, in flight configuration, shall be tested in an altitude chamber to test its susceptability to corona marking. Operate times will follow the flight profile and the system internal

pressure shall be 3 to 10 microns during a minimum of 5% of the A mode and 3 to 1 microns or less, during a minimum of 20% of the B mode.

4.17 Test Matrix

The test matrix philosophy and report shall be expanded to provide a plan for implementation. The additional GSE requirements shall be defined and will include consideration for weight and balance, pyro checkout, and payload simulators.

5.0 INSPECTION AND CERTIFICATION

Prior to testing a "J" System, all components of the system shall be inspected by a Quality Assurance Representative and certified as complying with drawing T22-600. The system shall meet flight quality standards in regard to workmanship and cleanliness.

5.1 Failure During Test

In the event of failure during test, the testing shall be discontinued. Such failure shall be completely documented and reported for analysis and disposition. Disposition shall be in accordance with LMSC and Associate Contractors Standard Operating Procedures.

5.2 Test Certification

A Quality Assurance Representative shall witness and verify the accuracy of all testing.

5.3 Quality Assurance Provisions

5.3.1 Classification of Tests:

The testing of the "J" System noted in paragraph 1.1 shall consist of acceptance and pre-launch tests.

5.3.2 Acceptance Test:

Each "J" System shall be accepted and tested in accordance with the basic provisions of specification LMSC T3-3-002.

5.3.3 Preparation for Delivery:

Precautions shall be taken to protect the accepted "J" System from damage and contamination during storage and shipment. Storage of Panoramic Instruments, Double Frame Camera, Cassettes, and etc., shall be under modified class #2 Clean Room conditions as per TO-0025-203.

6.0 NOTES

LMSC 6117B is amended as follows:

A. General Environmental Specification except paragraph 1.2.4.1, 3.2.1.4, 3.2.1.5, 3.2.1.9, 4.3.1, 4.4, 4.6, and 4.8.

B. Paragraph 1.1.5 of LMSC 6117B is changed to read: "Advanced Projects Engineering Department of Contractor."

C. Delete from LMSC 6117B paragraph 1.2.2.1 and substitute: "Equipment shall be transported by military transport aircraft and motor vans. The equipment shall be protected and packaged to withstand such conditions as well as shock and vibration prevalent during shipping.

D. Delete paragraph 1.2.3 of LMSC 6117B and substitute: "Contractor storage facilities will ordinarily be airconditioned. However, heat and humidity may occur and equipment shall be able to withstand such conditions up to 75°F and 50% relative humidity.