C05098942

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206 PROGRAN REPORT



VOLUME

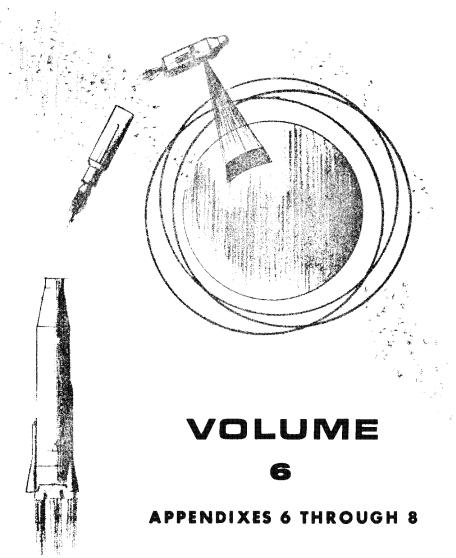
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This Document Contains 308 Pages November 1967

206 PROGRAM REPORT



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APPENDIX 6

PAYLOAD SUBSYSTEM SPECIFICATION

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Phase II

Photographic Subsystem

Specification No. 702-145

Prepared by
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Phase II Specification	Photographic	Subsystem
Specification No. 702-145	Release Date:	2/5/62

1. SCOPE AND MISSION

- 1.1 Scope This specification defines the Photographic Subsystem of the Recoverable Satellite Reconnaissance System. It includes the performance and environmental requirements, and defines the quality assurance provisions required to determine compliance of the subsystem to these requirements. This specification also defines related items necessary for the performance of the task. This specification shall reference subsidiary specifications of the photographic subsystem, and to that extent serve as an index for this larger group of documents.
- 1.2 <u>Mission</u> It shall be the mission of the photographic subsystem to obtain high resolution photographs of selected areas of the earth from an orbiting satellite in accordance with the requirements outlined in this document.

2. APPLICABLE DOCUMENTS

- 2.1 This specification is in accordance with the requirements of Work Specification Exhibit "A" to contract AF33(616)7704 Part I Statement of Work and those Military Standards and Specifications as specified therein.
- 2.2 The following specifications, standards, and publications of latest issue in effect, form a part of this specification. Applicability of the listed documents shall depend on their specific reference in this specification and shall be in conformance with 2.1. In the event of conflict between the listed documents and this specification, this specification shall take precedence.



SPECIFICATIONS

Mi	11	tary	
-	-		

MIL-Q-9858	Quality Control System Requirements
Eastman Kodak Company	
401-101	Instructions for Preparation of Drawings by Subcontractors
401-102	Technical Requirements for Proposals and Subcontracts
401-106	Subcontractor Reliability Requirements
401-119	Design and Manufacturing Standards
502-115	Cable Assemblies
502-118	Environmental Design Criteria Including Qualification and Acceptance Test Levels for RSRS Payload
502-146	GE-EK Program 206 Interface Specification
502-154	Focus Control Electronics Assembly
502-158	Cable Test Point Board (Set)
502-161	Breakout Box
502-162	Secondary Standard
502-181	Operating Equipment (Ground Equipment Functional Specification)
502-208	Electric Simulator
602-100	Elevation Servo Assembly (Stereo Servo Assembly)
602-101	Azimuth Servo Assembly (Crabbing Servo Assembly)
602-126	Cradle

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602-128	Electrical Distribution Component
602-132	Erector
602-144	Package Shipping Container (Payload Shipping Container)
602-157	Leak Rate Test Set
602-168	Purging Equipment
602-171	General Purpose Mobile Hoist
602-174	Space Chamber Integration Lifting Yoke (Camera Payload Integration Lifting Yoke)
602 -217	Command Monitor
702-102	Motor Speed Drive (Film Drive Electronics Assembly)
702-110	Record Viewer
702-127	Record Storage Bracket
702-135	Forward Record Storage Assembly
702-139	Film Supply Cassette Assembly
702-141	Record Loading and Unloading Kit
702-143	Integration Accessory Kit
702-147	Handling Accessory Kit
70 2 - 173	Record Storage Assembly Test Set
702-175	Record Splicer
702-176	Handling Specification for Recovered Record
702-183	Accessory Shipping Container
702 - 184	Final Product Specification

702-213	Record Advance Control
702-214	Air Supply and Record Storage Alignment Measuring Equipment (Film Supply Cassette and Record Storage Alignment Measuring Equipment)
702 <i>-</i> 221	Forward Storage Table and Lifting Yoke
702 -22 6	Record Travel Viewer
802-103	Structural Mock-up
802-107	Test Console
802-108	Portable Test Set
802-114	Truck
802-122	Camera Assembly
802-123	Thermal Model Payload
802-124	Forward Record Storage Drop Test Assembly (Dummy Forward Record Storage Assembly)
802-125	Lens and Flat Mirror Assembly (Lens Assembly)
802-129	Structure Assembly
802-134	Target for Moving Target Assembly
802-137	Space Chamber Lifting Yoke (Camera Payload Assembly Lifting Yoke)
802-148	Flight Payload Qualification Test Plan
802-149	Collimator Assembly
802-150	Engineering Model
802-153	Flight Payload Model
802-156	Line of Sight Test Set



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802-163 Record Dolly

802-177 Test Record Support Equipment

802-179 Aerospace Ground Equipment

(Includes Environmental Criteria)

802-207 Dynamic Simulator

802-238 Test Record Transfer

802-243 Programmable Slit Mechanism for Camera Assembly

STANDARDS

Military

MIL-STD-150A Photographic Lenses

Eastman Kodak Company

401-108 Design Standard for Human Factors, Engineering

DRAWINGS

Eastman Kodak Company

501-113-3 GE-EK Electrical Interface Program Z

501-114-3 Instrumentation Information Payload

Program Z

703-100 Lens and Flat Mirror Alignment and

Adjustment Procedure

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801-112-3	Test Point Information, Camera Payload
801-116-1) 801-116)	GE-EK Payload Interface
804-104	Flight Payload Acceptance Test Procedure for the Camera Payload Subsystem
804-105	Aerospace Ground Equipment Acceptance Test Procedure
805-101	Space Chamber Assembly
805-110	Lens and Camera Adjustment Procedure
808-103	Film Format "B"
808-501	Plate, Slit Aperture
813-227	Shield "B" Assembly, Dust, External Interface

OTHER PUBLICATIONS

USAF Bulletin

WDT 56-5 Rev. C

Technical Manual Program

Eastman Kodak Company

554-121 Film Handling and Film Handling Assemblies

554-132 Operational Procedures for Post Mission

Smear Analysis

3. REQUIREMENTS

The Photographic Subsystem shall provide the design, fabrication, test, and support necessary to obtain high resolution photography from an orbiting satellite. The record thus obtained shall be returned to specified recovery site after a five day operational life time.

- 3.1 <u>Definitions</u> For the purpose of this Photographic Subsystem specification the following definitions are given:
- 3.1.1 Camera Payload The camera payload (C/P) is a generic term that may include the engineering, reliability test, S/V compatibility and flight payload models. The C/P portion of the photographic system consists of the flight equipment required to collect visual information on a photographic film, store the film prior to exposure, wind the exposed record onto the forward record storage assembly in the recoverable portion of the vehicle, and the electrical subsystems necessary to both control and monitor the performance of the photographic system by means of the command and telemetry susbsystem in the OCV + SRV. The C/P is the equipment that consists of the following assemblies (See Table I) and mechanisms required for orbital operation or demonstration of such capability for the system except those assemblies and mechanisms which are the responsibility of other subsystems. In the text, a flight model C/P is referred to as a flight payload for brevity.

TABLE I

<u>Item</u>		Specifications
(a)	Camera Assembly	802-122
(b)	Lens and Flat Mirror Assembly (Lens Assembly)	802-125
(c)	Film Supply Cassette Assembly	702-139



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TABLE I (CONT'D)

Item		Specifications
(d)	Forward Record Storage Assembly	702-135
(e)	Structure Assembly	802-129
(f)	Elevation Servo Assembly (Stereo Servo Assembly)	602-100
(g)	Azimuth Servo Assembly (Crabbing Servo Assembly)	602-101
(h)	Focus Control Electronics Assembly	502-154
(i)	Motor Speed Drive (Film Drive Electronics Assembly)	702-102
(j)	Electrical Distribution Component	602-128
(k)	Cable Assemblies	502-115
(1)	Programmable Slit Mechanism for Camera Assembly	802-243

- 3.1.2 Configuration The system configuration at launch is shown in Figure I. The parts of this configuration which concern this photographic subsystem are as given in 3.1.2.1 through 3.1.2.4.
- 3.1.2.1 Orbital Control Vehicle (OCV) The OCV is that portion of the S/V that establishes structural continuity between the S/V booster system and SRV. The OCV houses part of the C/P, the satellite programmer, the battery supply and other systems, subsystems and major elements.
- 3.1.2.2 Satellite Re-entry Vehicle (SRV) The SRV is that portion of the satellite which houses the exposed film, the retrieval subsystem and other subsystems and major elements. (Eastman Kodak Company Forward Record Storage Assembly is attached to but is not considered to be part of the SRV). The SRV protects the film during the terminal phases of the mission, descent from orbit through retrieval.



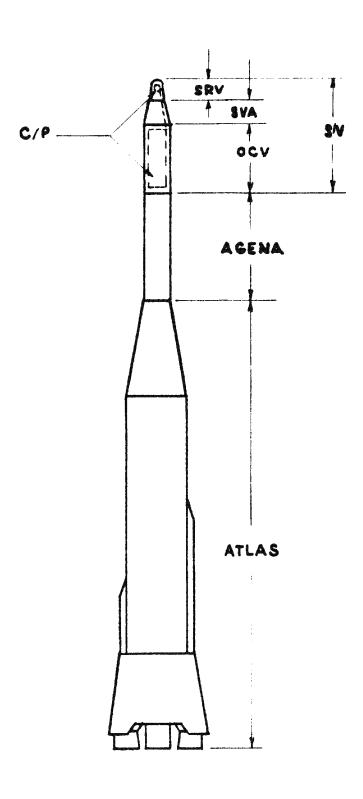


Figure I

- 3.1.2.3 Satellite Vehicle Adapter (SVA) The satellite vehicle adapter section is interposed between the OCV and SRV sections of the S/V. This section contains no C/P hardware but shall provide a light tight film chute for the transport of film from the film handling assembly to the forward record storage assembly in the SRV.
- 3.1.2.4 Satellite Vehicle (S/V) The flight system consisting of the OCV and the SRV when they are connected into one unit with the C/P installed.
- 3.1.3 Component A component is an assembly of parts, the aggregate weight of which does not exceed 75 pounds, arranged within a single package designed to perform a specific function.
 - 3.1.4 Assembly An assembly is a combination of parts and components.
- 3.1.5 Smear Degradation of image quality caused by uncompensated image motion relative to the film is called smear. This is usually specified in equivalent feet at ground level.
 - 3.1.6 Subsystem The subsystem or photographic subsystem consists of:
 - (a) All those airborne equipments payloads, models, mock-up, etc., specified in this document.
 - (b) The Aerospace Ground Equipment and spares required to support the airborne equipment.
- 3.1.7 System The system consists of the integration of all those subsystems and facilities required to fulfill the system objective.
- 3.1.8 Associate Contractor An associate contractor is one of several major contractors associated with the production of the complete system; a contractor having direct responsibility to the Air Force for one or more complete subystems.

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3.1.9 Interface - An interface is the physical, or abstract boundary between two subsystems. such an interface defines the areas of mutual responsibility, interest, or limitations of concern to the associated contractors involved. These interfaces may be mechanical, electrical or environmental; as an example: the physical surfaces and spacings in the mating of several parts, modules, components or subsystems; or an activity, for example loading of flight film into the S/V. The GE-EK Program 206 Interface Specification SVS 105Z/502-146 and GE-EK Payload Interface, 30S2000/801-116 or 30S2000-I/801-116-1 control the GE-EK interface. Both documents are under GE change control.

3.2 Electrical Requirements

3.2.1 Photographic Subsystem (Electrical Requirements) - The general photographic subsystem electrical requirements are specified in the following paragraphs. The details of the electrical requirements are given in the individual component specifications for the airborne deliverable hardware, and the Aerospace Ground Equipment. Airborne deliverable hardware and Aerospace Ground Equipment shall be electrically compatible.

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- 3.2.1.1 Instrumentation The C/P shall provide instrumentation outputs to the satellite vehicle for recording and/or telemetering to a ground station during orbital operation. These instrumentation outputs shall be available at the Launch Operations Building (LOB), Vehicle Support Building (VSB), Missile Assembly Building (MAB), and Tracking Station (TS) during ground testing at the launch site. The available instrumentation shall provide data on camera operation, temperature, slit position, stereo and crab position of the stereo mirror, film handling, focus detector operation, and the status of the port opening (Port open telltale). The instrumentation points shall conform to Eastman Kodak Company Specification 502-146. The schedule by which the payload instrumentation shall be changed from payload to payload is reflected in the revision and effectivity schedule of GE-EK Program 206 Interface Specification GE SVS 1052/EK 502-146, Revision F.
- 3.2.1.2 Power Electrical power from the OCV shall be supplied to the C/P as unregulated plus 28 volt d.c. (nominal) for environmental control and C/P operation, and plus 5 volts d.c. (nominal) for instrumentation. All power shall be supplied through the interface. Unless otherwise required by component specifications the ground equipment shall be capable of operating satisfactorily on commercially available power.
- 3.2.2 Camera Payload The electrical requirements for the C/P shall be in accordance with the applicable component specification of 3.1.1,

 Table I. A short description of these follows:

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- 3.2.2.1 Camera Assembly The electrical requirements for the camera assembly shall be in accordance with Eastman Kodak Company specification 802-122 which includes the requirements for connectors, instrumentation, electromagnetic interference, and wiring of the assembly.
- 3.2.2.2 Lens and Flat Mirror Assembly (Lens Assembly) The electrical requirements for the lens assembly shall be in accordance with Eastman Kodak Company specification 802-125, this specification covers the requirements for the temperature instrumentation.
- 3.2.2.3 Film Supply Cassette Assembly The electrical requirements for the film supply cassette assembly shall be in accordance with Eastman Kodak Company specification 702-139.
- 3.2.2.4 Forward Record Storage Assembly The electrical requirements for the forward record storage assembly shall be in accordance with Eastman Kodak Company specification 702-135.
- 3.2.2.5 Structure Assembly The electrical requirements for the structure assembly shall be in accordance with Eastman Kodak Company specifications 502-146 and 802-129. These requirements are concerned with temperature, port door instrumentation and grounding.
- 3.2.2.6 Elevation Servo Assembly (Stereo Servo Assembly) The electrical requirements for stereo servo assembly which positions the stereo mirror in each of three positions in response to electrically coded commands received from an external source shall be in accordance with Eastman Kodak Company specification 602-100.

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3.2.2.7 Azimuth Servo Assembly (Crabbing Servo Assembly) - The crabbing servo assembly shall be capable of rotating the stereo mirror to any one of two sets of eight preselected crab positions. These positions are determined in part by the location of the servo and may be chosen to satisfy the photographic requirements of orbits which result in northbound or southbound photographic orbits. The crab servo is positioned on the right side or +Y side of the stereo mirror bridge to produce a negative crab correction for orbits with southbound photographic passes. The crab servo is positioned on the left or -Y side of the stereo bridge to produce positive crab correction for orbits with northbound photographic passes. The electrical requirements of this assembly shall be in accordance with Eastman Kodak Company specification 602-101. This assembly shall operate in response to electrically coded commands received from an external source.

3.2.2.8 Focus Control Electronics Assembly - The focus control electronics assembly shall provide, in its primary mode of operation, information for transmission to ground facilities to permit an operator to command the camera focus mechanism. This assembly may, in closed mode, provide intelligence to control power to drive the focus mechanism. The OCV shall be required to position the vehicle to a predetermined obliquity angle for a focus sequence to allow operating of the focus control electronic assembly within its design range. The electrical requirements for the focus control electronics assembly shall be in accordance with Eastman Kodak Company specification 502-154.

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- 3.2.2.9 Motor Speed Drive (Film Drive Electronics Assembly) The film drive electronics assembly shall provide two phase power, at the specified voltage and frequency to the camera film drive in response to the binary coded command. The 64 film drive speed steps corresponding to this binary code structure shall be in accordance with Eastman Kodak Company drawing 502-146. This assembly shall also amplify data signals and provide power to operate the data lamps in the camera assembly. The electrical requirements for the film drive electronics assembly shall be in accordance with Eastman Kodak Company Specification 702-102.
- 3.2.2.10 Electrical Distribution Component The electrical distribution component shall act as a junction point for all input commands; distribute primary power, and environmental power, regulate instrumentation power, and house instrumentation circuitry. The requirements for the electrical distribution component shall be in accordance with Eastman Kodak Company Specification 602-128.
- 3.2.2.11 Cable Assemblies The cable assemblies shall provide the appropriate connections to each electrical package and functional unit. The electrical requirements shall be in accordance with Eastman Kodak Company Specification 502-115.
- 3.2.2.12 Programmable Slit Mechanism (Slit Positioner) The electrical requirements of the slit positioner which locates the camera slit in each of four positions in response to electrically coded commands received from an external source shall be in accordance with Eastman Kodak Company Specification 802-243.
 - 3.2.3 Deliverable Hardware and AGE
- 3.2.3.1 Airborne Models The electrical requirements for the deliverable hardware airborne models shall be in accordance with the following Eastman Kodak Company specifications:

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TABLE II

Item	<u>Item</u>		
(a)	Engineering Model	802-150	
(b)	Structural Mock-up	802-103	
(c)	Forward Record Storage Drop Test Assembly (Dummy Forward Record Storage Assembly)	802-124	
(a)	Thermal Model Payload	802-123	
(e)	Flight Payload Model (Includes S/V Compatibility Models and Reliability Test Model)	802-153	
(f)	Dynamic Simulator	802-207	
(g)	Electric Simulator	502-208	

- 3.2.3.2 Aerospace Ground Equipment
- 3.2.3.2.1 Payload Test Equipment The power requirements for the payload test equipment shall be in accordance with 3.2.1.2. Additional requirements shall be in accordance with the applicable Eastman Kodak Company component specification of 3.8.2, Table III.
- 3.2.3.2.2 Payload Support Equipment Electrical requirements for the payload support equipment shall be in accordance with the individual Eastman Kodak Company specifications of 3.8.2, Table III.
- 3.2.3.2.3 Photo Support Equipment The electrical requirements of the photo support equipment shall be in accordance with the individual Eastman Kodak Company specifications of 3.8.2, Table III.
- 3.2.3.2.4 Operating Equipment This equipment is to be supplied by an associate contractor in accordance with Eastman Kodak Company specification 502-181. This equipment is part of the complete focus control equipment and is located in an associate contractor's operating console at the TS.



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- 3.2.4 Interfaces
- 3.2.4.1 Airborne Electrical The flight payload electrical interface shall conform to the requirements of Eastman Kodak Company Specification 502-146.

 This specification shall contain the following information:
 - (a) Interface inter-connections and pin assignments
 - (b) Conducted noise specification
 - (c) Test plug requirements, display and recording information
 - (d) Umbilical cord requirements, display and recording information
 - (e) Overload protection requirements
 - (f) Power requirements
 - (g) Time data signal configuration
 - (h) Instrumentation signal information
 - (i) Command structure
- 3.2.4.2 Aerospace Ground Equipment The aerospace ground equipment electrical interface requirements shall be in accordance with Eastman Kodak Company Specification 802-179.
- 3.2.4.3 EMI Compatibility The design of the Photographic Subsystem shall reflect the requirements of Eastman Kodak Company Specification 502-146 and this specification with regards to Electromagnetic Interference (EMI).
 - 3.3 Environmental Requirements

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- 3.3.1 Photographic Subsystem (Environmental Requirements) The subsystem shall be designed to complete a mission successfully in the encountered environments. These environmental requirements shall include all periods starting with shipment from the manufacturer's plant and ending with recovery and processing of retrieved film after orbital flight.
 - 3.3.2 Camera Payload
- 3.3.2.1 General The flight payload shall comply with the environmental requirements of Eastman Kodak Company specifications 501-118 and 502-140. Included in these specifications are environmental conditions relating to the following life phases:
 - (a) Storage and Transportation
 - (b) Handling and Mating
 - (c) Pre-flight
 - (d) Powered Flight
 - (e) Orbital Flight
 - (f) De-orbit and Separation
 - (g) Re-entry
 - (h) Parachute Deployment to Impact
 - (i) Air Snatch
 - (j) Water Impact and Recovery

The environmental characteristics considered are:

- (a) Vibration
- (b) Acceleration

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- (c) Shock
- (d) Acoustic Noise
- (e) Temperature
- (f) Pressure
- (g) Humidity
- (h) Explosive or Corrosive Atmosphere
- (i) Life (Duration)
- (j) Precipitation
- (k) Salt Spray, Sand and Dust
- (1) Fungus
- (m) Electromagnetic Interference (EMI)
- 3.3.2.2 Lens Provisions shall be made by Eastman Kodak Company and associate contractors to control the lens environment in accordance with Eastman Kodak Company specifications 502-146 and 802-125.
- 3.3.2.3 Stereo Mirror Provisions shall be made by Eastman Kodak Company and associate contractors to control the stereo mirror environment in accordance with Eastman Kodak Company specification 502-146 and 802-125.
- 3.3.2.4 Flight Payload View Port Door Operation The design, fabrication, installation and operation of the flight payload view port door shall be the responsibility of an associate contractor who shall accomplish the tasks so as to introduce the minimum thermal input to the stereo mirror and lens assembly. Details of port door operation are specified in 3.7.5.2 and Eastman Kodak Company drawing 502-146.

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- 3.3.2.5 Re-entry The associate contractor supplying the SRV is responsible for the maintenance of all environmental conditions required in the SRV. It is of particular importance that the film environment during re-entry and recovery sequences be proper. This environment shall be as specified in Eastman Kodak Company specifications 502-118 and 502-146. Particular attention should be devoted to preventing the injection of contaminants due to possible pressure differentials during this phase of the mission.
 - 3.3.3 Deliverable Hardware and AGE
- 3.3.3.1 Airborne Models The environmental requirements for the deliverable hardware airborne models shall be in accordance with the applicable specifications of 3.2.3.1, Table II.
- 3.3.3.2 Aerospace Ground Equipment The environmental requirements of the aerospace ground equipment shall be in accordance with Eastman Kodak Company specification 802-179.
 - 3.3.4 Interfaces
- 3.3.4.1 Airborne Models (Environmental) The environmental interface requirements to insure satisfactory orbital operation of the integrated system shall be in accordance with Eastman Kodak Company specification 502-146.

3.4 Mechanical Requirements

- 3.4.1 Photographic Subsystem (Mechanical Requirements) The photographic subsystem shall correlate and integrate the mechanical requirements of the airborne equipment and the aerospace ground equipment in a manner which insures the compatibility necessary for the subsystem to meet its performance requirements.
- 3.4.2 Camera Payload The mechanical requirements shall be in accordance with applicable Eastman Kodak Company specification of Table I of 3.1.1.
- 3.4.2.1 Axes Orientation The orientation and nomenclature of the flight payload axes are as follows:

Roll Axis X Parallel to the longitudinal axis of the vehicle.

Negative in the direction of the vehicle velocity vector.

Yaw Axis Z Perpendicular to the roll axis and in the orbit plane. Negative in the direction of the earth.

Pitch Axis Y Defined by the right-hand rule.

Mutually perpendicular to the yaw and roll axes at their intersection.

Positive rotation about any of these axes shall be defined by the right-hand rule.

3.4.2.2 External Dimensions - The over-all dimensions and station positions of the C/P shall be in accordance with Eastman Kodak Company drawings 801-116-1 and 801-116. The subsystem shall extend from about station 21.5 to station 211 as defined by the associate contractor. The component support tube portion of the payload which extends from station 125 to station 211 shall be approximately 36 inches in diameter. The forward record storage assembly provided as a part of the C/P subsystem shall nominally occupy

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the volume between stations 21.5 and 39.8. The Satellite Vehicle Adapter provided by an associate contractor shall provide structural continuity between the SRV and OCS station 82. The volume between station 82 and station 125 shall include the stereo mirror, its servos and support mechanisms. The above dimensions are nominal. Additional and more detailed information may be obtained by referring to the sections on configuration, space envelope, and interfaces of Eastman Kodak Company Specification 802-129.

3.4.2.3 Weight and Center of Gravity - The maximum weight of the Camera Payload shall be in accordance with Eastman Kodak Company Specification 502-146. The center of gravity of the C/P shall meet the requirements of Eastman Kodak Company Specification 502-146.

3.4.2.4 Moment and Products of Inertia - Calculated values of moments and products of inertia shall be supplied by Eastman Kodak Company in accordance with Eastman Kodak Company Specification 502-146.

3.4.2.5 Unbalanced Angular Momentum - The C/P shall meet the unbalanced angular momentum requirements of Eastman Kodak Company Specification 502-146.

3.4.2.6 Material - All materials used for the film enclosure of the camera payload shall be chosen from a list of materials which do not adversely affect the photographic properties of the film. The materials used for the C/P shall be of the lightest weight possible consistent with good engineering practices. material requirements for each component and assembly shall be in accordance with component drawings.

3.4.2.7 Mechanical Alignment - The mechanical alignment tolerances of the C/P shall be in accordance with Eastman Kodak Company drawing 703-100, 801-116-1, and 805-110, and specifications 502-146, 802-122 and 802-129. The smear produced by variations in alignment shall be less than that allowed in 3.7.4.2

- 3.4.2.8 Structural Requirements The structural requirements for the C/P shall be in accordance with Eastman Kodak Company Specification 802-129.
 - 3.4.3 Deliverable Hardware and AGE
- 3.4.3.1 Airborne Models The mechanical requirements for the deliverable hardware airborne models shall be in accordance with applicable Eastman Kodak Company Specifications in 3.2.3.1, Table II.
- 3.4.3.2 Aerospace Ground Equipment The aerospace ground equipment mechanical requirements shall be in accordance with the applicable Eastman Kodak Company Specifications of 3.8.2, Table III.
 - 3.4.4 Interfaces
- 3.4.4.1 Airborne Models The C/P (OCV + SRV) interface shall be in accordance with Eastman Kodak Company drawing 801-116-1. The mechanical requirements for this interface shall be in accordance with Eastman Kodak Company Specification 502-146.
 - 3.5 Optical Requirements
- 3.5.1 Photographic Subsystem (Optical Requirements) The photographic subsystem shall correlate and integrate the optical requirements, of the airborne equipment and aerospace ground equipment in a manner which insures conformance of the subsystem to its performance requirements.
- 3.5.2 Camera Payload The C/P optical requirements shall be as follows:
 - 3.5.2.1 Lens and Stereo Mirror

- 3.5.2.1.1 Focal Length The focal length of the lens system shall nominally be 77 inches and shall be in accordance with Eastman Kodak Company Specification 802-125.
- 3.5.2.1.2 Aperture The aperture of the C/P lens assembly shall be such that this aperture in conjunction with the focal length shall produce a nominal F-number of 4. The T-stop of the lens system for white light shall be 5.6 and when bandpass filter and film effects are included shall be 6.4, as demonstrated by appropriate calculation and appropriate reflectance and transmission measurements. There shall be a stereo mirror whose nominal orientation is at an angle of 45 degrees to the optical axis of the lens. There shall be an aperture attached to the sterro mirror with dimensions that limit the axial beam to no less than 19.50 inches diameter. The aperture, in conjunction with the stereo mirror, shall not cause any axial vignetting when the photographic subsystem is rolled into any obliquity position and no more than 0.5 per cent when the stereo mirror is moved to any of its three positions.
- 3.5.2.1.3 Alignment (Lens) The lens assembly shall be aligned in accordance with Eastman Kodak Company drawing 703-100.
- 3.5.2.1.4 Alignment (Lens and Stereo Mirror) The alignment of the C/P lens and stereo mirror assembly shall not cause a loss of image quality greater than allowed by this specification. The detail alignment tolerances on this alignment shall be in accordance with Eastman Kodak Company Specification 802-125.
- 3.5.2.1.5 Resolving Power The On-axis resolution of the lens and stereo mirror shall be adequate to supply the photographic subsystem with the capability to meet the resolution requirements of section 3.7.

3.5.2.2 Camera

3.5.2.2.1 Focus Provisions - The C/P shall provide focusing in accordance with Eastman Kodak Company Specifications 502-146 and 502-154. A prefocus correction shall be made to compensate for the shift in focus caused by the difference in object distance between operations at orbital altitude in a vacuum and the collimator setting at infinity in air in the laboratory.

3.5.2.2.2 Slit Aperture Plate - Flight Payloads 1 through 12 shall contain a slit aperture plate consisting of three photographic slits and two test slits. The slit aperture plate shall be capable of being manually positioned from outside the camera case. Flight Payloads 13 and on shall contain a programmable slit aperture plate consisting of four operational slits (three photographic and one ground test slit) and an independently controlled test slit. This slit aperture plate shall be capable of being commanded through the S/V command subsystem to any of the four operational slits. The test slit position shall be programmable through independent circuitry only from pieces of AGE hardware designated in Eastman Kodak Company Specification 802-153. Associated with each of the photographic slits shall be a pair of smear slits at each end of the main slit. The use of the smear record produced by these slits is described in 3.7.3.4.

3.5.2.2.3 Filter - The filter shall be minus-blue glass filter chosen for haze reduction purposes and reduction of lens chromatic aberrations. It is part of the slit aperture plate assembly (Eastman Kodak Company drawing 808-501).

3.5.2.2.4 Camera Drive Specification - The camera shall drive the film at any of 64 film drive speeds upon receipt of the appropriate signals from the motor speed drive of 3.2.2.9. The appropriate film drive speed shall be that speed which most closely approximates the predicted rate of motion of the image of the ground scene. It shall move the film with sufficient accuracy to prevent image degradation, due to banding and smear, as required in Eastman Kodak Company

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Specification 802-122 and this specification.

- 3.5.2.2.5 Data Signals 20 pps and 500 pps time marks shall be provided to the Camera Payload from an external source. A time label shall also be provided with the 20 pps signal. These pulses will illuminate mean lamps exposing the data signals on the film through an auxiliary optical system in the camera. The character and arrangement of the data signals on the film shall be in accordance with Eastman Kodak Company Specifications 502-146 and 802-153.
- 3.5.2.3 Lens and Camera Alignment The lens and camera shall be aligned in accordance with Eastman Kodak Company drawing 805-110.
 - 3.5.3 Deliverable Hardware and AGE
- 3.5.3.1 Airborne Models The optical requirements for the deliverable airborne models shall be in accordance with applicable Eastman Kodak Company Specifications of 3.2.3.1, Table II.
- 3.5.3.2 Aerospace Ground Equipment The aerospace ground equipment optical requirements shall be in accordance with Eastman Kodak Company Specification 802-179.
- 3.5.3.2.1 Collimator Assembly The collimator shall require a parabolic mirror and associated optical equipment capable of meeting the requirements of Eastman Kodak Company Specification 802-149, for testing the optical characteristics of the photographic payload.
 - 3.5.4 Interfaces
- 3.5.4.1 Airborne Models The optical interface requirements to insure satisfactory orbital operation of the integrated system shall be in accordance with Eastman Kodak Company Specification 502-146.
- 3.5.4.2 Aerospace Ground Equipment The aerospace ground equipment optical interface requirements shall be in accordance with Eastman Kodak Company Specification 502-146.

3.6 Film Requirements

- 3.6.1 Film Type The film shall be a composite material consisting of a thin flexible sheet with a light-sensitive emulsion coating. The film used shall be Kodak High Definition Aerial Film. (Estar Thin Base).
- 3.6.2 Physical Characteristics The subsystem will use commercially available film (see 3.6.1). The photographic subsystem has been designed to operate with this film and the physical characteristics of the film are as given in Eastman Kodak Company Specification 702-184.
- 3.6.3 Photographic Characteristics The film shall have the photographic characteristics given in Eastman Kodak Company Specification 702-184.
- 3.6.4 Film Quantity The C/P shall have a capacity of 3000 feet of Estar thin base film whose maximum thickness including emulsion coating is not greater than 0.0033 inch.

3.7 General Requirements of the Photographic Subsystem

3.7.1 Launch and Injection into Orbit - The environmental conditions during the launch and injection into orbit shall be in accordance with Eastman Kodak Company Specification 502-118. All components and assemblies within the flight payload portion of the satellite vehicle shall be inactive during the launch sequence, with the exception of the film supply reel torque motor which shall be energized prior to lift off. This voltage shall be maintained throughout all powered flight sequences associated with launch, orbit injection, and on orbit powered flight sequences.

3.7.2 Orbital Requirements

3.7.2.1 Environmental - The flight payload shall be capable of operating within the environmental conditions in accordance with Eastman Kodak Company Specification 502-118.

- 3.7.2.2 Standard Orbit for Photographic Operations During photographic operations a minimum perigee altitude of 70 n mi should be utilized. The apogee altitude should be compatible with lifetime, number of orbit adjusts required, molecular heating rates and maximum altitude during photography.
- 3.7.2.2.1 Altitude The flight payload shall maintain full obliquity capability when operating in an altitude range of 80 ± 11 nautical miles above its nadir. Operations at higher altitudes will be accompanied by a reduced obliquity capability. See paragraph 3.7.3.2. The maximum altitudes for nadir and stereo photography are 122 n mi and 112 n mi respectively.
- 3.7.2.2.2 Inclination The flight payload shall meet the requirements of this specification when in orbits whose orbital inclinations may vary between 80° and 105°.
- 3.7.2.2.3 Eccentricity The flight payload shall meet the requirements of this specification when operating in any eccentric orbit whose altitude range is consistent with the altitude limits of 3.7.2.2.1 over the area of interest.
- 3.7.2.2.b Time of Launch The flight payload shall meet the requirements of this specification when launched into an orbit whose daylight equator crossing occurs between 1000 hours and 1400 hours local solar time. (This requirement establishes the thermal design parameters and the limits of illumination under which the C/P shall be required to produce acceptable photographic results).

The flight payload shall therefore meet these requirements for an equivalent midnight launch.

3.7.2.3 Orbit Particularity - The flight payload shall comply with the requirements of this specification only when the satellite is operating in the orbit specified in 3.7.2.2, and shall not comply during maneuvers required to return the payload to the specified orbit. (Maintaining the satellite in the



specified orbit shall be the responsibility of an associate contractor).

- 3.7.2.4 Attitude Control The flight payload shall be capable of meeting the requirements of this specification only when the S/V attitude is held within the limits which produce smear less than equal to the tolerance given in this specification. (Attitude control shall be the responsibility of a subsystem supplied by an associate contractor).
- 3.7.2.5 Communications The flight payload shall receive commands from, and transmit instrumentation voltages to a communications subsystem which shall have the responsibility of maintaining a radio frequency link with tracking stations.
- 3.7.2.6 Tracking Tracking and vehicle ephemeris shall be supplied by an associated subsystem. The responsibility for which belongs to an associate contractor.
 - 3.7.3 Coverage
- 3.7.3.1 Area of Interest The flight payload shall be capable of photographing areas within certain political boundaries located in the Northern Hemisphere between 30 and 80 degrees North Latitude.
- 3.7.3.2 Obliquity Aiming The flight payload shall be capable of photographing areas to the left and right of the satellite vehicle ground track when rotated up to 42 degrees from the vertical about its longitudinal axis when the vehicle is in the specified altitude range as given in 3.7.2.2.1. Operation of the flight payload at higher altitudes shall be accompanied by a loss in the capability of the flight payload to operate at higher obliquity angles as limited by the range of film drive speeds required in Eastman Kodak Company Specification 802-122 and this specification.

This obliquity motion shall be accomplished by another subsystem.

3.7.3.3 Modes of Operation - The flight payload shall be capable of taking three types of photographs. These types are: Stereo pairs, lateral pairs, and continuous strip. Other hybrid modes such as stereo triplets and lateral triplets, which are extentions of the 3 basic modes, are also possible.

3.7.3.3.1 Stereo Pairs - A stereo pair consists of two photogographs of the same area. These photographs are taken looking forward and aft with respect to the local vertical from consecutive positions along the orbit track.

3.7.3.3.2 Lateral Pairs - A lateral pair consists of two photographs of different target areas. These target areas are spaced laterally with respect to the ground track and will normally be located at approximately the same latitude. A lateral pair consists of one photograph taken on a forward looking stereo angle and some obliquity angle, and a second photograph taken at an aft looking stereo angle and at a different obliquity angle than the first photograph.

3.7.3.3. Continuous Strip Photography - A continuous strip photograph is a single strip photograph nominally taken at a zero stereo angle of a target area located within the obliquity range of the vehicle.

3.7.3.4 Photographic Format - The photographic format shall be in accordance with Eastman Kodak Company drawing 808-103. The resultant time data tracks of this format shall have a minimum density of .5 at the slowest film speed (IMC) and a minimum density above fog of at least .3 at the fastest film speed (IMC) after the completion of intermediate processing in accordance with Eastman Kodak Company Specification 702-184. The film format shall also record images through the smear slits. This smear record provides a means of

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checking the obliquity aiming angle with respect to the nadir within \pm 1° when the appropriate measurements are made and reduced in accordance with Eastman Kodak Company Utility Manual 554-132.

- 3.7.3.5 Quantity of Photography The flight payload shall be capable of taking 600 stereo pairs or the equivalent amount of lateral pairs or continuous strip photography during a five day photographic lifetime. The subsystem shall be capable of this amount of photography while in photographic contact with the areas defined in 3.7.3.1.
- 3.7.4 System Ground Resolution The camera payload (assuming nominal system smear contributions) will have a ground resolution range of 1.7 to 2.1 feet for vertical on axis photography at 70 n.mi. with an apparent contrast ratio of 2:1 as viewed from above the atmosphere. Specific camera payload performance is given in paragraph 3.7.4.1.
- 3.7.4.1 Camera Payload Resolution The camera payload resolution shall be determined utilizing a 2:1 low contrast target of the type defined in Figure 7 of MIL-STD-150A. When tested with this standard, the average value of the geometric mean resolution on axis shall not be less than the following values:

Resolution	Effectivity
104 lines/mm	FM-1 to FM-16
110 lines/mm	FM-17 or 4 Nov. 64 (whichever is later)
115 lines/mm	FM-18 or 2 Dec. 64 (whichever is later)
120 lines/mm	FM-19 or 2 Jan. 65 (whichever is later)
125 lines/mm	FM-20 or 30 Jan. 65 (whichever is later)
130 lines/mm	FM-21 or 27 Feb. 65 (whichever is later)
130 lines/mm	FM-22 to FM-34 (provided after 27 Feb. 65)

With C/P performance at 104 lines/mm, ground resolution for vertical photography will vary between 2.1 and 2.8 feet over the altitude range of 70 to 90 nautical miles as a function of altitude. (Assumes S/V smear contributors as given in paragraph 3.7.4.2).

With C/F performance at 130 lines/mm, ground resolution for vertical photography will vary between 1.7 and 2.2 feet over the altitude range of 70 to 90 nautical miles as a function of altitude. (Assumes S/V smear contributors as given in paragraph 3.7.4.2.)

3.7.4.2 Smear Tolerances - The total smear produced at the center of the field by all smear contributors and measured on the ground shall be as follows for operations at 70 n.mi. and a 0.0085 inch slit width. (Total smear is defined as that on-axis smear which will be exceeded in less than 5% of the frames from a single mission, with a confidence level of 95%.) Proportionately larger smear levels will be obtained for operations at higher altitudes due mainly to the increased scale factor.

Camera Payload

Vertical	Photography
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30° Obliquity/15° Stereo

 $S_x = 0.49$ foot

 $S_w = 0.77$ foot

 $S_v = 0.26$ foot

 $S_v = 0.36$ foot

Orbital Control Vehicle

Vertical Photography

30° Obliquity/15° Stereo

 $S_X = 0.17$ foot

 $S_r = 0.52$ foot

 $S_v = 0.37$ foot

 $S_v = 0.62$ foot

Ephemeris Prediction

Vertical Photography

30° Obliquity/15° Stereo

 $S_{v} = 0.21$ foot

Sx = 0.26 foot

The symbols $S_{\mathbf{X}}$ and $S_{\mathbf{y}}$ represent the intrack and crosstrack smear levels respectively. A listing of the separate smear contributors and their individual smear contribution is provided in Table V.

3.7.4.2.1 Target Acquisition - Target acquisition requirement shall be considered to be the acquisition of the target within 50 percent of the field of view or the stereo overlap area. Conformance to this requirement can be assured if the following obliquity aiming capability is provided:

- (a) Roll attitude position accuracy ± 0.7°

In addition the following programming information is required:

 Knowledge of satellite position over the target.

Altitude ± 0.5 nautical mile

Cross track ± 1.5 nautical miles

In track ± 5.8 nautical miles

2. Knowledge of target position ± 1.0 nautical mile.

- 3.7.5 Flight Payload Programming and Sequence of Operations
- 3.7.5.1 Supply Spool Torque Motor The torque motor supply film tension shall be turned on prior to launch and shall remain on throughout the powered flight portion of the launch and injection into orbit sequence, and during all powered flight sequences for orbit maintenance or adjustment.
- 3.7.5.2 Flight Payload View Port Door The flight payload view port door shall be the responsibility of the associate contractor in charge of the payload vehicle. When the port is open it shall not vignette the light beams to the lens mirror system. The view port door shall be opened for as short a time as is consistent with the achieving of the photographic mission. The door will be opened just prior to the start and closed immediately after the completion of a photographic or focus pass. The view port door shall be completely open during any photographic operation or focus sequence. Details of the view port door operation shall be in accordance with Eastman Kodak Company specification 502-lh6.
- 3.7.5.3 Camera Operation The camera shall be programmed to operate for as long a time as possible for each target, commensurate with the physical limitations of the system, such as looper capacity, and the necessity for preparing for the next photograph to be taken in orbit. Reduced resolution will result when the dynamic capacity of the film supply looper is exceeded, causing the film handling system to operate simultaneously with the camera drive mechanism. The command system shall command the camera "ON" in the stereo mode for times from 3.5 to 9.5 seconds in 0.5 second increments, and "OFF" times between stereo pairs shall range from 3.0 to 11.4 seconds in 0.8

second increments. In the strip mode the commands shall provide for camera "ON" times from 0.1 - 102.4 seconds in 0.1 second increments.

The starting and stopping times required for stabilization of film velocity shall be as required by Eastman Kodak Company Specification 802-153.

3.7.5.4 Stereo Mirror Motion - The stereo mirror shall be capable of being positioned to three positions which will allow photography at angles of 0° or ± 15° from vertical. The resolution requirements are applicable only when commands for stereo mirror movement are satisfied prior to the time when the camera has achieved the commanded image motion compensation speed. The stereo mirror shall take no more than 4 seconds to move from one extreme position to the opposite extreme position and no more than 2 seconds to move to an adjacent mirror position.

3.7.5.5 Crab Motion - The flight payload shall be capable of positioning the stereo mirror in crab to one of two sets of eight selected positions for N/S or S/N orbits for the purpose of compensating for cross track image velocity.

A selection method, accessible before the C/P is mated to the OCV in the MAB shall be provided to select the proper set of eight crab corrections to be used. The resolution requirements of this specification are only applicable when the camera has achieved the commanded image motion compensation speed. Crab movement shall not take place during camera operation.

A movement of one step in crab shall take less than 1 second. A movement in crab from one extreme to the opposite extreme position shall take less than 8 seconds.

3.7.5.6 Obliquity Aiming - Obliquity aiming shall be accomplished by a rotation of the entire S/V. This maneuver shall be accomplished by an OCV subsystem and is the responsibility of an associate contractor. The command for obliquity position shall be received in sufficient time to allow completion

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of the motion prior to camera operation. The minimum range of roll positions shall be \pm 44 degrees in steps of 0.7 \pm 0.02 degrees. The roll maneuver shall not prohibit completion of any required mode of operation.

3.7.5.7 Instrumentation and Recorders - Instrumentation and recorders shall normally be turned on when the flight payload view port door is open. The recorder may be commanded to remain off. The instrumentation and recorder requirements shall be in accordance with Eastman Kodak Company Specification 502-146.

3.7.5.8 Preparation for De-orbit - The preparations for the recovery of the exposed record shall provide the maximum protection for the photographic latent image and the maximum reliability for the de-boost sequence. Under normal operations, sufficient camera operation will be programmed to empty the film supply cassette and achieve a telemetry indication that all film has been transported to the forward record storage assembly. Upon use of the complete film supply, or cutting of the film, film tension will drop and the take-up motor will run continuously until C/P power is off.

Devices provided by an associate contractor will cut the film, (if exhausted has not been completed) seal the SRV and separate the film chute. To fulfill the requirements above, the following sequence should be followed:

- (a) Transport all the film into the T/U cassette
- (b) Activate the SRV cutter sealer
- (c) After SRV sealing, turn off C/P power
- (d) Separate the film chute

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3.7.5.9 Vehicle Programming - The photographic subsystem programs are not the responsibility of this subsystem contractor, however, it shall be required that such programming comply with the P/L restrictions necessary for the successful operation of the photographic subsystem.

3.7.6 Focus Control by Subsystem - The photographic subsystem shall provide a focus control system as part of the flight hardware. This system shall have the ability to sense relative camera focus, while in orbit, when the vehicle is in a predetermined stable attitude to attain a standard in-track image speed for the focus sequence as specified in Eastman Kodak Company Specification 802-153.

The flight payload focus position shall be adjustable in any of three modes of operation as follows:

- (a) The open loop mode in which real time focus system output signals are transmitted to certain ground stations where this information is used by operators to determine the necessary real time commands to be transmitted through the programmer and control system.
- (b) The remote-record mode in which focus system output signals are recorded over any land mass during daylight, read-out at a subsequent contact station and returned to focus operators who determine the necessary real time commands to be transmitted through the programmer and control system.
- (c) The closed loop mode in which a servo system automatically adjusts for the optimum focus signal output.

- 3.7.7 Handling of Recovered Record After landing of the recovery vehicle the handling of the film record shall be in accordance with Eastman Kodak Company Specification 702-176.
- 3.7.8 Operational Film Processing The flight payload subsystem shall meet the requirements of this specification in so far as the film is processed to meet the requirements of Eastman Kodak Company Specification 702-184.

3.8 Deliverable Hardware and AGE

- 3.8.1 Airborne
- 3.8.1.1 Structural Mock-up The Structural mock-up shall be nonoperating model of the complete flight payload. It shall simulate size, but not weight or any other characteristics. It shall be dimensionally accurate at the exterior envelope and at the mating interfaces, including electrical and mechanical connections. Requirements for the structural mock-up shall be in accordance with Eastman Kodak Company Specification 802-103.
- 3.8.1.2 Forward Record Storage Drop Test Assembly (Dummy Forward Record Storage Assembly). The dummy forward record storage assemblies are intended for a program of laboratory and aerial drop tests to be conducted by an associate contractor. Impact recording equipment may be installed. The assembly shall duplicate the size, weight, and mass distribution of flight hardware. The requirements for the dummy forward record storage assembly shall be in accordance with Eastman Kodak Company Specification 802-124.
- 3.8.1.3 Thermal Model Payload The thermal model payload shall contain simulated electrical loads and instrumentation to permit the accurate determination of temperature distribution under simulated flight environments. The thermal model payload shall faithfully represent the thermal characteristics, which will exist in the flight payloads. Requirements for the thermal model



payload shall be in accordance with Eastman Kodak Company Specification 802-123.

3.8.1.4 Engineering Model - This model shall be representative of the first flight model payload design, but shall be modified as required or indicated by the results of engineering review or testing. The unit shall be designed to meet applicable specifications for flight payloads, but will not be required to pass environmental testing as prescribed in these specifications. Requirements of the engineering model shall be in accordance with Eastman Kodak Company Specification 802-150.

3.8.1.5 Flight Model Payload - The flight payload models shall be composed of the assemblies specified in 3.1.1, Table I. The flight model payload shall be responsible for exposing film in orbit upon receipt of command from an associated subsystem; storing the unexposed film from launch until time of exposure and winding the exposed film into the forward record storage assembly for the recovery phase of flight. The flight payload shall include the structures and mechanism required for the orbital operation of the equipment except those which are the responsibility of other subsystems, as defined in Eastman Kodak Company Interface Specification 502-146.

The complete requirements of the flight payload shall be given in Eastman Kodak Company Specification 802-153.

3.8.1.5.1 S/V Compatibility Model - The S/V compatibility model shall establish the compatibility of the Flight Payload with the associate contractor's OCV + SRV. This model shall meet the performance requirements of a flight payload model except in areas where performance does not affect compatibility. An example of such an area is optical requirements. The

performance requirements for the S/V compatibility model shall be in accordance with Eastman Kodak Company Specification 802-153.

- 3.8.1.5.2 Reliability Test Model The reliability test model shall be fabricated and assembled to be identical with the Flight Model Payload, Eastman Kodak Company Specification 802-153, and shall be updated in a similar fashion except where engineering judgment indicates that the design change has no significant effect on the qualification of the affected component. This model which includes additional components and subassemblies as defined in Work Statement Exhibit "A" to AF33(616)7704 shall be subjected to reliability testing to establish modes of failure under environmental extremes and to accumulate the maximum possible operating time and shall be tested in accordance with Eastman Kodak Company "Flight Payload Qualification Test Plan" 802-148.
- 3.8.1.6 Dynamic Simulator Dynamic simulator shall be provided to simulate the static, dynamic, spatial, inertial and stiffness characteristics of the C/T during powered flight in accordance with Eastman Kodak Company drawing 805-101. The dynamic simulator shall comply with the requirements of Eastman Kodak Company Specification 802-207.
- 3.8.1.7 Electric Simulator An electric simulator shall be provided to produce a high degree of assurance that the C/P, OCV and SRV can be mated electrically without damage to any of the three subsystems. The electrical simulator shall be capable of acting as a substitute for the C/P during electrical interface compatibility checkout at the MAB and on the Pad. The electric simulator shall conform to the requirements of Eastman Kodak Company Specification 502-208.

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3.8.2 Aerospace Ground Equipment - The aerospace ground equipment shall be in accordance with Eastman Kodak Company Specification 802-179. Data below gives the five major categories of this equipment and lists those items that belong to each. The Aerospace Ground Equipment list, format "A", of Work Statement - Exhibit "A" to AF33(616)7704 forms a more extensive reference for these items. The individual specifications as listed in Table IV give the complete requirements of each item. Table IV also lists the location where the equipment is recommended for use.



TABLE III Aerospace Ground Equipment

		Recommended For Use At		
<u>Title</u>	Specification	EK	GE	VAFB
Payload Test Equipment				
Test Console	802-107	x		x
Portable Test Set	802-108	x	x	х
Collimator Assembly	802-149	x		х
Record Storage Test Set	702-173	х	×	х
Line of Sight Test Set	802-156	x		х
Leak Rate Test Set	602-157	x	x	х
Cable Test Point Board (Set)	502-158	x	x	x
Record Storage Bracket	702-127	x	x	х
Command Monitor	602-217		х	х
Breakout Bos	502-161		x	x
Secondary Standard	502-162	x		x
Payload Support Equipment				
Record Loading and Unloading Kit	702-141	x	×	х
Record Dolly	802-163	x	x	x
Air Supply and Record Storage Alignment Measuring Equipment (Film Supply Cassette and Record Storage Alignment Measuring Equipment)	702-214	x	x	x
Integration Accessory Kit	702-143	x	x	x



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TABLE III (CONT'D)

Aerospace Ground Equipment

Title	Specification	Recommended For Use At EK GE VAFB		
Payload Support Equipment(Cont'd)		and a by	STATES OF STATES	Commences in the commence
Purging Equipment	602 -168	х	х	х
Record Advance Control	702-213		x	x
Record Travel Viewer	702-226	х	x	X
Forward Storage Table and Lifting Yoke	, 702 <i>-</i> 221	x	х	X
Payload Handling Equipment				
General Purpose Mobile Hoist	602-171	x		x
Truck	802-114	x	х	ж
Space Chamber Lifting Yoke (Camera Payload Assembly Lifting Yoke)	802-137	x	х	x
Handling Accessory Kit	702-147	x	х	x
Erector	602-132	х	x	x
Package Shipping Container (Payload Shipping Container)	602-144	x		
Accessory Shipping Container	702-183	x		
Space Chamber Integration Lifting Yoke (Camera Payload Integration Lifting Yoke)	602-174	x	x	X
Cradle	602-126	x		
Photo Support Equipment				
Record Viewer	702-110	x		x
Record Splicer	702 - 175	x	x	x
Test Record Support Equipment	802-177	x	x	x
Test Record Transfer	802-238	x		х

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TABLE III (CONT'D)

Aerospace Ground Equipment

Recommended For Use At

Title

Specification EK GE VAFB

Operating Equipment

Operating Equipment (Ground Equipment Functional Specification)

502-181

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- 3.8.2.1 Payload Test Equipment The payload test equipment shall supply the required testing capability for checking out the payload. Required equipment is listed in Table III of 3.8.2, and the individual specification for each piece of equipment is listed in this table.
- 3.8.2.1.1 Test Console The test console consists of all components and equipment which are essential to supply the power for operating the C/P and associated test collimator equipment. In conjuction with the collimator, the console provides the stimuli required to induce proper flight payload operations and a display of the output of all desired flight payload circuit voltages.
- 3.8.2.1.2 Portable Test Set The portable test set is a portable, less versatile, version of the test console. It provides the flight payload with signals and power inputs for limited operation away from the collimator and test points for the outputs of all transducers in the flight payload. The portable test set provides the only means of operating the flight payload at the associate contractor's facility and a means of operating the flight payload when it is not on the collimator at Vandenberg Air Force Base.

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3.8.2.1.3 Collimator Assembly - The collimator shall provide an optical reference, a target simulating the scale seen from nominal orbital altitude of 72 nautical miles, essential in ascertaining the performance qualities of the payload assembly and of the complete flight payload assembly.

A stationary target shall be provided for the measurement of resolution and other optical characteristics. A moving target shall be provided to simulate apparent motion of the scene that the camera views while in orbit, and a target shall also be supplied to test the focus system.

- 3.8.2.1.4 Record Storage Test Set The film record storage assembly test set shall have the capability to provide the forward record storage with a sufficiently exact simulation of operating inputs and outputs to enable testing the performance requirements of the forward record storage assembly.
- 3.8.2.1.5 Line of Sight Test Set The line of sight test set shall provide a means of determining position accuracy of the Stereo and Crab servo drives. The test set shall also provide a means for line of sight alignment of the complete flight payload optical assembly with respect to a flight payload reference surface and for checking such alignment subsequent to certain severe environmental testing and handling. The line of sight test set shall be in accordance with Eastman Kodak Company specification 802-156.
- 3.8.2.1.6 Leak Rate Test Set Certain sections of the flight payload shall be required to maintain an internal air pressure in accordance with Eastman Kodak Company specification 502-118. The leak rate test set shall provide the means of determining the rate at which this internal pressure



changes when the flight payload pressure differentials are equivalent to those existing in the operating environment. As a part of this equipment a leak detector shall be required for locating the source of leaks.

- 3.8.2.1.7 Cable Test Point Board (Set) The cable test point board shall be a rack and test jack panel arrangement including insertion cables which may be introduced between various C/P subassemblies when mounted on the C/P, for use in trouble shooting and camera payload check out.
- 3.8.2.1.8 Record Storage Assembly Bracket The record storage assembly bracket shall be attached to the cradle and used to support the assembly in the proper relation to the remainder of the flight payload. The bracket shall be used in production and assembly tests in the absence of the support supplied by the re-entry vehicle. The bracket shall contain an adjustment feature to permit alignment of the forward record storage assembly with the remainder of the flight payload.
- 3.8.2.1.9 Command Monitor The command monitor provides a means of observing certain selected command inputs to the C/P and telemetry outputs from the C/P at the electrical interface between the C/P and the remainder of the S/V. This device will allow diagnostic evaluation of test results in the MAB and on the Pad, and will also act as a safety monitor to measure the integrity of the C/P during all test sequences prior to launch.
- 3.8.2.1.10 Breakout Box The breakout box shall be used at the S/V flight payload interface as an insertion box to provide switching and breakout capability during functional and integration tests as well as trouble shooting operations.



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- 3.8.2.1.11 Secondary Standard The secondary standard shall provide a means of calibrating meters, measuring equipment and recorders in the electrical test equipment against standards capable of being calibrated against laboratory or primary standards.
- 3.8.2.2 Payload Support Equipment The payload support equipment shall consist of the support equipment listed in Table III of 3.8.2. Table III of 3.8.2 lists the individual specification numbers for each of the payload support equipment items. A description of individual items is given in 3.8.2.2.1 through 3.8.2.2.8.
- 3.8.2.2.1 Record Loading and Unloading Kit The record loading and unloading kit shall consist of those items, essential for loading and threading the film into the payload either before or after mating of the flight payload with the OCV plus SRV. It shall provide items necessary for removing used film from the record storage after test.
- 3.8.2.2.2 Record Dolly The record dolly shall provide a means of supporting, protecting, transporting and handling of the film rolls between the storage area (cooler) and loading station or vice versa. It shall perform the same function in removal of film at flight payload test stations and in transporting the film to the test record processing station.
- (Film Supply Cassette and Record Assembly Measuring Equipment) —
 The film supply cassette and record storage assembly alignment measuring equipment shall enable the proper linear and angular alignment between the following elements of the film handling system: camera, film supply cassette, and forward record storage assembly.

3.8.2.2.3 Air Supply and Record Storage Alignment Measuring Equipment



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- 3.8.2.2.4 Integration Accessory Kit The integration accessory kit shall include all the additional items necessary to remove the cradle from the flight payload. It shall supplement the C/P lifting yoke, the erector, the C/P integration lifting yoke and the overhead hoist.
- 3.8.2.2.5 Purging Equipment The purging equipment shall supply the necessary dry gas and appropriate fittings required to provide the conditions within the shipping container necessary for the establishment of a dry air environment.
- 3.8.2.2.6 Record Advance Control The record advance control provides an auxiliary method of advancing the film within the C/P, after the payload has been mated with the OCV. When commanded the unit will supply the necessary signals via auxiliary cables to the motor speed drive, forward record storage assembly motor, and supply cassette torque motor, to advance the film for test and threading operations. The unit shall be used in the MAB and the VSB and VAFB.
- 3.8.2.2.7 Record Travel Viewer The record travel viewer provides a means of visually inspecting and tracking of the film onto the forward storage assembly take-up roller of a completely assembled satellite vehicle.
- 3.8.2.2.8 Forward Storage Table and Lifting Yoke The forward storage table and lifting yoke provides a method of holding the record storage assembly in the proper position so that record spool may be inserted into or removed from the record storage assembly. It also provides a means of transporting the forward record storage assembly within a building and provides stowage for the yoke. The yoke provides a means of lifting the forward storage assembly.



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- 3.8.2.3 Payload Handling Equipment The payload handling equipment shall provide the capability of handling the payload according to the list, Table III of 3.8.2. Table III of 3.8.2 also lists the individual specification number for each of the payload handling equipment items. A description of individual items is as follows:
- 3.8.2.3.1 General Purpose Mobile Hoist The general purpose mobile hoist shall be used for general handling (e.g. replacement of parts and assemblies on the collimator and on payloads) at Vandenberg Air Force Base, Missile Assembly Building.
- 3.8.2.3.2 Truck The truck is a mobile platform for supporting the cradle and its contents during assembly and for transporting the cradle and its contents horizontally between assembly and test stations.
- 3.8.2.3.3 Space Chamber Lifting Yoke (Camera Payload Assembly Lifting Yoke) The C/P assembly lifting yoke is a structure that shall permit the stable attachment of a hoist to the cradle containing the C/P assembly.
- 3.8.2.3.4 Handling Accessory Kit The handling accessory kit shall include all the special wrenches, lifting adapters, slings and other tools, except the camera payload lifting yoke, to perform the necessary tasks described as format "A", of the Aerospace Ground Equipment list of Work Statement Exhibit "A" to AF33(616)7704 and the tasks required in the specification for this item. (See Table III of 3.8.2).
- 3.8.2.3.5 Erector The erector shall provide a means for rotating the cradle and contents from a horizontal to vertical position and back again

without causing vibration or shock damage or distortion to the cradle contents.

The erector shall be a required piece of equipment wherever the payload is removed from its cradle.

- 3.8.2.3.6 Package Shipping Container (C/P Shipping Container) The C/P shipping container receives the C/P (less forward record storage assembly) and its cradle. The shipping container shall minimize injurious effects of transportation and incident handling upon the contents. It shall provide and maintain a clean inert interior atmosphere.
- 3.8.2.3.7 Accessory Shipping Container The accessory shipping container shall provide a protective enclosure that provides a proper environment during shipping and handling between manufacture and receiving point for the forward record storage assembly.
- 3.8.2.3.8 Space Chamber Integration Lifting Yoke (C/P Integration Lifting Yoke) The C/P integration lifting yoke is a structure that shall in conjunction with a hoist provide support for the C/P during and after removal from the cradle when in a vertical position. It is also used to lower the flight payload into the OCV during mating.
- 3.8.2.3.9 Cradle The cradle shall be a very rigid handling device that holds, protects and provides support for the C/P. It shall be designed to support the assembly in a manner identical to that provided in the OCV. The cradle shall be made to accept the forward record storage assembly. (see 3.8.2.1.8) in operation when required.

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- 3.8.2.4 Photo Support Equipment Table III of 3.8.2 lists the specifications for the individual items of photo support equipment. A description of the individual items is given in 3.8.2.4.1 through 3.8.2.4.3.
- 3.8.2.4.1 Record Viewer The record viewer shall provide a suitable means of viewing the film output of the C/P for visual and microscopic inspection on an illuminated viewing table. Suitable film handling and measuring equipment shall also be provided in the design of the record viewer.
- 3.8.2.4.2 Record Splicer The record splicer shall provide the capability of making thin, uniform reliable splices on 9.5 inch record which shall pass through the camera and film transport system.
- 3.8.2.4.3 Test Record Support Equipment The test record support equipment shall consist of specialized items such as re-wind and support tables which shall be as specified in the individual specifications for this equipment.
- 3.8.2.4.4 Test Record Transfer The test record transfer shall consist of an item to aid in removing quantities of test film from the forward record storage assembly. Mounted on the supply cassette assembly after removal of the supply cassette cover, it may be used to re-wind film from the take-up spool without the necessity of disassembling the forward record storage assembly to remove the take-up spool.
- 3.8.2.5 Operating Equipment The operating equipment shall fulfill the function of the ground based portion of the focus control system, and is located in the operating console, the test console, and the portable test set. As such it shall contain networks for real time control of various focus

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control function modes. The operating equipment shall provide metering and display information indicating and metering various focus control functions.

- 3.8.2.6 Spare Parts All spare parts shall be considered part of the Aerospace Ground Equipment and shall be as follows:
- 3.8.2.6.1 Airborne Spares Airborne spare parts shall be supplied in accordance with 2.2 of Annex II Exhibit "A" of the Work Statement Exhibit "A" to AF33(616)7704.
- 3.8.2.6.2 Aerospace Ground Equipment Spare Parts All aerospace ground equipment spare parts shall be supplied in accordance with 2.2 of Annex II of Exhibit "A" of Work Statement Exhibit "A" to AF33(616)7704.

3.9 General Requirements

- 3.9.1 Manufacturing Standards The photographic subsystem components shall conform to the manufacturing standards of Eastman Kodak Company standards 401-104-2.
- 3.9.2 Interchangeability Components of all equipment, of the same model, regardless of series designation, exclusive of experimental and prototype systems, shall be interchangeable or replaceable.
- 3.9.3 Ease of Assembly and Maintenance of Equipment Mechanical and electrical components shall be designed and constructed to require a minimum of skill, experience and time necessary to assembly and maintain them. The design shall eliminate in so far as possible any misassembly of parts or mismating of electrical connections. The components design and construction shall minimize the need for holding or supporting these components during final positioning and fastening.

3.9.4 Service Life - Service life is defined as operational or "wear time" from final payload assembly through the flight operational phase. This includes all performance at Eastman Kodak Company and Vandenberg Air Force

Base as well as flight operation.

The complete flight payload shall be able to survive a service life of 2,400 stered pairs utilizing 12,000 feet of film, or its equivalent. This equivalent shall be considered operation of the flight payload which does not cause any part of the flight payload to be operated for an accumulated time or under a stress greater than would be employed in taking the above defined stereo pairs.

Though the duty cycles of individual components vary, the life of these individual components shall be adequate to allow the completion of the subsystem service life. The individual component service life shall be given in the applicable component specification.

- 3.9.5 Reliability A primary objective of the design and manufacture of the photographic subsystem is to achieve high reliability in accordance with Eastman Kodak Company Specification hol-106. The reliability requirement shall be to achieve a 95 percent probability of obtaining 60 percent information return for the performance requirements listed below:
 - (a) Capable of being launched into orbit and performing its functions in that environment.
 - (b) Resolving power shall be as specified in section 3.7.1:

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- (c) Area Coverage On command, and in a maximum of five days, be capable of exposing the entire film supply in modes of operation specified in this document.
- (d) Capable of protecting the film during launch, and on obit, prior to exposure and of performing the necessary film handling tasks specified in this specification. If the tasks listed in the reliability portion of the Work Specification are carried out, it will be considered that the above engineering confidence level has been achieved.
- 3.9.6 Disposition of Variances Variances from the requirements of this specification shall require Eastman Kodak Company approval.
- 3.9.7 Contract Conformance It is understood that the contract is conformed to if the photographic subsystem conforms to the requirements of this specification.
- 3.9.8 Human Engineering Where feasible, the provisions of Eastman Kodak Company standard 401-108 "Design Standards for Human Factors, Engineering" shall apply.
 - 3.9.9 Safety of Personnel
- 3.9.9.1 Mechanical The design of the equipment shall provide maximum convenience and safety to personnel when installing, operating, and maintaining or replacing the equipment. Sharp projections on edges of cabinets, doors and similar parts shall be avoided.
- 3.9.9.2 Electrical Provisions shall be made to prevent personnel from accidently coming in contact with voltages in excess of 40 volts, including potentials on charged capacitors when the subsystem is in its normal operating condition.

- 3.9.9.2.1 Ground Potential The design and construction of the equipment shall be such that all external parts shall be at ground potential at all times.
- 3.10 <u>Documentary Requirements</u> Procedures shall be prepared and documented by the contractor defining a quality control system that shall fulfill the requirements of this specification. The documentation requirements shall include, but not be limited to, the following:
- 3.10.1 Drawings All engineering drawings and associated lists prepared by the contractor for the purpose of defining requirements of design, inspection and tests for deliverable equipment shall be prepared in accordance with Eastman Kodak Company specifications 401-101 and 401-102.
- 3.10.2 Specifications The contractor shall generate material to complete performance requirements and description of the equipment contained in this specification.
- 3.10.3 Manuals An integrated series of equipment oriented class III (Utility) technical manuals shall be provided by Eastman Kodak Company. These manuals pertaining to the C/P and associated ground equipment shall be prepared in accordance with WDT Exhibit 56-5C. These manuals shall be available when delivery of equipment is made.
- 3.10.4 Inspection Reports Inspection reports shall be generated and maintained by the contractor. These reports, as well as in-process inspection, shall be made available, upon request, by Eastman Kodak Company. Continuity of records and identity of parts assembled, shall likewise be maintained and made available by Eastman Kodak Company.

- 3.10.5 Alignment and Calibration Records shall be generated and made available of the alignment and calibration of all measuring and test equipment for the subsystem.
- 3.10.6 Test Procedures Qualification and acceptance test procedures for the subsystem that demonstrate conformance with the requirements of this specification shall be prepared by the contractor.
- 3.10.7 Performance Record All data including operating time and malfunction reports, generated through tests, shall be recorded by serial number and preserved as a performance record in the log book defined by Eastman Kodak Company drawing 804-104.

4. QUALITY ASSURANCE PROVISIONS

The quality control system requirements of MIL-Q-9858 shall apply.

- 4.1 Classification of Tests The inspection and testing of the subsystem hardware shall be classified as follows:
 - (a) Qualification Tests
 - (b) Acceptance Tests
 - (c) Reliability Tests
- 4.2 Qualification Tests Qualification tests to verify the capability of the flight payload to meet its functional and environmental requirements shall be performed on individual components and on a payload assembly, in accordance with Eastman Kodak Company specification 802-148.

The reliability test model as defined in 3.8.1.5.2 shall be used in this test program. Qualification testing shall include but not be limited to the following:



- 4.2.1 Visual Inspection All parts, subassemblies and assemblies to be qualification tested shall be inspected for conformance to the manufacturing standards, Eastman Kodak Company standard 401-119.
- 4.2.2 Drawing Conformance All parts, subassemblies and assemblies to be qualification tested shall be inspected for conformance with their respective drawings.
- 4.2.3 Performance Tests The equipment to be qualification tested shall be tested for its ability to comply with the performance requirements of section 3.
 - 4.2.4 Environmental Qualification Tests
- 4.2.4.1 Payload Assembly A single payload (the reliability test model) shall be subjected to the environmental tests of section 4.4 of Eastman Kodak Company specification, 802-148 (Flight Payload Qualification Test Plan), which is based upon qualification test requirements of Eastman Kodak Company specification 502-118 (Environmental Design Criteria). Following completion of these tests the payload shall be inspected for damage and the performance test of 4.2.3 shall be repeated. In addition, individual components (representative of flight payload design, but not necessarily components of the reliability test model only) shall be subjected to the environmental tests of sections 4.1 thru 4.3 of Eastman Kodak Company specification 802-148.
- 4.2.4.1.1 Diagnosis Report Following the environmental qualification tests, diagnosis shall be made of any impairment of performance of the subsystem assembly components, and a full report shall be written.



(E)

- 4.2.4.2 Aerospace Ground Equipment Environmental qualification tests shall be required for the shipping containers used for the payload, and the forward record storage assembly as specified in applicable individual specifications.
 - 4.2.5 Life Tests
- 4.2.5.1 Payload Assembly The service life capability of the payload assembly shall be tested for compliance with requirements of Eastman Kodak Company specification 802-153 and this specification.
- 4.2.5.2 Aerospace Ground Equipment All items of ground equipment shall be designed for compliance with service life requirements of Eastman Kodak Company specification 802-179. Life tests shall not be performed.
- 4.3 Acceptance Tests The Flight Model Payloads and Aerospace Ground Equipment shall be acceptance tested as follows:
- 4.3.1 Flight Model Payloads Acceptance tests shall be performed on each Flight Model Payload. The test procedures shall comply with 3.10.6 and shall be in accordance with Eastman Kodak Company drawing 804-104 and specification 802-153 and shall include, but not be limited to the following:
- 4.3.1.1 Visual Inspection All parts, subassemblies and assemblies of the payloads shall be inspected for conformance to the manufacturing standards, Eastman Kodak Company standard 401-119.
- 4.3.1.2 Drawing Conformance All parts, subassemblies and assemblies of the payloads shall be inspected for conformance to their respective drawings.



F

- 4.3.1.3 Performance Tests The Flight Payload Models shall be tested for their ability to comply with the requirements of Eastman Kodak Company specification 802-153.
- 4.3.2 Aerospace Ground Equipment Acceptance tests shall be performed on all Aerospace Ground Equipment. The acceptance test procedure shall comply with 3.10.6 and shall be in accordance with Eastman Kodak Company drawing procedure 804-105, and shall include but not be limited to the following:
- 4.3.2.1 Visual Inspection All parts, subassemblies and assemblies of the ground equipment shall be inspected for conformance to the manufacturing standards, Eastman Kodak Company standard 401-119.
- 4.3.2.2 Drawing Conformance All parts, subassemblies and assemblies of ground equipment shall be inspected for conformance with their respective drawings.
- 4.3.2.3 Performance Tests All Aerospace Ground Equipment shall be tested for its ability to comply with requirements of Eastman Kodak Company specification 802-179 and shall meet the requirements of the individual specifications of Table III of 3.8.2.
- 4.3.3 Other Equipment Other deliverable airborne equipment and mockups shall be subjected to performance tests in accordance with applicable specifications for each item.
 - 4.3.4 Environmental Acceptance Tests
- 4.3.4.1 Flight Payloads Each payload shall be subjected to the acceptance vibration test levels specified in Eastman Kodak Company specification 502-118.

- 4.3.4.2 Aerospace Ground Equipment Environmental acceptance tests of Aerospace Ground Equipment shall not be required.
- h.h Reliability Testing A series of tests shall be conducted utilizing the Reliability Test Model to determine safety margins and investigate modes of failure, due to extremes of environmental or operating conditions or due to extended operation (life testing). Results of these tests, together with results of qualification testing and applicable testing of other airborne models listed in Table II of section 3.2.3.1, shall constitute fulfillment of the laboratory test program requirements of section 3.1.4.4 of Work Statement, Exhibit "A", to AF33(616)7704.

4.5 Test Conditions

- 4.5.1 Alignment and Calibration The alignment and calibration of all measuring and test equipment for the subsystem and the recorded data shall be in accordance with the requirements of 3.10.5.
 - 4.5.2 Atmospheric Conditions
- 4.5.2.1 Payload Assembly The atmospheric conditions for all subsystem tests, shall be in accordance with the temperature, barometric pressure and relative humidity requirements of Eastman Kodak Company specifications 502-118 and 502-146.
- 4.5.2.2 Aerospace Ground Equipment The atmospheric conditions for all items of aerospace ground equipment tested shall be in accordance with operating and nonoperating conditions of Eastman Kodak Company specification 802-179.
- 4.5.3 Electrical Conditions The electrical inputs and outputs of the subsystem components under test shall be in compliance with section 3.

4.6 Documentation - The documentation of the payload components and ground equipment shall be in compliance with the requirements of section 3.10.

5. PREPARATION FOR DELIVERY

- 5.1 <u>Camera Payload</u> The camera payload, less the camera payload retrieval components shall be packed and packaged in the camera payload shipping container, Eastman Kodak Company specification 602-144.
- 5.2 Forward Record Storage Assembly The forward record storage assembly shall be packed and packaged in the accessory shipping container Eastman Kodak Company specification 702-183 in accordance with the loading procedure, Eastman Kodak Company Utility Manual, 554-121.
- 5.3 <u>Dust Shield "B" Assembly</u> The external interface dust shield "B" assembly, Eastman Kodak Company drawing, 813-227, shall be packed and packaged in a separate container for shipment.
- 5.4 Aerospace Ground Equipment All items of aerospace ground equipment shall be suitably packed, packaged and marked for shipment by common carrier. The packing shall provide protection for the equipment to withstand the general environmental conditions incident to handling, transportation and storage commensurate with the method of shipment.

Where practical, each component shall be packed separately to minimize size and weight. Shipping and handling of the equipment shall be supervised at every stage by responsible personnel. All items shall be caution placarded in prominent locations in order to minimize the possibility of handling mishaps.

C

- 5.4.1 Packaging (Separate Components or Items) All subassemblies and assemblies for shipment as separate items and not for assembly to a camera payload, shall be cleaned, labeled, and sealed, with their identification, in transparent plastic bags.
- 5.4.1.1 Major Assemblies The major assemblies after cleaning and sealing in plastic bags as above, shall be packaged in fitted and padded boxes. The boxes shall be reusable and shall be equipped with hinges and latch. Each box shall bear proper identification.
- 5.4.1.2 Small Parts Small parts, such as screws, nuts, retaining rings, etc., shall be cleaned and sealed in plastic bags as above. There shall be several parts, but only one part number per bag.
- 5.5 <u>Packing</u> All parts, subassemblies and assemblies, as packaged, shall be crated for shipment as follows:
 - (a) Major assemblies in fitted boxex shall be crated individually.
 - (b) Other assemblies and subassemblies shall be crated individually.
 - (c) Small parts in plastic bags, shall be grouped and each group crated individually.
- 5.6 Packing List A list of all parts included in a crate shall be placed immediately beneath the cover of the crate.
- 5.7 <u>Warning Notice</u> A warning notice which indicates that the plastic bags shall not be opened prior to assembly due to cleanliness requirements, shall be prominently displayed on each list and on each plastic bag.

C

6. NOTEL

6.1 Smear Allocation and Subsystem Performance Tolerances - If the location, attitude, and orbital parameters of the satellite are known, it is theoretically possible to determine a film speed that would exactly compensate for image motion along the center line of the photograph. Errors in knowledge of satellite location and attitude, the small changes in attitude during exposure, vibrations in the film drive mechanism and the discreteness of the film velocity steps can cause slight errors in image motion compensation that will produce smear.

The following paragraphs and tables discuss the various contributors to smear and the tolerance for each. Table IV gives the formulas for the X and Y components of object smear (in the ground plane) at the center of the field.

6.1.1 Smear Pudget Theory - Each on-axis contributor may be assigned to one of two categories. Category A consists of those contributors whose smears vary independently within a single mission. The smears produced by individual members of this category may be root-sum-squared.

Category B is characterized by the property that the smear which its members cause is different from mission to mission. Because these smears are not variable within a mission, they cannot be root-sum-squared with the members of Category A. Since they are independent, however, they may be root-sum-squared within themselves.

The smear contributed by Categories A and B must be combined to produce an over-all allowable smear that will not be exceeded in 95 percent of the frames taken during any one mission at a 95 percent confidence level. The total smear is computed by the following formula:

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Total smear, S_x or $S_y = Q S_A + S_{\gamma}$

There: S, the smear due to the ith contributor listed in Table 6.

- S = Smear due to the combined Category A (within mission) contributors.
- S_B = Smear due to the combined Category F (between mission) contributors.

Note that the smear for each contributor corresponds to its two-sigma variability as given in Table V, so that $S_i = 2\sigma_i$. The 95 percent confidence level is established by assuming that during any single mission the P category smears combine to give a smear approximately equal to the two-sigma variability of their sum. This value (S,) is then treated as a constant for the mission and for the analysis which follows. Note that a confidence level of 95 percent is quite conservative. The A contributor distribution is then considered to be shifted, with its mean at $\boldsymbol{\Sigma}_{\mathrm{R}}$ during a mission (See Figure 6-1). The 95 percent probability of having an actual smear less than or equal to the total allowable smear is established by choosing the factor Q correctly. If Q is chosen too small, the smear computed by equation (1) bounds less than 95 percent of the cases. If Q is chosen too large, the smear bounds more than 95 percent of the cases. There is one Q such that the total smear either side of zero, as computed by equation (1) bounds 95 percent of the area under the (shifted) A-distribution. This is the one that is used. For $S_{\rm R}$ large compared with $S_{\rm A}$, Q = 0.83.

Two extreme cases of this situation are depicted in Figure 6-1. In the top figure, $S_{\rm p}$ is essentially zero, so that the A-distribution is not shifted. The number of standard deviations (sigma units) which include 95 percent of the A-distribution is by definition, 1.96 $\sigma_{\rm A}$, or 0.98 $S_{\rm A}$, since $S_{\rm e}$ is a two-sigma smear. In the lower figure of Figure 6-1, $S_{\rm B}$ is large. In this case V = 0.83 as stated earlier.

For the G-System, on axis, Q is approximately 0.92, since the "B" contributors are small, but not zero. In actual computation, the factor Q is determined iteratively by computer to establish the 95 percent probability for any given smear budget.

6.1.? Assignment of Contributors to Sources - A different breakdown of smear contributors is required to separate the contributors according to their source. All of those contributors which are attributable to the camera payload section are placed in one group, while those due to the CC7 are placed in another. Tracking contributions belong to a third group.

The total smear (in the ground plane) attributable to the camera payload is computed as follows: The value of the individual smear contributors (X_i, Y_i) are taken from Table V. These calculations are based on an 0.0085 inch slit width (short dimension), at a 70 n.mi. altitude, and vertical photography.

702-145

$$\varepsilon_{\chi(\xi/\Gamma)}^{2} = \sqrt{\frac{12}{\xi_{i}^{2}}} \qquad \sqrt{\frac{20}{\xi_{i}^{2}}} \qquad \sqrt{\frac{20}{\xi_{i}^{2}}} \qquad * 5.9 \text{ in. } * .h9 \text{ ft.} \quad (2 * .92)$$

$$S_{Y(C/P)} = \sqrt[3]{\begin{cases} 12 \\ 4 \\ 1 \end{cases}} - \sqrt[3]{\begin{cases} 20 \\ 21 \\ 1 \end{cases}} = 3.1 \text{ in.} = .26 \text{ ft.} \quad (2 = .92)$$

Similarly, the CV contributors total as follows:

$$S_{X(CCV)} = \sqrt[2]{\begin{cases} \frac{7}{x^2} \\ i \\ i = 2 \end{cases}} + \sqrt{\begin{cases} \frac{17}{x^2} \\ i \\ i = 15 \end{cases}} = 2.0 \text{ in.} = .17 \text{ ft.} \quad (2 = .92)$$

$$\mathbb{E}_{\mathbb{Y}(\infty\mathbb{Y})} = \sqrt{\frac{7}{\mathbb{Z}^2}} + \sqrt{\frac{17}{\mathbb{Z}^2}} = 4.4 \text{ in.} = .37 \text{ ft.} \quad (Q = .92)$$

$$= 15$$

The only tracking contributor (X_1 , Y_1), (knowledge of altitude) yields smear of:

$$\mathcal{E}_{X(T)}$$
 = 2.5 in. • .21 ft. (2 • .92)

$$S_{Y(T)} = 0 \text{ in.} = 0 \text{ ft.}$$

For the 15° stereo, 30° obliquity, -2.0° crab case at 70 n.mi., the results of solving the above equations are:

$$S_{X(C/P)}$$
 = 9.2 in. = 0.77 ft.

$$Sy(C/P) = 4.3 in. = 0.36 ft.$$

$$S_{X(OCV)} = 6.2 \text{ in.} = 0.52 \text{ ft.}$$

$$S_{Y(OCV)} = 7.4 in. = 0.62 ft.$$

$$S_{X(T)}$$
 = 3.1 in. = 0.26 ft.

$$S_{Y(T)} = 0 \text{ in.} = 0 \text{ ft.}$$

TABLE IV SMEAR EQUATIONS

Knowledge of Altitude Roll Pitch	Ground FWB Ax sec 2 t t wh Ay (1 + sec wh Ay sec 2 t t wh Ay (1 + sec wh Ay sec 2 t t wh Ay sec 2 t t wh Ay tan C t t wh Az tan C t	Image Plane which was $\frac{Ah}{A}$ which \frac{Ah}
Roll Rate Pitch Rate	$X_{L_1} = \frac{m_1}{F} A_{Z_1} \sec^2 \Sigma \sec \Omega$ $X_{S_2} = 0$. $Y_{S_1} = \frac{wh^2}{FV_{X_1}} A_{X_2} \sec^2 \Sigma \sec^3 \Omega$. $X_{S_1} = \frac{wh^2}{FV_{X_2}} A_{Y_1} \sec^2 \Sigma \sec^2 \Omega$. $X_{S_1} = \frac{wh^2}{FV_{X_2}} A_{Y_1} \tan \Sigma \sec^2 \Omega$ tan $\Omega \sec^2 \Omega$.	$x_{5} = 0$. $x_{5} = 0$. $x_{5} = \frac{Wh}{v}$ Ax sec Σ sec Ω . $x_{6} = \frac{Wh}{x}$ y sec ² Σ . $x_{6} = \frac{Wh}{v}$ Ay tan Σ sec Σ tan Ω .

TARLE IV (Continued)

	On Ground	In Image Plane
Yaw Rate	$x_7 = \frac{Wh^2}{fV} A_z \sec^{\mu} \Sigma \tan \Omega \sec \Omega$	$x_7 = \frac{\partial h}{\partial x} + \frac{1}{x} \tan \Omega \sec^2 \Sigma$
	$Y_7 = \frac{Wh}{FV_X}^2 A_z$ tan $\Sigma \sec^2 \Sigma \sec^2 \Omega$	y = Wh A tan Σ sec Σ
Crab Servo Steps and Error	$x_8 = \frac{Wh}{F} \Delta x \sec^2 \Sigma \tan \epsilon \sec \epsilon$	x * W 4x tam G
	Y ₈ = Wh Δx sec Σ sec ² G.	y ₈ ⋅ ₩ Δχ
Film Drive Oscillation Amplitude	$x_9 = \frac{wh^2}{FV}$ (v1b) sec ¹ $\Sigma \sec^2 \Omega$	x, * Wh (Vib) sec 2 sec f.
	Y9 * 0.	y = 0.
Stereo Servo	x_{10} = μ \overline{F} $\Delta\Sigma_m$ tan $\Sigma \sec^2 \Sigma \sec \zeta \cos x x_{10}$ =	$\times x_{10} = h \ W \Delta \Sigma_{r_1} $ tan $\Sigma \cos \times$
	$Y_{10} = h \frac{Wh}{F} \Delta \Sigma_m an \Sigma sec \Sigma sec^2 G sin \times y_{10}$	\times \mathbf{y}_{10} = \mathbf{b} $\mathbb{W}_{L\Sigma}_{m}$ tan Σ sin \times
Film Velocity Steps	χ_{11} * $\frac{Wh}{F}$ $\left(\frac{\Delta V_{\mathrm{F}}}{V_{\mathrm{F}}}\right)$ sec Σ sec Ω	x11 * W (NYF)
	Y11 * 0.	y 11 · C.
Film Velocity Drift	$x_{12} = \frac{wh}{F} \left(\frac{\Delta^{V} F}{V_F} \right) \sec^2 \Sigma \sec \zeta$	$x_{12} = N\left(\frac{\Delta V_F}{\sqrt{g}}\right)$
	Y12 * C.	y ₁₂ * C.

TAPLE IV (Continued)

	IABLE IV (Continued)	1
	On Ground	In Image Plane
Roll Alignment	$X_{15} = \frac{Wh}{F} B_X \sec^2 \Sigma \tan \Omega \sec \Omega$	x_{15} * * * * tan $_{\Sigma}$
	Y ₁₅ = 0.	$y_{15} = 0$.
Pitch Alignment	$x_{16} = \frac{wh}{F} B_y (1 + sec^2 \Omega) \tan \Sigma sec^2 \Sigma$	x ₁₆ * W By (cos β + sec β) tan Σ
	Yle F B sec I tan G sec G	y_{16} * WBy sec Σ sin G
Yaw Alignment	$X_{17} = \frac{Wh}{F} B_z \tan f \tan \Sigma \sec^2 \Sigma$	x_{17} $^{\circ}$
	Y = Wh B sec I sec C	V17 * 1 1 2 cos f. sec 2
Crab Mirror Mounting Error	$X_{18} = \frac{Wh}{F}$ M sec ² I tan Ω sec Ω	x ₁₈ * W M _c tan Ω
	r_{18} . Wh Mc sec Σ sec ² Ω	y ₁₈ * W M _c
Stereo Mirror Mounting Error	$x_{19} = u_{\overline{F}}^{Wh} M_s \tan \Sigma \sec^2 \Sigma \sec G \cos x$	x ₁₉ * h W M _s tan ∑cos ×
	$x_{19} = 4 \frac{Wh}{F} M_s \tan \Sigma \sec \Sigma \sec^2 \Omega \sin x$	y ₁₉ = μWMs tan Σsin χ
Knowledge of Focal Length	$X_{20} = \frac{Wh}{F} \left(\frac{F}{F} \right) \sec^2 \Sigma \sec \Omega$	$x_{20} = W\left(\frac{\Delta F}{F}\right)$
	Y20 * 0.	y ₂₀ = 0.

TAPLE IV (Continued)

NOMENCIATURE

- A Roll error angle (includes error in obliquity maneuver)
- $A_{\mathbf{v}}$ * Pitch error angle
- $k_2 = 180$ error angle
- A Roll rate error
- A_v Pitch rate error
- A, . Yaw rate error
- E. = Vehicle alignment error about roll axis
- By * Vehicle alignment error about pitch axis
- D, = Vehicle alignment error about yaw axis
- Δx * Errow in crab compensation (steps and servo error)
- Vib = Amplitude of the linear velocity error of the platen due to vibration (oscillation)
- $\Delta V_{\rm F}$ = Amplitude of the linear velocity error of the platen due to discreteness and drift of the drive mechanism and/or electronics
- $M_{\rm c}$ = Angular error in sterec mirror crab alignment (radians)
- ${\rm M}_{\rm S}$: Angular error in stereo mirror stereo alignment (radians)
- X_i = Component of smear on ground parallel to the ground track for the ith contributor
- x_i = Component of smear in the image plane perpendicular to the slit
 for the ith contributor
- Y = Component of smear on ground perpendicular to the ground track

 for the ith contributor
- y_i = Component of smear in the image plane parallel to the slit for the ith contributor

TABLE IV (Continued)

NOMENCLATURE

- Slit width
- h * True altitude of the camera above ground
- F = Focal length
- Ah = Uncertainty in knowledge of altitude
- Σ = Stereo angle of line of sight
- Σ * Stereo mirror angle * 1/2
- $\Delta\Sigma_m$. Uncertainty in stereo mirror angle due to errors in the positioning mechanism
- Ω * Obliquity angle of the line of sight
- χ = Crab angle of the mirror

C05098942

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Intrack (Sx) and Crosstrack (Sy)
Smear Contributors

SMEAR (95% Level)
(at 70.0 n.m. altitude, with 0.0085 in. slit wide

(F) 30° Obliquity E**sti**mated Vertical Smear 15° Stereo Suggested STD Photography ○omx(in.) y(in.)x(in.) y(in.)Allocation Smear Contributor Tolerance Distribution Deviation ponent Knowledge of Altitude (n.m.) ±0.5 Normal 0.167 2.68 0 3.34 0 Ephemeris X Roll Attitude (deg) ±0.7 Normal 0.233 0 C 3.30 C OC A X₂ 0 4.42 4.74 007 X3,Y3 Pitch Attitude (deg) ±1.0 Normal 0.333 0 Yaw Attitude (deg) ±0.6 Normal 0.200 0 3.93 0.66 4.92 OC V x_L, y_L 0.003 1.86 Roll Rate (deg/sec) ±0.01 Normal 0 1.11 0 OC V Y5 Pitch Rate (deg/sec) ±0.02 Normal 0.007 2.21 0 2.97 0.50 OCV X6, Y6 0.005 0 0.65 Yaw Rate (deg/sec) ±0.015 Normal 0 1.29 OCV X7,Y7 0.145)_{RSS} Crab Steps (deg) ±0.25 Uniform 0 3.00 2.16 4.19 C/P XA,YR Crab Error (deg) (RSS) ±0.15 Normal Film Dr. Oscillation Amplitude 518.0 7.81 (microns/sec) 1554.0 Normal 5.04 0 0 C/P Xq 0.073 0 1.92 Stereo Servo (not LOS) (deg) ±0.22 Normal 0 0.08 C/P X10,Y10 C/P Film Velocity Steps (%) ±0.50 Uniform 0.289 3.25 0 4.05 0 X₁₁ Film Velocity Error (%) ±0.20 Normal 0.067 0.75 0 0.94 0 C/P X₁₂ Roll Alignment (deg) 0 0.19 OC V ±0.04 Normal 0.013 0 0 X₁₅ Pitch Alignment (deg) ±0.04 Normal 0.013 0 0 0.18 0.19 OC V X16,Y16 Yaw Alignment (deg) ±0.1 Normal 0.033 0 0.66 0.11 C.82 ∞ V X17,Y17 Crab Mirror Mounting (deg) ±0.05 0.017 0.24 Normal 0 0.33 0.46 C/P X₁₈, Y₁₈ Stereo Mirror Mounting (deg) ±0.05 Normal 0.017 С 0 0.44 0.02 C/P X₁₉,Y₁₉ Knowledge of Focal Length (in.) ±.062 Normal 0.021 0.30 0 0.38 0 C/P X20

(Fill be exceeded in less than 5% of the frames from a single mission with a 95% confidence level.)

11.67

8.35

S/V

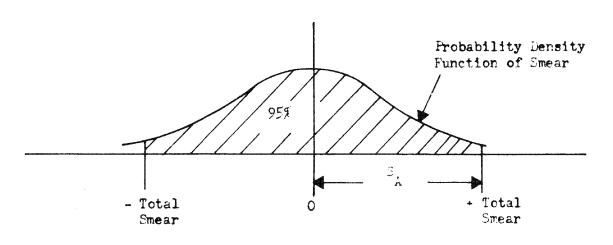
5.18

6.88

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Total Smear (in.)

"A" Contributors Only



Q = 0.98

Large """ Contributors

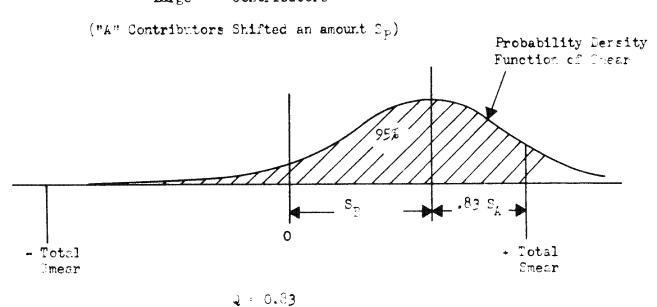


Figure 6-1 Smear Probability Density

APPENDIX 7

SYSTEMS TEST PROCEDURE

R-300488-KH

144 Sheets:

VTP-302

SYSTEMS TEST PROCEDURE

EASTMAN KODAK COMPANY

VAFB

	RE	/ISIONS	
SYM DESCRIPT	ION	DATE	APPROVAL
A General rewrite existing operat		4-15-66	

PREPARED BY:

QUALITY CONTROL:

DATE:

DATE:

PROJECT SUPERVISOR:

DATE: 4-6-66

BASE MANAGER:

DATE:

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Flow Plan

1.0 PURPOSE

The purpose of this procedure is to:

Verify the capability of the OCV to provide the proper voltages, commands, and connections to the OCV/CP interface.

Provide instruction and criteria for the mating operations.

Demonstrate that the C/P, after mating and on through all the ground testing, is capable of performing the electrical and/or mechanical operations necessary for the flight mission.

2.0 REFERENCE DOCUMENTS

VTP-301 Subsystem Test Procedure VOI-400 Operating Instructions 801-116 Payload Interface 502-146 Interface Specification

3.0 DOCUMENTATION

3.1 Test Data

All test data shall be recorded on the data sheets for this procedure.

3.2 Payload Log

The payload log shall be maintained as a historical record of the testing progress.

3.3 Chart Records

The TME chart recorders shall be operated whenever the five (5) volt instrumentation voltage is applied. The GEL J, K and L recorders shall be operated whenever the TM is available. All the recorders shall be operated at a speed of one (1) mm/sec. during the non-event periods, and at five (5) mm/sec. during the event periods.

(Exception: The GEL J, K and L recorders shall be operated at ten (10) mm/sec. during the airborne recorder play-back periods.)

3.3 At the time when a chart is removed from a recorder, it shall be identified with the following information:

CP/OCV Serial Number Test Procedure Number Items/Tasks Numbers Date Time Recorder Designation

3.4 Disposition of Data

All charts, real time data sheets, and C/P log sheets shall be delivered to the data room immediately after the completion of an operation and/or test procedure (unless otherwise noted).

4.0 FACILITIES

4.1 Equipment

544-294 Breakout Box Assembly 550-100 Portable Test Set 552-125 Electric Simulator 644-700 Erector 648-100 Space Chamber Cradle Assembly 737-383 Record Storage Test Set 744-409 Plug Gage 745-529 Record Travel Viewer and Carrying Case Assembly Record Supply and Record Storage Alignment Fixture 748-497 749-100 Record Splicer 844-150 Integration Lifting Yoke Assembly 16 Channel Recorder (incl. Selector Switch Panel and Digital Voltmeter) Alignment Target Plano Mirror Theodolite and Stand Record Clamps (2) Digital Electronic Counter Compensator Locking Plug Compensator Protective Cover Assembly Bellows Support Pad Plastic Roller Covers (3) Rollaway (includes tools listed on the Tool Check List) Hygrometer 5534 Overhead Hoist

4.2 Power

115 ± 5 volt AC, 60 cycles ± 1%, single phase, 60 amperes

4.3 Area

Clean room standards maintained as per Interface Specification, 502-146.

5.0 OPERATING CONDITIONS

5.1 Environmental

Temperature $-60^{\circ}F$ to $90^{\circ}F$ (unless otherwise noted) Humidity $-45 \pm 5\%$ RH (until that time when all the record path is sealed after integration; beyond that time, the associate is responsible for preventing condensation of moisture on any surface of the C/P). Pressure -30.86 to 29.3 In. HG. ABS.

5.2 Payload Status

The status of the payload shall be defined in each operation.

5.3 Calibration

All test instruments used for conducting these tests shall be within their calibration periods.

OPERATION 1 FRSA READINESS

- 1.0 PLUG GAGE CHECK
- 1.1 Upon notification by the associates, provide the Plug Gage (744-409) and assist with its installation into the RV.
- 1.2 Verify that when all the components are installed in the capsule, there is clearance about the Plug Gage and the capsule cover can be seated.
- 1.3 Remove the Plug Gage.
- 2.0 FRSA INSTALLATION
- NOTE: Conditions necessary to start this item: VTP-301, Task 11 complete.
- 2.1 Disconnect P668/J668, remove the FRSA reel and replace the two (2) reel mounting U-clamps.
- 2.2 Remove the protective covering from the mirrors, inspect and clean the FRSA as required.
- 2.3 Install the three (3) plastic roller covers on the FRSA rollers.
- 2.4 Install the compensator protective cover.
- 2.5 Remove the FRSA from the handling frame and vacuum out the mounting holes in the FRSA.
- 2.6 Deliver the FRSA to the RV build-up area and assist with the installation as required.
- 2.7 Prior to the FRSA/Capsule Alignment, remove the compensator protective cover and install the compensator locking plug.
- 2.8 After the FRSA/Capsule Alignment, remove the compensator locking plug and install the compensator protective cover.
- 3.0 CUTTER CHECKS
- 3.1 Provide the associates with the record to conduct their cutter and sealer checks.

- 3.2 Verify that the associates return the record that was given to them for their cutter and sealer checks and discard this record into a "used record" container.
- 4.0 WEIGHT AND BALANCE OF THE RV
- 4.1 Upon notification by the associates that they are ready to have the reel installed in the FRSA for weight and balance, remove the compensator protective cover.
- 4.2 Remove the two (2) reel mounting U-clamps and install the reel. Secure the reel with the U-clamps utilizing the screws previously removed and connect P668/J668.
- 4.3 Install the compensator locking plug and secure with tape.
- 4.4 Monitor the build-up of the RV.
- 4.5 When the weight and balance task has been accomplished, disconnect P668/J668, remove the reel, reinstall the U-clamps, remove the compensator locking plug and tape, and reinstall the compensator protective cover.
- 5.0 FRSA REEL INSTALLATION
- 5.1 When the build-up of the RV has been completed to the point of installing the FRSA reel, move the RV into the EK/V subsystem area.
- 5.2 Remove the compensator protective cover and the three (3) plastic roller covers.
- 5.3 Inspect the RV/FRSA and clean as required.
- 5.4 Install the FRSA reel. Use four (4) new U-clamp screws (400-164-141) and torque to 25 ± 2 inch-pounds.
- 5.5 Connect the FRSA frame plug, P668 to the FRSA reel jack, J668.
- 5.6 Disconnect P1461 from the FRSA frame jack, J661, and then connect the Record Storage Test Set plug, P661, to J661.
- 5.7 Connect a ground lead between the FRSA frame and the Record Storage Test Set chassis.

- 5.8 Thread a twenty-five (25) foot length of leader (clean record) through the FRSA compensator and rollers and secure three-quarters (3/4) of one wrap around the reel per VOI-402. Record the measured length of the leader installed.
- 5.9 Station one person in line with the FRSA entrance rollers to hold the record clear of interference and to maintain adequate tension on the record during the take-up operation.
- 5.10 Turn on the Record Storage Test Set power and command the FRSA reel on, in the forward direction, for a three (3) second interval.
- 5.11 Verify that the FRSA operates properly and that the reel pawls are engaged.
- 5.12 Continue to operate the FRSA reel in the forward direction as required to take up all but ten (10) feet of the leader (as measured outside the FRSA from the compensator roller to the end of the leader).
- 5.13 Turn the test selector switch on the Record Storage Test Set to the instrumentation position CPL 15.
- 5.14 Rotate the gear on the shaft of roller thirty-one (31) in such a manner as to obtain the maximum and minimum values of CPL 15 as indicated by the meter on the Record Storage Test Set. Record both voltage levels on the data sheet.
- 5.15 Rotate the gear to a position such that CPL 15 output is left at its maximum value.
- 5.16 Slide the record protection envelope over the ten (10) feet of excess leader (the end of the envelope must be no closer than two (2) inches from the compensator roller).
- 5.17 Roll up the excess leader and envelope and secure the roll to the compensator roller frame.
- 5.18 Disconnect P661 and connect P1461 to J661 and remove the FRSA frame ground lead.
- 5.19 Reinspect the RV/FRSA (in particular for cleanliness, interference, and also proper installation of the EMI strap).

ITEM

5.20 Cover the exposed area of the RV with a piece of plastic sheeting, move the assembly back to the RV work area, and release the assembly to the associates.

6.0 SRV BUILD-UP

6.1 Monitor and assist as needed to handle the record during the build-up of the SRV.

CAUTION: If it becomes necessary to clean the record, a clean, lint-free, dry cloth should be the <u>only</u> material used. Handle the record with clean, white gloves.

6.2 After the leader/record protection envelope has been threaded through the section of chute with the chute access port opening and this section has been mated and fastened, remove the record protection envelope. Roll up the excess leader and tape it securely in the chute access port opening in such a manner as to block off or seal the chute.

RTDS F VTP-302-1 OPERATION 1 FRSA READINESS NON-CON-PROCEDURE PROCEDURE FUNCTION REQUIRED FORMANCE DEVIATION PARAGRAPH UNITS MEASURED DESCRIPTION REFERENCE REFERENCE REFERENCE MIN. MAX. Plug Gage Check 1.0 Init/ Date 1.1 Plug Gage Installed . 88 Verify Plug Gage/Capsule Fit 1.2 Plug Gage Removed 1.3 2.0 FRSA Installation P668/J668 Disconnected, FRSA reel 2.1 Ck Removed Mirrors Uncovered and FRSA Inspected 2.2 Ck and Cleaned 2.3 Three (3) Plastic Roller Covers Ck Installed 2.4 Compensator Protective Cover Installed Ck Ck FRSA Mounting Holes Vacuumed 2.5 FRSA Installed Init/ 2.6 Date 2.7 Compensator Protective Cover Removed, Compensator Locking Plug Installed

D1-1

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OPERATION	1 FRSA READINESS F_				RTDS		VTP-302-1
PROCEDURE	· FUNCTION	·				NON-CON-	PROCEDURE
PARAGRAPH REFERENCE	DESCRIPTION	UNITS	REQUI MIN.	RED MAX.	MEASURED	FORMANCE REFERENCE	DEVIATION REFERENCE
2.8	FRSA/Capsule Alignment Completed, Compensator Locking Plug Removed, and Compensator Protective Cover Reinstalled	Init/ Date					
3.0	Cutter Checks						
3.1	Record Provided	Ck			CONTRACTOR OF THE PROPERTY OF	Charles and Charle	
3.2	Record Returned and Properly Discarded	Init/ Date					
4.0	Weight and Balance of the RV				SHOPPIN Planta of The Planta		
4.1	Compensator Protective Cover Removed	Ck			***************************************		
4.2	FRSA Reel Installed and P668/J668 Connected	Ck			WAARAN STATE OF THE STATE OF TH	:	
4.3	Compensator Locking Plug Installed and Secured	Init					
4.4	RV Build-up Monitored	Ck					
4.5	Weight and Balance Task Completed, P668/J668 Disconnected, Reel Removed, Compensator Locking Plug Removed and Compensator Protective Cover Reinstalled	Init/ Date			W1-00-00-00-00-00-00-00-		

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OPERATION 1	FRSA READINESS	WARK ARK OF THE CORE OF	-	RTDS		VTP-302-1
	FUNCTION			de de la companya de	NON-CON-	PROCEDURE
	DESCRIPTION	UNITS	REQUIRED MIN. MAX.	MEASURED	FORMANCE REFERENCE	DEVIATION REFERENCE
LL.]	FRSA Reel Installation			мунтикк а (му руу мусын	utheathy framedownsh	
	Compensator Protective Cover and Three (3) Plastic Roller Covers Removed	3		waggip money do navigan company on constants of		anantayan kanakan kana
1.d	FRSA/RV Inspected and Cleaned	ž		Characteristics of the same processing the same of the		geographysa and Political Law
<u></u> 0,	FRSA Reel Installed w/Four (4) New Screws (torqued to 25 ± 2 inch-pounds)	3				·
	P668/J668 Connected	3			mar iddeviu vilken a	
	Record Storage Test Set Plug, P661, Connected to FRSA Frame Connector, J661	Š		The second secon		SC. ZUZ-11
	FRSA Frame Ground Lead to the Record Storage Test Set Chassis	ž		er e		amaning 4 mang tung tung tung tung tung tung tung tu
	Twenty-five foot Length of Leader Threaded onto FRSA	ž				- Charles (1999) - Cha rles (1999) - Charles (1999) - C
	FRSA Operates Properly, Pawis Engaged	స		The state of the s		Paracist Process Constitution (Process Constitution Const
	Fifteen (15) feet of Leader in FRSA, Ten (10) feet of Leader Outside FRSA	ž				mgaalalaa ardigi oliga giga gagahana aana
	CPL 15 Maximum Value	Volt	As Read			And Special and Special State of State
	CPL 15 Minimum Value	Š Š Č	As Read			
						general de la companya de la company
						5-1-3

PERATION	1 FRSA READINESS F		Press.		RTDS		VTP-302-
PROCEDURE	FUNCTION				-p	NON-CON-	PROCEDURE
PARAGRAPH REFERENCE	DESCRIPTION	UNITS	REQUI	RED MAX.	MEASURED	FORMANCE REFERENCE	DEVIATION REFERENCE
5.15	CPL 15 Maximum Value	Vo1t	As S	Set			
5.16	Record Protection Envelope On	Ck			Age-spath-control-cont	Control of the contro	
5.17	Record Protection Envelope/Leader Rolled and Secured to Compensator Roller Frame	Ck			the man than provided the second		
5.18	Disconnect P661, Connect P1461 to J661 and Remove Ground Lead	Ck					
5.19	RV/FRSA Reinspected	Ck			Tigaturia (100 - 1		
5.20	RV Assembly Covered, Moved to RV Work Area and Released	Init/ Date			Mark the state of	·	
6.0	SRV Build-up					Notice to the second	
6.1	SRV Build-up Monitored	Ck					
6.2	Record Protection Envelope Removed, Leader Rolled and Secured in Chute	Init/ Date					
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OPERATION 2 SV ELECTRICALLY MATED SUBSYSTEM VERIFICATION

- 1.0 TEST PROCEDURE 50
- 1.1 Verify that the equipment and interconnections comply with V0I-409/TP-50.
- 1.2 Verify that the TME is properly configured and is operating.
- 1.3 Monitor the TME for the computer events and the HMC verifications as per TP-50.
- 1.4 Operate the GEL recorders J, K and L (at a speed of 10 mm/sec) at one time during the test when both the operating power and the TM are on.
- 1.5 Read and record the DVM values of all the available VTP/VP points, via the selector switch, at the first opportune time, when both the TM and the operating power are on.
- 1.6 Verify the presence of the twenty (20) CPS and the five hundred (500) CPS timing signals.
- 1.7 Obtain the charts from recorders J, K and L in the GEL along with the TME charts and deliver to the data room.
- 1.8 Reduce the data from the charts and record as required on the data sheets.
- 1.9 Verify that all the data has been analyzed and that all the non-conformances and/or procedure deviations have been described on the Non-Conformance/Procedure Deviation sheet, and that the data package has been completed.

PROCEDUAE	FUNCTION	The second secon			NON-CON-	PROCEDIRE
PARAGRAPH REFERENCE	DESCRIPTION	UNITS	REQUIRED MAX.	MEASURED	FORMANCE REFERENCE	DEVIATION REFERENCE
0.1	TP-50	endel State de Maria de Consente en Esperie de La Espe La Consenta de La Co				
garan-	Verify equipment and set-up complies with VOI-409/TP-50	3			and the state of t	
<u>.</u>	TME recorders monitored, all computer events verified per TP-50	Š				di-Aprila naturalida (Balan Balan Ba
7.	GEL recorders operated	ž				RAIIIIA PRINCIPA MARININI PRINCIPA MARINI PRINCI
5.	Ambients read and recorded on ambient sheet	Š			**************	
9.	Timing signals present 20 CPS	3			-	nakaja film kindraliku kindraliku kindraliku kindraliku kindraliku kindraliku kindraliku kindraliku kindraliku
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Date

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		4	10-51	1.20-1.30		-	25	14-10	3.70-4.10		
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Bit sequence for Simulator Operation in Task 5 of TP-50 DRS-VTP-302-2

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4122	116	1	0	1	0	0	1	1	521.3					<u> </u>										
4202	117	1	0	1	0	1	0	0	525.2	0	0	0	1	0										
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Bit sequence for Simulator Operation in Task 5 of TP-50

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VTP-302-3

OPERATION 3 ELECTRICALLY MATED MISSION PROFILE

NOTE: Conditions necessary to start this operation:

VTP-302, Operation 2 complete. (Test Acceptance Record signed off and/or the SV released for further processing.)

- 1.0 TEST PROCEDURE 41
- 1.1 Verify that the equipment and interconnections comply with VOI-409/TP-41.
- 1.2 Verify that the TME is properly configured and is operating.
- 1.3 Monitor the TME for the computer events and the HMC verifications as per TP-41.
- 1.4 Read and record the DVM values of all the available VTP/VP points via the selector switch at the first opportune time when both the TM and the operating power are on.
- 1.5 Operate the GEL recorders J, K and L (at a speed of 10 mm/sec) at one time during the test when both the operating power and the TM are on.
- 1.6 Obtain the charts from recorders J, K and L in the GEL along with the TME charts and deliver to the data room.
- 1.7 Reduce the data from the charts and record as required on the data sheets.
- 1.8 Verify that all the data has been analyzed, and that all the non-conformances and/or procedure deviations have been described on the Non-Conformance/Procedure Deviation sheet, and that the data package has been completed.

OPERATION	3 ELECTRICALLY MATED MISSION PROFILE	F			RTDS	-	VTP-302-3
PROCEDURE	. FUNCTION	· · · · · · · · · · · · · · · · · · ·	r		·	NON_CON_	PROCEDURE
PARAGRAPH REFERENCE	DESCRIPTION	UNITS	REQUI	MAX.	MEASURED	FORMANCE REFERENCE	DEVIATION REFERENCE
1.0	TP-41	100111					
1.1	Verify Equipment and Set-up Complies with VOI-409/TP-41	Ck					
1.3	TME Recorders Monitored, all Computer Events Verified per TP-41	Ck	·		WATER CONTRACTOR OF THE PROPERTY OF THE PROPER		
1.4	Ambients Read and Recorded on Ambient Sheet	Ck			The se 1888 Squared to remove the squared to the sq		
1.5	GEL Recorders J, K and L Operated	Ck			-		
1.8	Verify Data Package Completed	Init/ Date					
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(SIMULATOR)

T.P. No. 41

Date____

Page 2 of 5

Run No.

Time

DRS-VTP-302- 3.

Task Time	CPL No.	Channel and Pin	Expocted Value ± 5%	Actual TIM	Value HMC	CPL No.	Channel and Pin	Expected Value ± 5%	Actual TIM	Value H/S
	VP 46	+28 V	27-32.5 V	•		21	12-3	2.20-2.40	•	
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	2	1029.	0.40-0.50			23	12-12	3.00-3.30		
	3	14-14	0.80-0.90		•	24	10-5	3.15-4.00	,	
	4	10-51	1.20-1.30			25	14-10	3.70-4.10	• .	
	5.	10-57	1.50-1.70			26	10-72	3.25-4.10		
	6	10-52	1.90-2.10			27	74-20	4.50-4.70		
	7	10-53	2.30-2.50		- addituminda <u>mana</u>	28	15-4	5.00-5.40		•
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- пун ВАНТилиот	11	12-6	3.85-4.15			32	10-6	1.00-1.50		
	12	14-16	4.00-4.20			- 33	12-13	1.40-2.00	• •	
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OPERATION 4 C/P WEIGHING, INSTALLATION AND OCV/SRV MATING

NOTE: Conditions necessary to start this operation:

VTP-301, Operation 14, complete. Room temperature is 70 \pm 5°F. Room humidity is 45 \pm 5%.

- 1.0 WEIGHING THE C/P
- 1.1 The C/P will be weighed before mating. At that time, utilizing the overhead hoist with the load cell attached, connect the clevis to the Integration Lifting Yoke.
- Remove the C/P from the cradle following the procedure described in VOI-412, Paragraph 6.8 (Item 6.8.1 thru 6.3.12).
- 1.3 Raise the C/P until there is approximately one-quarter (1/4) inch clearance between the mating surfaces of the cradle and the C/P.
- CAUTION: The C/P must be controlled during this activity so that connector P-6)1 does not contact the top section of the cradle.
- 1.4 Proceed with the weighing operation as directed by the associates and record the measured weight.
- 1.5 When the weighing operation is completed, reinstall the C/P onto the cradle following the procedure described in VOI-412, Paragraph 6.10 (Item 6.10.4 thru 6.10.11).
- 1.6 Remove the clevis from the Integration Lifting Yoke, move the hoist clear of the C/P, and remove the load cell from the hoist.
- 2.0 INSTALLATION OF THE C/P INTO THE OCV
- 2.1 Check off the tool list for the tools retained in room 106.
- 2.2 Remove the C/P from the cradle following the procedure described in VOI-412, Paragraph 6.8 (Item 6.8.1 thru 6.8.12.
- CAUTION: Although the mating of the C/P to the OCV is the associates' responsibility, work as closely as possible

- 2.2 with them so as to prevent any damage from occurring to the C/P. Pay particular attention to the guiding of the torsion pin into its slot in the OCV.
- 2.3 Remove the three (3) stow pins when the C/P mounting pads are approximately one-half (1/2) inch above the OCV mating surfaces.
- 2.4 Assist during the final mating and verify that the three (3) thermal bushings are in before the mating bolts are installed.
- 2.5 Reinstall the three (3) stow pins when the mating bolts are started. (Make certain the stow pins are secured before the mating bolts are tightened.)
- 2.6 After the mating bolts have been tightened, remove the Integration Lifting Yoke and lower it onto its dolly.
- 2.7 Remove the three (3) "T" brackets from the C/P.
- 2.8 Assist and monitor the fastening of the zipper on the dust shields A and B.
- 2.9 Monitor the installation of the EMI grounding strap to the OCV.
- 2.10 Remove the dust caps from the interface connectors.
- 2.11 Verify that the interface connectors P1495, 1496, 1497, 1498, 1499 and 1454 mate properly with the C/P connectors and check for proper cable freedom and routing.
- 2.12 Install the dust shield and adapter plate assembly to the exit of the air supply at station 84 per drawing 801-116.
- CAUTION: The air supply exit will be opened under a reduced light condition and then resealed before returning to a normal light condition.
- 2.13 Monitor and assist the associates with the installation of the dust shield to the OCV.

ITEM

3.0 OCV/SRV MATING

- 3.1 When the associates are properly configured for mating the SRV to the OCV, fasten the two (2) record clamps to the forward and aft sides of the VA access hatch opening. (The record clamp with the metal shield attached is mounted on the forward side of the hatch opening.)
- 3.2 Verify that the inside section of the bellows assembly is clean.
- 3.3 Unroll the free end of the record at the exit of the air supply and thread it through the bellows and the VA chute, and out the access port.

CAUTION: Do not loosen the air supply exit seal.

- 3.4 Feed the bellows support pad through the bellows section and on up the chute to the access port until the pad is even with the extended bellows mating surface.
- 3.5 Under a reduced room light condition, remove the air supply exit seal and transfer the record tension to the access port.
- 3.6 Monitor the attachment of the bellows section to the air supply exit adapter plate. Return to a normal room light condition after the four (4) corner screws are secured.
- 3.7 Maintain record tension by pulling the record through the access port in conjunction with the movement of VA toward the OCV.
- 3.8 When VA/OCV mating surfaces are aligned and partially fastened, remove the bellows support pad and secure the record in the aft record clamp.
- 3.9 Utilizing a hand mirror and a flashlight, inspect the chute area from the access port to the air supply exit roller for record clearance and verify that the bellows has folded properly.
- 3.10 Verify that the hatch opening over the chute access port is covered with a piece of plastic material.

- 3.11 Recheck the tool list for the tools retained in room 106.
- 3.12 Remove the aperture mask cover at the start of the I. P. alignment.
- 3.13 Verify that all the data has been analyzed, and that all the non-conformances and/or procedure deviations have been described on the Non-Conformance/Procedure Deviation sheet, and that the data package has been completed.

OPERATION	4 C/P WEIGHING, INSTALLATION AND OCV/SRV	MATING	<u>.</u>	RTDS	VTP-302-4	
PROCEDURE	· FUNCTION				NON-CON-	PROCEDURE
PARAGRAPH REFERENCE	DESCRIPTION	UNITS	REQUIRED MIN. MAX.	MEASURED	FORMANCE REFERENCE	DEVIATION REFERENCE
1.0	WEIGHING THE C/P	and illigation in the state of			weekstable Westerlands	
ordy ordy galana	C/P Weight (as weighed and not including the Viewport Boot and Dust Shield Ass'y)	Lbs.			uhan Addi Vel Pipanin kenggar	
2.0	INSTALLATION OF THE C/P INTO THE OCV	<u> </u>		ayuu ooyaa aa		
2	Tool List Checked	ž			NSANAMAN LUNGS PERSON	attro restaurance
2.3	Three (3) stow pins removed	క		The second section of the sect	·	
2.4	Three (3) thermal bushings in socket mounting ring	3			versteensteens of the property of the second	
2.5	Three (3) stow pins reinstalled	3		And the second s		
27	Three (3) "T" brackets removed	. <u>\$</u>		And the second s		
2,0	Zipper on dust shields A & B fastened	<u></u>		The second secon		
2.9	EMI grounding strap installed to OCV	3				enverture Present
2.10	Dust caps removed	ಕ			·	
2.11	Interface connectors mate properly and cables checked	Š				
2.12	Dust shield and adapter plate installed to C/P	Š				
		unteren en er en				

OPERATION 4	4 C/P WEIGHING, INSTALLATION AND OCV/SRV MATING	MATIN	<u>د</u>		RTDS	NON-CON-	PROCEDURE
	DESCRIPTION	UNITS	REQU	REQUIRED N. MAX.	MEASURED	FORMANCE	DEVIATION REFERENCE
	Dust shield installed to OCV	ž	•			**************************************	and the speciments of the specimens of t
	OCV/SRV MATING				gg-vid-vop-tygggly-vide-Piggyy	villetti Visioni di 1874 salend	
	Two (2) record clamps installed	Š				NATE Constitution of Constitut	oomien myss _{aal} goo
	Inside section of Bellows Assembly clean	ž				al-hananstosangs s	
	Bellows support pad installed	ž			٠		h-Nasawayan-Nasawaya araniya
	Bellows support pad removed and record clamped	Š				and and an annual magnetic field of the second of the seco	hans with a special street, but any street
	Record clearance and bellows fold checked	ž				• •	
	Hatch opening covered	స					nishi kuga seperki kugan sela
	Tool list rechecked	Init/ Date				and graph and a state of the st	eldringsychinosystytems (Flynger vi
	Aperture Mask Cover removed	ž					magazini di Angelo Mana
	Verify data package completed	Init/ Date				· ·	autonya na 1976 a 1881 a 1881
						e e e e e e e e e e e e e e e e e e e	
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OPERATION 5 MATED ALIGNMENT CHECK

NOTE: Conditions necessary to start this operation:

VTP-302, Operation 4, complete. S/V moved from assembly area into Room 106. Room temperature is $70 \pm 5^{\circ}F$. Room humidity is $45 \pm 5^{\circ}K$.

ITEM

1.0 SV ORIENTATION AND EQUIPMENT SET-UP

- 1.1 Have the associates roll the SV until the X/Z plane is horizontal and the -Y axis is vertical.
- NOTE: Verify that the SV is moved far enough forward on its carriage rails to allow adequate clearance, between the end of the rails and VA access hatch area, for the positioning of the transfer mirror stand.
- 1,2 Have the associates open the viewport door.
- 1.3 Verify that the three (3) stow pins are locked in place.
- 1.4 Have the associates lower the SV vehicle carriage jacks until the wheels are off the floor.
- 1.5 Install the alignment fixture to the air supply and attach the plano mirror to the clinometer surface of the fixture.
- 1.6 Place the theodolite in position 1 and level it with the telescope axis at approximately the same height as the work holes in the primary structural ring. See Figure 1.
- 1.7 Place the load leveling jig against the machined surface of the air heater assembly and have the vehicle carriage jacks adjusted so that the X axis bubble indicates level and the Z axis bubble is level within one (1) graduation.
- 1.8 Adjust the theodolite in azimuth and elevation until the horizontal reticle intersects the center of the nearest work hole.
- 1.9 Adjust the theodolite in azimuth only until the other work hole is observed.

- 1.10 Have the associates roll the SV using the roll adjustment screw until the horizontal reticle approaches the center of this work hole.
- 1.11 Repeat Items 1.8, 1.9 and 1.10 as necessary until the horizontal reticle intersects the centers of both work holes.
- 1.12 Adjust the height of the theodolite instrument stand so that, with the theodolite leveled and the zenith angle set and locked at $90^{\circ} \pm .5^{\circ}$, the horizontal reticle intersects the center of both work holes.
- NOTE: All theodolite readings will be direct readings, (i.e. the Roman numeral I on the theodolite frame must be facing the operator when the elevation readings are made).
- 1.13 Verify that the load leveling jig bubble level, which is parallel to the X axis, indicates level and the theodolite horizontal reticle is in the plane established by the centers of the two work holes, with the theodolite leveled and its zenith scale indicating $90^{\circ} \pm 0.5^{\circ}$ before proceeding with the operation.
- 1.14 Mount a target on a fixed location so that it is approximately in the plane of the theodolite and is visible from both theodolite positions 1 and 2. See Figure 1.
- 1.15 Rotate the theodolite, in azimuth only, and focus on the target.
- 1.16 Adjust the target until its center coincides with the theodolite horizontal reticle.
- 1.17 Remove the tape and unroll the record in the chute access port and secure it in the forward clamp on the access hatch.
- 1.18 Place the transfer mirror stand in the VA access hatch area so that the transfer mirror is positioned into the center of chute access port. See Figure 1.
- 1.19 Lower the stand onto its leveling legs and adjust the height to center the transfer mirror in the chute.
- 1.20 Adjust the two (2) leveling screws on the transfer mirror fixture base until the fixture is level in the X axis direction (perpendicular to the line of sight from the

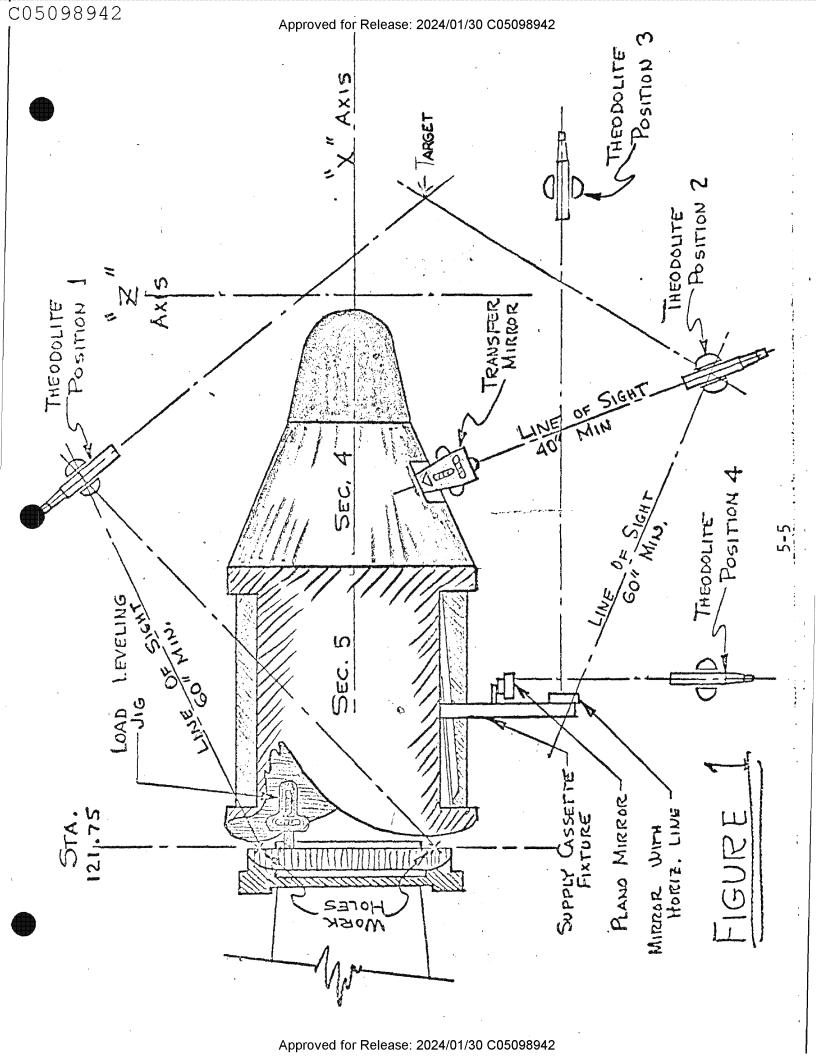
ITEM

- 1.20 theodolite in position 2). See Figure 1.
- 1.21 Place a second theodolite in Position 2. See Figure 1. Position the stand so that the line of sight through the theodolite to the transfer mirror is perpendicular to the transfer mirror cross level.
- 1.22 Adjust the theodolite to approximately the same height as the target.
- 1.23 Level the theodolite and set the zenith angle to $90^{\circ} \pm 0.5^{\circ}$.
- 1.24 Focus the theodolite on the target.
- 1.25 Adjust the height of the theodolite instrument stand and re-level the theodolite as required until the horizontal reticle coincides with the center of the target.
- NOTE: Before proceeding with the operation, verify that the theodolite is level, the zenith angle is 90° ± 0.5", and the horizontal reticle intersects the center of the target.
- 1.26 Sight from the theodolite in position 2 to the transfer mirror and adjust the mirror and the leveling screw (in line of sight) to achieve autocollimation.
- NOTE: The theodolite must still be level with the zenith angle $90^{\circ} \pm 0.5^{\circ}$ and the horizontal reticle in the X/Z plane as established by the target.

2.0 FRSA TO AIR SUPPLY ALIGNMENT

- 2.1 Rotate the transfer mirror until the etched cross lines on the FRSA mirror can be seen through the theodolite. This observation requires critical aiming of the instrument stand light down the chute to the transfer mirror.
- 2.2 Autocollimate from the FRSA mirror. Read and record the elevation (TZ) reading.
- 2.3 Read and record the elevation (TUE2) and azimuth (TUA2) readings to the intersection of the lines on the FRSA mirror.

- 2.4 Read and record the elevation (TUE1) and azimuth (TUA1) readings to the limit of visibility on the upper extreme end of the vertical line on the FRSA mirror.
- Rotate the theodolite and focus on the extreme outer edge of the horizontal line on the air supply alignment fixture mirror. Read and record the elevation (SCEI) reading. See Figure 1.
- 2.6 Measure and record the distance between the theodolite pivot axis in position 2 and the transfer mirror.
- 2.7 Measure and record the distance between the theodolite pivot axis in position 2 and the outer edge of the air supply alignment fixture mirror (82).
- 2.8 Move the theodolite from position 1 to position 3. See Figure 1.
- 2.9 Adjust the height of the theodolite as required to set up for autocollimation from the air supply alignment fixture mirror and level the theodolite.
- 2.10 Autocollimate from the air supply alignment fixture mirror and read and record the elevation (SZ) reading.
- 2.11 Move the theodolite from position 3 to position 4. See Figure 1.
- 2.12 Adjust the height of the theodolite as required to set up for autocollimation from the plano mirror and level the theodolite.
- 2.13 Autocollimate from the plano mirror and read and record the elevation (SX) reading.
- 2.14 Calculate the X axis and Z axis tilt and the Y axis translation before disturbing the equipment set-up.
- 2.15 Verify that all the data has been analyzed, and that all the non-conformances and/or procedure deviations have been described on the Non-Conformance/Procedure Deviation sheet, and that the data package has been completed.



OPERATION	5 MATED ALIGNMENT CHECK F				RTDS	VTP-302-5	T
PROCEDURE	FUNCTION	- 		•		NON-CON-	PROCEDURE
PARAGRAPH REFERENCE	DESCRIPTION	UNITS	REQU MIN.	IRED MAX.	MEASURED	FORMANCE REFERENCE	DEVIATION REFERENCE
1.0	SV ORIENTATION AND EQUIPMENT SET-UP						
1.3	Three (3) stow pins locked in place	Ck					
1.17	Record unrolled and secured in clamp	Ck			***************************************		
1.26	Theodolite in Position 2 is in the X/Z plane and autocollimation to the trans-mirror achieved.	Ck			and the same of th		
2.0	FRSA TO AIR SUPPLY ALIGNMENT						
2.2	Elevation reading (TZ)	*					
2.3	Elevation reading (TUE2)	*					
	Azimuth reading (TUA2)						
2.4	Elevation reading (TUE1)	*			White programmer is a submary think any agreement		
	Azimuth reading (TUA1)				<u> </u>		
2.5.	Elevation reading (SCE1)	*			***************************************		
2.6	D1 = Distance from theodolite Position 2 to transfer mirror +20"	Inch	60"	•			
	* Degrees, Minutes, Seconds.						

_Approved for Release: 2024/01/30 C05098942

D5-1

OPERATION 5 MATED ALIGNMENT CHECK F RTDS VTP-302-5 PROCEDURE FUNCTION NON-CON-PROCEDURE PARAGRAPH REQUIRED FORMANCE DEVIATION DESCRIPTION UNITS MEASURED REFERENCE REFERENCE REFERENCE MAX. MIN. 2.7 D2 = Distance from theodolite Position 2 to outer edge supply alignment mirror Inch 60" Theodolite Position 3 to supply align-2.10 ment mirror (autocollimated) elevation reading (SZ) 2.13 Theodolite Position 4 to plano mirror (autocollimated) elevation reading (SX) Init/ Date 2.15 Verify data package completed

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05-2

Degrees, Minutes, Seconds.

OPERATION 5 MATED ALIGNMENT CHECK

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VTP-302-5

OI CHALLON) TRATED ACTUMENT OFFICE					V17-302	
PROCEDURE	FUNCTION		PROCEDURE				
PARAGRAPH	DESCRIPTION	UNITS		JIRED	MEASURED	FORMANCE REFERENCE	DEVIATION REFERENCE
REFERENCE		10.110	MIN.	MAX.	11211001122	REFERENCE	VEL EVENOE
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4.17	X Axis Tilt:	İ					
	T.U. X Axis Tilt				,		
	(abbot) (TUA) TUA)						
	(34401) (TUA2-TUA1) =	±Min					
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	Supply X Axis Tilt						
	The state of the s						
	$(SX-90^{\circ}) =$	±Min			the manders of the second	and comments	
	Total X Axis Tilt						
	(T.U. Tilt)-(Supply Tilt) =	±Min	-301	+30'	*************************************		
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VTP-302-5	NON_CON_ FORMANCE	1					`		,	
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L	FUNCTION									
5 MATED ALIGNMENT CHECK	DESCRIPTION	Z Axis Tilt:	T/U Z Axis Tilt	= (21-006)	Supply Z Axis Tilt (SZ-90°) =	Total Z Axis Tilt (T/U Tilt)-(Supply Tilt) =				
OPERATION 5	PROCEDURE PARAGRAPH PERSPENCE	2.14						at angle terre garage and a second a second and a second	Viguente de la companya de la compa	niditiggs-m

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-5	PROCEDIRE DEVIATION REFERENCE						The Administration of	
VTP-302-5	NON-CON- FORMANCE REFERENCE		•		· •			
-	MEASURED							
	REQUIRED N. MAX.						,	
1	UNITS MIN.				- Inch	C C +1	Madden de disposition agricultura con a successiva de se disposition de la constante de la con	urantrillo.
5 MATED ALIGNMENT CHECK F	FUNCTION DESCRIPTION	Y Axis Translation:	Relative Translation, T.U. to X/Z Plane [TAN (TUE2-90°)] [D1] =	Absolute Translation, T.U. to X/Z Plane [Relative Translation] + [6.0 TAN (T/U X Axis Tilt)] = ±1	Relative Translation, Supply to X/Z Plane [TAN (SCE1-90°)] [D2] =	Absolute Translation, Supply to X/Z Plane [Relative Translation] + $\begin{bmatrix} 23.25 \text{ TAN} \\ \text{(Supply X Axis Tilt)} \end{bmatrix} = \pm 1$		
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PROCEDURE DEVIATION REFERENCE			
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MEASURED	=		
REQUIRED MAX.	-0.050" +0.050"		
UNITS	-1 -1		oostaatiin taa ka k
DESCRIPTION	Total Y Axis Translation, Supply to T.U (Absolute Translation, T.U.)-(Absolute Translation, Supply) =		
PROCEDURE PARAGRAPH REFERENCE	2.14		oonoodista kana ayaa ayaa

OPERATION 6 C/P SYSTEM TRACKING AND READINESS

NOTE: Conditions necessary to start this operation:

VTP-302, Operation 5, complete. Room temperature is $70 \pm 5^{\circ}F$. Room humidity is $45 \pm 5\%$.

ITEM

1.0 RECORD SPLICING

- 1.1 Unroll the excess record which is rolled and taped to the forward and aft record clamps at the VA access hatch.
- 1.2 Fit the two (2) sections of the record into the record splicer and allow enough overlap outside the splicer to insure proper alignment of the record.
- 1.3 Make the record splice and log the length of record cut off the supply and take-up sides respectively.
- 1.4 Have the associates roll the SV until the X/Y plane is horizontal and the +Z axis is vertical.
- 1.5 Under dark room conditions, remove the air supply cover.
- 1.6 With an operator stationed at the access port to guide the record and maintain tension, release the supply reel brake and slowly rewind the supply reel until the slack record loop in the access port area is taken up. The two (2) record clamps must be released while tension is maintained to both the supply and take-up.
- 1.7 Adjust the record to be centered on the air supply rollers, paying particular attention to roller number twenty-seven (27).
- 1.8 Log the record splice location in the air supply by indicating the direction and distance of the splice from a particular roller number.
- 1.9 Install the record travel viewer on VA chute access port opening.

- 1.10 Utilizing the record travel viewer, verify that the record is centered between the flanges on the compensator roller in the forward direction. With a flashlight and a hand mirror observe that the supply exit roller, number twenty-eight (28), is clearly visible with no interference in the chute in the aft direction.
- 1.11 Install the air supply cover and secure it with the screws previously removed.
- 1.12 Return the room to a normal light condition.
- 2.0 TRACKING AND MSD CHECK
- 2.1 Verify that the equipment and interconnections comply with VOI-409/C/P System Tracking and Readiness.
- 2.2 Verify that the "GO/NO GO" indicator on the PTS is in the "GO" condition.
- 2.3 Read and record the times on the PTS running time meters.
- 2.4 Set the operating power to 28 ± 0.2 volts.
- 2.5 Execute the MSD and Gain Power "off" before applying operating power to the C/P.
- 2.6 Station an operator at the VA access hatch opening to observe the movement of the record via the record travel viewer.
- 2.7 Start the 16 channel recorder running at 5mm/sec. and apply operating power to the C/P. (If the take-up side of the looper is not empty and/or if there is not sufficient record tension, the FRSA drive will operate until these conditions are satisfied.)
- 2.8 Verify that the record tracking and instrumentation indications are normal.
- NOTE: The recorder will be operated at 5mm/sec. during all events and at 1 mm/sec. during non-event periods when operating power is applied.

ITEM

- 2.9 Read and record the operating current.
- 2.10 Read and record the values of all the instrumentation points available from DVM, via the selector switch, on the 16 channel recorder cabinet.

Read and record the values of VTP-30, VTP-31, VTP-32, VTP-33, VTP-34, VTP-35 and VP-45 from the DVM on the PTS.

- NOTE: During the following MSD operations the MSD must be executed "off" prior to turning "off" operating power.
- 2.11 Select MSD speed 1 and execute the command "on" for one (1) complete cycle of the looper as indicated by VTP-17. Read and record the period count of BBT-2.
- 2.12 Verify that the MSD operation and the record tracking are normal.
- 2.13 Repeat Item 2.11 at speed 28.
- 2.14 Verify that the MSD operation and the record tracking are normal.
- 2.15 Repeat Item 2.11 at speed 46.
- 2.16 Verify that the MSD operation and the record tracking are normal.
- 2.17 Repeat Item 2.11 at speed 64.
- 2.18 Verify that the MSD operation and the record tracking are normal.
- 2.19 Select MSD speed 1 and execute the command "on" for four (4) complete cycles of the looper as indicated by VTP-17. Read and record the period count of BBT-2.
- 2.20 Verify that the MSD operation and the record tracking are normal.
- 2.21 Verify that all indications from VTP-15, VTP-16, VTP-17, VTP-18, VTP-19, VTP-28 and VTP-29 are normal for all the MSD operations.

ITEM

- 2.22 Remove the record travel viewer from the VA chute access port opening.
- 3.0 SUPPLY REEL TORQUE MOTOR CHECK
- 3.1 Connect the DVM on the PTS to BBT-5.
- 3.2 Execute the CB-24 command and read and record the BBT-5 value.
- 3.3 Turn "off" the operating power and the recorder.
- 4.0 VIEWPORT BOOT ASSEMBLY INSTALLATION AND SERVO CHECK
- 4.1 Have the associates roll the SV until the X/Z plane is hori-zontal and the Y axis vertical.
- 4.2 Have the associates open the viewport door.
- 4.3 Remove the reference mirror and verify the mirror bay is clear for mirror movement.
- NOTE: One operator will observe mirror movement and verify that clearance exists between the C/P mirror and SV section #5 areas after each command satisfaction. Observations will be made from the viewport and air supply access openings.
- 4.4 Select and execute the following mirror servo commands and record VTP-13 and VTP-14 after each command has been satisfied:

Elev. Position	Azimuth Position
2	Q
3	8
1	8
1	1
3 1	1
2	i

4.5 Turn OFF C/P Power.

- 4.6 Install Viewport Boot Assembly (813-407) to C/P aperture mask and make certain that metal strips on viewport boot do not extend beyond the aperture mask when assembly is complete. Have the associates install the viewport door side of the viewport boot assembly per drawing 801-116.
- 4.7 Verify that the mirror bay is clear for mirror movements.
- 4.8 Turn ON C/P Power.
- NOTE: Insure that the viewport boot does not bind during the mirror movements. If any binding occurs during the following servo commands, determine problem, eliminate binding and repeat mirror commanding sequence.
- 4.9 Select and execute the following mirror servo commands and record VTP-13 and VTP-14 after each command has been satisfied:

Elev. Position	Azimuth Position
_	
2	8
3	8
1	8
1	1
3	1
1	gu
2	1

- 4.10 Verify that the movement of the mirror assembly with the viewport boot attached was normal.
- 5.0 HEATER POWER CHECK
- 5.1 Verify that the port open sensor is not covered or obstructed.
- 5.2 Turn ON the heater power and adjust for 28 ± 0.2 volts.
- 5.3 Read and record the heater power current value.
- 5.4 Read and record the DVM value of VP-50.

VTP-302

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- 5.5 Read and record the room temperature.
- 5.6 Read and record the values of all the instrumentation points available from the DVM, via the selector switch, on the 16 channel recorder cabinet.

Read and record the values of VTP-30, VTP-31, VTP-32, VTP-33, VTP-34, VTP-35 and VP-45 from the DVM on the PTS.

- 5.7 Turn "off" the heater and operating power.
- 5.8 Read and record the resistance values of BBT-3 and BBT-4.
- 5.9 Read and record the times on the PTS running time meters.
- 6.0 POST READINESS
- 6.1 Remove the two (2) record clamps from the access hatch.
- 6.2 Disconnect the test equipment from the C/P interface.
- 6.3 Reconnect the in-flight cables to J695, J696, J697, J698 and J699.
- 6.4 Verify that the VA chute access port cover is installed.
- 6.5 Notify the associates that the SV alignments are completed.

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	RED MAX.		3.75	3.75	3.75	2.63	2.2		2,60	0.63			2.4	5.	
	REQUIRED MIN. M		1.55	1.55	1.55	2.33	1.70		2,40	0.37			, 	V	
,	UNITS		Volt		4000 4000	engelskeppendedlinstilletijks Ond dipk	40r	etife dist		ere dan		-100- -100- -100-	425 45d	479 429	### ### ### ###
FUNCTION	DESCRIPTION	Function	Temp.	Temp.	Temp.	Ref. Voltage	Temp.	Slit Position	Stereo Position	Crab Position	<pre>1/u Qty. Coarse #1 Reel Rot.</pre>	I/U Qty. Fine	Looper Position	MSD Output	Data Signals
	DESCR	VTP/VP	7	∞	6	10	generge. generals	12	13	14	15	91	1,7	8	16
		Sw. Pos.	7	Φ	6	10		12	13	71	15	16	17	1.8	19
PROCEDURE	PARAGRAPH REFERENCE	2.10	D. 1000	ng Mangapatan sa sakah	ankila magayayan kabana				opmon del de la seguina de			de Andreas de Sentence de S	nakata keraman keja igan k		

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FUNCTION		Function	Platen Position Coarse	Gain Output (VP5)	Gain Fwd. (VP1)	Gain Rev. (VP12)	CB-10 Monitor	Port Open Tell Tale	Envir. Bus (VP50)	Platen Position - Fine	I/U Qty. Coarse #2	T/U Motor Current	+5v Inst. (VP13)	-22v (VP44)	-
DESCRIPTION		VTP/VP	20	21	22	23	24	25	56	27	28	29	ŧ	ŧ	
		Sw. Pos.	20	21	22	23	24	25	26	27	2 8	29	30	~	
PROCEDURE PARAGRAPH REPERVENCE		2.10 Cont 1d	3		от того до надажено в	 	- Virginia vytrod Lebell	Migging vingler ngiring mg	enterente en	reneral en de Metropogo en anterior	adeler e _{rod} gygga sa op an		Politica,		

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	RED MAX.		28.2	22,2	3.08	4.32	3.35	9,	89•	3.33			
	REQUIRED MIN. M		27.8	21.8	2.78	3.92	2.73	.30	. 28	2.93			
or the state of th	UNITS				entry entry	=	entry		ding upp	days Onus	- Angele Control of Section 1	Professional Control of the Control	anar-gro-k _{an-g} ar-mangar-mar-mar-mar-mar-mar-mar-mar-mar-mar-m
C/P SYSTEM TRACKING AND READINESS F	DESCRIPTION	/VP Function	+28v (VP46)	* +22v (VP45)	* CB_8 Monitor (VTP_ 30)	* CB-9 Monitor (VTP-31)	* CB_11 Monitor (VTP-32)	* Pwr. Cont. Mon. Stereo Servo (VTP-33)	* Pwr. Cont. Mon. Crab Servo (VTP-34)	* Oper. Supply Output (VTP-35)			Indicates VTP/VP measurement at PTS
EM TR/	D	VTP/VP	ı	ę	30	~	32	33	34	35			S VTP/
		Sw. Pos.	32										* Indicate
OPERATION 6 PROCEDURE	PARAGRAPH REFERENCE	2.10	Contro	AMERICAN AND AND AND AND AND AND AND AND AND A							144 agus da Taglaga ya Isaann	Persita ya ya mata ka a a a a a a a a a a a a a a a a a	

OPERATION	6 C/P SYSTEM TRACKING AND READINESS F	والمتوافدة المدورة والمالية	# 194.h		RTUS	VTP-302.6	
PROCEDURE PARAGRAPH REFERENCE	FUNCTION DESCRIPTION	UNITS	REQUIRED MIN. M	RED MAX.	MEASURED	NONCON. FORMANCE REFERENCE	PROCEDURE DEVIATION REFERENCE
2.18	MSD operation and record tracking normal	Š					
2.19	BBT-2 for speed 1	့ င်	34339	344.08	ARMEDIA - 1-4		
2.20	MSD operation and record tracking normal	š			And the second s		, pp. ovec
2,21	Indications on VTP-15, 16, 17, 28 and 29 normal	<u>ػ</u> .			Specification of the contraction		
3.0	SUPPLY REEL TORQUE MOTOR CHECK	en e		occurrency of the second			
3.2	BBT-5	Vo1t	24	33.4			ggar-Viggaga antibu-rasani ili saggi
4.0	VIEWPORT BOOT ASSEMBLY INSTALLATION AND SERVO CHECK						agguya afar di Pagguya afar di
†• †	Reference mirror removed and mirror bay clear for mirror movement	3			Service of the servic		
4.5	Elevation Position 2 VTP-13	Volt	2.40	2.60	des de Processor Assert de Lastin nationales de la paperage		
	Azimuth Position 8 VTP-14	Min Mary	4.39	4.65	mander on a caller of a region of a region of the second		فاعين درورودا المائلة ا
	Transition time (AZ. 1-8)	Sec	8	0			
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PROCEDURE PARAGRAPH	FUNCTION DESCRIPTION	UNITS	REQ'J]		MEASURED	NON-CON- FORMANCE REFERENCE	PROCEDURE DEVIATION REFERENCE
REFERENCE			MIN.	MAX.		REFERENCE	INDI DICINOD
4.5 Cont'd	Elevation Position 3 VTP-13	Vo1t	4.32	4.58	Section of the date of the connection		
	Azimuth Position 8 VTP-14	11	4.39	4.65			
	Transition Time (E1. 2-3)	Sec	6 20	2.0			
	Elevation Position 1 VTP-13	Vo1t	0.37	0.63	BOTTON - BASE Charles of Windows		
	Azimuth Position 8 VTP-14	11	4.39	4.65	State of the second State	Marian Indiana	
	Transition Time (E1. 3-1)	Sec	-	4.0	Sparred Base College C		
	Elevation Position 1 VTP=13	Vo1t	0.37	0.63	biologyaeudari orkasında mayovi adan, sanın	And a second sec	
	Azimuth Position 1 VTP-14	11	0.37	0.63	Mining also replaced Communication of the Communica	Talk the state of	
	Transition Time (AZ. 8-1)	Sec	-	8.0	kmod Dolpha landber (Charles on the control		
	Elevation Position 3 VTP-13	Vo1t	4.32	4.58	With addition in the Vigilian and Company		
	Azimuth Position 1 VTP-14	11	0.37	0.63		-	
	Transition Time (E1. 1-3)	Sec	-	4.0			
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					Table and Agriculture and Agri		
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PROCEDURE	FUNCTION		Amount of the second	r e dyman andremsky, popul v po dedece , popul	gragificas mobile (*9), essentántico dessentántico dessentántico de secuenta de la constitución de la consti	NON-CON-	PROCEDURE
PARAGRAPH RBFERENCE	DESCRIPTION	UNITS	REQUIRED MIN. M	RED MAX.	MEASURED	FORMANCE REFERENCE	DEVIATION REFERENCE
4,5	Elevation Position 1 VTP-13	Š	0.37	0.63	THE PROPERTY OF THE PROPERTY O		
cont 1d	Azimuth Position 1 VTP-14	disease friendly group consists of the second secon	0.37	0.63	dipension authors and the section of sections.		got de la constant d
	Transition Time (E1. 3-1)	Sec	g	0.4	ALTO COMPANY AND		
	Elevation Position 2 VTP=13	Voit	2,40	2.60	Aggige A.J. H (ET) A. "He are the Law World Held	~~~~	ndali vil ¹⁸ din aas assast ¹⁸⁸
	Azimuth Position 1 VTP=14	apla angle	0.37	69.0	Benevitivapen cité conflue de la resp. Set-		Married State of the State of t
	Transition Time (El. 1-2)	Sec	:	2.0	**************************************		
h.7	Viewport Boot installed	Š			eresign of the scattering respirate and refreshing security		Manager (School VP) Labeled 6 PP - Free
8.4	Mirror Bay clear for mirror movement	Š			(MENTELLIN Flors Verzoelle acemateur - setta.		no dana _{mark} anggapan dinaman ^{ag} a na ma
6.4	Elevation Position 2 VTP-13	Vo.t.	2.40	2.60	war flessylvike sifter Age with a right and the		
	Azimuth Position 8 VTP-14		4,39	4.65	Beide Mundin and ber up to the secondary	e de la composition della comp	of quantizing windows (18 mass
	Transition Time (AZ. 1-8)	Sec	ı	0.8	***Andil***(4.6.44)***(Shiphanich-madiferendjiet/Emilykyliji)		rooman Mad-MVV Manada and sure sub- 0.00
					iliongy on a section of the section		⁵⁰ da.manyonappaniidda
					an annual constant and a second		

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OPERATION 6 C/P SYSTEM TRACKING AND READ PROCEDURE	PARAGRAPH REFERENCE	Elevation Position 3	contid Azimuth Position 8	Transition Time (E1, 2-3)	Elevation Position 1	Azimuth Position 8	Transition Time (E1. 3	Elevation Position 1	Azimuth Position 1	Transition Time (AZ. 8	Elevation Position 3	Azimuth Position 1	Transition Time (El. 1

r resonati	DESCRIPTION	JCN	GIN THE SALE	CON	TEASURY)	MON CONT. FORWANCE	POCESTERY DEVIATION)
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6.4	Elcvation Position 1 VTP-13	Volt	0.37	0.63				
ס. משני	Azimuth Position 1 VTP-14		0.37	0.63	en Ladinsku, di je de oddie agge uddieddig		manda de la quintermante	
	Transition Time (E1, 3-1)	Sec	£	0*†7	er en			Арр
	Elevation Position 2 VIP-13	> - - -	2.40	2.60	Jour Charles Phase Colleges		nassussan Proma novo	roved fo
	Azimuth Position 1 VTP=14	ddan ddor	0.37	\$9.0	e de la company			r Rele
	Transition Time (El. 1-2)	Sec	8	2,0	Marieman en allegen en der ei megigen de komment	277	· · · · · · · · · · · · · · · · · · ·	ase: 20
7	Mirror movement normal	<u>3</u>			enterment St. e., de Comate Madigi		والمعارف والمساور والمعارف والمعارف	24/01/30
2.0	HEATER POWER CHECK					APPLIT AND		C050
5.	Port open sensor not obstructed	Š						98942
5.3	Heater current	Amp	0.0	3,5	THE STATE OF THE PROPERTY OF THE STATE OF TH		nder of the Confession of the	2
5.4	VP-50	Volt	3.0	0.1				
5. V	Room temperature	Deg	65	75	The second secon			
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		vi bilitati sarra					Marya	-
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OPERATION	6 c/p syst	C/P SYSTEM TRACKING AND	REVOITERS F	5	- 1. Co		RTDS	VTP-302-6	, , , , , , , , , , , , , , , , , , , ,
PROCEDURE			FUNCTION						PROCEDURE
PARAGIMPH REFERENCE		DESCRIPTION	Administrative consistent and the consistence of th	UNITS	REQUIRED MIN. M.	(ED MAX.	MEASURED	FORMANCE REFERENCE	DEVIATION REFERENCE
5.6	Ambient DV functions:	Ambient DVM Readings - functions:	s - after C/P						
	Sw. Pos.	VTP/VP	Function				·		,
	Q LANCES	guera	CB-12 Monitor	Volt	2.80	3.18	Age will be being grown for the analyst article for the latter		,
	7	2	Temp.	das	1.70	2,14	The second secon		od Tol
	~	m	Temp.	opio opio opio	0.75	2.70	The second secon		TTEIC
	77		Temp.		1.55	3.75			
	L/s	N	Temp.		1.55	3.75	des projette des des companyes		UZ-17U
	9	9	Temp.		.53	3.80		٠.	
	7	7	Tcmp.	### ##################################	1.55	3.75	- Le ye Blad-gayangilan - 19 din digilar dan daga		
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	12	2	Slit Position					,	
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OPERATION	6 C/P SYSTEM TRACKING AND READINESS F		RTDS	VTP-302-6	
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6.2	Test Equipment disconnected	- 	The second secon	······································	
6.3	Interface connectors connected C	ž		Millionill-Wes-Philips-singu	1988 jazz (1991 - 199 ₀ zaza
, h.9	VA Chute Access Port Cover installed C			in a a lakkanya peringga	
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1	REFERENCE					• ,			
	MEASURED								
REQUIRED	MIN. MAX.								
	UNITS	Init/ Date							and the second
	DESCRIPTION	Associates notified SV alignments complete							
PROCEDURE PARAGRAPH	REFERENCE	6.5							

VTP-302

OPERATION 7 SV SYSTEM VALIDATION TEST

ITEM

- 1.0 TEST PROCEDURE 16
- 1.1 Verify that the equipment and interconnections comply with V0I-409/TP-16.
- 1.2 Verify that the TME is properly configured and is operating.
- 1.3 Verify that the GEL recorders J, K and L are properly configured and are operating.
- 1.4 Monitor the TME and GEL recorders for the computer events and the HMC/G-COM verifications as per TP-16.
- 1.5 Read and record the DVM values of all the available VTP/VP points, via the selector switch on 16 channel recorder cabinet, at the first opportune time when both the TM and the operating power are on (but before any of the computer events take place).
- NOTE: The GEL recorder L shall be operated at ten (10) mm/sec. for twenty (20) to forty (40) seconds during periods when the ambient values for the CPL points are taken.
- 1.6 Repeat Item 1.5 after all of the computer events are completed.
- 1.7 Read and record the resistance values of UMB-3 and UMB-4, and record the test area temperature and humidity.
- 1.8 Obtain the charts from the TME and the GEL (J, K, L) recorders and deliver to the data room.
- 1.9 Reduce the data from the charts and record as required on the data sheets.
- 1.10 Verify that all the data has been analyzed and that all the non-conformances and/or procedure deviations have been described on the Non-Conformance/Procedure Deviation sheet, and that the data package has been completed.

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Run No.

Timo

DRS-VTP-302- 7

Task Timo	CPL	Channel and Pin	Expected Value # 5%	Actual TIM	Valuo HMC	CPL No.	Channel and Pin	Expected : Value ± 5%	Actual TIM	Value HG
	VP 46	+28_Y_	27-32.5 V			21	12-3		•	
	1	10-7			·	22	12-8			
	2	1029				23	12-12			
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	4	10-51				25	14-10			
	5	10-57			•	.26	10-72	o		A CONTRACTOR OF THE PROPERTY O
	6	10-52	en e			27	- 14-20			
	7	10-53				28	15-4	_		• -
	8	10-54				29	12-2			
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Task & Item No.	Time Prgm. Actual	CPL No.	Link Channel Pin	Expected Value 5%	Actual TLM	Value HMC	1	Com 2	mand 3	Bit:	s 5	6	7	MSD TIM ON O	E Remarks
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		VP46	(+28v)	27 - 32.5v											PWr. ON
	•	13	2-14-1	48 - 53											
		14	2-12-2	7 - 13											
		17	2-14-17	Inc.											Event 2 ON
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÷		19	2-14-3												
·	:	13	2-14-1	48 - 53		-									Event 2 OF
		14	2-14-2	20 - 25											
		17	2-14-17	Dec.											
		18	2-12-11	0 - 20											(0.3 sec).
		19	2-14-3	0 - 10											1.4

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Event 3 ON

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2-12-11 > 30

Inc.

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Run No.

Timo_

DRS-VTP-302-7

Task Timo	CPL	Channel and Pin	Expected Value ± 5%	Actual TLM	Valuo HVC	CPL No.	Channol and Pin	Expected Value = 5%	Actual TIM	Valua H/G
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	8	10-54				29	12-2	· · · · · · · · · · · · · · · · · · ·		
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Timo

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DRS-VTP-302-

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Time of Test

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Time of Test

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	20	14-19		77714171						

OPERATION 8 FINAL MAB CONFIDENCE TEST

NOTE: Conditions necessary to start this operation:

VTP-302, Operation 7, complete. (The Test Acceptance Record signed off and/or the SV released for further processing.)

- 1.0 C/P PREPARATION
- 1.1 When the associates have removed the access hatch over the air supply and have opened the viewport door, remove the three (3) stow pins.
- 1.2 Install thirty-four (34) new screws (400-164-120) in the air supply cover. Torque all cover screws to 15 inch-pounds, tightening diametrically opposite pairs in alternate quadrants and then, using the same sequence, finish torque all screws to 20 inch-pounds.
- 2.0 TEST PROCEDURE 23
- 2.1 Verify that the equipment and interconnections comply with V0I-409/TP-23.
- 2.2 Verify that the TME is properly configured and is operating.
- 2.3 Verify that the GEL recorders J, K and L are properly configured and are operating.
- 2.4 Monitor the TME and GEL recorders for the computer events and the HMC/G-COM verifications as per TP-23.
- 2.5 Read and record the DVM values of all the available VTP/VP points, via the selector switch on the 16 channel recorder cabinet, at the first opportune time when both the TM and the operating power are on (but before any of the computer events take place).
- NOTE: The GEL recorder L shall be operated at ten (10) mm/sec. for twenty (20) to forty (40) seconds during periods when the ambient values for the CPL points are taken.
- 2.6 Repeat Item 2.5 after all the computer events are completed.

- 2.7 Read and record the resistance values of UMB-3 and UMB-4, and record the test area temperature and humidity.
- 2.8 Obtain the charts from the TME and GEL (J, K, L) recorders and deliver to the data room.
- 2.9 Reduce the data from the charts and record as required on the data sheets.
- 2.10 Verify that all the data has been analyzed and that all the non-conformances and/or procedure deviations have been described on the Non-Conformance/Procedure Deviation sheet, and that the data package has been completed.

PROCEDURE	FUNCTION					NON-CON-	PROCEDURE
PARAGRAPH	FUNCTION	I I	REQIJ]	TRED	T	FORMANCE	DEVIATION
REFERENCE	DESCRIPTION	UNITS	MIN.	MAX.	MEASURED	REFERENCE	REFERENCE
1.0	C/P PREPARATION						
1.1	Three (3) stow pins removed	Ck				Market Ma	
1.2	New screws installed in Air Supply Cover and torqued to 20 inch-pounds	Ck					
2.0	TEST PROCEDURE - 23						
2.1	Equipment and interconnections comply with VOI-409/TP-23	Ck			AMERICAN CONTRACTOR AND ADVANCED CONTRACTOR		
2.2	TME is properly configured and operating	Ck					
2.3	GEL recorders J, K and L are properly configured and operating	Ck			dinastra		
2.4	TME and GEL recorders monitored, HMC/ G-COM verifications per TP-23	Ck					
2.5 & 2.6	Ambients read and recorded on ambient sheets	Ck					
2.7	Test area temperature	Deg	60	90	-		
	Test area humidity	% RH	45	55			
							08-1

OPERATION	8 FINAL MAB CONFIDENCE TEST F	American consistency of the constant of the co		RTDS	VTP-302-	8
PROCEDURE	, FUNCT	ION		·	NON-CON-	PROCEDURE
PARAGRAPH REFERENCE	DESCRIPTION	UNITS	REQUIRED MAX.	MEASURED	FORMANCE REFERENCE	DEVIATION REFERENCE
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Contra	UMB-4	K_V_	As Read	Martine and the second		
2.10	Verify data package completed	Init/ Date				
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OPERATION 9 SV TRANSPORTATION, MATING AND R-DAY CHECKS

NOTE: Conditions necessary to start this operation:

VTP-302 Operation 8 complete. (Test Acceptance Record signed off and/or the SV released for further processing.)

- 1.0 SV TRANSPORTATION AND MATING
- 1.1 Verify that when the SV is transported out of the test area, the environmental blankets are installed and are operating.
- 1.2 After the umbilical cables are connected to the SV, obtain and record the UMB-3 and UMB-4 values once every hour.
- 2.0 TEST PROCEDURE 26
- 2.1 Verify that the GEL recorders J, K and L are properly configured and are operating.
- 2.2 Monitor the GEL recorders for the computer events and the G-COM verifications as per TP-26.
- NOTE: The GEL recorder L shall be operated at ten (10) mm/sec. for twenty (20) to forty (40) seconds during periods when the ambient values for the CPL points are taken.
- 2.3 Obtain the charts from the GEL recorders and deliver to the data room. (The TME charts will be delivered to the data room from the PALC.)
- 2.4 Reduce the data from the charts and record as required on the data sheets.
- 2.5 Verify that all the data has been analyzed and that all the non-conformances and/or procedure deviations have been described on the Non-Conformance/Procedure Deviation sheet, and that the data package has been completed.

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9 SV TRANSPORTATION, MATING AND R-DAY CHECKS	FUNCTION	DESCRIPTION	SV TRANSPORTATION AND MATING	Environmental blankets on and operating	UMB-3 and UMB-4 values recorded hourly	TEST PROCEDURE - 26	GEL recorders J, K and L properly con- figured and operating	GEL recorders monitored, G-COM verifi- cations per TP-26	Verify data package completed					
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REMARKS

OPERATION 10 AMBIENT CHECKS

NOTE: Conditions necessary to start this operation:

VTP-302 Operation 9 complete. (The Test Acceptance Record signed off and/or the SV released for further processing.)

ITEM

1.0 PREPARATION

- 1.1 Check with the associate test conductor(s) to obtain the times at which the ambient checks will be run. (Usually the periods between runs vary from four (4) to twelve (12) hours.)
- 1.2 Obtain and record the UMB-3 and UMB-4 values once every hour.

2.0 AMBIENT CHECKS

- 2.1 Verify that prior to each ambient check, the GEL recorders J, K and L are properly configured and are operating.
- 2.2 Monitor the GEL recorders for the computer events and the G-COM verifications as per TP-26, Task 7.
- NOTE: The GEL recorder L shall be operated at ten (10) mm/sec. for twenty (20) to forty (40) seconds during periods when the ambient values for the CPL points are taken.
- 2.3 Obtain the charts from the GEL recorders and deliver to the data room.
- 2.4 Reduce the data from the charts and record as required on the data sheets.
- NOTE: During the final twenty-four (24) hours before launch the C/P temperature levels must be established by the flight heater control systems of the C/P.

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THERMAL CONDITIONS DATA SHEET

RTDS 302-10

SHEET NO. <u>D10-2</u>

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OPERATION 11 TERMINAL COUNTDOWN

NOTE: Conditions necessary to start this operation:

VTP-302 Operation 9 complete. (Test Acceptance Record signed off and/or the SV released for further processing.)

All C/P temperature instrumentation has indicated that the C/P temperature levels have been established by the flight heater control systems over a period of twenty-four (24) hours from the scheduled launch time.

- 1.0 TEST PROCEDURE 24
- 1.1 Verify that the GEL recorders J, K and L are properly configured and are operating.
- 1.2 Obtain, record and plot the UMB-3 and UMB-4 values every thirty (30) minutes until T-6 minutes.
- 1.3 Monitor the GEL recorders for the computer events and the G-COM verifications as per TP-24 through task 5.
- NOTE: The GEL recorder L shall be operated at ten (10) mm/sec. for twenty (20) to forty (40) seconds during periods when the ambient values for the CPL points are taken.
- 1.4 Obtain the charts from the GEL recorders and deliver to the data room. (The TME charts will be delivered to the data room from the PALC.)
- 1.5 Reduce the data from the charts and record as required on the data sheets.
- 1.6 Analyze the data and verify that the computer is in a "GO" condition.
- 1.7 Fill out the VAFB Prelaunch and Launch Data Sheets and report this information to the STC personnel upon request.
- 1.8 Monitor the GEL recorders for the computer events and the G-COM verifications as required throughout the remaining tasks of TP-24.

- 1.9 After the ambient check following the flight mirror position event in task 19, verify that all the TM values meet the requirements listed in the data sheets.
- 1.10 Record the final ambient TM values on the ambient data sheet.
- 1.11 Obtain and record the UMB-1, UMB-2, UMB-5 and UMB-6 values and/or status indications each minute from T-6 minutes to launch on the data sheet provided.
- 1.12 Monitor the GEL recorders on through launch and as long as the TM is available.
- 1.13 Obtain the charts from the GEL recorders and deliver to the data room.
- 1.14 Reduce the data from the charts and record as required on the data sheets.
- 1.15 Verify that all the data has been analyzed and that all the non-conformances and/or procedure deviations have been described on the Non-Conformance/Procedure Deviation sheet and that the data package has been completed.

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4. To determine the telemetry bias on absolute temperature points use the following table:

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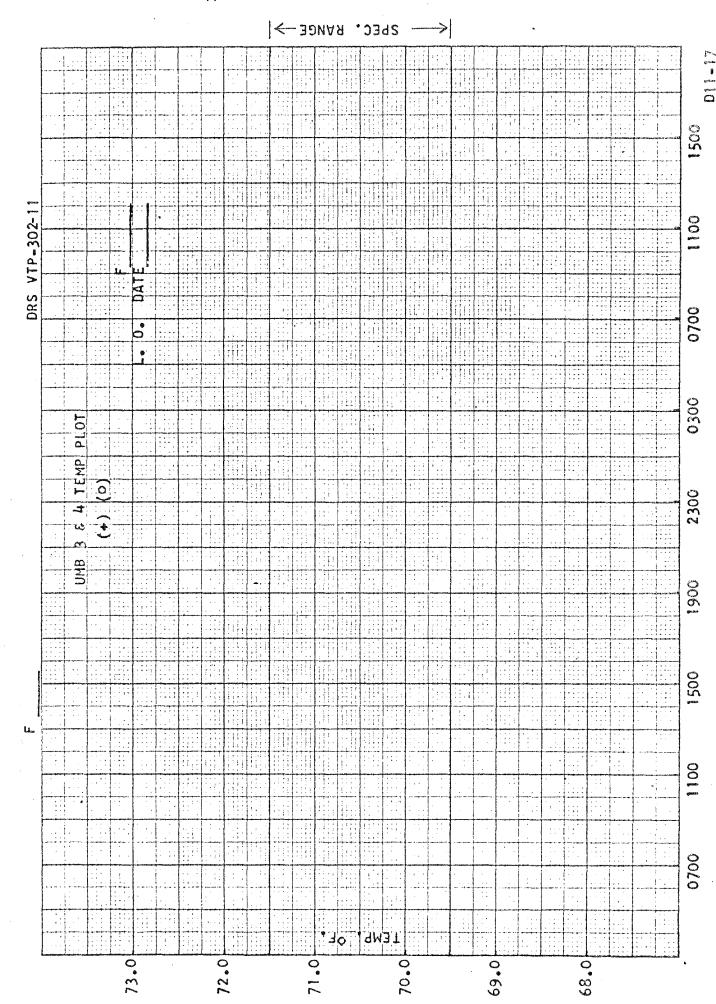
Offset No. 2 (Avg (3) - Avg (4) =

NOTE: Add offset No. 1 to telemetered values of CPL's 4, 6, 7, 8, 9 and 10.

Add offset No. 2 to telemetered values of CPL's 2 and 11.

PL	CHAN-PIN	ITEM	Task 5 % FULL SCALE * (Corrected)	Task 19 % FULL SCALE * (Corrected)
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2	10-29	Forward Record Storage Temp.	andre where T takket for the Copy of the C	The control of the co
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3	14-14	Stereo Mirror		agada magila selikan kenangalama di Jamasok dapa sangan pagasagai sa angaha a angan pagan pagama an
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5	10-57	Lens Barrel	A CONTRACTOR OF THE STATE OF TH	The second second control of the con
6	10-52	45° Temp.		and a comparation of the compara
7	10-53	CST, -Y Sta. 149 Temp.	and constructive in the figure of the state	
8	10-54	CST, -Y Sta. 179 Temp.	and a second of the contract o	and an analysis of the second
9	10-55	CST, -Y. Sta. 198 Temp.		one file to the file file file file file file file fil
10	10-56	Temperature Instrumentation Reference Voltage		suurrettoinen kainen seksikkin keikin kainen ka
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17	14-17	Looper Position		
18	12-11	MSD Electronics	Approximate American Commission C	BOOK AND THE STATE OF THE STATE
19	14-3	Amplified Data Signals		
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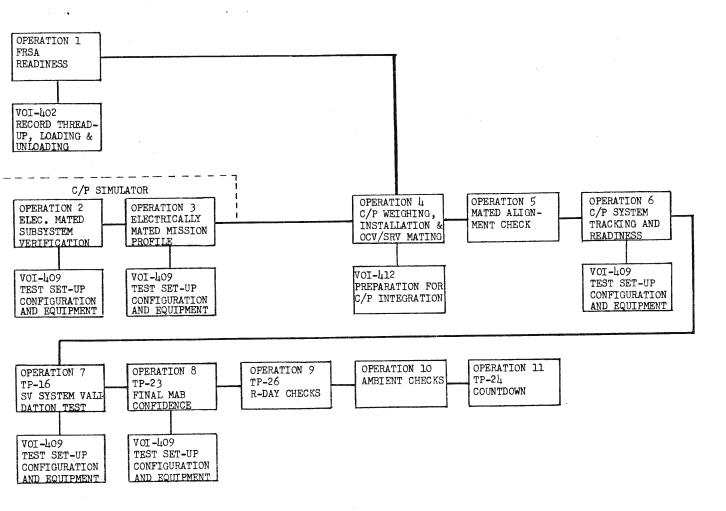
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i :	23	12-12	Focus Reverse		
	24	10-5	CB 10 Monitor		nemakandan kepi filam apasud kundinan nemakan kepi filozofi (2,500) tahun negari kepi
	25	14-10	Port Stoolie		: : : : : : : : : : : : : : : : : : :
	26	10-72	Environmental Power Supply		
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	29	12-2	Take-up Motor Current		
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	31	12-9	CB 9 Monitor		in annings (1889-1889) see on a space space she is a particular she included in consideration consideration (in
	32	10-6	CB 11 Monitor		Principal and the first of the
	33	12-13	Elevation Servo		
	34	12-17	Azimuth Servo		and the state of t
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SYSTEMS FLOW PLAN



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APPENDIX 8

PAYLOAD VALIDATION LOG

Approved for Release: 2024/01/30 C05098942

U. Vinkey

R - 300778 - KH-009

VALIDATION LOG

FM- 239/988

Tests and Data Evaluation

Field Engineering

EASTMAN KODAK COMPANY

Vandenberg Air Force Base

California

Prepared by:

Reviewed by:

Reviewed by:

Approved by:

S. t. Canger Klishtonider

D'ieman GRPoore

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C/P Validation Log

FM-<u>239</u>/988

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```
The C/P, FM239, has been tested in accordance with the
following procedures:
VTP-301 Subsystem Test Procedure, Revision F:
Task 1
         Continuity and Wiring Verification
Task 2
         Alignment of FRSA to Supply Cassette
Task 3
         Line of Sight
Task 4
         Test Record Installation and Tracking and
         Slit Evaluation
Task 5
        Focus Series
Task 6
        MSD Frequency and Port Open Telitale
Task 7 Focus Control Checkout
Task 8 Heater Operation
Task 9 Photo Validation
Task 10 Slit Evaluation
Task 11 FRSA Checkout
Task 12 Flight Record Loading and Hardware Installation
Task 13 Flight Record Photographic Validation and Slit
         Evaluation
Task 14 Final C/P Preparations for Mating
SET 46 Elevation and Azimuth Servo Replacement
SET 53 Record Transport Control Module Replacement
ETR 71 5 volt Instrumentation Checkout
ETR 72 Distribution Box Checkout (Fuse Assembly Replacement)
ETR 73 Roller and Base Assembly Replacement
ETR 75 Record Transport Looper System Checkout
VTP-302
          System Test Procedure
Operation 4 Systems Preparation
Operation 5 Alignment Check
Operation 6 System Tracking and Readiness
TP-16, Rev. AD
                Issued 6 Mar 67
                                  SV Systems Validation
```

Issued 23 Feb 67 SV Confidence

R-2 Day Check

Countdown

issued 7 Apr 67

Issued 2 Jun 67

TP-23, Rev. AC

TP-25, Rev. G

TP-24, Rev. 1

FM-239 Subsystem Summary

The Camera Payload arrived at VAFB on 11 February 1967.

Fight modifications were made to up-date the payload for Flight.

KVM 238, 242, and 249 were Elevation and Azimuth Servo replacements.

A special engineering test (SET 46) was performed to validate each up-dated servo. KVM-248 was performed to epoxy the screwheads of the encoder nameplate located in both the Elevation and Azimuth servos. Engineering test requests (ETR-71 and 72) were run to evaluate a loss in 5 volt instrumentation voltage. KVM 236 was performed to replace the 5 volt instrumentation fuse (F-5) which had blown. KVM-237 was performed to replace the Roller and Base Assembly. ETR-73 validated the replacement. KVM-250 was performed to replace the left hand Connector Rod Assembly. KVM-251 was performed to replace the Record Transport Control Module. SET-53 validated the RTCM replacement.

Waivers generated as a result of subsystem testing were as follows:

- 1. Fuse F-5 (5 volt instrumentation voltage) blown. (KV-182)
- 2. MSD period count below specification for speeds 55 and 64. (KV-183)
- 3. Reference mirror readings out of specification. (KV-191)

All tasks, 1-14, inclusive, of VTP-301, Rev. F, Subsystem Test Procedure were performed and verified that the payload was acceptable for mating with the GE vehicle.

Best Photographic Focus, biased for flight, was established at 2.250 VDC for CPL-20.

The following readings are Geometric Mean Resolution values (1/mm) obtained during the C/P Photo Validation Test, VTP-301, Task 9 at:

Speed	31
Slit	В
Temperature	70.27°F
CPL-20	2.125 VDC

 On Axis
 +.5°
 -.5°

 151
 131
 124

The following readings are Geometric Mean Resolution values (1/mm obtained during Flight Record Photo Validation Test, VTP-301, Task 13 at:

Temperature	70.07°F
CPL-20	2.125 VDC
Can #16	

Slit Position	G. M.
В	136
C	139
D	116

The C/P was prepared for mating with GE (SV988) on 24 May 1967.

FM-239 Systems Summary

Flight Record, Can #16, was loaded into the C/P on 22 May 1967.

The Payload, FM-239, and the vehicle #988 were mated on 2h May 1967. One waiver (KV-190) was written to reorient the OCV Dust Shield "B" Zipper Assembly. This was done so that it would be compatible with the C/P Dust Shield "A" Zipper Assembly which was received with the Dust Shield Fastener incorrectly oriented to the Aluminized Glass Fabric of the Zipper Assembly.

Operation 5 (System Alignment) was successfully completed on 25 May 1967.

Operation 6 (Tracking and Readiness) was started on 26 May 1967. ETR 75 was initiated in order to evaluate an anomaly on the Record Transport Looper System. In particular, the looper carriage would actuate the looper empty switch and then drift back allowing the take-up motor to restart. The anomaly occurred only with the Y Axis horizontal. It was theorized that the anomaly was due to the effects of gravity and inertia on the looper carriage assembly. A waiver (KV-192) was written to accept.

SV System Validation Test, TP-16, was completed on 27 May 1967.

MAB Confidence Test, TP-23, was completed on 1 June 1967. ER-19 was run to check an Associates anomaly.

B-Day check, TP-26, was completed on 2 June 1967. ER-20 was run to check an Associates anomaly.

Countdown Procedure, TP-24, was started at 0245 P.D.T., 4 June 1967. The procedure was completed and liftoff occurred at 1104 P.D.T.

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c/r Fii 39

Sheet No. ________

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		Test	or Function Performed	Di	screpancy, Failure or Variation	Record Used	Tr. s
	hote'	No.	Title or Descriptica	llo.	Description	Frot/Acoust	(1:- : : : :)
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	12-13	301-11	FROM S/S.				
į	9-11-67		FROM C/O. ROUD C/P CHISPMINT				
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-0030	3-767	ETR9/R	PHOTO SpCK SVINST CKEUK		5 Vour Par la Dist Bar Bus REPLACED FASE	612	
			1 `	Kum 239	REALOGED FUSE		(321-8 5 luised)
	3-13	11/2/2	DIST BAG C/a	KUNI 238	SERUO & INSTALLED		(t
-130e	3-15-	Ser- 46-1	COMPLETE -RUS RIO	111/1/11/20	7 EKU MAO (Roller & BASE ASSY)	65.57	
1		l .	!	11			
OBno.	277	ETR-73	TE 41 207 CP2 CP416-28			1046	
					Cn1 + 192	15.4	1875 TOTAL DECA
-1515	3-23	301-5-1-7	Lano 18 Otto 10.5		5.1777	15.4	15 -5 1/16 / Kag.
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- 1515	3-28	301-5-4	Focus (-142°) 63.5°	1	`	16013	
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-1000	4-18	C 131 .	Deplace Az Servo				
763	4-21	DET 46	2 Serva C/0			131/01	
7(0)	4-24	301/5-5	FOCUS CK (pert sens les)			134.8'	
	I					,	
-0930	4-27		EXPOSURE SPRIES			123.0'	
1	- 1	ı		II.	1	l l	li e

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Approved for Release: 2024/01/30 C05098942 SULMARY of THE 105

C/P FM 39

Sheet No. 2

Marin III. Salah S		Test	or Function Performed	Dj	serepancy, Fail re or Variation	Record Veed	Remarks
D	ate'	Noc	Title or Description	No.	Description	Test // neura.	(Dars in Area)
-1645 4	27 30	01-9	FASTE BOL		,	1 30.5	
_ 4	27		C/P of G//Imator				
-1035 4	-28	31-6	MS	-		60.2	
5	-18 3	42-3-3	TP-111-3 58800 C/0				
- 2200	25	ET 46-3	SERUS C/O	KV191	Reference Weren out of your	94.7	
5	-22/ 3	8-10	HTR CK FFCDI C/O				
- 5,00	11						
-1430	JE:	31-12	Lang Burney Survey			13.7	ion the
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						The control of the co	
- 1435 51	24 30	2-4	MATE CP-OCV				
				KV 190	That third any "A"		
2200			MTE Sec VEVI				
-17:30 51	1/25		MATE Sec TVAV				
9	125 35	52'-1	MAYE Sec TVAV				
	3	Ng - 51	Say one to				
183. 3	1/24 3	12.6	Sand one la			179.3-	LOOPER BOLLDEES.
-1906 3	127 3	52-7	TP-16-1 &2 TP-03			39,6	
-1200 6	-/-67 30	02-8	TP-03	:		19. 2	
-107 6-	2.61 3	02-9-1	[P- 26		was prince	18.6	
-1300 6	76 BO	24.2	TP-26- 400			17,2	
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-11076-	4 87	24	TP 24 HFT OF F		CA: 20 12	2	
	Ш	1			CPL-27 35%	^	1

Approved for Release: 2024/01/30 C05098942

Date: 3-2-67

C/P No. 239

VTP-301 Subsystem Test Procedure

Task 1 Continuity and Wiring Verification

This task was performed according to procedure.

The following non-conformances and/or deviations were encountered:

None.

The test sequence was continued.

Date: 3-2-67

C/P No. FM-239

VTP-301 Subsystem Test Procedure

Task 2 Alignment of Test FRSA to Supply Cassette

This task was performed according to procedure.

The C/P was leveled by using the Supply Alignment Jig levels.

The theodolite was set up by using the mirrors of the Supply Alignment Jig. The Test FRSA was adjusted by autocollimating, using the preset theodolite.

The following non-conformances and/or deviations were encountered:

None.

The test sequence was continued.

Date: 3-3-67 5-19-67

0/9 No. 239

VTP-301 Subsystem Test Procedure

Task 3 Line of Sight

This task was performed according to procedure.

The position data is plotted on the accompanying sheets. The transition time data is in the table below:

Elevation	Servo		SET	46
Position	Time	(Sec.)	Time	(Sec.
3-1				3.35 3.30
Azimuth Se	<u>rivo</u>			
Position	Time	(Sec.)		
3 - 8		6.7 6.3		5.6 5.6
Slide Serve	2			
Position	Time	(<u>Sec.</u>)	*	
1-2 2-3 3-4 1-3 1-4 2-4		2.00 2.15 2.05 4.05 6.00 4.00		

The following non-conformances and/or deviations were encountered: Reference Mirror was determined to be out of spec and unadjustable. Refer to waiver 191.

The test sequence was continued.

40003

DATA SHEET
FOR
ACLEPTANCE TEST PROCEDURE: 804-104
LINE OF SIGHT POSITIONS

Elevation Serve at 0 ° Azianth Serve at 40 °

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90°04'

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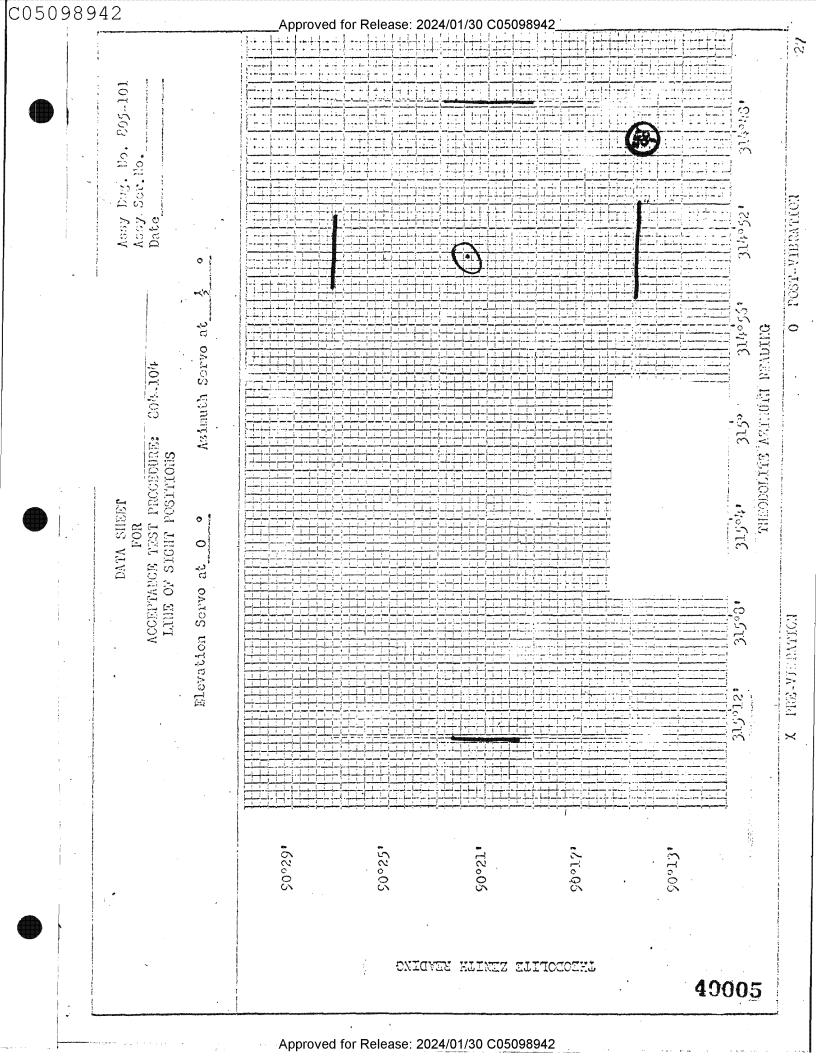
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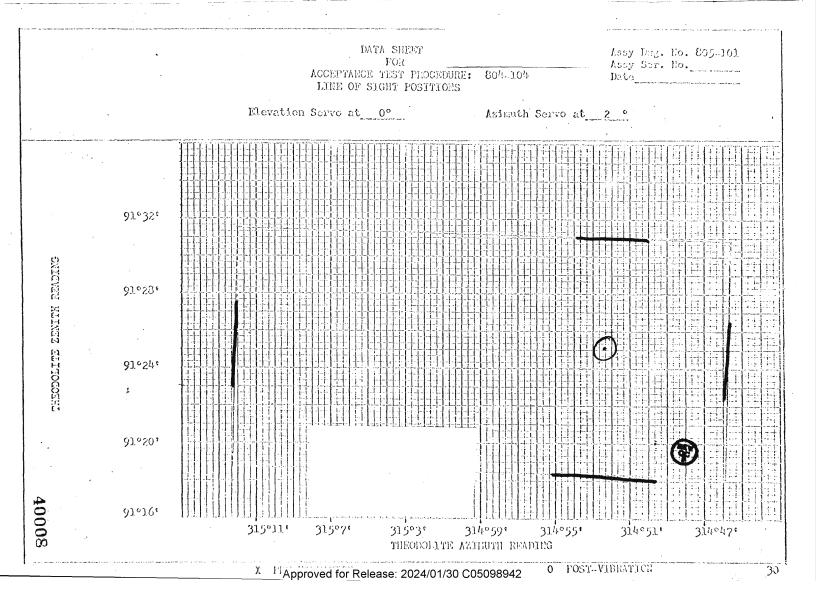
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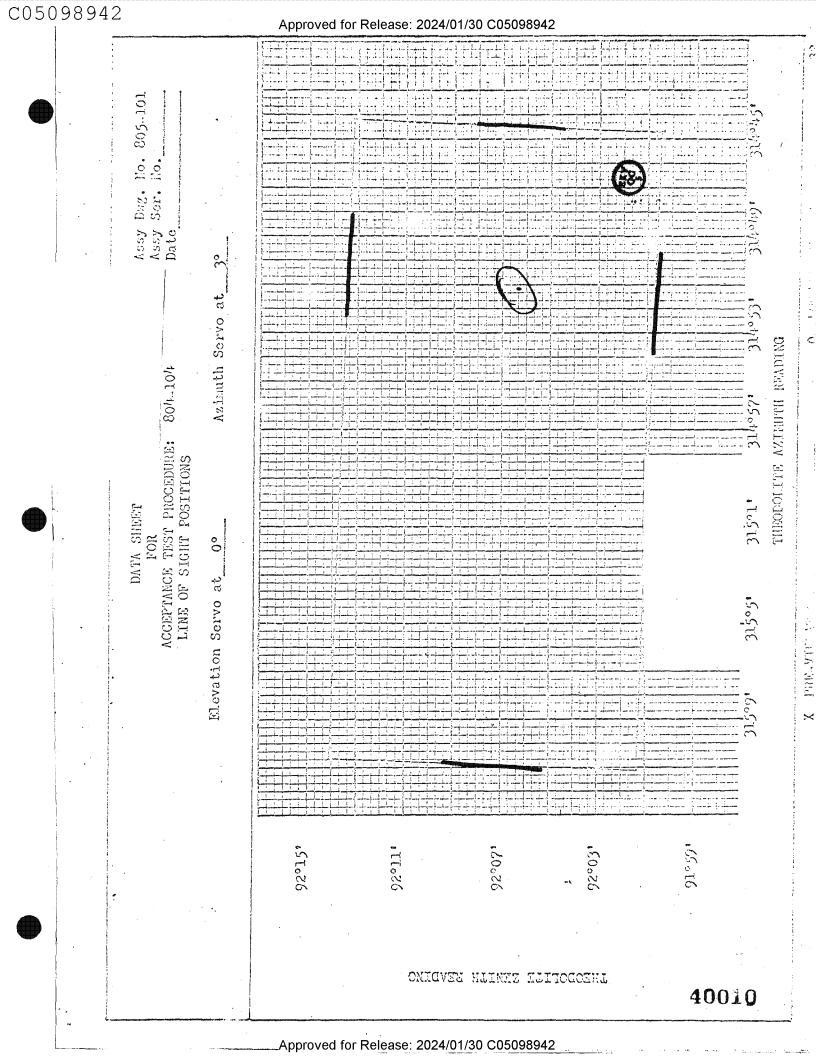
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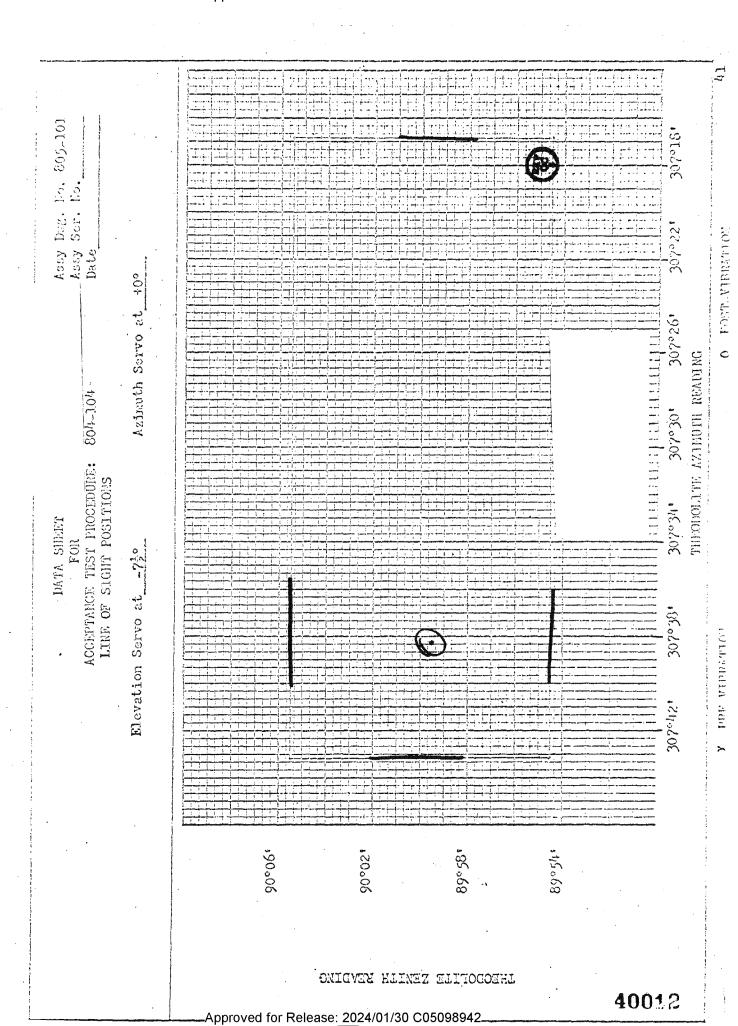


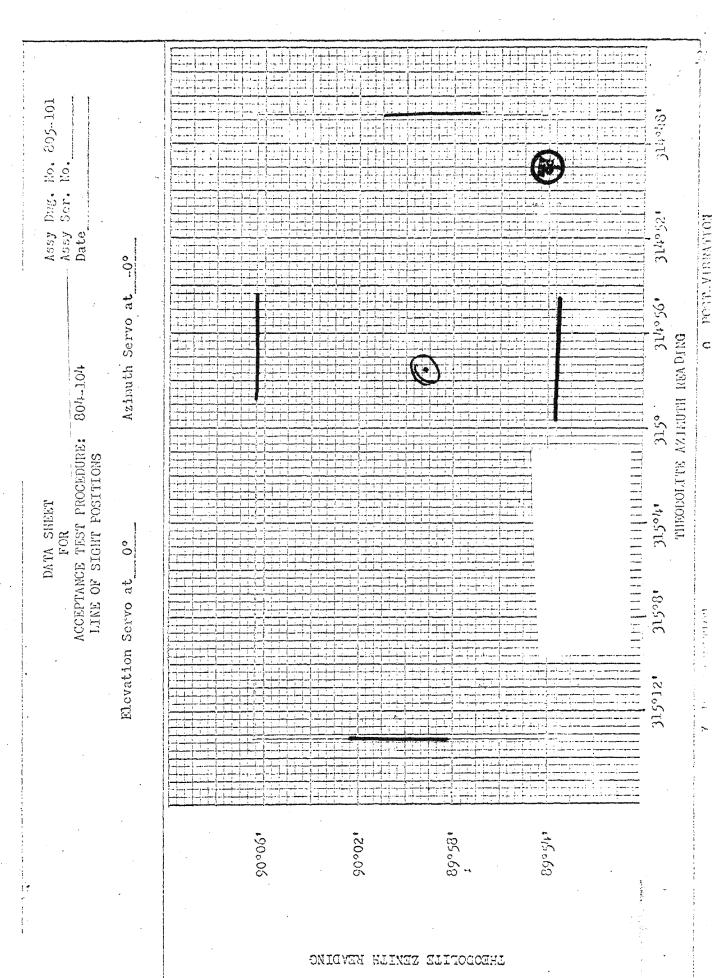
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Approved for Release: 2024/01/30 C05098942



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40013

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	Elevation		3220421	X
		\$0°03°	. 70 / 70	

PHICAGE TENTH READING

40014

Date: **3-3-67 3-20-67**

C/P No. FM 239

VTP-30: Subsystem Test Procedure

Task 4 Test Record Installation and Tracking and Slit Evaluation

This task was performed according to procedure.

The following non-conformances and/or deviations were encountered:

CPL-28 does not indicate output-upon replacement of blown fuse (F-5) that occurred during Task 5 satisfactory CPL-28 data was ebtained. Also Roller and base assembly replaced at a later date.

Date: 3-23-67 3-24-67 3-28-67

C/P No. 239

VTP-301 Subsystem Test Procedure

Task 5 Focus Series

This task was performed according to procedure.

The "Best Focus Position" was established at CPL-20 =2.125 volts at an average C/P temperature of 70.17 °F.

The GM for this platen position was:

On Axis		153	lines/mm
Off Axis	÷2½0	105	lines/mm
Off Axis	-2½°	104	lines/mm

Temperature runs:

On Axis +120F -120F

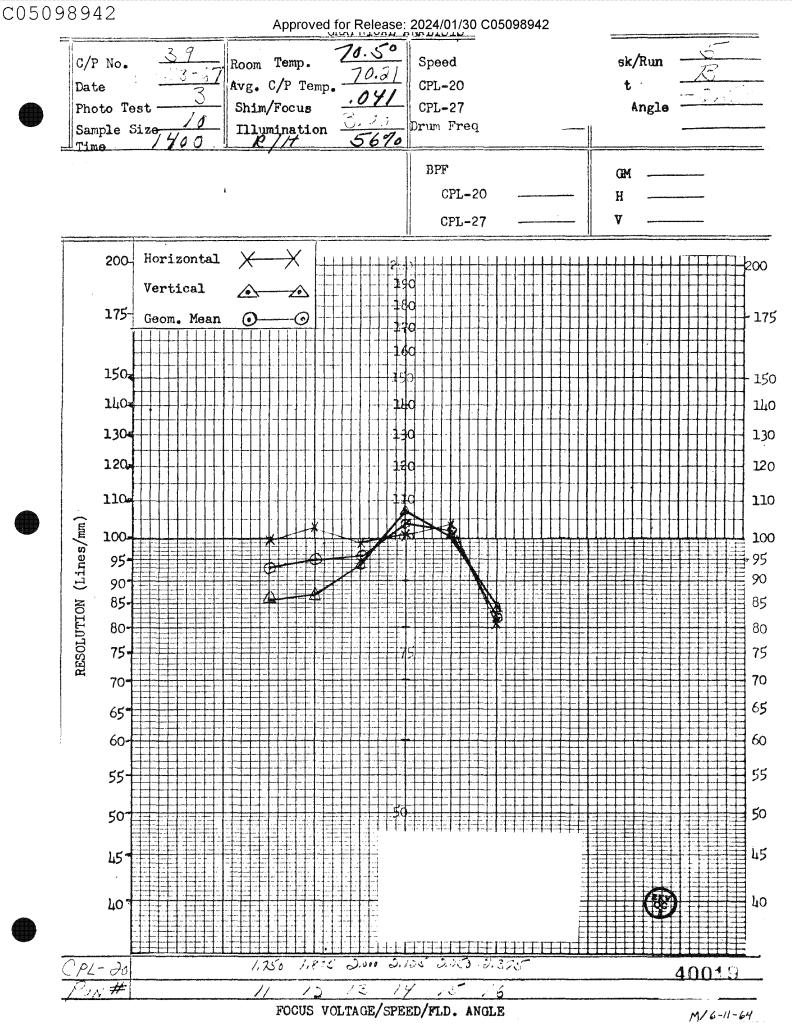
157 lines/mm at CPL-20 = 2.050 158 lines/mm at CPL-20 = 2.200

Supporting data is included in the accompanying sheets.

The following non-conformances and/or deviations were encountered: During testing 5 velt instrumentation dropped to zero volts. It was determined that Fuse F-5 wasblown. Upon replacement satisfactory data was obtained.

C/P No. 7	C/P No. 37 70 70 70 70 70 70 70	98942	Approved for Rele	ase: 2024/01/30 C05098942 เปล่น ลุกลุบเอบอ	
CPL-20 H — V — V — V — V — V — V — V — V — V —	CFL-20 CFL-27 V 200- Horizontal Vertical 175- Geom. Mean 160 150 110 130 140 140 140 150 110 160 175 160 160 160 175 160 160 175 175 180 180 180 180 180 180 180 18	Photo Test Sample Size	Room Temp. 70. Avg. C/P Temp. 70. Shim/Focus	Speed , 0./7 CPL-20 CPL-27 Drum Freq	lit · ·
Vertical	Vertical 175 Geom. Mean 160 150 160 150 160 130 130 130 140 140 160 160 170 180 180 180 180 180 180 18		4	CPL-20	- Н
		Vertical 175- Geom. Mean 150- 110- 130- 120- 110- 100- 120- 120- 120- 120- 12			200 -17 -17 -19 -19 -19 -19 -19 -19 -19 -19 -19 -19

C/I		Room Temp.			5 (3'
Pho	oto Test	Shim/Focus	CPL-27	, 2	and the second s
			BPF CPL-20 CPL-27	GM ———— H ————— V ————————————————————————	
	200 Horizont Vertical				
	175- Geom. Me	an <u>O</u>	1		
	140		12c		
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(Lines/mm)	95-				
RESOLUTION	85- 80- 75-				
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	45				



FOCUS VOLTAGE/SPEED/FLD. ANGLE

2/-12

M/6-11-64

Date: 4-28-67

3/P No. 239

VTP-301 Subsystem Test Procedure

Task 6 MSD Frequency and Port Open Telltale

This task was performed according to procedure.

The following non-conformances and/or deviations were encountered: MSD period count at speeds 55 and 64 were below minimum specification. Waiver written to accept (KV-183).

Date: 4-26-67

C/P No. 239

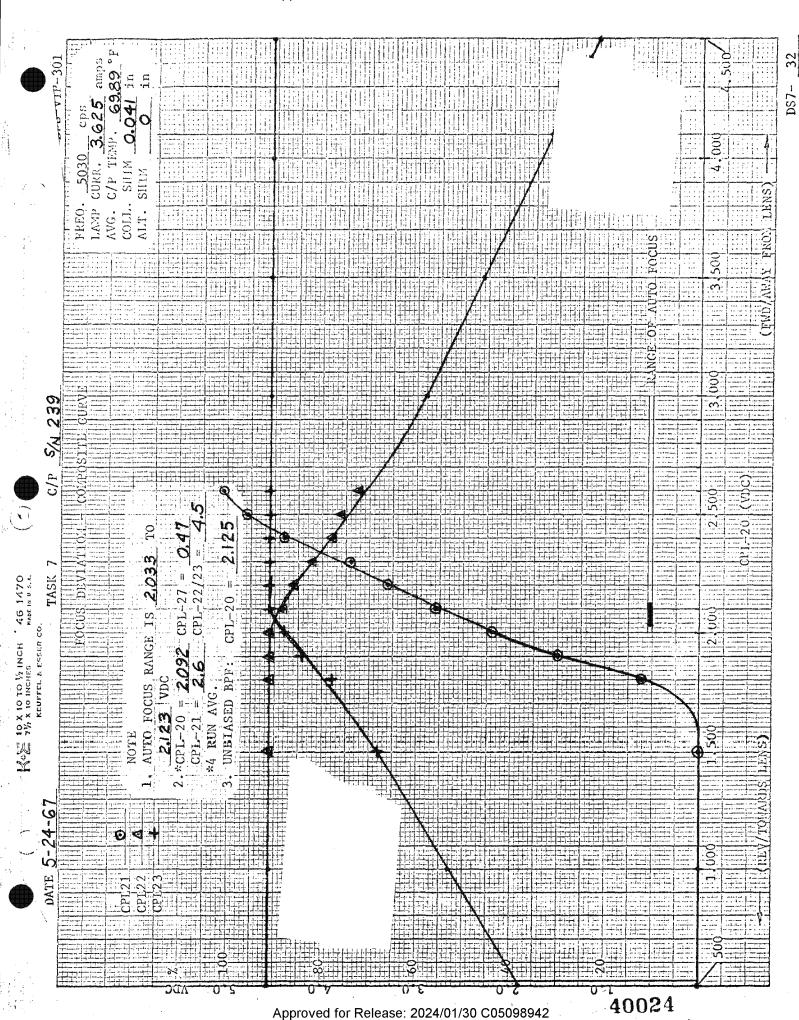
VTP-301 Subsystem Test Procedure

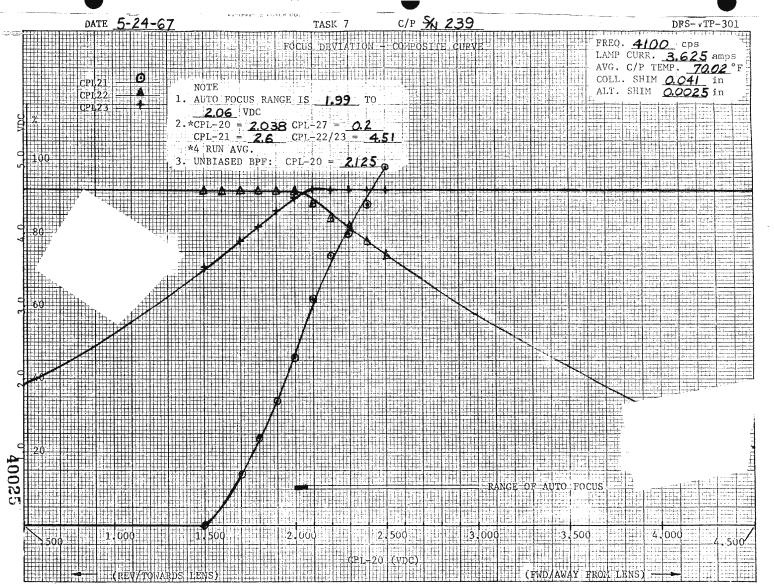
Task 7 Focus Control Checkout

This task was performed according to procedure.

Plots of the data for the 3 frequencies are included in the accompanying sheets.

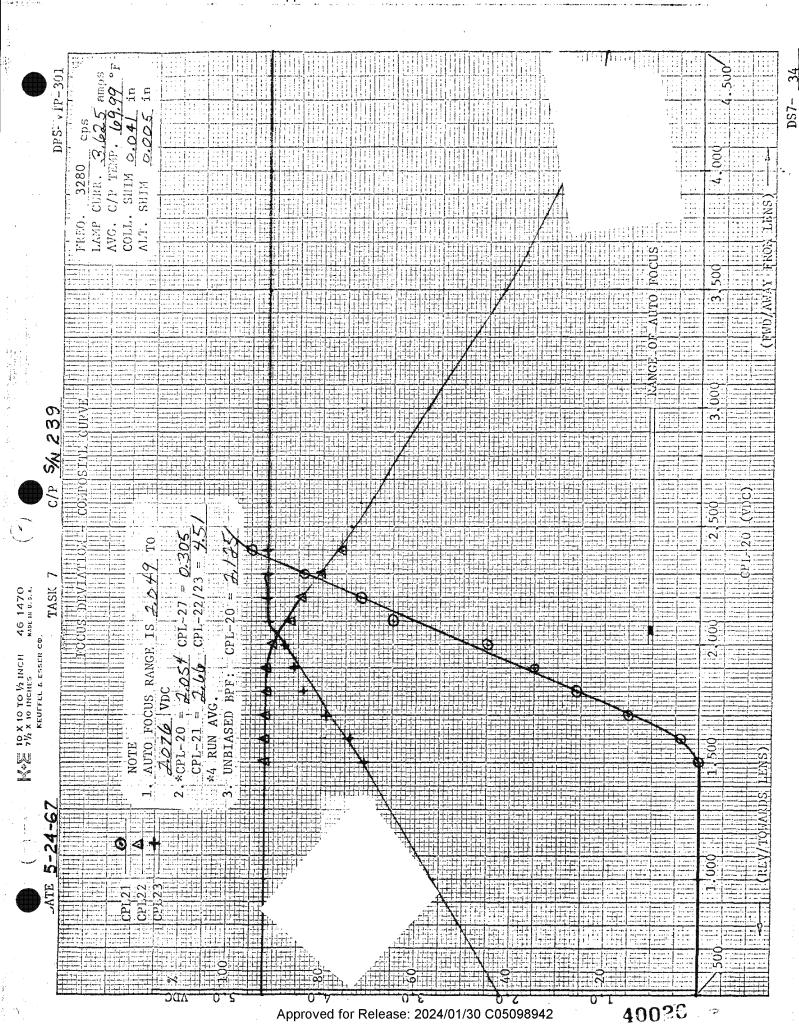
The following non-conformances and/or deviations were encountered: Average C/P temperature for the 3280 cps run was +.22°F above specification. Average C/P temperature for the 4100 cps run was .11°F above specification.





Approved for Release: 2024/01/30 C05098942

DS7-



Date: 5-22-67

C/P No. FM- 239

VTP-301 Subsystem Test Procedure

Task 8 Heater Operation

This task was performed according to procedure.

The following non-conformances and/or deviations were encountered:

NONE

Date: 4-27-67

C/P No. 239

VTP-30: Subsystem Test Procedure

Task 9 Photo Validation

This task was performed according to procedure.

The optimum settings for "BPF" at an average C/P temperature of 70.27 OF were determined to be:

CPL-20 **2.125** volts CPL-27 **0.708** volts

The resulting resolution for the above conditions for speed 31 are tabulated below:

S11t 3

GM On Axis
Off Axis +0.5°
Off Axis -0.5°
Average

151 lines/mm
lines/mm
12h lines/mm
lines/mm

Slit C

GM on Axis

148 lines/mm

Slit D

GM On Axis

<u>124</u> lines/mm

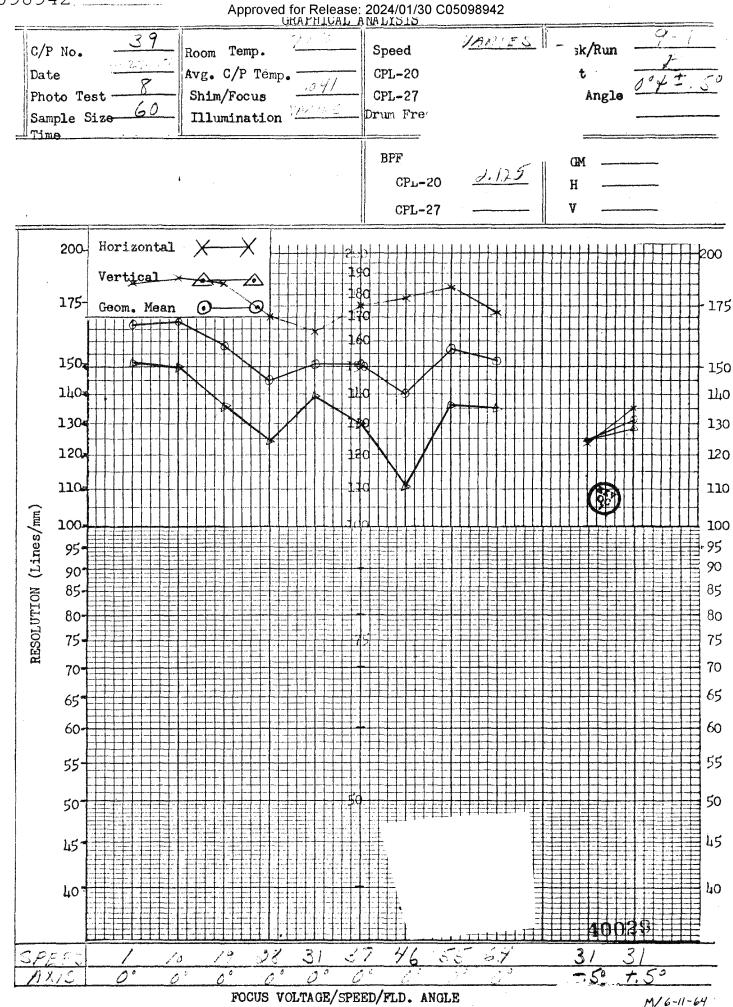
Supporting data is included in the accompanying sheet.

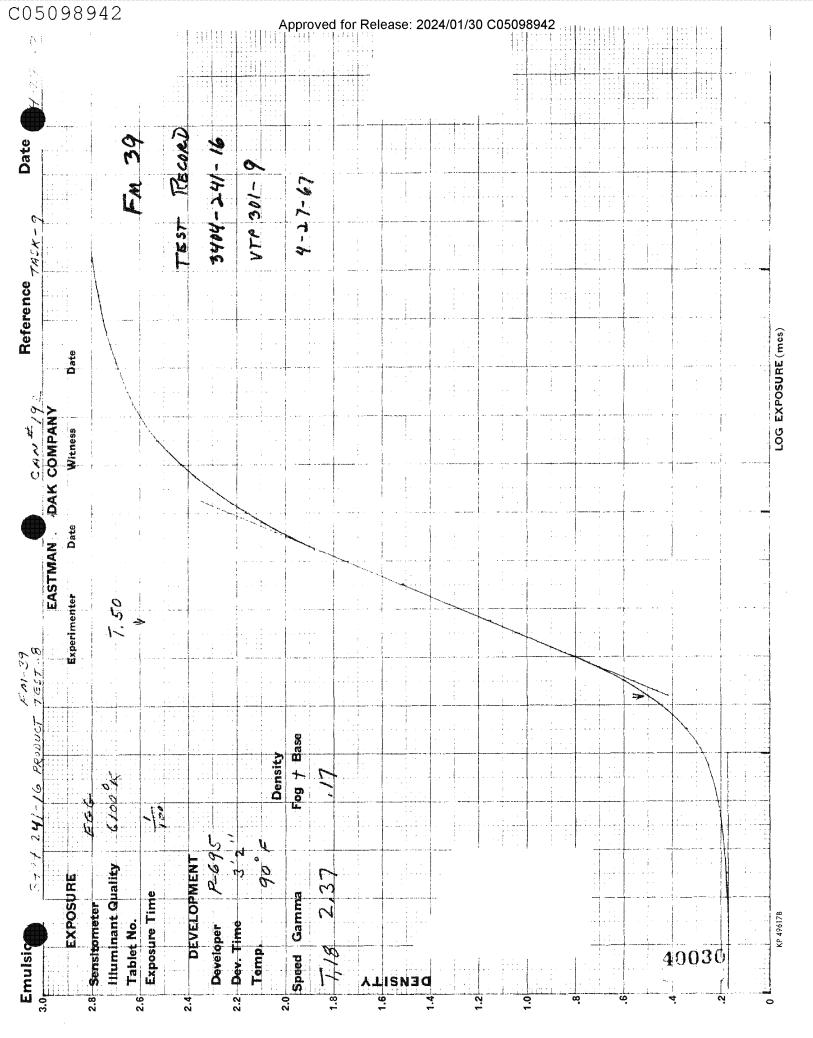
The following non-conformances and/or deviations were encountered:

Nonel

The test sequence was continued.

40028





Date: 5-23-67

C/P No. 239

VIP-301 Subsystem Test Procedure

Task 10 Slit Evaluation

This task was performed according to procedure.

A visual check of the test samples was made at EKV. There were no indications of any non-conformances.

The samples were sent to Rochester for complete evaluation.

Date: 12-13-66

C/P **FM 239**

VTP-301 Subsystem Test Procedure

Task 11 FRSA Checkout

This task was performed according to procedure.

The FRSA was S/N N-648

The following non-conformances and/or deviations were encountered:

None.

Date: 5-22-67

C/P No. 239

VTP-301 Subsystem Test Procedure

Task 12 Flight Record Loading and Hardware Installation

This operation was performed according to procedure.

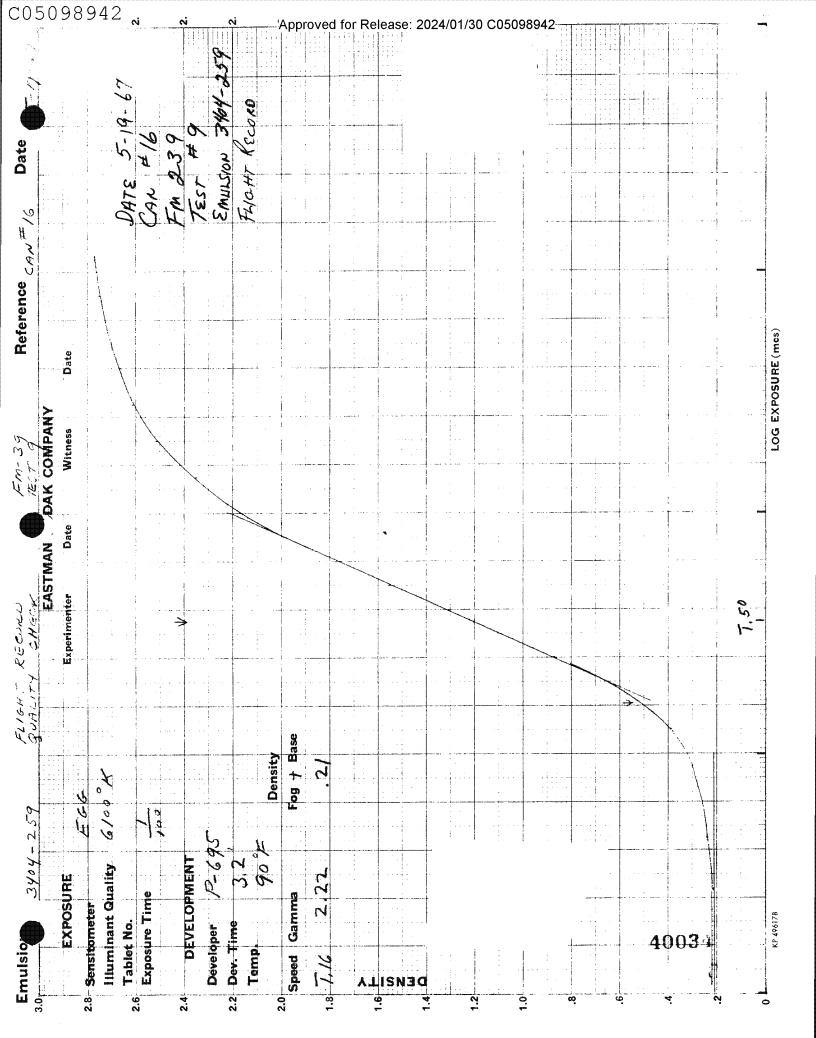
The following record makes up the Flight load received in Can #16:

Emulsion	Footage
3404-259	24001
50-380-32	1000'
so-362-3-10-6	1001

Sensitometric data is plotted and included. 25 feet of fogged record were installed in the FRSA. 3339.0 feet of the original record were available at mating.

The following non-conformances and/or deviations were encountered:

None.



Approved for Release: 2024/01/30 C05098942

Date: 5-23-67

0/9 No. 239

VTP-301 Subsystem Test Procedure

Task 13 Flight Record Photographic Validation and Slit Evaluation

This operation was performed according to procedure.

Geometric Mean for the runs were as follows:

Slit Position

3	136_	lines/mm
C	139	lines/mm
Ð	116	lines/mm

The following non-conformances and/or deviations were encountered:

None.

Date: 5-24-67

C/P No. FM- 239

VTP-301 Subsystem Test Procedure

Task 14 Final C/P Preparation for Mating

This task was performed according to procedure.

The following non-conformances and/or deviations were encountered:

None

Date: 5-24-67

C/9 No.

FM 239

VTP-302

Systems Test Procedure

Operation 4 Systems Preparation

This operation was completed in two steps.

- 1. Loading flight Record Task 12, VTP-301
- 2. Weighing C/P Operation 4, VTP-302

The C/P weight was 1164.87 1bs.

The following non-conformances and/or deviations were encountered: The Dust Shield Fastener was attached to the Aluminized Glass Fabric of Dust Shield "A" Assembly in the wrong orientation. Mating surface was outboard rather than inboard in order to be compatible with OCV Dust Shield "B" Assembly. Assembly "B" was repositioned to be compatible with Assembly "A" for expendiency. Refer to Waiver KV-190.

Date: 5-25-67

6/9 No.

FM-239

VTP-302 Systems Test Procedure

Operation 5 Alignment Check

This operation was performed according to procedure.

Final results were as follows:

+1 min. 30 sec. Z Axis tilt

The following non-conformances and/or deviations were encountered:

None.

Date: 5-26-67

C/P No.

FM-239

VTP-302 Systems Test Procedure

Operation 6 C/P System Tracking and Readiness

This operation was performed according to procedure. Final results were as follows:

The flight redord configuration at the end of this operation:

Slit through Supply 3145.1 feet Slit through FRSA

Transition time of Servos:

Azimuth

Position 1-8 Time: 5.7 sec. 8-1 sec.

Elevation

Position 1-3 Time:

"BFP" Setting (attained with a PTS):

CPL-20 2.233 voits CPL-27 1.299 voits

The following non-conformances and/or deviations were encountered: The Record Transport Looper system did not operate normally during the tracking check with the Y Axis horizontal. The Looper Carriage would actuate the looper empty switch and then drift back allowing the take-up motor to restart. Refer to waiver KV-192.

Sheets 2 Date <u>6/5/67</u>

To:

R. Moler

Subject:

Launch Status of FM39 Payload

All TLM data generated as a result of the Countdown (TP-24) has been evaluated. Temperature conditions as determined by UMB-3 and UMB-4 were within the specification limits of 69.5° and 71.5° F for the pre-launch period.

The final status of the C/P at launch was

as follows:

<u>CPL</u>	% Full Scale	Condition
1 2 3	37 28	Deleted 68.79°F. -0.19 T°F
4 5 6 7	60 60 60 61	71.16°F 71.16°F 71.37°F 71.30°F
8 9 10	60 58 50	71.30°F 70.53°F +22 V Ref. Volt age
11 12 13 14	38 32 47 52 44	Pos. B Slit Pos. 2 Elev. Mirror Pos. 5 Az. Mirror 3013.9 Ft. In Supply

CPL	% Full Scale	Condition
16	88	344.8 Ft. In T.U.
17	39	Normal Tension
18	0	MSD Off
19	41	Brake On
20	44	BPF
21-23	0	Timer Off
24	Petto 1995	Deleted
25	19	Step 1
26	<u> 78</u>	Env. On
27	25	BPF
23	50	Same as 15 & 16
29	2	Data Lamps OFF
30	\$100 GEB	Deleted
31	Side OBS	Deleted
32	460 1809 	Deleted
33	ndormalistic français de la constantina del constantina de la constantina de la constantina del constantina de la constantina de la constantina de la constantina de la constantina de la constantina de la constantina de la constantina de la constantina de la constantina de la constantina de la constantina de la constantina de la constantina de la constantina de la constantina de la consta	Power Monitor, Elev.
34	10	Power Monitor, Az.
35	<u>81</u>	Operational Supply
+22V	88	+22v
UMB - 3	58.70 K	70.60°F
UMB - 4	<u>58.41</u> K	70.67 ^o F

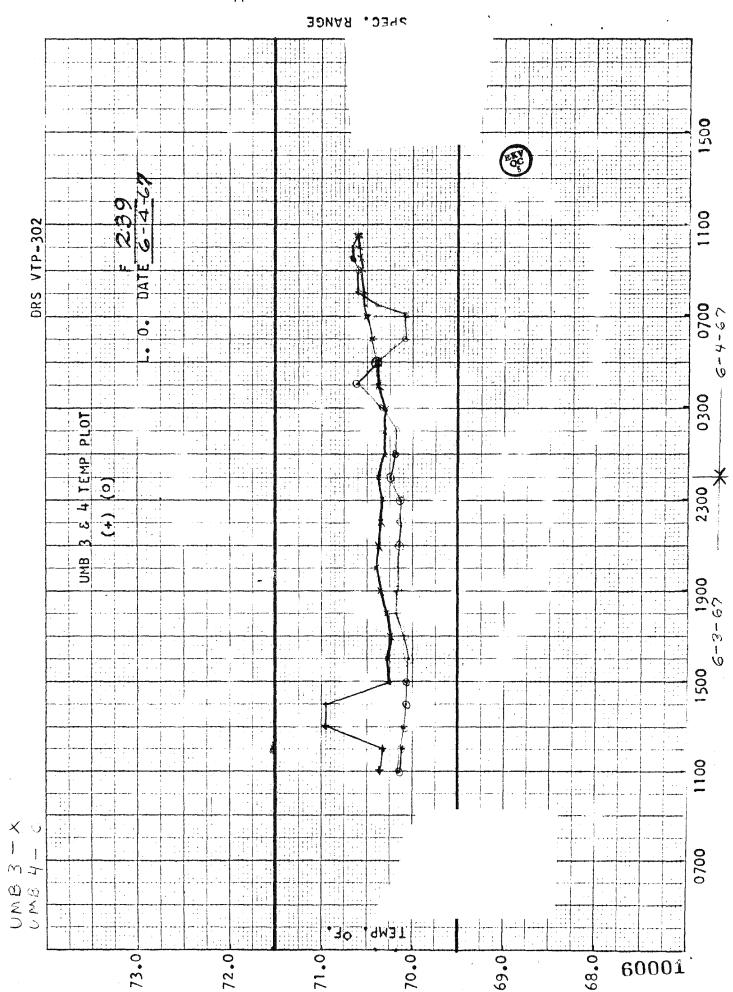
No potential problems were evident upon completion of the data analysis.

S.Langer/kb .

S. Langer

Approval: G. R. Poore

Copy 001: R. Moler



Approved for Release: 2024/01/30 C05098942

509894 •	#				Approved f	for Release	: <u>202</u> 4/01/	30 C05098	3942 <u>3</u>)	í	Sheat		of
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Approved for Release: 2024/01/30 C05098942

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FAILURE ANALYSIS

AO 1281 - (REV. 11 - 61)			
1. FAILURE LOCATION: (Name) A. Major Component or Assembly	2. HAS TH	IS PART FAILED BEFORE	Failure Report No. KV 182
C/P		Yes No	- The state of the
B. Chassis or Sub-Assembly	If yes,	See Report No.	
Distribution Box	3. FAILUF	RE CATEGORY: Early Fai	lure Human Initiated Failure
Fuse Board Assy - A-5		Vear Out Failure (Time to Fai	lureHrs.)
4. MODE OF FAILURE (Manner or way part failed) Apparent overload in 5 volt Ins	trumen t a	tion Ckt caused blow	wn fuse, F-5 (1/20 amp.)
5. CAUSE OF FAILURE: (Attach Photos or Sketche: Undetermined at this time (3/7/c Investigation into 5 volt	67):		the C/P showed no
shorts or low resistance that w	ould cau	se overload	
Investigation into AGE show	wed no c	ondition that would	create overload
this included check from Interfa	ace end	of cables thru Test	Console to recorder.
	ormance to		
ANALYST C. Krausse Dote	of Analysi	<u>3 / 7 / 67</u>	The name is a second of the se
7A. RECOMMENDED Fabrication Methods CHANGE:Other	Inspec	tion Procedure Spe	cifications Design
B. DESCRIPTION OF CHANGE:		geragan ganggirki 1990 dalam nganagi perumahan malaksam dibipakahik kisam madaksake m	
	Reliab	ility Approval	
8. DESCRIPTION OF ACTION TAKEN: The Re	oll er/ Ba	se Assy was removed	and sent to
Rochester for a different retro	fit. EK	C/Rochester QC follo	owed up investigation
in CPL 28 area when the Assy was	s in Roc	hester.	
9. ACTION TAKEN BY		DC0 NO0	DR EFFECTIVE DATE / /
NAME	GROUP		

COPIES:

FAILURE REPORT

1. FAILURE LOCATION (Dwg. Title)	2. DWG. NO.	3. SER. NO.	4. MANUFACTURER	5. REPORT NO. KV182
A. Major Component or Assembly	805-101	A.	A.	
C/P		239		6 PROJECT
B. Chassis or Sub-Assembly	617-114	B.	В.	Equipment Type:
Distribution Box		611N832		A. Primary
C. Failed Part	c. ₆₁₇₋₁₁₈	c. N453	С.	B. Support
Fuse Board Ass'y A-5				hand
7. EFFECT ON MAJOR COMPONEN	· · · · · · · · · · · · · · · · · · ·	cal * Analysis Require	Major	Minor
8. DESCRIPTION OF TEST: (Bench (includ	······································	ection, Operation		Etc.)
During an on Axis Focus	s test (VTP 3	01-task 5)		
9. DESCRIPTION OF FAILURE: (G	Give symptoms observior and during fail	rved: Environme ure)	ental & Operational (Conditions Part was subjected to
Blew Fuse F-5 (5 volt I Distribution Box	instrumentatio	on Voltage)	on Fuse Boar	d Assy A-5 in
	#A			
				•
·				
O. PRESENT STATUS OF:		Marie Company of the		amana anananin ya masa masa masa masa kada kaya mayana, masa may lallanyi ya ya kado kibaliyya mayani
A. MAJOR COMPONENT		B. FAILED	PART.	(Field)
Returned to Service			rakı: Failure Analysis at	(Diant)
Awaiting Parts			placed By	
Awatting Fatts			pracea by	NAME
C. AUTHORIZATION TO PROCEE	ED WITH TEST:	□Rep	oaired By	Niph_consultables*vprqeEorophettisere
			urned to	
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#*************************************	727.00	Scr	apped	
11. Originated By: R. H. Ziemar	1 12. Dat	e of Failure 3	/ 4/67	Time

COPIES:

M

WAIVER FOR KV 183 leport No. APPROVAL OF NON-CONFOR Variation FM 239 Serial No. Research and Engineering Deviation 5-19-67 Date 805-101 Space Chamber Sssembly Dwg. No. & Rev. Item Name FM-239 Originator <u>Bishetsrieder</u> Serial No. Description of Non-Conformance MSD Period Specification Value (inc. + .10% Tol.)

SPEED	MAX	MIN	ACTUAL READING		FROM NOMINAL
5 5	20105	20065	20062	,	.114
64	18383 -	18346	18340	 •	•133

No. of Previous Occurrences 10 Disposition X Accept Reject

Disposition and/or Corrective Action Instructions

The measured values represent an out of tolerance condition as indicated above. This condition will not affect flight conditions for this unit.

Disposition:

Accept Reject Rework

O.C. Engr. Dieman 17/67

Program Mgr. Whitetrieder 5/31/67

Base Mgr.

AF Rep. David Millie & May 67

Variation Deviation		WAIVER PPROVAL OF NO Research and	N-CONFORM?		eport No. erial No. Date	KV 190 FM-239 5-26-6
Item Name	Space Chambe	er Assembly	aşınınd Yanı aramıd dayı yerin Miliring elektilik daylılı	Dwg. No. & 1	Rev. 805.	-101
Serial No.	FM-239		Originator	Bishetsrie	der	and the second s
	÷					,
with mating per drawing.	ace was facing on surface of Dust	Shield "B" Z	ipper Assy (813	-241) attache	d to 2000 O	cv
			·			Additional Production and Production
o. of Previous C	occurrences (O Dispositi	on	ject		
attached to @ 0	Instructions ield "B" Zipper V. Reposition t	Assy (813-241 the above assy	Accept Re	ield Flange (ng surface fa	cing inboar	·d

0.0. Herr. Program Mgr. Philatenistry

Base Mgr.

AF Rep. 7/31/67 (28)

Variation Deviation		WAIVE APPROVAL OF N Research and	ON-CONFORMAT		port No.	KV 191 FM-239 5-26-67
Item Name		er Assembly		Dwg. No. &	Rev. 805-1	.01
· Serial No.	239		Originator	Bishet	srieder	n spirage planet in the second second section of the second section of the second section of the second section of the second section of the second section of the second section of the second second section of the section of the section
Description of	Non-Conformanc	e.				
The Ref	erence Mirror	readings in SE	T #46, "Elevation	on and Azimut	h Servo	
The Ref	erence Mirror	is normally se	t at El 90° 00'	12" Az 45°	00 t 00n:	. •
The Ref	erence Mirror	could not be a	djust ed.		thullware-pulled-a-quape	
J					J .	
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o, of Previous (Occurrences	Disposit				
Description of Non-Conformance The Reference Mirror readings in SET #46, "Elevation and Azimuth Servo Replacement", were: El 90° 00' 40" Az 44' 55' 12" The Reference Mirror is normally set at El 90° 00' 00" Az 45° 00'00" The Reference Mirror could not be adjusted. The Reference Mirror tolerance for Elevation and Azimuth are ± 30".						
risposition and/c	or			ject		
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risposition and/corrective Action The custom El 90° 0	or Instructions omer was giver	the Reference	Accept Re	of	or position	
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Disposition:	Accept	Reject	Rework	
O.C. Engr.	Ryceman 3/7	167		
Program Mgr.	RBis hetsnieder	31/67		
Base Mgr.				
AF Rep.		May 67		70006

		. WAIVER FOR		7977 ** ¢	
		, APPROVAL OF NON-CONF	ort No.	KV 19	72
Variati	on	Research and Engineer	ial No.	23	39
Deviati	on.	,	Date	<u> 5-26-</u>	-67
Item Name	Space Chamber	r Assembly	Dwg. No. & Rev. 805-	-101	
Toom Manc		en en mentre de la companya del la companya del la companya de la	and a second second	The second secon	
Serial No.	239	Originator	Wellishanders in the Manuschan College Control College Control College	Pr-tie-summy demonstration (Left policy free	mphen Mohittennighte
Description	of Non-Conform	nance The Record Transport 1	Cooper system did not	TATAT	770
operate nor		ne tracking check of C/P reading	ness testing operating	Yes	No
6 VTP-302.		The Joaner corriege w	mld actuate the		:
looper empt	y switch (S-100	The looper carriage wo O4) then drift back allowing th			1
. 100000100		During normal operation	on the looper carriage		
holds the m	icro switch clo	osed at the end of the emptying		:	
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1 1				į	Ē c
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4 4 4				į.	
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ing and the second of the second and a secon	and Published Annual Control of the		Links vykaniya tapastanii styyykäytyyyyjäykä siiiini jäytyyynysii tasittiselt-ainta 97-17-ainja ja ja ja ja ja Links valta kan an atamamman ja ja ja ja ja ja ja ja ja ja ja ja ja	·	
Disposition	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	TANK			1
1			ا د م م م م م م م م م م م م م م م م م م		
		e different payload voltages (2 nd horizontal. The anomaly occ			; ;
horizontal.	It was theoriz	ed that the anomaly was probab	oly due to the effects o	f	,
		oper carriage assembly having ous units. The decision was m			,
	ue the t est c yc		iade to accept the assem	.ULY &S	•
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The second secon		in designation on the first transport of the first of the	ቸው ያሳመድታል እና የሚያስፈመው ተመመረተ መመመስ መመመስ መመመስ መመመስ መመመስ መመመስ መመመ	Control of the second of the s	A 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
Approval		Date			
Q.C. Engr.	P4	5/27/67			
Program Mgr.	Birtherice	L- 5/27/67	THE RESERVE OF THE PROPERTY OF	en aldre en en en en en en en en en en en en en	
AF Rep	: 71 Jan 100 4) 100 40	(/-/-	70	0007	, , , , , , , , , , , , , , , , , , ,
77 · · · · · · · · · · · · · · · · · ·		0///67	anat sahat na penatumundi ayu dapi ndapi hida duda dengere dasa ene erropanyu daba	-	(1111, p.111, p
AF Rep.	angermagnangs, aya aya aya aya aya aya aya aya aya ay		унко-9-4-ба-да-биян-кеш-6-о підміолитиат темпетте-кейш-алақыш-аштет-контокса-а-	; ************************************	Lasteronomeros

DISCREPANCY & DISPOSITION LOG

	Con	dition Originated	1	Action	n Required	Ĺ	le No. Fm239		37
		"P" Plant "V" VAFB	"F" Failur "W" Waiver		"O" On Site Repair "R" Replace	Sheet	No.		
No.	Date	Description		Origin	Corrective A	ction	ll l	tion By	
7	1/1/67	TREA Container Extrem &			CREANED Life	zalunia.		®	/ ,
2	2/1/	C/P CorrAMER HANDL PULLED PRETIDILY TREAD	MIS HALL.	P	Bone Brief				
3	3/2/47	DUST STIFFA 7/1-299 :		p	Bar Umfiled projecty	•			767
4	3/2	1I STRAP TOO T To Spec		P	Land Evere St			(je)	7/27/67
5	3/2	Orra Clines On		P	Change of it will		The plant of the p	80 PM	198 .
6	3/2/1	1 MIRROR 1101/	38-100 St 1911	9	AGE - relieve &			ু ®	
0083	3/2/67	PLATEN HAS CIRCUM TO	GA UMIT	P	Recordingly and			<u></u>	Fiz/67
80	3//67	1 40000	KIT AWAITE	P.,			THE REAL PROPERTY OF THE PERSON OF THE PERSO		FES.

C05098	942	š	-	" Appro	ved for Rel	ease: 2024	/01/30 C05	098942	i	!	i A
	2.9	:	Taken Date								72/2/2
	Im 2	8	[-	(M) (FE)	(A)(B)	(A)(EB)		4	A) (28)	A (FS)	(A) (B)
} . · · · · · · · · · · · · · · · · · · ·	No.	•	Action Tvne Bv			antiburo en carbander Sidenbirona.		AMOTEUPER (Particular)	agus que responsable con		
ITION LOG	Required Vehicle	On Site Repair Replace	rrective Action	Da Dalet.	sait I feet	and Later than	of Structure (Committee)	Nemaur D		THE STICK TO POLLER.	Rea J. Cope William
) DISPOSITION		"0" (No.		B.A.	104	<u> </u>		J. Like	9
<u> </u>	Action	ire r	Origin	2	2	0		2	7	2	N. S.
DISCREPANCY	gramming.	"F" Failure		1 1 2	RATCRS.	A BOSHT 1/h			72.		truce R.
	lition Originated	"p" Plant "V" VAFB	Description	MILLTIPLE SCRATEHES +X Lers Bringer	(1) STERO MIRROR BLEMISH (SCRATCE	LENS HAS DSCRATCH ABOUT 1/2 +Y+2 Gome ARPROX 3 WAYAMINE	ROLLEGS 11, 13 815 10 Th & CAMENIA.	TAPE LEFT	HAVE SCHAFFINES OF THE S.	ANDER ON ROLLER 14/0 RAISED CAN BE FELT	FET JCK, SCRINCHES, FULLS
	Condition Originated	"P" Plant "V" VAFB	Date Description	MULTIPLE +X LErs 6	BLEMISH (SC.	3 LEWS HAS DSCRATCH A +Y+2 Golina Argansax 3	HOLLERS 11, 13 815 10 TH & CHAIREN	TAPE LEFT	167 HAVE SO.	1000 3/ Own On Romer 410	12 TS 135

DISCREPANCY 8	Ĝ	DISPOSITION LOC
D2001123121101	4	Dror Corracon mod

	Con	dition Originated	F	Action	Required	Vehicl		23	<u> </u>
		"P" Plant "V" VAFB	"F" Failum "W" Waive	e .	"O" On Site Repair "R" Replace	Sheet	No.		
No.	Date	Description	` .	Origin	Corrective		Type	- 1	aken Date
17	5/24/	I perfect thest shis	Id factioner	P	Personal associa	They Reversed			167 -
•		(wall) Et ziffer	outload also	P	graphe e parteriole de	1102	0 ;		Hy The second
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70010		•							The second secon
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C05098942

Fm 39

SUMMARY

			Pailures/Waivers	V	Mods/Variations			
Rpt	AGE	Major	Component/Ass'y	Description	Remark/Reason	Comp	plet	ed
Rym	Veh	Ass'y	Jomponomo, Los y	00011701000		. 11 00 1	Ву	8
236	9/0		DSTRIBUTION BOX	REPLACE FILE BO ASSYA-5		17	³ ૧	
237	%	39	AIR SUPPLY	REDINCE ROLLER ASSEY		3/13	PAC	D
238		39	STERO MIRROR	REPLACE SERVOS			RO	
242	0/0	39	STORS MIRROR	REPLASEROUS.	·	1/c/65	Ryo	
248	1/0		AZ E'EL SERVOS	REPORTE ETA SERVOS. EPOXI WO SCHELL SI PLANFOLATE OF POLL STROTTERS. ELICOPERS		7/3/6	4	1
249	0/0	39	STEREO MIGRISA	TEMPLE STRUGE	•	E/IL,	A. C.	
250	e: p	39	CHEREN MIRROR	COLLEGE CONVERTING ROD		7	Q.	D
251	9/0	39	DISTRIBUTION BET	MOUNC & C/O.		7/23/65	E	2
 			•					
			PARTS LIST		-			
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			Approve	ed for Release: 2024/01/30 C05098942		mann Turn name (m		1

AUTHORIZATION FOR FIELD MODIFICATION

Report	No.	KUM-236

HORIZATION	FOR	FIELD	MODIFICATION		
				Date	3-8-67

Item Name Distribution Box Assembly	
Drawing Number 617-114	
Item Serial No. 611 N 832	Veh. Serial No. FM-239
Design Authorization Reference:	Phone conversation J.C. Heit (EKR)
and R. Bish (EKV)	
	nanca di 1000000 milyono di 100000000000000000000000000000000000
Description of Modification: Repl	aced Fuse Board A-5 (Dwg #617-118)
Set 20 performed to check modification.	dood ruse board A-2 (Dwg #01/=110)
SOUTH TO STATE OF STA	
Old fuse board S/N N-453	
New fuse board S/N P-297	
APPROVALS	COMPLETION
Bischibnesder 3/13/67	Date <u>3-14-67</u>
Prime Contractor Rep. Date	By A Aliran
	1212

Approved for Release: 2024/01/30 C05098942

Air Force Rep.

KUM-237

UTHORIZATION	FOR	FIELD	M ⁷					patro
		* * * * * * * * * * * * * * * * * * * *	**	D	at	e	3-9-67	-

Drawing Number 711-297
Item Serial No. N-341 Veh. Serial No. FM-239
Design Authorization Reference: TWX # R-008358-XH Program office to EKR
•
Description of Modification: Remove and Replace Roller & Base Assembly Ser # N-341 after modification at EKR.
Procede with normal S/S test UTP-301 as
check out following installation.

APPROVALS		COMPLETION
Prime Contractor Rep.	3/13/67 Date	Date 3-13-67 By R. G. Perry
Air Force Rep.	Date	QC D. K. Broker. 80003

	Report No. KUM-238
AUTHORIZATION FOR	R FIELD MODIFICATION—Date
	•
Item Name Space Chamber	
Drawing Number 805-101	
Item Serial No. FM-239	Veh. Serial No. FM-239
Design Authorization Reference:	
TWX #R- 008357 XH	Program
office to EKR	Paramiran and HIV to reconsider the contract of the contract o
	•
Description of Modification: Re	eplacing Elev. Serv S/N 605053
Dwg #614-100 and Azim Ser S/N 612061 Dw	wg. #614-101
New Elev Servo Ser #701062 A	
Azim Servo Ser #611 060 A	
4900	
Perform Set 46 following installation	
	,

APPROVALS	COMPLETION
Prime Contractor Rep. Date	2 pate $\frac{3-14-67}{2}$
	By C. G. Terry
- 20	- bo ARBerta

Air Force Rep.

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Report No. _KVM 2142 AUTHORIZATION FOR FIELD MODIFICATION

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80005

LOIL	ليونيه سديد	MODAL AGALTIM		
)ate	4-7-67

Item Name Elevation & Azimuth Servo Assemblies
Drawing Number 614-100/614-101
Item Serial No. 612102A/H09027M-> Veh. Serial No. 239
Design Authorization Reference: Ref. TWXROO8415-TH
Description of Modification:
(1) Replace Elevation Servo, 614-100, S/N 701062A with Elevation
Servo S/N 612102A.
(2) Replace Azimuth Servo, 614-101, S/N 611060A with Azimuth Servo
S/N 409027 MA-2
Perform items (1) and (2) Servo validation as per SET #46
TOTAL TOOMS (I) CHA (I) SOLVE VOLUME OF POLICE (I)
COMPLETION
APPROVALS COMPLETION.
Prime Contractor Rep. Date Date Date Prime Contractor Rep. Date
Prime Contractor Rep. Date By R.Q. Perry
7 Apr 67 QC Paris
Air Force Rep. / Date

Approved for Release: 2024/01/30 C05098942

Air Force Rep. /

AUTHORIZATION FOR FIELD MODIFICATION		<u>48</u>
	Date <u>5-17-</u>	67

Item Name <u>Elevation and Azimuth Servos</u>	and an analysis of the second	
Orawing Number 614-100 & 614-101		
Elev. 701063 Item Serial No. <u>Azim. 612061</u> Veh. Serial No	. 239	
	iliyada	
Design Authorization Reference: Telecon: P. Murfin	(EKR)	
and D. Mirth (SSD)	овори, _{пос} надали узданова очени о оборина по о ФРФ ССР пода и национення оформов ОФ Ма	
	Marting the state of the state	
	Mily who have the transfer and the state of	et en e
	All All All All Marine and All All All All All All All All All Al	All land
Description of Modification: <u>Cut lock wires and remove</u>	e (8) screws holding	
cover to servo. Cover screw heads (2), holding Poly Scien	ntific Nameplate.	
	·	
with Epoxy. Cure over night, Re-assemble servos, Purge w	th Dry No - leak	•
rate - and continue SET-46.		
<u> </u>		
CEVE 1.6 is absolute to the bound of the control of		,
SET 46 is checkout procedure to be performed following ser	vo replacement.	
		**
		*
		*
		*
		**
APPROVALS COMP	LETION.	
APPROVALS	LETION,	
7D. 14 'S -1/1 016 3	LETION	
RBihetsnider 5/31/67 Date John 3	LETION, 1 Kerry	
Prime Contractor Rep. Date By 1167	LETION, 1 Kerry	
Prime Contractor Rep. Date Date	LETION, 1 Kerry	

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AUTHORIZATION	FOR FI	CODTETCATION

	Report	No.	KVM	249
¥	1	20+0	5-17-	-67

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Item Name Elevation and	Azimuth Servos
Drawing Number 614-10	0 and 614-101
Item Serial No. See Be	low Veh. Serial No. 239
Design Authorization Ref	erence: Per phone from Rochester, Poore-Heit
per Program Office Direc	ctive.
Description of Modificat	ion: Replace both Elevation and Azimuth Servos
and perform SET-46 (Serv	o checkout procedure) following replacement.
	The second of th
OLD SERVO S/N	new servo s/n
Elev. 612102- A-1	Elev. 701063-A-1
Azim. 409027- MA-2	Azim. 612061-1-A
aktorist delevariament merename er en en er en en en en en en en en en en en en en	
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 APPROVALS		COMPLETION
Prime Contractor Rep.	5/31/67 Date	Date 5/18/67 By C Krause RB ~
Air Force Rep.	31 May 67 Date	QC MBookey & 80007

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AUTHORIZATION FOR FIELD MODIFICATION

Report No. <u>KVM 250</u>

Date <u>5-17-67</u>

Item Name Connecting Rod L.H Drawing Number 807-252 Item Serial No. See Below Veh. Serial No. 239 Design Authorization Reference: Telecon: M. Culhane (EKR) R. Bishetsrieder (EKV) Description of Modification: Replace Connecting Rod L.H (S/N N 165) with Red L.H (S/N L 560) Original rod diverted for use on FM-238. APPROVALS COMPLETION		
Design Authorization Reference: Telecon: M. Culhane (EKR) R. Bishetsrieder (EKV) Description of Modification: Replace Connecting Rod L.H (S/N N 165) with Rod L.H (S/N L 560) Original rod diverted for use on FM-238.	Item Name Connecting Rod L.H	
Description of Modification: Replace Connecting Rod L.H (S/N N 165) with Rod L.H (S/N L 560) Original rod diverted for use on FM-238.	Drawing Number 807-252	
R. Bishetsrieder (EKV) Description of Modification: With Roff L.H (S/N L 560) Original rod diverted for use on FM-238.	Item Serial No. <u>See Below</u>	Veh. Serial No. 239
Description of Modification: Replace Connecting Rod L.H (S/N N 165) with Rod L.H (S/N L 560) Original rod diverted for use on FM-238.	Design Authorization Reference:	Telecon: M. Culhane (EKR)
Description of Modification: Replace Connecting Rod L.H (S/N N 165) with Rod L.H (S/N L 560) Original rod diverted for use on FM-238.	R. Bishetsrieder (EKV)	
with Rod L.H (S/N L 560) Original rod diverted for use on FM-238.		•
with Rod L.H (S/N L 560) Original rod diverted for use on FM-238.		
Original rod diverted for use on FM-238.	- withouthings	deplace Connecting Rod L.H (S/N N 165)
	Original rod diverted for use on	FM-238.
APPROVALS COMPLETION		
<u>APPROVALS</u> <u>COMPLETION</u>		
APPROVALS		
	APPROVALS	COMPLETION

Prime Contractor Rep. 5/31/6-

Air Force Rep.

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31 Moy 67 D. . e Date 5/15/67

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80008

AUTHORIZATION FOR FIELD	Report No.	
,	Date	<u>5-19-67</u>
Item Name <u>Distribution Box</u>		Methurumanija
Drawing Number 617-114		
Item Serial No. N-279 Veh. S	Serial No. 239	niteojaniaus
Design Authorization Reference: Per phone	from Rochester - Poore-	-Helt
per Program Office Directive		ggsffggfinnsjirksfdiesmegge
	ga an through through the transfer than the structure of the second contract of the second	districtiva de la companya del companya de la companya del companya de la company
Description of Modification: Replace Recor	d Transport Command Modu	ıle
(RTCM) (617-114) S/N 279 with new module S/N K-3	lh. Leak rate test and	ngfinanseNeusodonfunus
functionally check the re-assembled P/L per SET-	53.	Philippinama kykolandriska
	voimin-francoine (FA) - 45 - 45 - 45 - 45 - 45 - 45 - 45 - 4	bernangen different innerenge
	tum-dyttisedadoseimijandovadosejynang-karamam-karamid-variatingynihybon	v GARDonikio kerikuwa
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		ghi dinghin (Thianggaya
	Markinandi kuntur sira di markina da mashini da markina da markina di markina di markina di markina di markina	n
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APPROVALS	COMPLETION	•
RBishetonia 5/31/67 Date	5/22/67	
Prime Contractor Rep. Date	5/22/67 (ranse RB~	
· · ·	RB. P. B	
3, May 67 OC 2	HE LOZ-VI	

80009

Air Force Rep.

Veh. No. 233

Sheet No.

PARTS CHANGE LOG

	Major Ass'y	Part Name			Removed		Replaced			
tem	Part No/SN	Part Number		Serial No.	Ву	Date		Date	QC	Remarks
	Ca - 11 /1/4	Variety 2000	01d	N-341	7	3,	6.	1/		-
/		711-294	New	11-341		1/5-	1:6	1/3		
à	C/P		01d	611N832			=M	3/14/	(3)	
3	-/P	617-114	New	61111932		57	LN	57		
う	C/p	Parathan Commo	01d	605053	四尺	3/8/67	RAY	3/10	(E)	
5		614-100	New	701062A	10,111	167	JK	69		*
U	\mathcal{C}_{ρ}	azimit K. Serva	01d	612061	~~ × .	19/3	18194	3/20	(%)	·
7	$\underline{\mathcal{C}}$	614-101	New	611060A	1.00	1 7/33	JA	157		· ·
_	C/0	Ex draw Fire or	01d	100064 8	Z.K	1/11	RAP	3/14		
	90	64-551	New	105053	D.	13%		167	W	
/	DIST	TUES BOARD ASSY A-5	01d	11-453	12/2	19/57	Sm	2	1	,
6		617-118	New	P-397		19/57	~/	767	(3)	
7	c/α	Elevatino Senos	01d	701062 A	J_	12/	18	3/		
	8 1	614-100	New	612.102 A1		7/67		1/67	1	
8	c/P	aginuth Strong	01d	611060A	RAP	4/19/67	RAP	4/3/67	(%)	,
0	805-101	614-101	New	409027 MA-2	DF-000		DF/20	67	2	
G	C/p	Armend Lines	01d				J	3/1-1	(F)	Supplies Str to shop
		516-202	New	70 .			1	1/3/67		
,	Stone Miran Cerry		01d	N-163	DW	5/10/	JK	3/	(A)	Committee of Frank 38
10	(a)	301-252	New	1-56c	DFIB	10/	/<	7/5-		,
	8/0		01d	612102A1			JK	15/-	(ERY)	
//	330 -101 /	614-100	New	10106341	JK	4/18/17	1 '	1/8/		
7,	CIP	Beanuly Ormo	01 d	409037 MA-2	,	1/20	e		6	
17	805-101	614-101	New	612061-1A	K176	5/3 181	197-	767		

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Approved for Release: <u>202</u>4/01/30 C05098942

PARTS CHANGE LOG

Veh. No. 23

Sheet No.

-					T			1		
	Major Ass'y	Part Name			Removed		Replaced			,
I tem		Part Number		Serial No.	Ву	Date	Ву	Date	QC	Remarks
12	DISTRIBUTION GOS	RECORD THAN SOME MYD	01d	N-279	W/K	5/19/57	LX.	14/	(3)	
13	617-114	617-223 View Port Bost 312-464	New	K-314		1/6>		7.00	@	
14	5. W.	VIEW PORT BOST	01d				Pap	14/		Initial Intellet
[[4.717 (38 a 17 h.)	8.2.464	New	11- 8-11			734	290	6	
- 15	This Fire (300)	Slave Price	<u>01a</u>	1659, #3, #17	Debod	5/29/				Final Pensoral for
-			New		100	-07	<u></u>		1	New Tendows
16	air Tunke	Screw 1. 2000 an Supple	01d New		Charl.	5/29/6>				Trud Elite Answer
		N./	01d		RAP		<u> </u>			
17	Pay Therrows	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	New		PAR	5/26/67	<u> </u>			Final Removal
- History			01d	The state of the s						
			New							
			01d							,
(New				<u> </u>			
			01d		}					
			New							
			01d				}			
***************************************			New							
		•	01d							
			New							
	890 1		01d					,		
			New							
	P		01d							
	AND CONTRACTOR OF THE PROPERTY		New							

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Fm 239

OPERATING TIME LOG

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	OF ENAPTING TITLE EDG											
D	TEST Title & No.	T I	OPERATIN		HEATER		GAIN C		MSD TI	ME 40/CPL 18	-	
A.		M. E	start	test	start	test	start	test	start	test		
Ē		_	stop	accum	stop	accum		accum		accum		
	ROCH		66.54			3.09		14.80		8.94	-	
3/67	Joi 3 Los		847.00 847.51	.51	87.22	0	372.26	0	150.11	0	4	
	301-4-1		847,90	39 90		0	envigiorer, datare av elle	9/	170.15	.04	<u> </u>	
3/4/5	301-5-1		848.73	1.75	alpha Marian Cara and	0		0	140.30	15.19		
77/67	ETR		841.64	.67		0		0	150,71	.50		
1/4/81	Ser 46 '			2.07 4.47	200	0		0		0		_
	Set 72		1	3.57	87.22	55	3 <u>72.26</u> 312.27	,01	140.80	.33 .83		
3/20	301-4-0-		300.53	1.04 8.10	<u> 87.77</u>	9	372,27	0	14/1.13	6		_
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3/24	301-57-3		859.09	10,23		0		9/	141.65	1135		
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4/20	SET 46-2		860,20 862.50	2.73	87.92	.15 .70	372.27	0	141.80	1.50		
4/24	301-5-5		863.07	371.21		0	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	0	141.91	1.61		
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OPERATIONS LOG

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-	Title & No.) Remarks	Elev Cpl 13 test	test	Empty Sw test	Full Sw test accum		test	test accum		-
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5/22	SET 53 5 301-8	0	6	2 701	3	6368	2369	0		
,	361-12	0	0	2 703	2 388	6370	2.371	1 64		
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