HIRDLS

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HIGH RESOLUTION DYNAMICS LIMB SOUNDER

Originator: David Mason & Eric Johnson Date: 1999, January 22

Subject/Title: **HIRDLS PERFORMANCE VERIFICATION PLAN**

Description/Summary/Contents:

1. This Performance Verification Plan (PVP) defines the verification process ,test philosophy, and the test sequence which will be used in the systematic verification of the HIRDLS Instrument.
2. This plan formulates a coherent framework from which the detailed verification process, test configurations, facility requirements, and detailed schedules can be developed.
3. This satisfies the requirements of CDRL #L022

DRAFT

This is the Draft version of Rev D. Updates from the Released Rev C dated June 11, 1998 are shown in red and have change bars in the margins

Keywords Performance Verification Plan, test philosophy, CDRL L022

Purpose of this Document: Define the HIRDLS Instrument Performance Verification Process

Reviewed/Approved by:	LMMS: A.R. Kraemer		
Date (yy-mm-dd):			

Oxford University
Department of Atmospheric, Sounding
Oceanic, and Planetary Physics
Parks Road
Oxford OX1 3PU,
United Kingdom

University of Colorado at Boulder
Center for Limb Atmospheric

3300 Mitchell Lane, Suite 250
Boulder, Colorado
80301-2296
United States of America

EOS

Record of Revisions

Revision Letter	DESCRIPTION OF CHANGES	DATE
	Original Document	**August 1,1990**
A	**Revised by the Instrument Integrator**	**June 27,1996**
B	**Structure and Content Revised**	**July 28, 1997**
C	**Structure and Content Revised**	

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1.0 General Information

1.1 Purpose

The purpose of this HIRDLS Instrument Performance Verification Plan (PVP) is to define the verification philosophy and processes which will be used to systematically verify the HIRDLS Instrument against the functional and performance requirements defined in the Instrument Technical Specification (SP-HIR-013) and against the verification requirements defined in the Performance Verification Specification (SP-HIR-064). The Performance Verification Specification performs two functions. First it "collects" the verification requirements defined in the ITS, MAR, and GIRD into a single requirements document and second it defines the methods to be used for verification of each Instrument requirement defined in the ITS. This PVP defines how the verification requirements defined in the PVS will be satisfied. The HIRDLS program is developing two instruments, the Proto-flight Model (PFM), and an Engineering Model (EM). This PVP satisfies the Instrument Integrator requirements of CDRL #L022 by addressing the overall HIRDLS I&T program, which includes both instruments.

1.2 Verification Philosophy

The philosophy governing the development of the HIRDLS verification program is the recognition that there are three fundamentally different types of requirements: functional, performance, and environmental. Verification of the functional requirements is a straightforward process but can be quite time consuming. In order to properly characterize the functionality of the instrument, testing requires verification of all possible combinations of subsystem configurations as well as many "non-valid" configurations to ensure the Instrument reacts properly. The schedule allotted for the integration and testing of each instrument is approximately equal in duration. To provide sufficient test time for the detailed verification of the PFM performance, the validation of the PFM instrument mathematical models, and complete environmental testing the integration and test priorities for the EM will be geared toward integration risk reduction.

The EM risk reduction testing will be focused on the testing of the subsystem-to-subsystem interfaces including mechanical, optical, electrical. Further it will focus the testing of the end-to-end functionality of the instrument, and the testing of selected performance parameters. By focusing on the resolution of physical interface, instrument level functionality, and key performance issues within the limitations of the EM configuration the integration time for the PFM will be greatly reduced. This will effectively provide more time for performance and environmental verifications on the PFM.

The philosophy governing the verification of the performance requirements is centered around the realization that the actual instrument on orbit performance and the predictability of its on orbit performance are equally important. Not only must the verification process prove that the instrument meets its performance requirements, as defined in the ITS, but it must also characterize the critical parameters of the mathematical models in sufficient detail as to predict instrument performance when unexpected, and untested, conditions arise over the HIRDLS five year mission. It will be the completeness with which we characterize each model that will ultimately justify the confidence in the value of the science data the HIRDLS instrument produces. The fidelity and accuracy of the mathematical model is based on the validity of the model assumptions during its creation. The two areas which cause model predictions to deviate from the actual performance are either 1) the actual performance of a component or subsystem is misrepresented in the model, or 2) the interrelationship (the interface) between subsystems in the instrument are

misrepresented. The HIRDLS program approach to instrument verification has been designed to greatly reduce, if not eliminate, these issues.

All ITS functional, performance, and environmental requirements defined in the ITS and PVS will be fully verified on the PFM. However, since all mechanical, optical, primary side electrical interfaces, and software functionality will have been tested in detail on the EM, the PFM Integration and functionality verifications will require much less time. This time reduction will allow the majority of the PFM I&T verification schedule to be focused on evaluating the Instruments critical performance and environmental survivability perameters. This complimentary approach to EM and PFM I&T will enable the PFM to be fully verified against its requirements and the mathematical models to be characterized within the limited amount of time the HIRDLS program has for the PFM integration and testing.

The two most technically challenging areas of the HIRDLS program are the requirements governing the Instruments Line-of-Sight (LOS) performance and its Radiometric performance. The LOS performance requirements fall into two categories: Pointing and Knowledge. Both the LOS Pointing and Knowledge requirements must be fully characterized as part of the Instrument Integrators I&T program. The Radiometric performance has also been separated into two categories: Radiometric Calibratibility and Radiometric Calibration. Final Instrument Radiometric Calibration will occur at Oxford University following the completion of Instrument I&T and prior to Instrument delivery to the Spacecraft Integrator. However, prior to shipping the Instrument to the UK and undergoing the nine month calibration process the Instrument Integrator must assure that the instrument remains free of contaminants and that its performance is stable enough to accept a calibration. During the Instrument Integrators I&T program a series of tests specifically designed to assess the Instruments ability to be calibrated, or its "calibratibility", will be performed. Further all PFM I&T activities will be performed with strict adherence to the HIRDLS Contamination Control Plan to ensure the programs radiometric objectives can be met.

1.3 Verification Objectives

The main objective of the HIRDLS Instrument Performance Verification Process is to verify that the Proto-flight Model (PFM) meets the functional, performance, and environmental requirements identified in the Instrument Technical Specification (ITS) according to the verification requirements defined in the Performance Verification Specification (PVS). This plan describes how this will be achieved by expanding on the following:

1) The attributes of the basic HIRDLS Instrument Design
2) The verification process which includes
    a) Breadboard design validation including the EM Instrument testing
    b) Life Testing
    c) Subsystem Requirements Verification and Trending requirements
    d) Software Verification Testing
    e) Flight Unit Interface Testing
    f) Flight Unit Functional Testing
    g) Flight Unit Performance Testing
    h) Flight Unit Environmental Testing
3) The Test Facility definitions
4) The Ground Support Equipment definitions
5) Test Control requirements including the definition of verification planning, procedural, and test documentation requirements.
6) The verification approach which will be used for validation of each of the major mathematical models.

7) The expansion of detail to the Verification Cross Reference Matrix defined in the PVS.

2.0 Applicable Documents

The HIRLDS PFM Instrument will be fully verified to the requirements defined in the Instrument Technical Specification (ITS) sections 3.0 and 4.0, the Performance Verification Specification (SP-HIR-064), and the EOS Mission Assurance Requirements (MAR), section 3.0, as outlined in the Instrument Integrator Statement of Work (PM-NCA-044). The following additional documents will be incorporated into the verification process as they apply to unique sections identified and listed below.

2.1 Government Documents

GSFC 424-12-00-01	Chemistry and Special Flights Instrument Software Management Plan
GSFC 422-11-12-01	General Interface Requirements Document (GIRD) for EOS Common Spacecraft Instruments
GSFC 424-11-13-01	Mission Assurance Requirements (MAR) for the High Resolution Dynamics Limb Sounder (HIRLDS), EOS Chemistry Mission

2.2 HIRDLS Program Documents

PA-HIR-006	Contamination Control Plan (CCP)
PM-HIR-004	HIRLDS Configuration Management Plan
PM-HIR-093	HIRDLS Management Plan
PM-NCA-041	Contract Documentation Requirements List (CDRL)
PM-NCA-044D	Instrument Integrator SOW
SP-HIR-013R	Instrument Technical Specification (ITS)
SP-HIR-031	Structural and Thermal Subsystem (STH)
SP-HIR-033	Gyro Subsystem (GSS) Specification Document
SP-HIR-034	Cryocooler Subsystem (CSS)
SP-HIR-036	Power Subsystem (PSS) Specification Document
SP-HIR-037	Detector Subsystem and Warm Filter Carrier (DSS)
SP-HIR-038	Instrument Processor Subsystem (IPS)
SP-HIR-039	Instrument Ground Support Equipment (IGSE)
SP-HIR-040	Telescope Subsystem Specification (TSS)
SP-LOC-274	SSG Assembly Specification (SSGA)
SP-LOC-275	Telescope Electronics Unit Specification (TEU)
SP-LOC-276	Chopper Mechanical Unit Specification
SP-LOC-277	Optical Bench Vibration Isolator Specification
SP-LOC-278	Accelerometer Specification
SP-HIR-044	IFC Subsystem Specification Document
SP-HIR-050	Sunshield Shield Subsystem (SSH)

SP-HIR-054	Instrument Thermal GSE Specification Document
SP-HIR-058	Instrument Mechanical GSE Specification Document
SP-HIR-064	HIRDLS Performance Verification Specification (PVS)
SW-HIR-96	HIRDLS Flight Software Management Plan (SMP)
SP-HIR-103	Command and Telemetry Handbook
SP-HIR-112	Instrument PFM Integration Plan
SP-HIR-188	HIRDLS Subsystem Environmental Requirements
SP-LOC-121	Acceptance Test Station (ATS)
SP-LOC-139	Detailed Optical Design Specification
TC-LOC-158A	HIRDLS Engineering Model Configuration
TC-LOC-168	HIRDLS ITS- Requirements Flowdown
TP-HIR-007	Pre-launch Calibration Plan
TP-LOC-204	PFM Instrument Test Plan
TP-LOC-243	EM Instrument Test Plan
TP-LOC-247	TSS S/S Integration and Test Plan
TBD	HIRDLS Instrument Analysis Plan
TBD	HIRDLS Instrument Inspection Plan
SW-NCA-25	HIRDLS Software Management Plan

2.3 Information Documents

SC-HIR-12	Science Requirements Document (SRD)
SC-HIR-18	Instrument Requirements Document (IRD)

3.0 HIRDLS Instrument Overview

The High Resolution Dynamics Limb Sounder (HIRDLS) Instrument Program is an international joint development project between the US and the UK. The US team consists of the University of Colorado at Boulder, which operates the Center for Limb Atmospheric Sounding (CLAS), and its subcontractors. The UK team consists of Oxford University, Rutherford Appleton Laboratory (RAL), Reading University, and their subcontractors. There are joint principal investigators for this project: Dr. John C. Gille of CLAS, and Dr. John J. Barnett of Oxford University. The lead project manager is from the US team at CLAS, and the lead system engineer is from the UK team at Oxford University. Each country is providing the resources necessary to perform the tasks it has agreed to in the Work Share Agreement between RAL and NASA Goddard Space Flight Center for designing, fabricating, testing, and calibrating the Instrument. HIRDLS is planned for launch on the Earth Observing System (EOS) Chemistry Mission (CHEM) Platform, currently scheduled for launch in 2002.

The US subassemblies include the Telescope Subsystem (TSS), The Detector Subsystem (DSS), the Instrument Processor Subsystem (IPS), and the Cooler Subsystem (CSS). The US is also responsible for performing Instrument Integration, Line-of-Sight (LOS) testing, verifying radiometric calibratability, and performing instrument Environmental testing.

UK subassemblies include the Structural Thermal Subsystem (STH), the Sunshield Subsystem (SSH), the Gyroscope Subsystem (GSS), the In-Flight Calibrator (IFC), and the Power Supply Subsystem (PSS). The UK is also responsible for developing warm and cold spectral filters, and for the radiometric calibration of the Integrated HIRDLS Instrument.

The following subparagraphs describe each of the subsystems within the HIRDLS Instrument. These subsystem descriptions provide the subsystem acronym, their top level function, and the major components within each subsystem for both the PFM and EM configurations. The HIRDLS Instrument configuration is illustrated in Figure 3.0.

9.0 Instrument Verification Cross Reference Matrix

The Instrument Verification Cross Reference Matrix is defined in Table 4.2 of the Performance Verification Specification (SP-HIR-064). This matrix defines the method to be used and the level of instrument assembly required for verification of each line item defined in section 3 and 4 of the Instrument Technical Specification (SP-HIR-013). This VCRM is expanded in Table 9.0 to provide traceablity down to the next level documentation.

9.1 Methods of Verification

The methodology used to demonstrate compliance of the HIRDLS Instrument conforms to the methods defined in paragraph 4.2.1 of the PVS. The definition of these methods are repeated below. The method of verification and the required level of assembly is defined in the Verification Cross Reference Matrix donated in Table 4.2 of the PVS. Table 9.0 below adds to this matrix the next lower level document name and paragraph number each verification flows to.

Inspection (I)
This method involves examining an item against the applicable document to confirm compliance with the requirements. This method also involves physically examining the article to ensure conformance with envelope, mass, and electrical grounding requirements.

Analysis (A)
This method consists of interpreting or interpolating/extrapolating analytical or empirical data with reference to defined conditions or analytical procedures to ascertain theoretical compliance with stated requirements.

Test (T)
This method entails performance of a functional operation under specific conditions. Instrumentation and special test equipment, or both, will be used to generate, acquire, and record data. This method will also include analysis of the test data.

Demonstration (D)
This method of verification involves performance of a functional operation under specific conditions of Pass/Fail scenario. Instrumentation and special test equipment, or both may be used to generate, acquire, and record data which will be used to determine if the instrument performance lies within the required range.

Not Applicable (N)
Use of the term "not applicable" will be limited to those paragraphs/paragraph for which there is no requirement stated, or where requirements are fully specified in subparagraphs. The legend at the end of the VCRM indicates the instrument configuration used for each ITS line item and the verification method used. Some VCRM lines will require verification to be performed at two levels of configuration and combined to formulate a complete verification.

9.2 Levels of Verification

The term "Verification level" in the context of requirements verification refers to the level of assembly the hardware or software will be at when the particular requirement is verified. The following subparagraphs define the various levels for the HIRDLS program.

Instrument (INST)
A spacecraft subsystem consisting of sensors and associated hardware for making measurements or observations in space. For the purposes of this document, the HIRDLS Instrument is defined to be the point were all nine subsystems are fully integrated.

Instrument Integration (I/I)
A functional subdivision of the Instrument which is comprised of two or more subsystems, units from different subsystems, or any combination thereof but does not include all Instrument subsystem. Examples of verifications at the Instrument Integration level are subsystem-to-subsystem interface testing, optical alignments, etc.

Subsystem (S/S)
A functional subdivision of the Instrument. The HIRDLS Instrument has nine subsystems as defined in section 3.0.

Unit
A functional subdivision of a subsystem, and generally a self-contained combination of items performing a function necessary for the subsystem's operation. Examples are the Telescope Electronics Unit, Blackbody Electronics Unit, Encoder Electronics Assembly, etc.

Assembly (ASSEM)
A functional subdivision of a Unit consisting of parts or subassemblies that perform functions necessary for the operation of the Unit as a whole. Examples are the Encoder Heads, single axis Gyro, etc.

Subassembly (S/A)
A subdivision of an assembly or Unit. Examples are wire harnesses and loaded printed circuit boards.

Part
A hardware element that is not normally subject to further subdivision or disassembly without destruction of design use. Examples include resistor, integrated circuit, relay, connector, bolt, and gaskets.

9.3 Next Level Document and Paragraph Number

The columns within Table 9.0 labeled Next Level Document and Paragraph Number indicate the next lower level document and paragraph number where information regarding the requirement and verification of that requirement can be found.

Table 9.0
HIRDLS Instrument
Verification Cross Reference Matrix

ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
3.0	Instrument Specification					N	--	--	--
3.1	Inst. Description and Definition					N	--	--	--
3.1.3	Coordinate Frames					N	--	--	--
3.1.3.1	Space Reference Coordinate Frame					N	--	--	--
3.1.3.2	Instrument Ref. Coordinate Frame	I					Inst	IIP	
3.1.3.3	Telescope Ref. Coordinate Frame					N	--	--	--
3.2	Modes of Operation					N	--	--	--
3.2.1	Off Mode				D		Inst	TP-LOC-204	6.1.3
3.2.2	Survival Mode			T			Inst	TP-LOC-204	
3.2.3	Idle Mode				D		Inst	TP-LOC-204	6.1.4
3.2.4	Low Power Mode				D		Inst	TP-LOC-204	6.1.5
3.2.5	Standby 1 Mode				D		Inst	TP-LOC-204	6.1.6
3.2.6	Standby 2 Mode				D		Inst	TP-LOC-204	6.1.7
3.2.7	Mission Mode				D		Inst	TP-LOC-204	6.1.2
3.3	Optical Specifications					N	--	--	--
3.3.1	Vertical Field of View			T			Inst	TP-LOC-204	8.1
3.3.2	Vertical Response			T			Inst	TP-LOC-204	8.1
3.3.3	Vertical Response Stability					N	--	--	--
3.3.3.1	Within a Single Channel		A				Inst	IAP	
3.3.3.2	Between Channels		A				Inst	IAP	
3.3.4	Horizontal Field of View			T			Inst	TP-LOC-204	8.2
3.3.5	Out-of-Field Response			T			Inst	TP-LOC-204	6.8, 8.3
3.3.6	Focus					N	--	--	--
3.3.6.1	Object Distance		A	T			Inst	TP-LOC-204	8.4
3.3.6.2	Active Focusing	I					S/S	SSG Spec	

Table 9.0
HIRDLS Instrument
Verification Cross Reference Matrix

ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
3.3.7	Obscurations		A	T			Inst	IAP/TP-LOC-204	/8.10
3.4	Radiometric Specifications					N	--	--	--
3.4.1	Channel Spectral Response		A	T			Inst/S/S	IAP/	SSG,Filt,DSS
3.4.2	Spectral Response Stability		A				Inst	IAP	
3.4.3	Out-of-Band Response		A	T			Inst/S/S	IAP/	SSG,Filt,DSS
3.4.4	Radiometric Performance					N	--	--	--
3.4.4.2	Radiometric Channel Gain			T			Inst	TP-LOC-204	8.5
3.4.4.2.1	Radiometric Channel Gain Stability		A				Inst	IAP	
3.4.4.3	Radiometric Channel Offset				D		Inst	TP-LOC-204	8.6
3.4.4.3.1	Radiometric Channel Offset Stability		A				Inst	IAP	
3.4.4.4	End-to-End Channel Transfer Funct.			T			Inst	TP-LOC-204	8.8
3.4.4.5	Elect. Crosstalk bet. Radiometric Channels			T			IPS S/S	SP-HIR-038	
3.4.4.5.1	Elect. Crosstalk under Test Overload			T			IPS S/S	SP-HIR-038	
3.4.4.6	Radiometric Channel Overload Recovery			T			I/I	TP-LOC-204	5.3.6
3.4.4.7	Radiometric Channel Slew Rate			T			IPS S/S	SP-HIR-038	
3.4.5	Radiometric Noise					N	--	--	--
3.4.5.1	End-to-End Radiometric Noise Performance			T			Inst	TP-LOC-204	8.9
3.4.5.2	Noise Equivalent Power		A				Inst	IAP	
3.4.6	Dynamic Range					N	--	--	--
3.4.7	Radiometric Digitization					N	--	--	--
3.4.7.2	Radiometric Quantization Step Size Uniformity			T			IPS S/S		
3.4.7.3	Sampling Rates					N	--	--	--
3.4.7.3.1	Raw Data Sampling Rate				D		I/I	TP-LOC-204	5.3.2.2
3.4.7.3.2	Radiometric Sampling Rate	I			D		Inst	TP-LOC-204	6.1.2
3.4.8	Radiometric Signal Processing	I					IPS S/S	SP-HIR-038	
3.4.9	In-Flight Radiometric Calibration	I					Inst	IIP	Des Doc

Table 9.0
HIRDLS Instrument
Verification Cross Reference Matrix

ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
3.5	Pointing and Scanning Specifications					N	--	--	--
3.5.1	Elevation Pointing and Scanning					N	--	--	--
3.5.1.1	Elevation Scan Range			T			Inst	TP-LOC-204	7.1/8.11
3.5.1.2	Elevation Scan Rate		A	T	D		Inst	TP-LOC-204	7.2/ ? / ?
3.5.1.4	Fixed Angle Mode	I		T	D		Inst	TP-LOC-204	6.1.8
3.5.1.5	Elevation Angle Jitter		A	T			Inst	TP-LOC-204	8.12
3.5.2	Azimuth Pointing and Scanning					N	--	--	--
3.5.2.1	Azimuth Scan Range			T			Inst	TP-LOC-204	7.3
3.5.2.2	Azimuth Scan Step and Settle			N					
3.5.2.3	Azimuth Pointing Accuracy		A	T			Inst	TP-LOC-204	7.4
3.5.3	Instrument Alignment					N	--	--	--
3.5.3.1	Interface Alignment Cube	I					Inst	IIP	
3.5.3.2	TRCF-to-IRCF Alignment		A	T			Inst	TP-LOC-204	5.11.1.1
3.5.3.3	Optical Cube Requirements	I					STH S/S	SP-HIR-031	
3.5.3.3.1	Optical Cube Surface Area	I					STH S/S	SP-HIR-031	
3.5.3.3.2	Optical Cube Surface Orthogonality	I					STH S/S	SP-HIR-031	
3.5.3.3.3	Optical Cube Documentation	I					STH S/S	SP-HIR-031	
3.5.3.3.4	Optical Cube Cover	I					STH S/S	SP-HIR-031	
3.5.4	Baseline Scan Patterns				D		Inst	TP-LOC-204	6.1.9
3.6	Mechanical Specifications					N	--	--	--
3.6.1	Instrument Envelope	I					Inst	TP-LOC-204 IIP	9.1.3
3.6.2	Instrument Mass Properties					N	--	--	--
3.6.2.1	Mass	I					Inst	TP-LOC-204 IIP	9.1.1
3.6.2.2	Center of Mass Measurement	I					Inst	TP/LOC/204	9.1.2

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
								IIP	
3.6.2.3	Moments of Inertia		A				Inst	IAP	
3.6.3	Mechanical Interface with Spacecraft					N	--	--	--
3.6.3.1	Instrument Mounting	I					Inst	IIP	
3.6.3.1.1	Mounting Interface	I	A				Inst		
3.6.3.1.2	Instrument Drill Templates	I					IMGSE S/S		
3.6.3.2	Limit Loads		A				Inst	IAP	
3.6.3.2.1	Factors of Safety		A				Inst	IAP	
3.6.3.2.2	Qualification Loads		A				Inst	IAP	
3.6.3.2.3	Strength of Materials		A				Inst	IAP	
3.6.3.3	Disturbance Torques		A				Inst	IAP	
3.6.4	Instrument Structural Dynamics		A				Inst	IAP	
3.6.5	Pressurized System Design		A	T			DSS, CSS, & GSS S/S	SP-HIR-037 SP-HIR-034 SP-HIR-033	
3.6.6	Instrument Mechanisms					N	--	--	--
3.6.6.2	Caging of Mechanisms	I					Inst	IIP	
3.6.6.3	Drive Mechanism Torque Margin		A	T			SSH, GSS, TSS, CSS.S/S	SP-HIR-050 SP-HIR-033 SP-HIR-040 SP-HIR-034	
3.6.6.4	Drive Motor Locked-Rotor Survival	I	A	T			SSH, GSS, TSS, CSS.S/S	SP-HIR-050 SP-HIR-033 SP-HIR-040 SP-HIR-034	
3.6.7	Access to Instrument Components	I					Inst	IIP	

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
3.6.9	Launch Site Equipment Installation and Removal	I					Inst	IIP	
3.7	Electrical Specifications					N	--	--	--
3.7.1	Electrical Interface with Spacecraft	I	A	T			Inst	TP-LOC-204	6.4, 6.9
Gird 5.0	Electrical Interface Requirements					N	--	--	--
Gird 5.1	Electrical Interface Requirements					N	--	--	--
Gird 5.1.1	Electrical Interfaces	I					Inst	IIP	des
Gird 5.1.2	Electrical Interface Definitions					N	--	--	--
Gird 5.1.2.1	Power Interface	I					Inst	IIP	des
Gird 5.1.2.2	Quiet Power Bus					N	--	--	--
Gird 5.1.2.3	Noisy Power Bus					N	--	--	--
Gird 5.1.2.4	Survival Heater Power Bus	I					Inst	IIP	Des
3.7.1.1	Power Buses				D		Inst	TP-LOC-204	6.1.1, 6.4.2.2
3.7.2	Power Specification					N	--	--	--
Gird 5.2	Power Specification					N	--	--	--
Gird 5.2.1	Instrument Power Harness		A				Inst	IAP	
Gird 5.2.2	Average and Peak Power Consumption					N	--	--	--
Gird 5.2.3	Allocation of Instrument Power	I					Inst	IIP	Doc
Gird 5.2.4	Instrument Power-Level Documentation	I					Inst	TRW D26477	5.2.4
Gird 5.2.5	Power Characterisitics					N	--	--	--
Gird 5.2.5.1	Voltage					N	--	--	--
Gird 5.2.5.1.1	Primary Instrument Voltage					N	--	Superseded by	UIID 5.1.1
S/C ICD 5.2.5.1.1	Supplied Voltage								
S/C ICD 5.2.5.1.1-a	Voltage Range			T			Inst	TP-LOC-204	6.4.2.1.1 to 6.4.2.1.4
S/C ICD 5.2.5.1.1-d	Abnormal operation Voltage Limits		A				Inst	IAP	

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Gird 5.2.5.1.2	Unannounced Removal of Power			T			Inst	TP-LOC-204	6.4.3
Gird 5.2.5.1.3	Input Ripple					N	--	--	--
Gird 5.2.5.1.4	Abnormal Operation Steady-State Voltage Limits					N	--	Superseded by	UIID 5.1.1
Gird 5.2.5.1 5	Power Source Impedance					N	--	--	--
Gird 5.2.5.2	Current					N	--	--	--
Gird 5.2.5.2.1	Instrument Turn-on Transients			T			Inst	TP-LOC-204	6.4.5.1
Gird 5.2.5.2.2	Instrument Turn-off Transients			T			Inst	TP-LOC-204	6.4.5.2
Gird 5.2.5.2.3	Instrument Operational Transients			T			Inst	TP-LOC-204	6.4.5.3
Gird 5.2.5.2.4	Instrument Reflected Ripple Current			T			Inst	TP-LOC-204	6 4.6
Gird 5.2.5.2.5	Overcurrent Protection					N	--	--	--
Gird 5.2.5.2.5.1	Overcurrent Protection Device Size		A				Inst	IAP	
Gird 5 2.5.2.5.2	Overcurrent Protection Device Size Documentation	I					Inst	TRW D26477	5.2.5.2.2
Gird 5.2.5.2.5.3	Instrument Internal Overcurrent Protection	I					Inst	IIP	Doc
Gird 5.2.6	Power Control					N	--	--	--
Gird 5.2.6.1	Power Connections					N	--	--	--
Gird 5.2.6.2	Instrument High-Voltage Restriction	I					Inst	IIP	doc
Gird 5.2.6.3	Documentation of Instrument High-Voltage Restrictions	I					Inst	TRW D26477	5.2.6.2
3.7.2.6	Abnormal Operation		A	T			Inst		
3.7.2.6.a	Unannounced Power Removal			T			Inst	TP-LOC-204	6.4.3
3.7.2.6.b	Polarity Reversal		A				Inst	IAP	
3.7.2.6.c	Undervoltage/Overvoltage			T			Inst	TP-LOC-204	6.4.4
3.7.2.6.d	Loss of Continuity		A				Inst	IAP	
3.7.3	Grounding & Isolation					N			
3.7.3.2	Primary Power Isolation			T			Inst	TP-LOC-204	6.4.7.2
3.7.3.3	Secondary Power Isolation	I		T			I/I	TP-LOC-204	5.11.6
3.7.3.6	Bonding			T			I/I	TP-LOC-204	5.12

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
3.7.3.6.1	Equipment Bonding	I					Inst		
3.7.3.6.2	Electrical Connector Bonding			T			I/I	TP-LOC-204	5.13
Gird 5.3	Grounds, Returns, and References					N	--	--	--
Gird 5.3.1	Grounding Responsibility	I					Inst	TRW D26477	5.3.1
Gird 5.3.1.1	Power Harnessing					N	--	--	--
Gird 5.3.1.1.1	Power Routing and Shielding					N	--	--	--
Gird 5.3.2	Power Leads and Returns	I					Inst	IIP	doc
Gird 5.3.2.1	Power Shield Bonding	I					Inst	IIP	doc
Gird 5.3.2.1.1	Isolation	I					Inst	IIP	doc
Gird 5.3.2.1.2	Power Input Isolation	I					Inst	IIP	doc
Gird 5.3.2.1.3	Primary Power Isolation			T			Inst	TP-LOC-204	6.4.7
Gird 5.3.2.1.4	Secondary Power Isolation			T			PSS	SP-HIR-036	
							IPS	SP-HIR-038	
							TSS	SP-HIR-040	
Gird 5.3.2.2	Power Reference					N	--	--	--
Gird 5 3.2.2.1	Primary Power Reference					N	--	--	--
Gird 5.3.2.2.2	Secondary Power Return	I					Inst	IIP	doc
Gird 5.3.2.2.3	Secondary Power Reference	I					Inst	IIP	doc
Gird 5.3.2.2.4	Isolated Secondary Referencing	I					Inst	IIP	doc
Gird 5.3.3	Signal Reference	I					Inst	IIP	doc
Gird 5.3.3.1	Signal Reference Connectivity	I					Inst	IIP	doc
Gird 5.3.3.2	Signal Reference Constraints	I					Inst	IIP	doc
Gird 5.3.4	Chassis Ground					N	--	--	--
Gird 5.3.4.1	Instrument Ground Plane					N	--	--	--
Gird 5.3.4.2	Component Grounding					N	--	--	--
Gird 5.3.4.2.1	Component Ground Location	I					Inst	IIP	doc

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
Gird 5.3.4.2.2	Component Ground Connection					N	--	--	--
Gird 5.3.4.2.3	Component Bonding Straps	I					Inst	IIP	doc
Gird 5.3.4.3	Connector Grounding	I					Inst	IIP	doc
Gird 5.3.4.4	Chassis Ground Current	I					Inst	IIP	doc
Gird 5.3.4.5	External Ground Tie Point	I					Inst	IIP	doc
Gird 5.3.5	Signal Reference Plane					N	--	--	--
Gird 5.3.5.1	Instrument Ground Plane Connections					N	--	--	--
Gird 5.3.5.2	Thermal Blanket Grounding					N	--	--	--
Gird 5.3.5.2.1	Thermal Blanket Layer Interconnection			T			STH TSS	SP-HIR-031 SP-HIR-040	
Gird 5.3.5.2.2	Thermal Blanket Chassis Grounding	I					I/I	TP-LOC-204	5.11 1.3 & 5.12.2
Gird 5.4	Harnesses					N	--	--	--
Gird 5.4.1	Harnesses Provider					N	--	--	--
Gird 5.4.2	Harness Hardware Documentation	I					Inst	IIP	doc
Gird 5.4.3	Harness Wiring Requirements	I					Inst	IIP	doc
Gird 5.4.4	Tie Points					N	--	--	--
Gird 5.4.4.1	Tie Point Locations and Provider					N	--	--	--
Gird 5.4.4.2	Tie Point Documentation	I					Inst	--	--
Gird 5.4.5	Connectors					N	--	--	--
Gird 5.4.5.1	Connector Clearance	I					Inst	IIP	doc
Gird 5.4.5.2	Connector Location and Types	I					Inst	IIP	doc
Gird 5.4.5.3	Connector Keying	I					Inst	IIP	doc
Gird 5.4.5.4	Interface Connector Provider					N	--	--	--
Gird 5.4.5.4.1	Harness Connectors					N	--	--	--
Gird 5.4.5.4.2	Instrument Component Connectors	I					Inst	IIP	doc

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
Gird 5.4.5.4.3	Connector Types	I					Inst	IIP	doc
Gird 5.4.5.4.4	Connector Type Documentation	I					Inst	IIP	doc
Gird 5.4.5.5	Flight Plugs					N	--	--	--
Gird 5.4.5.5.1	Flight Plug Installation	I					Inst	IIP	doc
Gird 5.4.5.5.2	Flight Plug Responsibility	I					Inst	IIP	doc
Gird 5.4.5.5.3	Flight Plug Documentation	I					Inst	IIP	doc
Gird 5.4.5.6	Connector Protective Covers	I					Inst	IIP	doc
Gird 5.4.5.7	Test Connectors					N	--	--	--
Gird 5.4.5.7.1	Test Connector Accessibility	I					Inst	IIP	doc
Gird 5.4.5.7.2	Test Connector Documentation	I					Inst	IIP	doc
Gird 5.4.5.8	Breakout Boxes	I					Inst	IIP	doc
Gird 5.4.5.9	Buffer Connectors and Connector Savers					N	--	--	--
Gird 5.4.5.9.1	Connector Saver Utilization	I					Inst	IIP	doc
Gird 5.4.5.9.2	Connector Saver Provider	I					Inst	IIP	doc
Gird 5.4.5.10	Electrical Connector Constraints	I					Inst	IIP	doc
Gird 5.5	Electro-Explosive Devices					N	--	--	--
Gird 5.5.1	Electro-Explosive Device Interface	I					Inst	IIP	doc
Gird 5.5.2	Selection of Devices	I					Inst	IIP	doc
Gird 5.5.3	Electro-Explosive Device Characteristics					N	--	--	--
Gird 5.5.3.1	Electro-Explosive Device Current Load	I					Inst	IIP	doc
Gird 5.5.3.2	Electro-Explosive Device Use	I					Inst	IIP	doc
Gird 5.5.4	Safety Short	I					Inst	IIP	doc
Gird 5.5.5	Intra-Instrument Cabling	I					Inst	IIP	doc
Gird 5.5.6	Electro-Explosive Device Circuitry Protection	I					Inst	IIP	doc
Gird 5.5.7	Electro-Explosive Device Isolation	I					Inst	IIP	doc
Gird 5.5.8	Arming and Disarming	I					Inst	IIP	doc

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
Gird 5.5.9	Electro-Explosive Device Testing					N	--	--	--
Gird 5.5.9.1	Electro-Explosive Device Circuitry Test Capability	I					Inst	IIP	doc
Gird 5.5.9.2	Electro-Explosive Device Test Capability	I					Inst	IIP	doc
Gird 5.6	Test Points					N	--	--	--
Gird 5.6.1	Test Point Interfaces					N	--	--	--
Gird 5.6.2	Test Point Interface Documentation	I					Inst	IIP	doc
Gird 5.7	*Spacecraft/Instrument Interface Simulator*			T			Inst	TP-LOC-204	6.7
3.7.6	EMI/EMC					N	--	--	--
Gird 10.11	EMI/EMC and Magnetic Requirements					N	--	--	--
Gird 10.11.1	Conducted Emission, Power Leads (CE01/CE03)			T			Inst	TP-LOC-204	9.3.1
Gird 10.11.2	Conducted Emission, Antenna Terminal (CE06)	I					Inst	IIP	Doc
Gird 10.11.3	Conducted Susceptibility, Power Leads (CS01/CS02)			T			Inst	TP-LOC-204	9.3.2
Gird 10.11.4	Conducted Susceptibility, Spike, Power Leads (CS06)			T			Inst	TP-LOC-204	9.3.3
Gird 10.11.5	Radiated Emission, Magnetic Field					N	--	--	--
Gird 10.11.5.1	Radiated AC Magnetic Field Emissions (RE01/RE04)			T			Inst	TP-LOC-204	9.3.4
Gird 10.11.5.2	Radiated DC Magnetic Field Emissions			T			Inst	TP-LOC-204	9.3.5
Gird 10.11.5.3	Magnetic Fields Documentation	I					Inst	IIP	doc
Gird 10.11.6	Radiated Emission, Electric Field (RE02)					N	--	--	--
Gird 10.11.6.1	Narrowband Emission, Electric Field (RE02)			T			Inst	TP-LOC-204	9.3.6
Gird 10.11.6.2	Broadband Emission, Electric Field (RE02)			T			Inst	TP-LOC-204	9.3.7
Gird 10.11.7	Radiated Susceptibility, Magnetic Field					N	--	--	--
Gird 10.11.7.1	Radiated AC Magnetic Field Susceptibility (RS01)			T			Inst	TP-LOC-204	9.3.8
Gird 10.11.7.2	Radiated DC Magnetic Field Susceptibility			T			Inst	TP-LOC-204	9.3.9
Gird 10.11.8	Radiated Susceptibility, Electric Field (RS03)			T			Inst	TP-LOC-204	9.3.10
3.7.7	Temperature Sensors	I					Inst	IIP	doc
3.7.8	Survival Heaters	I	A	T		N	--	--	--

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
3.7.8-a	Identification of S/S Min Survival Temp		A				Inst	IAP	
3.7.8-b	Heater Sizing and Set Point Determination		A				Inst	IAP	
3.7.8-c	Heater Power Dissipation		A				Inst	IAP	
3.7.8-d	Thermostat Setpoint and Hysteresis			T			Inst	TP-LOC-204	9.4.2
3.7.8-e	Survival Heater Redundancy	I					Inst	IIP	doc
3.7.8-f	Average and Peak Loads			T			Inst	TP-LOC-204	9.4.2
3.8	Thermal Specifications					N	--	--	--
3.8.1	Thermal Interface with Spacecraft		A				Inst	IAP	
Gird 4.1	Thermal Interface Description		A				Inst	IAP	
3.8.1.1	Thermal Design	I					Inst	IIP	doc
Gird 4.2	Thermal Design	I					Inst	IIP	doc
3.8.1.2	Heat Transfer	I	A				Inst	--	--
Gird 4.3.1	Heat Transfer to Spacecraft		A				Inst	IAP	
Gird 4.3.2	Segregation of Instrument Heat Sources	I					Inst	IIP	doc
Gird 4.3.4	Environmental Heat Transfer		A				Inst	IAP	
3.8.2	Instrument Temperatures	I	A				Inst		
Gird 4.4.1	Spacecraft Temperature Range		A				Inst	IAP	
Gird 4.4.2	Instrument Temperature Range	I					Inst	IIP	doc
Gird 4.5.2	Instrument Temperature Monitoring	I					Inst	IIP	doc
Gird 4.5.3	Temperature Sensor Location	I					Inst	IIP	doc
3.8.3	Thermal Control Hardware					N			
3.8.3.1	Thermal Control Hardware Responsibility	I					Inst	IIP	doc
Gird 4.6.2.1	Thermal Control Hardware Responsibility	I					Inst	IIP	doc
Gird 4.6.2.2	Thermal Control Hardware Responsibility	I					Inst	IIP	doc
3.9	Command and Data Handling Specifications	I	A	T	D		Inst	TP-LOC-204	6.1.2, 6.5.1, 6.5.3, 6.5.4

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
Gird 6.0	Command and Data Handling Requirements					N	--	--	--
Gird 6.1	Instrument Modes					N	--	--	--
Gird 6.1.1	Instrument Off Mode				D		Inst	TP-LOC-204	6.1.3
Gird 6.1.2	Instrument Survival Mode				D		Inst	TP-LOC-204	9.4.1.2
Gird 6.1.3	Instrument Operational Mode(s)				D		Inst	TP-LOC-204	6.1.2
Gird 6.1.4	Instrument Mode Documentation	I					Inst	IIP	doc
Gird 6.2	General Electrical Interface Requirements					N	--	--	--
Gird 6.2.1	Interface Conductors	I					Inst	IIP	doc
Gird 6.2.2	Interface Circuitry Isolation	I					Inst	IIP	doc
Gird 6.2.3	Interface Fault Tolerance	I					Inst	IIP	doc
Gird 6.3	Passive Analog Telemetry	I					Inst	IIP	doc
Gird 6.3.1	Number of Passive Analog Telemetry Channels	I					Inst	IIP	doc
Gird 6.3.2	Passive Analog Telemetry Signal Characteristics	I					Inst	IIP	doc
Gird 6.4	Digital Data Convention	I					Inst	IIP	doc
Gird 6.5	Command and Telemetry Bus Requirements					N	--	--	--
Gird 6.5.1	Bus Functions				D		IPS S/S	SP-HIR-038	
Gird 6.5.2	Bus Type			D	T		IPS S/S	SP-HIR-038	
Gird 6.5.3	Bus Configuration			D	T		IPS S/S	SP-HIR-038	
Gird 6.5.4	Number of Functionally Distinct Instrument Remote Terminals	I					Inst	IIP	doc
Gird 6.5.5	General Bus Requirements					N	--	--	--
Gird 6.5.5.1	Electrical Interface	I					Inst	IIP	doc
Gird 6.5.5.2	Mode Codes				D		IPS S/S	SP-HIR-038	Or S/W?
Gird 6.5.5.3	Status Word	I			D		IPS S/S	SP-HIR-038	Or S/W?
Gird 6.5.5.4	Instrument RT Address Assignment	I			D		IPS S/S	SP-HIR-038	Or S/W?
Gird 6.5.5.5	Instrument RT Subaddress Assignment	I			D		IPS S/S	SP-HIR-038	Or S/W?

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
Gird 6.5.5.6	Data Wrap Around	I			D		IPS S/S	SP-HIR-038	Or S/W?
Gird 6.5.5.7	Automatic Retry					N	--	--	--
Gird 6.5.5.8	Data Buffering	I					IPS S/S	SP-HIR-038	Or S/W?
Gird 6.5.5.9	Remote Terminal Self Test				D		Inst	TP-LOC-204	
Gird 6.5.5.10	Instrument Timeout				D		IPS S/S	SP-HIR-038	Or S/W?
Gird 6.5.5.11	Illegal Command monitoring By Instrument RT				D		Inst	TP-LOC-204	6.5.2
Gird 6.5.6	Instrument Commands and Memory Load					N	--	--	--
Gird 6.5.6.1	Packetization for Commands and Memory Loads				D		IPS S/S	SP-HIR-038	Or S/W?
Gird 6.5.6.2	Command and Memory Load Packet Length	I					IPS S/S	SP-HIR-038	Or S/W?
Gird 6.5.6.3	Documentation	I					Inst	IIP	doc
Gird 6.5.6.4	Commands and Memory Loads Transfer					N	--	--	--
Gird 6.5.6.5	Command Constraints					N	--	--	--
Gird 6.5.6.5.1	Toggle Commands	I					IPS S/S	SP-HIR-038	Or S/W?
Gird 6.5.6.5.2	Critical Commands	I					IPS S/S	SP-HIR-038	Or S/W?
Gird 6.5.6.5.3	Bit Encoded Commands	I					IPS S/S	SP-HIR-038	Or S/W?
Gird 6.5.6.5.4	Override of Automatically Triggered Functions	I					IPS S/S	SP-HIR-038	Or S/W?
Gird 6.5.6.5.5	Command Sequence				D		IPS S/S	SP-HIR-038	Or S/W?
Gird 6.5.6.5.6	Command Execution Verification				D		Inst	TP-LOC-204	6.5.3
Gird 6.5.7	Time Marks and Time Code Data					N	--	--	--
Gird 6.5.7.1	Time Mark Transfer				D		IPS S/S	SP-HIR-038	Or S/W?
Gird 6.5.7.2	Time Code Data					N	--	--	--
Gird 6.5.7.2.1	Time Code Data and Format				D		IPS S/S	SP-HIR-038	Or S/W?
Gird 6.5.7.2.2	Time Code Data Transfer				D		IPS S/S	SP-HIR-038	Or S/W?
Gird 6.5.7.2.3	Time Code Data Accuracy			T			IPS S/S	SP-HIR-038	Or S/W?
Gird 6.5.7.2.4	Time Code Data Epoch	I					IPS S/S	SP-HIR-038	Or S/W?
Gird 6.5.7.3	Missing Time Marks and Time Code Data				D		IPS S/S	SP-HIR-038	Or S/W?

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
Gird 6.5.8	Instrument Engineering Data					N	--	--	--
Gird 6.5.8.1	Definition of Instrument Engineering Data	I					Inst	IIP	doc
Gird 6.5.8.2	Engineering Data Packetization	I					Inst	IIP	Doc S/W?
Gird 6.5.8.3	Engineering Data Constraints	I					Inst	IIP	Doc S/W?
Gird 6.5.8.3.1	Content and Structure	I					Inst	IIP	Doc S/W?
Gird 6.5.8.3.1-a	Data output similarity	I					Inst	IIP	Doc S/W?
Gird 6.5.8.3.1-b	Maximum Packet Size	I					Inst	IIP	Doc S/W?
Gird 6.5.8.3.3	Critical Engineering Data	I			D		Inst	IIP	Doc
							Inst	TP-LOC-204	???
Gird 6.5.8.4	Engineering Data Transfer				D		IPS S/S	SP-HIR-038	Or S/W?
Gird 6.5.8.5	Sampling Rate, Data Transfer Cycle and Time Gap	I			D		IPS S/S	SP-HIR-038	Or S/W?
Gird 6.5.9	Low Rate Science Data					N	--	--	--
Gird 6.5.9.1	Definition of Low Rate Science Data					N	--	--	--
Gird 6.5.9.2	Low Rate Science Data Rate Allocation	I					Inst	IIP	doc
Gird 6.5.9.3	Low Rate Science Data Packetization	I					Inst	IIP	Doc/S/W?
Gird 6.5.9.4	Packet Segmentation	I					Inst	IIP	Doc/S/W?
Gird 6.5.9.5	Low Rate Science Data Transfer				D		IPS S/S	SP-HIR-038	Or S/W?
Gird 6.5.9.6	Sampling Rate, Data Transfer Cycle and Time Gap	I			D		IPS S/S	SP-HIR-038	Or S/W?
Gird 6.5.10	Instrument Diagnostic Data					N	--	--	--
Gird 6.5.10.1	Definition of Diagnostic Data					N	--	--	--
Gird 6.5.10.2	Diagnostic Data Rate	I					Inst	IIP	Doc/S/W
Gird 6.5.10.3	Packetization of Diagnostic Data	I					Inst	IIP	Doc/S/W
Gird 6.5.10.4	Low Science Rate Instrument Diagnositc Data Transfer				D		IPS S/S	SP-HIR-038	Or S/W?
Gird 6.6	High Rate Data Link					N	--	--	--
Gird 6.6.1	High Rate Data Link Functions	I					Inst	IIP	doc
Gird 6.6.3	Data Rate Constraint	I					Inst	IIP	doc

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
Gird 6.6.4	Data Packetization	I					Inst	IIP	doc
Gird 6.6.5	Data Encoding	I					Inst	IIP	doc
Gird 6.6.6	High Rate Data Message	I					Inst	IIP	doc
Gird 6.6.6.1	Message Format	I					Inst	IIP	doc
Gird 6.6.6.2	Control/Framing Symbols and Encoding	I					Inst	IIP	doc
Gird 6.6.7	Message Transmission					N	--	--	--
Gird 6.6.7.1	Preamble	I					Inst	IIP	doc
Gird 6.6.7.2	Transmission Gap	I					Inst	IIP	doc
Gird 6.6.7.3	Transmission Rate	I					Inst	IIP	doc
Gird 6.6.8	Electrical Interface Requirements					N	--	--	--
Gird 6.6.8.1	Interface Drivers	I					Inst	IIP	doc
Gird 6.6.8.2	Interface Coupling	I					Inst	IIP	doc
Gird 6.6.8.3	Additional Interface Electrical Requirements	I					Inst	IIP	doc
Gird 6.6.9	Redundant High Rage Link Selection	I					Inst	IIP	doc
Gird 6.6.10	Data Rate Selection	I					Inst	IIP	doc
3.9.1	Passive Analog Telemetry	I					Inst	IIP	doc
3.9.3	Command and Telemetry (C&T) Bus Specification					N	--	--	--
3.9.3.1	Digital Data Convention	I			D		IPS S/S	SP-HIR-038	Gird 6.4
3.9.3.2	C&T Bus Functions				D		IPS S/S	SP-HIR-038	Gird 6.5.1
3.9.3.3	C&T Bus Type and Configuration	I					IPS S/S	SP-HIR-038	Gird Repeat
3.9.3.3-a	Remote Terminal Dual Redundancy	I					IPS S/S	SP-HIR-038	Gird 6.5.3
3.9.3.3-b	Gird 6.5.4	I					IPS S/S	SP-HIR-038	Gird 6.5.4
3.9.3.4	General C&T Bus Specifications					N	--	--	--
3.9.3.4.1	C&T Bus Electrical Interface	I	A				IPS S/S		Gird Repeat
3.9.3.4.1-a	C&T Bus Complies with MIL-STD-1553B	I					IPS S/S	SP-HIR-038	Gird 6.5.5.1
3.9.3.4.1-b	C&T Bus Dual Redundant	I					IPS S/S	SP-HIR-038	Gird 6.5.5.1

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
3.9.3.4.1-c	Remote Terminal Dual Redundant	I					IPS S/S	SP-HIR-038	Gird 6.5.5.1
3.9.3.4.1-d	Transformer Coupling	I					IPS S/S	SP-HIR-038	Gird 6.5.5.1
3.9.3.4.1-e	C&T Bus Single Point Failure		A				IPS S/S	SP-HIR-038	Gird 6.5.5.1
3.9.3.4.2	General C&T Bus Protocol	I		T			IPS S/S		Gird Repeat
3.9.3.4.2-a	Gird 6.5.5.2								Gird 6.5.5.2
3.9.3.4.2-b	Gird 6.5.5.3								Gird 6.5.5.3
3.9.3.4.2-c	Remote Terminal Address Assignment								Gird 6.5.5.4
3.9.3.4.2-d	Remote Terminal External Selectability								Gird 6.5.5.4
3.9.3.4.2-e	Gird 6.5.5.5								Gird 6.5.5.5
3.9.3.4.2-f	Self Test								Gird 6.5.5.9
3.9.3.4.2-g	Data Wrap-around								Gird 6.5.5.6
3.9.3.5	Command Protocol Specifications				D		IPS S/S		ITS/Gird Repeat
3.9.3.5.1	Command and Memory Load Packet Formats	I			D		IPS S/S		Gird Repeat
3.9.3.5.1-a	Gird 6.5.6.1								Gird 6.5.6.1
3.9.3.5.1-b	Load Packet Size								Gird 6.5.6.2
3.9.3.5.1-c	Load Packet Data Fields								Gird 6.5.6.2
3.9.3.5.1-d	Load Packet Documentation	I						IIP	Gird 6.5.6.3
3.9.3.5.2	Command Constraints				D		IPS S/S	SP-HIR-038	Gird 6.5.6.5
3.9.3.5.3	Illegal Command Monitoring	I			D		Inst	TP-LOC-204	Gird 6.5.5.11
3.9.3.5.4	Time Marks and Time Code Data	I			D		IPS S/S		
3.9.3.5.4-a	Gird 6.5.7.1								Gird 6.5.7.1
3.9.3.5.4-b	Gird 6.5.7.2								Gird 6.5.7.2
3.9.3.5.4-c	Not Receiving Timing Marks								Gird 6.5.7.3
3.9.3.5.4-d	Safing Sequencing			T			Inst		SW?
3.9.3.6	*Telemetry Protocol Specifications*	I			D		Inst	TP-LOC-204	6.5.4

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
3.9.3.6.1	Engineering Telemetry	I			D		Inst	TP-LOC-204	6.5.4.1
3.9.3.6.1-a	Gird 6.5.8.2								Gird 6.5.8.2
3.9.3.6.1-b	Gird 6.5.8.3.1								Gird 6.5.8.3.1
3.9.3.6.1-c	Gird 6.5.8.3.2								Gird 6.5.8.3.2
3.9.3.6.1-d	Max Packet Length								Gird 6.5.8.3.2
3.9.3.6.1-e	Engineering Data Contents	I					Inst	IIP	Doc/S/W?
3.9.3.6.1-f	Critical Parameters								Gird 6.5.8.3.3
3.9.3.6.1-g	Engineering Telemetry Format	I					Inst	IIP	doc
3.9.3.6.2	Science Telemetry				D		Inst	TP-LOC-204	6.5.3.2
3.9.3.6.2-a	Telemetry Rate								Gird 6.5.9.1
3.9.3.6.2-b	Gird 6.5.9.3								Gird 6.5.9.3
3.9.3.6.2-c	Gird 6.5.9.4								Gird 6.5.9.4
3.9.3.6.2-d	Science Telemetry Format	I					Inst	IIP	doc
3.9.3.6.2-e	Inclusion of Engineering Data in Science Telemetry	I					Inst	IIP	doc
3.9.3.6.3	Diagnostic Telemetry	I					Inst	TP-LOC-204	6.5.3.3
3.9.3.6.3-a	*Data Definition*								Gird 6.5.10.1
3.9.3.6.3-b	Output Rate								Gird 6.5.10.2
3.9.3.6.3-c	Gird 6.5.10								Gird 6.5.10
3.9.3.6.3-d	Diagnostic Telemetry Format	I					Inst	IIP	doc
3.9.3.6.4	Instrument to Spacecraft Transmission Time-outs				D		IPS S/S	SP-HIR-038	
3.10	Software Specifications					N			
3.10.1	Software Language Requirements	I					Inst		S/W
3.10.2	Flight Software Requirements	I			D		Inst	TP-LOC-204	6.1.1/S/W?
Gird 8.3	Instrument Flight Software Requirements					N	--	--	--
Gird 8.3.1	Instrument Flight Software Version Control	I					SW		doc
Gird 8.3.2	Instrument Flight Software Load				D		Inst	TP-LOC-204	6.1.1

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
Gird 8.3.3	Instrument Flight Software On-Orbit Installation and Verification				D		SW		doc
MAR 10.1	General	I					SW		doc
MAR 10.2	GFE Existing and Purchased Software	I					SW		doc
MAR 10.3	Software Safety	I					SW		doc
3.10.2.1	Software Development Requirements	I					SW		doc
3.10.2.4	Flight Software Version Control	I					SW		doc
3.10.2.5	Flight Software On-Orbit Installation and Verif.	I			D		Inst	TP-LOC-204	6.6
3.10.2.6	Processor System Resource Utilization	I					TSS IPS SW		
3.10.3	Flight Software Development Environment	I					SW		
3.11	Environments		A				Inst	IAP	
3.11.1	Random Vibration			T			Inst	TP-LOC-204	9.2.3
3.11.2	Sine Vibration			T			Inst	TP-LOC-204	9.2.2
3.11.3	Acceleration		A				Inst	IAP	
3.11.4	Shock		A				Inst	IAP	
3.11.5	Acoustic		A				Inst	IAP	
3.11.6	Thermal Environments		A						
Gird 4.3.4	Environmental Heat Transfer		A				Inst	IAP	
Gird 4.4.1	Spacecraft Temperature Range		A				Inst	IAP	
PVS 4.3.2.5	Thermal Balance Test			T			Inst	TP-LOC-204	9.4.1
PVS 4.3.2.6.1	Instrument Level Thermal Vacuum Test			T			Inst	TP-LOC-204	9.4.2
3.11.7	On-Orbit Vibration Environment					N	--	--	--
3.11.8	Humidity				D		Inst	TP-LOC-204	6.10
3.11.9	Pressure		A				S/S	SP-HIR-031	

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
			A					SP-HIR-033	
			A					SP-HIR-034	
			A					SP-HIR-036	
			A					SP-HIR-037	
			A					SP-HIR-038	
			A					SP-HIR-040	
			A					SP-HIR-044	
			A					SP-HIR-050	
3.11.10	Radiation					N	--	--	--
3.11.10.1	Total Ionizing Dose Radiation Environment		A				Inst	IAP	
3.11.10.2	Cosmic Ray and High Energy Proton Environment		A				Inst	IAP	
3.11.10.3	Spacecraft Charging	I					Inst		
3.11.10.3-a	Electrically Floating Conductors	I					Inst	IIP	doc
3.11.10.3-b	Unused Wires in Cables	I					S/S	Cables	doc
3.11.10.3-c	Circuit Board	I					S/S	IIP	doc
3.11.10.3-d	Mirror Coating Grounding	I					S/S	SP-HIR-040	
3.11.11	Atomic Oxygen		A				Inst		
Gird 10.10	Atomic Oxygen		A				Inst.	IAP	
3.11.12	Storage, Handling, and Transportation	I					Inst		???
3.12	Contamination Control Requirements					N	--	--	--
3.12.1	Materials Selection Criteria					N	--	--	--
3.12.1.1	Acceptance Screening of Nonmetallics		A	T			Inst	???	???
3.12.1.2	Outgassing of Materials and Subsystems	I					Inst	IIP	doc
				T			S/S	SP-HIR-031	
				T				SP-HIR-033	
				T				SP-HIR-034	

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
				T				SP-HIR-036	
				T				SP-HIR-037	
				T				SP-HIR-038	
				T				SP-HIR-040	
				T				SP-HIR-044	
				T				SP-HIR-050	
3.12.1.3	Settled Particulate Distributions	I					Inst	IIP	doc
3.12.2	Baseline Requirements for HIRDLS Contam. Control					N	--	--	--
3.12.2.1	Settled Particulates	I	A				Inst	???	???
3.12.2.2	Molecular Contaminants	I	A				Inst	???	???
3.12.3	Contamination Control Through Design	I					Inst	IIP	doc
3.12.3.1	Instrument Venting					N	--	--	--
3.12.3.1.1	Closure and Venting for Launch	I					Inst	IIP	doc
3.12.3.1.2	Outward Venting	I					Inst	IIP	doc
3.12.3.1.3	Inward Venting		A				Inst	IAP	
3.12.4	Sources of Contamination					N	--	--	--
3.12.4.1	Internal		A				Inst	IAP	
3.12.4.2	External		A				Inst	IAP	
3.12.4.3	Impact of HIRDLS Emissions on Other Instruments	I					Inst		
Gird 7.2	Instrument Sources of Contamination	I					Inst	IIP	doc
Gird 7.3	Instrument Venting					N	--	--	--
Gird 7.3.1	Instrument Venting Documentation	I					Inst	IIP	doc
Gird 7.3.2	Location of Vent Path	I					Inst	IIP	doc
Gird 7.3.3	Seald Hardware	I					Inst	IIP	doc
3.12.5	Verification of Cleanliness Levels	I					Inst	IIP	procedures
3.12.6	Protective Measurements to Maintain Cleanliness	I					Inst	IIP	procedures

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
3.12.6.1	Instrument Purge Requirements (COST IMPACT)	I					Inst.	IIP	procedures
3.12.6.2	Instrument Purge Fitting (COST IMPACT)	I					Inst	IIP	doc
3.13	Reliability and Safety Specifications	I	A				Inst/S/S		
MAR 7.1	General Requirements	I					Inst	IIP	doc
MAR 7.2	Reliability Analysis		A				Inst	IAP	
MAR 7.2.1	Failure Modes and Effects Analysis and Critical Item List		A				Inst	IAP	
MAR 7.2.2	Parts Stress Analysis		A				S/S	SP-HIR-031	
								SP-HIR-033	
								SP-HIR-034	
								SP-HIR-036	
								SP-HIR-037	
								SP-HIR-038	
								SP-HIR-040	
								SP-HIR-044	
								SP-HIR-050	
MAR 7.2.3	Reliability Assessments		A				Inst	IAP	
MAR 7.3	Analysis of Test Data	I					Inst	IIP	doc
MAR 7.4	Limited Life Items	I					Inst	IIP	doc
3.13.1	Instrument Reliability Level		A				Inst	IAP	
3.13.2	Operational Life		A				Inst	IAP	
3.13.3	Storage Life		A				Inst	IAP	
MAR 6.2.5.3	Shelf-Life-Controlled Materials	I					Inst	IIP	doc
3.13.4	Data Reliability		A				Inst	IAP	
3.14	Quality Assurance Requirements	I					Inst		
MAR 8.0	Quality Management System	I					Inst	IIP	Doc
MAR 8.1	QA Management System Requirements Augmentation	I					Inst	IIP	Doc

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
MAR 8.1.1	Paragraph 4.13.2 of ANSI/ASQC Q9001-1994 is augmented as follows:	I					Inst	IIP	doc
3.14.1	Identification and Markings	I					Inst	IIP	H/W
							S/S	SP-HIR-031	
								SP-HIR-033	
								SP-HIR-034	
								SP-HIR-036	
								SP-HIR-037	
								SP-HIR-038	
								SP-HIR-040	
								SP-HIR-044	
								SP-HIR-050	
3.14.2	Configuration Control	I					Inst		
MAR 5.3	Parts Lists	I					Inst	IIP	doc
MAR 5.3.1	Program Approved Parts List	I					Inst	IIP	doc
MAR 5.3.2	Parts Identification List	I					Inst	IIP	doc
3.14.4	Fabrication Control					N	--	--	--
3.14.4.1	Electrostatic Discharge Control	I					Inst	IIP	doc
3.15	Instrument Operational Concepts					N	--	--	--
3.15.1	Instrument Commanding Philosophy	I	A				Inst		
3.15.1-a	Flexible Commanding Structure	I					Inst	IIP	S/W doc
3.15.1-b	Ground Intervention frequency		A				Inst	IAP	
3.15.2	Instrument Monitoring and Safing Philosophy	I	A	T			Inst		
3.15.2-a	Engineering Data Collection	I					Inst	IIP	doc
3.15.2-b	Critical Parameter Checking		A				Inst	IAP	S/W
3.15.2-c	Self Safing			T			S/W		
3.15.2-d	Minor Anomalie Safing Exception			T			S/W		

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
3.16	Safety Requirements	I					Inst		
MAR 11.1	General Requirements	I					Inst	IIP	doc
MAR 11.2	System Safety Implementation Plan	I					Inst	IIP	doc
MAR 11.3	Structural Integrity and Fracture Control		A				Inst	IAP	
MAR 11.4	Analysis					N	--	--	--
MAR 11.4.1	Hazard Analysis		A				Inst	IAP	
MAR 11.4.2	Operation Hazard Analysis		A				Inst	IAP	
MAR 11.5	Hazard Control Verification		A				Inst	IAP	
MAR 11.6	Procedure Approval	I					Inst	IIP	doc
MAR 11.7	Reviews	I					Inst	IIP	doc
MAR 11.8	Safety Deviation/Waiver	I					Inst	IIP	doc
MAR 11.9	Safety Assessment Report	I					Inst	IIP	doc
MAR 11.10	Flammability	I					Inst	IIP	doc
3.17	Design and Construction Requirements	I					Inst	IIP	doc
3.17.1	Use of Metric Components	I					Inst	IIP	doc
							S/S	SP-HIR-031	
								SP-HIR-033	
								SP-HIR-034	
								SP-HIR-036	
								SP-HIR-037	
								SP-HIR-038	
								SP-HIR-040	
								SP-HIR-044	
								SP-HIR-050	
3.17.2	Parts	I		T			Inst		
MAR 5.1	General Requirements	I					Inst	IIP	doc

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
MAR 5.2	Electrical, Electronic, and Electromechanical (EEE) Parts					N	--	--	--
MAR 5.2.1	Parts Control Board	I					Inst	IIP	doc
MAR 5.2.1.1	PCB Meetings	I					Inst	IIP	doc
MAR 5.2.2	Parts Selection and Processing	I					Inst	IIP	doc
MAR 5.2.2.1	Custom Devices	I					Inst	IIP	doc
MAR 5.2.3	Derating	I					Inst	IIP	doc
MAR 5.2.4	Radiation Hardness	I					Inst	IIP	doc
MAR 5.2.5	Verification Testing	I		T			Inst/S/S	IIP	
MAR 5.2.6	Destructive Physical Analysis			T			S/S	SP-HIR-031	
								SP-HIR-033	
								SP-HIR-034	
								SP-HIR-036	
								SP-HIR-037	
								SP-HIR-038	
								SP-HIR-040	
								SP-HIR-044	
								SP-HIR-050	
MAR 5.2.7	Parts Age Control	I					Inst	IIP	doc
MAR 5.3	Parts List	I					Inst	IIP	doc
MAR 5.3.1	Program Approved Parts List	I					Inst	IIP	doc
MAR 5.3.2	Parts Identification List	I					Inst	IIP	doc
MAR 5.4		I					Inst	IIP	doc
3.17.3	Materials and Processes	I					Inst		
MAR 6.1	General Requirements	I					Inst	Matl. Plan ?	doc
MAR 6.2	Materials Selection Requirements	I					Inst	IIP	doc
MAR 6.2.1	Compliant Materials	I					Inst	IIP	doc

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
MAR 6.2.2	Noncompliant Materials	I					Inst	IIP	doc
MAR 6.2.2.1	Materials Used in "Off-the-Shelf-Hardware"	I					Inst	IIP	doc
MAR 6.2.3	Conventional Applications					N	--	--	--
MAR 6.2.4	Nonconventional Applications	I					Inst	IIP	doc
MAR 6.2.5	Polymeric Materials	I					Inst	IIP	doc
MAR 6.2.5.1	Flammability	I					Inst	IIP	doc
MAR 6.2.5.2	Vacuum Outgassing	I					Inst	IIP	doc
MAR 6.2.5.3	Shelf-Life-Controlled Materials	I					Inst	IIP	doc
MAR 6.2.6	Inorganic Materials	I					Inst	IIP	doc
MAR 6.2.6.1	Fasteners	I					Inst	IIP	doc
MAR 6.2.7	Lubrication	I					Inst	IIP	doc
MAR 6.3	Process Selection Requirements	I					Inst	IIP	doc
MAR 6.4	Procurement Requirements					N	--	--	--
MAR 6.4.1	Purchased Raw Materials	I					Inst	IIP	doc
MAR 6.4.2	Raw Materials Used in Purchased Products	I					Inst	IIP	doc
3.18	Performance Verification Requirements	I					Inst		
MAR 3.1	General Requirements	I					Inst	TP-HIR-008D	Entire Doc
MAR 3.2	Documentation Requirements					N	--	--	--

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
3.19	Documentation Requirements					N			
3.19.1	Use of Systeme International (SI) Units	I					Inst		
3.19.2	Instrument Interface Control Drawing Requirements	I					Inst		
3.19.3	Internal Interface Control Document Requirements	I					Inst		
3.19.4	Data Interface Documentation Requirements	I					Inst		
4	**Subsystem Requirements**					N			
4.1	**Structure/Thermal Subsystem**					N			
4.1.1	Subsystem Description					N	STH S/S		
4.1.2	Modes of Operation						STH S/S		
4.1.3	Mechanical Requirements					N			
4.1.3.1	Structure/Thermal Subsystem Envelope	I					STH S/S		
4.1.3.2	Mass			T			STH S/S		
4.1.3.3	Lifting Points	I					STH S/S		
4.1.3.4	De-Pressurization and Venting	I	A				STH S/S		

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
4.1.3.5	Access	I					STH S/S		
4.1.3.6	Mechanical Performance		A	T			STH S/S		
4.1.3.7	Mechanical Interfaces	I					STH S/S		
4.1.4	Electrical Requirements					N			
4.1.4.1	Input Power Requirements					N			
4.1.4.1.1	Power Allocation						Instrument		
4.1.4.1.2	Primary Power						Instrument		
4.1.4.1.3	Secondary Power	I					STH S/S		
4.1.4.2	Grounding Requirements	I					STH S/S		
4.1.4.2.1	Primary Power Grounding	I		T			STH S/S		
4.1.4.2.2	Secondary Power Grounding					N			
4.1.4.3	Electrical Interfaces	I					STH S/S		
4.1.5	Thermal Requirements					N			
4.1.5.1	Survival Heaters	I		T			STH S/S		
4.1.5.2	Thermal Blankets	I	A				STH S/S		
4.1.5.3	Radiators						* Not STH		
4.1.5.3.1	Temperature Variation at Unit Mounting Faces		A	T			STH S/S		
4.1.5.3.2	Accommodation for Laboratory Cooling						* Not STH		
4.1.5.4	Thermal Interfaces	I	A				STH S/S		
4.1.6	Environments		A				STH S/S		
4.1.7	Reliability Requirements		A				STH S/S		
4.2	**Sunshield Subsystem**					N			
4.2.1	Subsystem Description					N			
4.2.2	Modes of Operation								
4.2.3	Functional Requirements					N			
4.2.3.1	Closure and Shielding	I	A				S/S		

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
4.2.3.2	Drive Mechanisms			T			S/S		
4.2.3.3	Angle Sensors			T			S/S		
4.2.3.4	Hold-down and Release Mechanism		A	T			S/S		
4.2.3.4.1	Latching Without Power	I					S/S		
4.2.3.4.2	Latching Status			T			S/S		
4.2.3.5	Sun Sensors								
4.2.3.6	Fixed Baffles	I					S/S		
4.2.4	Mechanical Requirements	I					S/S		
4.2.4.1	Envelope	I					S/S		
4.2.4.2	Mass Properties	I					S/S		
4.2.4.3	Mechanical Performance		A	T			S/S		
4.2.4.3.2	Door Motion Disturbances		A				S/S		
4.2.4.4	Mechanical Interfaces	I					S/S		
4.2.5	Electrical Requirements	I					S/S		
4.2.5.1	Input Power Requirements					N			
4.2.5.1.1	Primary Power					N			
4.2.5.1.2	Secondary Power	I		T			S/S		
4.2.5.2	Grounding Requirements					N			
4.2.5.2.1	Primary Power Grounding					N			
4.2.5.2.2	Secondary Power Grounding	I		T			S/S		
4.2.5.3	Electrical Interfaces	I					S/S		
4.2.5.4	Electromagnetic Disturbances			T			S/S		
4.2.6	Thermal Interfaces	I					S/S		
4.2.7	Environments		A	T			S/S		
4.2.8	Reliability Requirements		A				S/S		
4.3	**Gyro Subsystem**					N	-		

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
4.3.1	Subsystem Description	I					SS		
4.3.2	Modes of Operation				D		SS		
4.3.3	Performance Requirements			T			SS		
4.3.3.1	Digital Rate Output			T			SS		
4.3.3.2	Angular Measurement Requirements		A	T			SS		
4.3.3.2.1	Elevation Requirements		A	T			SS		
4.3.3.2.2	Azumuth Requirements		A	T			SS		
4.3.3.3	Survival Rates			T			SS		
4.3.3.4	Warm-up			T			SS		
4.3.4	Mechanical Requirements					N	-		
4.3.4.1	Gyro Subsystem Envelope	I					U		
4.3.4.2	Mass Allocation	I					U		
4.3.4.3	GMU-GEU Interconnection				D		A		
4.3.4.4	Alignment					N	-		
4.3.4.4.1	Optical Alignment Cube					N	-		
4.3.4.5	Mechanical Interfaces	I					U		
4.3.4.6	Pressurization and Venting	I	A				SA		
4.3.5	Electrical Requirements					N	-		
4.3.5.1	Input Power Requirements			T			SS		
4.3.5.1.1	Primary Power					N	-		
4.3.5.1.2	Secondary Power					N	-		
4.3.5.2	Grounding Requirements					N	-		
4.3.5.2.1	Primary Power Grounding	I					SS		
4.3.5.2.2	Secondary Power Grounding	I					SS		
4.3.5.3	EMI/EMC Requirements			T			SS		
4.3.5.4	Electrical Interfaces			T			SS		

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
4.3.6	Thermal Requirements					N	-		
4.3.6.1	Subsystem Temperatures			T			SS		
4.3.6.2	Thermal Interfaces					N	-		
4.3.6.2.1	GMU Thermal Interface		A	T			U		
4.3.6.2.2	GEU Thermal Interface		A				U		
4.3.7	Control and Data Requirements			T			SS		
4.3.8	Environments			T			U		
4.3.9	Reliability Requirements		A				U		
4.4	**Telescope Subsystem**					N			
4.4.1	Subsystem Description					N			
4.4.2	Modes of Operation				D		S/S	SP-HIR-040 Volumes 1& 2	Vol. 1: para 3.1.2 Vol, 2 para 3.2.1.2, 4.3.1
4.4.3	Imaging Requirements					N			
4.4.3.1	System Aperture					N			
4.4.3.1.1	Positions of Stops and Pupils				D		OBA Unit		
4.4.3.1.2	System Aperture Size		A				OBA Unit		
4.4.3.2	Focal Length		A				OBA Unit	SP-HIR-040 Volume 1	Vol. 1 para 3.2.1.1.1
4.4.3.3	Field of View		A				OBA Unit		
4.4.3.4	Focusing Range							Need Waiver	
4.4.3.5	Spectral Bands		A				OBA Unit		
4.4.3.6	Optical Surface Durability		A				OBA Unit	SP-HIR-040 Volumes 1& 4	Vol. 1 para 3.2.1.1.1.5.6, 3.2.1.1.1.5.7
4.4.3.7	Obscurations		A				OBA Unit		
4.4.3.9	Optical Interfaces					N			
4.4.3.9.1	TSS to DSS Optical Interface				D		OBA Unit		

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
4.4.3.9.2	TSS to IFC Optical Interface				D		OBA Unit		
4.4.4	Radiometric Requirements					N			
4.4.4.1	Chopper	I					OBA Unit		
4.4.4.1.1	Chopper Performance			T			TSS, SSH	SP-HIR-040 Volume 4	Vol. 4 (to be written)
4.4.4.1.2	Chopper Temperature Stability			T			Chopper	SP-HIR-040 Volume 4	Vol. 4 (to be written)
4.4.4.1.3	Chopper Reference Signal			T			Chopper	SP-HIR-040 Volume 2	Vol. 2 para 3.2.1.6, 4.3.1
4.4.4.2	Transmission		A					Remove/Rewrite Requirement (Inst Level as stated not TSS level)	
4.4.4 3	Transmissive Optical Elements	I					OBA Unit		
4.4.5	Mechanical Requirements					N			
4.4.5.1	Scanner Axis Requirements					N			
4.4.5.1.1	Azimuth Axis	I					OBA Unit	SP-HIR-040 Volume 1	Vol. 2 para 3.2.1.1.1.2.10, 4.3.1
4.4.5.1.2	Elevation Axis	I					OBA Unit	SP-HIR-040 Volume 1	Vol. 2 para 3.2.1.1.1.2.10, 4.3.1
4.4.5.2	Dynamics Requirements					N			
4.4.5.2.1	TSS Stiffness		A				S/S	SP-HIR-040 Volume 1	Vol. 1 (to be written)
4.4.5.2.2	Isolation from Baseplate				D		TEU	SP-HIR-040 Volume 2	Vol. 1 para 3.2.1.3.2.6 Vol. 2 para 3.2.1.2, 4.3.1
4.4.5.3	Mass	I					Unit		
4.4.5.4	Envelope	I							
4.4.5.5	Accessibility	I					OBA Unit	SP-HIR-040 Volume 1	Vol. 1 para

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
									3.2.1.3.2.6
4.4.5.6	TSS Mechanical Interfaces	I					OBA Unit		
4.4.6	Electrical Requirements					N			
4.4.6.1	Power Allocation			T			S/S	SP-HIR-040 Volumes 1& 2	
4.4.6.2	TSS Electrical Interfaces	I					S/S		
4.4.7	Thermal Requirements			T			Unit	SP-HIR-040 Volumes 1-4	Vol. 1 para 3.2.5.3.5 Vol. 2 para 3.2.5.1.1, 3.25.2.1, 4.3.2.4
4.4.7.1	Thermal Interface	I					S/S		
4.4.7.2	Operational Heaters							TBD (no current requirement)	
4.4.7.3	Mirror Temperature Knowledge		A	T			OBA Unit		
4.4.7.4	Mirror Temperature Stability		A				OBA Unit		
4.4.7.5	Scan Mirror Temperature Gradients		A				OBA Unit		
4.4.8	Environments	I	A	T			TSS Components & SSH	SP-HIR-040 Volumes 1-4	Vol. 1 para 3.2.5.1 & 3.2.5.3 Vol. 2 para 3.2.5.1, 3.2.5.2, 4.3.2
4.4.9	Reliability Requirements	I	A?				S/S	SP-HIR-040 Volumes 1-4	Vol. 1 para 3.2.3 Vol. 2 para 3.2.3
4.4.10	TSS Pointing and Scanning Requirements					N			
4.4.10.1	Boresight Angle and Axis Motion Ranges			T			SMA Unit		
4.4.10.2	Elevation Requirements					N			
4.4.10.2.1	Scan Rate			T			S/S		
4.4.10.2.2	Elevation Angle Knowledge Requirements			T			S/S		

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
4.4.10.2.3	Elevation Angle Jitter Requirements			T			S/S		
4.4.10.2.4	Fixed Angle Mode			T			S/S		
4.4.10.3	Azimuth Requirements					N			
4.4.10.3.1	Azimuth Scan Increment and Settling Time			T			S/S	SP-HIR-040 Volume 2	Vol. 2 para 3.2.1.4, 4.3.1
4.4.10.3.2	Azimuth Slew Rate			T			S/S	SP-HIR-040 Volume 2	Vol. 2 para 3.2.1.4, 4.3.1
4.4.10.3.3	Azimuth Pointing Accuracy			T			S/S		
4.4.10.3.4	Azimuth Angle Jitter Requirements					N			
4.4.10.3.5	Azimuth Angle Knowledge Resolution and Sampling			T			SSGA S/S	SP-LOC-274	3.2.1.2.1.2.2
4.4.10.4	Calibration Aids							Delete Old Requirement)	
4.5	**Detector Subsystem**					N			
4.5.1	Subsystem Description					N			
4.5.2	Modes of Operation							SPU Requirement	
4.5.3	Imaging Requirements					N			
4.5.3.1	Cold Shield	I	A				S/S	SP-HIR-037	3.2.1.1.1
4.5.3.2	Optical Filters	I	A	T			S/S	SP-HIR-037	3.2.1.1.1, 3.2.1.4.7
4.5.3.3	Window	I	A	T			S/S	SP-HIR-037	3.2.1.1.3
4.5.4	Radiometric Requirements					N			
4.5.4.1	Noise Equivalent Power Density (NEP')		A	T			S/S	SP-HIR-037	3.2.1.2.4
4.5.4.2	Responsivity								
4.5.4.2.1	Responsivity Uniformity		A	T			S/S	SP-HIR-037	3.2.1.2.6
4.5.4.2.2	Responsivity Stability							SPU Requirement	
4.5.4.3	Frequency Response							SPU Requirement	
4.5.5	Mechanical Requirements					N			
4.5.5.1	Envelope	I					S/S	SP-HIR-037	3.1.3.2.3

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
4.5.5.2	Mass	I					S/S	SP-HIR-037	3.2.2.1
4.5.5.3	Mechanical Interface	I	A				S/S	SP-HIR-037	3.1.3.2.1
4.5.5.4	Stability Requirements						S/S	SP-HIR-037	TBD'S
4.5.5.5	Mechanical Design		A				S/S	SP-HIR-037	3.2.2.3
4.5.6	Electrical Requirements					N			
4.5.6.1	Output	I					S/S	SP-HIR-037	3.2.2.4
4.5.6.2	Element Bias Power							SPU Requirement	
4.5.6.3	Temperature Sensors Bias Power							SPU Requirement	
4.5.6.4	Electrical Interface	I	A				S/S	SP-HIR-037	3.1.3.1.5
4.5.6.5	Power Allocation							SPU Requirement	
4.5.7	Thermal Requirements					N			
4.5.7.1	Thermal Interface		A		D		S/S	SP-HIR-037	3.1.3.3
4.5.7.2	DSS Cryogenic Heat Load		A		D		S/S	SP-HIR-037	3.2.1.4.6
4.5.7.3	Thermal Cycling		A		D		S/S	SP-HIR-037	3.2.1.4.8
4.5.8	Environments		A		D		S/S	SP-HIR-037	3.2.4
4.5.9	Reliability Requirements		A				S/S	SP-HIR-037	3.2.3.1
4.6	**In-Flight Calibrator Subsystem**					N	-		
4.6.1	Subsystem Description	I					SS		
4.6.2	Modes of Operation			T			SS		
4.6.3	Imaging Requirements		A				U		
4.6.4	Radiometric Requirements		A				U		
4.6.5	Mechanical Requirements					N	-		
4.6.5.1	Envelope	I					U		
4.6.5.2	Mass	I					U		
4.6.5.3	Mechanical Interface	I					U		
4.6.5.4	Stability Requirements		A				U		

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
4.6.6	Electrical Requirements					N	-		
4.6.6.1	IFC Subsystem Secondary Power Requirements					N	-		
4.6.6.2	Power Allocation			T			SS		
4.6.7	Thermal Requirements					N	-		
4.6.7.1	Temperature Range			T			U		
4.6.7.2	Temperature Sensing			T			SS		
4.6.7.3	Temperature Control			T			A		
4.6.7.4	Thermal Interfaces		A				U		
4.6.8	Environments			T			U		
4.6.9	Reliability Requirements		A				U		
4.7	**Instrument Processor Subsystem**					N			
4.7.1	Subsystem Description	I					S/S		
4.7.1.1	Architectural Philosophy	I					S/S		
4.7.1.2	Functional Interfaces Description	I					S/S		
4.7.1.2.1	User Interface								
4.7.1.3	Operations Description	I					S/S		
4.7.2	Modes of Operation	I					S/S		
4.7.3	Functional Requirements					N			
4.7.3.1	Logical Interfaces					N			
4.7.3.1.1	Spacecraft Command and Telemetry (C&T) Interface	I					S/S		
4.7.3.1.2	Gyro Subsystem Interface	I					S/S		
4.7.3.1.3	Telescope Subsystem Interface	I					S/S		
4.7.3.1.4	Detector Subsystem Interface								
4.7.3.1.5	IFC Subsystem Interface								
4.7.3.1.6	Sunshield Subsystem Interface	I					S/S		
4.7.3.1.7	Cooler Subsystem Interface	I					S/S		

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
4.7.3.1.8	Operational Heaters Interface		A				S/S		
4.7.3.1.9	Power Subsystem Interface								
4.7.3.2	IPS Functions					N			
4.7.3.2.1	Spacecraft Communication					N			
4.7.3.2.1.1	Command Data								
4.7.3.2.1.2	Engineering Telemetry Data	I			D		S/S		
4.7.3.2.1.3	Science Telemetry Data								
4.7.3.2.1.3.1	Science Telemetry Data Item List								
4.7.3.2.1.3.2	Memory Dump and Diagnostic Data								
4.7.3.2.2	Timing Signal Generation	I					S/S		
4.7.3.2.2.1	Functional Description	I					S/S		
4.7.3.2.2.2	Performance Requirements					N			
4.7.3.2.2.2.1	Output Frequencies, Waveforms and Timing			T			S/S		
4.7.3.2.2.2.2	Phase Adjustment & Stability				D		S/S		
4.7.3.2.2.2.3	Operation Without the Chopper	I					S/S		
4.7.3.2.3	Science Data Acquisition and Processing								
4.7.3.2.3.1	Detector Data								
4.7.3.2.3.1.1	Channel Gain Range and Stability								
4.7.3.2.3.1.2	Channel Offset Range and Stability								
4.7.3.2.3.1.3	Channel Linearity								
4.7.3.2.3.2	Scanner Angle Data	I					S/S		
4.7.3.2.3.2.1	Scanner Angle Data Sampling Rate	I					S/S		
4.7.3.2.3.3	Gyro Data	I					S/S		
4.7.3.2.3.3.1	Gyro Data Sampling Rate	I					S/S		
4.7.3.2.3.4	Time Stamp Data	I	A				S/S		
4.7.3.2.4	Engineering Data Acquisition	I					S/S		

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
4.7.3.2.4.1	Data Availability	I					S/S		
4.7.3.2.4.2	Data Types					N			
4.7.3.2.4.2.1	Thermal Engineering Data	I					S/S		
4.7.3.2.4.2.2	Power Engineering Data								
4.7.3.2.4.2.3	Instrument Operational Status	I					S/S		
4.7.3.2.4.2.4	IPS Functional Status	I					S/S		
4.7.3.2.4.2.5	TSS Performance Data								
4.7.3.2.4.3	Sample Rates	I					S/S		
4.7.3.2.4.4	Data Range and Resolution	I		T			S/S		
4.7.3.2.4.5	Data Processing					N			
4.7.3.2.5	Chopper Control								
4.7.3.2.6	Scanner Control					N			
4.7.3.2.6.1	Scanner Command Protocol	I					S/S		
4.7.3.2.6.2	Scan Mode Select	I					S/S		
4.7.3.2.6.3	Scan Profile Commands	I					S/S		
4.7.3.2.6.4	Scan Synchronization Command	I		T			S/S		
4.7.3.2.6.5	Reset Commands	I					S/S		
4.7.3.2.6.6	Scanner Code and Parameter Load Commands								
4.7.3.2.6.7	Table Download	I					S/S		
4.7.3.2.6.8	Scanner Operational Heaters								
4.7.3.2.7	IFC Temperature Control								
4.7.3.2.8	Sunshield Control					N			
4.7.3.2.8.1	Sunshield Drive Mechanism Control								
4.7.3.2.8.2	Sunshield Hold-down and Release Mechanism Control	I					S/S		
4.7.3.2.9	Cooler Control	I					S/S		
4.7.3.2.10	Operational Heater Control								

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
4.7.3.2.11	Power Control/Monitor	I					S/S		
4.7.3.2.12	Instrument Control and Coordination Functions	I					S/S		
4.7.3.2.12.1	Commanding Capabilities	I					S/S		
4.7.3.2.12.2	Instrument Monitoring and Safety Requirements	I					S/S		
4.7.3.2.12.3	User Processes	I					S/S		
4.7.3.2.12.4	Real-Time Executive Functions								
4.7.3.2.12.5	Reception of Spacecraft-Furnished Parameters	I					S/S		
4.7.3.2.13	Code Maintenance Support	I					S/S		
4.7.3.2.14	Memory Management								
4.7.3.2.15	Background Testing								
4.7.4	IPS Software Requirements					N			
4.7.4.1	Boot State Requirements			T			S/S		
4.7.4.2	Operate State Requirements			T			S/S		
4.7.5	Hardware Requirements					N			
4.7.5.1	Functional and Performance Requirements					N			
4.7.5.1.1	Processor					N			
4.7.5.1.1.1	Data Types Supported								
4.7.5.1.1.2	Operations Supported								
4.7.5.1.1.3	Processing Margin		A				S/S		
4.7.5.1.2	Memory					N			
4.7.5.1.2.1	Non-Volatile Memory	I					S/S		
4.7.5.1.2.1.1	Secure Memory	I					S/S		
4.7.5.1.2.1.2	Reprogrammable Memory								
4.7.5.1.2.2	Volatile Memory	I					S/S		
4.7.5.2	Mechanical Requirements					N			
4.7.5.2.1	Mass	I					Unit		

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
4.7.5.2.2	Envelope	I					Unit		
4.7.5.3	Electrical Requirements					N			
4.7.5.3.1	Input Power Requirements					N			
4.7.5.3.1.1	Power Allocation			T			S/S		
4.7.5.3.1.2	Primary Power								
4.7.5.3.1.3	Secondary Power	I					S/S		
4.7.5.3.2	Grounding Requirements								
4.7.5.3.2.1	Primary Power Grounding								
4.7.5.3.2.2	Secondary Power Grounding			T			S/S		
4.7.5.3.3	Signal Electrical Interfaces					N			
4.7.5.3.3.1	Spacecraft								
4.7.5.3.3.2	Gyro Subsystem								
4.7.5.3.3.3	Telescope Subsystem								
4.7.5.3.3.4	Detector Subsystem								
4.7.5.3.3.5	IFC Subsystem								
4.7.5.3.3.6	Sunshield Subsystem								
4.7.5.3.3.7	Cooler Subsystem								
4.7.5.3.3.8	Operational Heaters								
4.7.5.3.3.9	Power Subsystem								
4.7.6	Design Requirements					N			
4.7.6.1	Backplane Bus								
4.7.7	Thermal Requirements					N			
4.7.7.1	Subsystem Temperatures	I		T			S/S		
4.7.7.2	Thermal Interfaces	I					S/S		
4.7.8	Reliability Requirements		A				S/S		
4.7.8.1	Functional Loss		A				S/S		

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
4.7.8.2	Data Loss		A				S/S		
4.7.8.3	Undetected Bit Errors		A				S/S		
4.7.8.4	Uncommanded Resets		A				S/S		
4.7.8.5	Subsystem Command Errors		A				S/S		
4.7.9	Environments			T			S/S		
4.8	**Cooler Subsystem**					N			
4.8.1	Subsystem Description					N			
4.8.2	Modes of Operation			T			S/S	SP-HIR-034	3.1.2
4.8.3	Mechanical Requirements					N			
4.8.3.1	Envelope	I					Unit		
4.8.3.2	Mass	I					Unit	SP-HIR-034	3.3.6
4.8.3.3	Mechanical Configuration					N			
4.8.3.3.1	General Configuration	I					S/S	SP-HIR-034	1.2, 3.3.5
4.8.3.3.3	Cryovac Housing	I					S/S	SP-HIR-034	3.3.3 b&f
4.8.3.3.3.1	Flexible Vacuum Enclosure Interface Port	I					S/S	SP-HIR-034	3.3.4
4.8.3.3.3.2	Pumping Port	I					S/S	SP-HIR-034	3.3.3 c
4.8.3.3.4	Cold Link and Flexible Vacuum Enclosure	I		T			S/S	SP-HIR-034	3.3.3 b&f, 3.3.4
4.8.3.3.5	Cooler Control Units (CCU's)	I					S/S	SP-HIR-034	
4.8.3.4	Mechanical Performance					N			
4.8.3.4.1	Peak Imbalance Force		A	T			S/S	SP-HIR-034	3.3.7.2
4.8.3.4.2	Minimum Operating Frequency			T			S/S	SP-HIR-034	3.3.7.1
4.8.3.4.3	Orientation in 1-g field		A	T			S/S	SP-HIR-034	3.3.7.5
4.8.3.4.4	Caging of Cooler Mechanisms			T			S/S	SP-HIR-034	3.3.7.6
4.8.3.4.5	Cryovac Housing					N			
4.8.3.4.5.1	Maximum Rate of Pressure Rise			T			S/S	SP-HIR-034	3.3.3 f

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ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
4.8.4	Electrical Requirements					N			
4.8.4.1	Input Power Requirements					N			
4.8.4.1.1	Power Allocation			T			S/S	SP-HIR-034	3.4.2.1
4.8.4.1.2	Primary Power		A	T			S/S	SP-HIR-034	3.4.1
4.8.4.1.3	Secondary Power	I					S/S	SP-HIR-034	
4.8.4.2	Grounding Requirements					N			
4.8.4.2.1	Primary Power Grounding			T			S/S	SP-HIR-034	3.4.4
4.8.4.2.2	Secondary Power Grounding			T			S/S	SP-HIR-034	3.4.4
4.8.4.3	Command and Telemetry Requirements					N			
4.8.4.3.1	Autonomous Operation			T			S/S	SP-HIR-034	3.5.1
4.8.4.3.2	Control Commands			T			S/S	SP-HIR-034	
4.8.4.3.2.1	IPS Control of Cold Node Temperature			T			S/S	SP-HIR-034	3.5.2
4.8.4.3.2.2	Frequency Control			T			S/S	SP-HIR-034	3.5.3
4.8.4.3.2.3	Active Vibration Cancellation			T			S/S	SP-HIR-034	3.5.5
4.8.4.4	Engineering Data			T			S/S	SP-HIR-034	3.5.4
4.8.4.5	Electrical Interfaces		A	T			S/S	SP-HIR-034	3.5, 3.4.1
4.8.5	Software Requirements	I					S/S	SP-HIR-034	3.6
4.8.6	Thermal Requirements					N			
4.8.6.1	Temperature Set-point Range			T			S/S	SP-HIR-034	3.2.1
4.8.6.2	Temperature Control Stability			T			S/S	SP-HIR-034	3.2.3
4.8.6.3	Usable Cooling Power vs. Operating Frequency			T			S/S	SP-HIR-034	3.2.2
4.8.6.4	Thermal Interfaces		A	T			S/S	SP-HIR-034	3.2 5
4.8.6.4.1	Cooler Radiator Panel Interfaces		A				S/S	SP-HIR-034	moot?
4.8.7	Environments					N			
4.8.7.1	Ground and Launch Environments		A	T			S/S	SP-HIR-034	6
4.8.7.2	CSS On-orbit Environment			T			S/S	SP-HIR-034	3.4.1.1

Table 9.0
HIRDLS Instrument
Verification Cross Reference Matrix

ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
4.8.8	Reliability Requirements					N			
4.8.8.1	Lifetime		A				S/S	SP-HIR-034	5.1, 5.2
4.8.8.2	Cycles of Operation		A				S/S	SP-HIR-034	5.3
4.8.8.3	Maintainability		A				S/S	SP-HIR-034	5.4
4.8.8.4	Pressurized System Design								
4.9	**Power Subsystem**					N			
4.9.1	Subsystem Description					N			
4.9.2	Modes of Operation			T			UNIT	SP-HIR-036	
4.9.3	Mechanical Requirements					N			
4.9.3.1	Envelope	I							
4.9.3.2	Mass			T			UNIT	SP-HIR-036	TBD
4.9.3.3	Mechanical Interfaces	I						SP-HIR-036	TBD
4.9.4	Electrical Interfaces					N			
4.9.4.1	Input Power Requirements					N			
4.9.4.1.1	Power Allocation Requirements	I		T					
4.9.4.1.2	Primary Power	I		T					
4.9.4.2	Output Voltage Requirements					N			
4.9.4.2.1	Instrument Processor Subsystem Secondary Power Interface			T			UNIT	SP-HIR-279	
4.9.4.2.2	Gyro Subsystem Secondary Power Interface			T			UNIT	SP-HIR-237	
4.9.4.2.3	Telescope System Secondary Power Interface			T			UNIT	SP-HIR-227	
4.9.4.2.4	Detector Subsystem Secondary Power Interface					N			
4.9.4.3	Grounding Requirements					N			
4.9.4.3.1	Primary Power Grounding			T				TC-HIR-169	7.0
4.9.4.3.2	Secondary Power Grounding			T			UNIT	TC-HIR-169	7.1 - 7.5
4.9.4.4	Command and Telemetry Requirements			T			UNIT	SP-HIR-279	3.2.3, 3.2.4

Table 9.0
HIRDLS Instrument
Verification Cross Reference Matrix

ITS Para #	Paragraph Title	Method of Verification I	A	T	D	N	Verif. Level	Next Level Document	Paragraph Number
4.9.5	Thermal Requirements					N			
4.9.5.1	Thermal Interfaces		A				UNIT	SP-HIR-036	TBD
4.9.6	Environments			T					
4.9.7	Reliability		A				UNIT	SP-HIR-036	TBD
5	Requirements Summary					N			
5.1	Subsystem Allocations					N			
6	Preparation for Delivery					N			
6.1	General								
6.2	Packing, Shipping Containers								
7	Appendices					N			
7.1	Acronym List					N			

10.0 Acronyms

ATP Acceptance Test Procedure
ATS Acceptance Test Station
BEU Black-body Electronics Unit
BOL Beginning of Life
CCP Contamination Control Plan
CCU Cooler Control Unit
CFA Cold Filter Assembly
CHEM Chemistry Mission Platform
CLAS Center for Limb Atmospheric Sounding
CSCI Computer Software Configuration Items
CSS Cooler Subsystem
CMU Cooler Mechanical Unit
CU University of Colorado at Boulder
DSS The Detector Subsystem
EEA Encoder Electronics Assembly
EM Engineering Model
EOL END OF LIFE
EOS Earth Observing System
FF Feed Forward
FMEA Failure Mode and Effects Analysis
GEU Gyro Electronic Unit
GIRD General Interface Requirements Document
GMU Gyro Mechanical Unit
GSE Ground Support Equipment
GSFC NASA Goddard Space Flight Center
GSS Gyroscope Subsystem
HIRDLS High Resolution Dynamics Limb Sounder
ICD Interface Control Document
IFC In-Flight Calibrator
IGSE Instrument Ground Support Equipment
IPS Instrument Processor Subsystem
IRD Instrument Requirements Document
ITS Instrument Technical Specification
LMMS ATC Lockheed Martin Missiles and Space, Advanced Technology Center
LOS Line-of-Sight
LOS ATS Line 0f Sight Acceptance Test Station
MAR Mission Assurance Requirement
MGSE Mechanical Ground Support Equipment
MLI Multilayer Insulation
OBA Optical Bench Assembly
OU Oxford University
PCU Power Converter Unit
PFM Protoflight Model
PSS Power Supply Subsystem
PVP Performance Verification Plan
PVS Performance Verification Specification
RATS Radiometric Acceptance Test Station
RAL Rutherford Appleton Laboratory

RO	Responsible Organization
SAIL	Science Algorithm Implementation Language
SMA	Scan Mirror Assembly
SMP	Software Management Plan
SPU	Signal Processing Unit
SRD	Science Requirements Document
SSGA	SSG Assembly
SSD	Subsystem Specification Document
SSH	Sunshield Subsystem
STH	Structural Thermal Subsystem
TBD	To Be Determined
TBV	To Be Verified
TSW	TEU Software
TGSE	Thermal Ground Support Equipment
TSS	Telescope Subsystem
VCRM	Verification Cross Reference Matrix
WFC	Warm Filter Carrier
WSA	Work Share Agreement
WSEA	Wobble Sensor Electronics Assembly