

HESSI Imager Initial Integration Test Procedure



Imager Initial Integration Test Procedure

HSI-MI&T-IMGR-IIT

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1 Introduction

1.1 Purpose

The following paper describes a semi-automatic integration test of the IDPU and Imager to the HESSI spacecraft. The test assumes that the IDPU, IPC and PD will be mounted and tested together with the flight harness.

The purpose is to verify that the IDPU and the spacecraft communicate properly, that the SOH telemetry is properly displayed on the ITOS pages, and that the ITOS system can reliably send commands to the IDPU through the spacecraft. In addition, test data is sent from the IDPU through the SSR and transmitted through ITOS and routed to a display computer.

1.2 Outline

- Spacecraft is Powered Up on Battery Simulator at 30V.
- Spacecraft telemetry should be set for 4Mbps downlink.
- All IDPU internal subsystems (DIBS/ADP) are powered up.
- Telemetry is enabled throughout the test. Science data input should not exceed 4Mbps.
- Imager Thermal Control is tested.
- Imager SAS data is recorded.

1.3 Operator Information

Date and Time Run: _____
Test Lead: _____
Time Estimate: 4 hours

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1.4 Hardware Requirements

Item	Description	OK
1.	Spacecraft Bus , including at least:	
1.1	SEM	_____Y/N
1.2	SSR	_____Y/N
1.3	Spacecraft Harness to IDPU	_____Y/N
1.4	Power System (Battery and/or GSE supply)	_____Y/N
1.5	SEM Flight Software Version Number	_____
2.	Instrumentation:	
2.1	IDPU VME Chassis	_____OK
2.2	Instrument Power Converter (IPC)	_____OK
2.3	Cryo Power Converter (CPC)	_____OK
2.4	Particle Detector (PD)	_____OK
2.5	Spectrometer	_____OK
2.6	Attenuator	_____OK
2.7	Imager	_____OK
3.	Instrument Harnesses , including at least:	
3.1	IDPU/IPC/CPC Harness	_____OK
3.2	IDPU/PD Harness	_____OK
3.3	IPC/PD Harness	_____OK
3.4	IDPU-RAS/Imager Harness	_____OK
3.5	IDPU-Spectrometer Harness	_____OK
3.6	IDPU-Imager Harness	_____OK
4.	Spacecraft GSE , including at least:	
4.1	Spacecraft to GSE Test and Power Harness	_____OK
4.2	Power rack	_____OK
4.3	Telemetry Rack	_____OK
4.4	ITOS system, including spacecraft and instrument databases	_____OK
4.5	ITOS Software Version Number	_____
5	Instrument GSE (none)	

1.5 Staffing Requirements:

The following people or their delegates are required:

Item	Description	Name
1.	Instrument System Engineer (Dave Curtis)	
2.	Test Conductor (Peter Harvey, Dave Smith)	
3.	Quality Assurance	

1.6 Setup Requirements

Item	Setup	OK
1	IDPU, and IPC, are mechanically integrated with spacecraft.	_____OK
1.1	Is CPC Installed?	_____Y/N
2	IDPU, IPC are electrically mated to the spacecraft electronics.	_____OK
3	IDPU is harnessed to the IPC via the Flight Instrument harness	_____OK
4	Spectrometer and Imager are harnessed to the IDPU	_____OK
5	Spacecraft is connected to the spacecraft GSE, and is ready for operations	_____OK
6	All instrument power services are off.	_____OK
7	Set "HESSI S/C Filter A/B Box" to A to connect IDPU to Cold Plate Temps	_____OK

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1.7 Safety Requirements

Item	Requirement	OK
1	HV Enable Plug Installed	_____OK
2	Actuator Enable Plug Installed	_____OK

2 Test Procedure

2.1 Power On/ Initialization

Step	Procedure	Measurement
1.	Power on and configure the spacecraft bus at 28V	_____OK
1.1	Verify spacecraft operating nominally via state-of-health telemetry	_____OK
1.2	Turn on SSR science telemetry; clear SSR contents	_____OK
2.	Temperature Checks	
2.1	Verify IDPUTEMP between -30C and +40C. Record Temp.	_____C
2.2	Verify IPCTEMP between -30C and +40C. Record Temp.	_____C
3.	Power On IDPU VME and IPC	
3.1	Enter SC_IDPUON	_____OK
3.2	Verify IDPU Mode is NORMAL	_____OK
3.3	Verify IDPU Current at 28V between 450mA and 600mA.	_____mA
3.4	Verify IDPU Voltages Nominal	_____OK
3.5	Verify Executive Status Nominal	_____OK
3.6	Verify IDPUT between -30C and +40C. Record Temp.	_____C
3.7	Verify IPCT between -30C and +40C. Record Temp.	_____C
3.8	Verify CPCT between -30C and +40C. Record Temp	_____C
3.9	Verify PDT between -30C and +40C. Record Temp	_____C
4.1	Verify RAS between -30C and +18C. Record Temp	_____C
4.2	Verify RAS 1T between -30C and +18C. Record Temp	_____C
4.3	Verify RAS 2T between -30C and +18C. Record Temp	_____C

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2.2 Aspect Data Processor Test

See Document HSI-MI&T-IMGR-FT

2.3 Imager Thermal Control Test

Item	Description	OK
1.	Enable	
1.1	Record Temperatures for UGT	_____ C _____ C _____ C _____ C
1.2	Record Temperatures for LGT	_____ C _____ C _____ C _____ C
1.3	Start SC-IDPU_SPWRON to turn ON Switched Power	_____ OK
1.4	Record IDPU LD Current	_____ mA
2.	Test Primary Grid Heaters	
2.1	/IPWMMODE CP=0,RAS=OFF,UGT=Primary,LGT=Primary	_____ OK
2.2	Verify Primary on UGT and LGT Heater mode	_____ V
2.3	/IDPUARM HTR	_____ OK
2.4	/IUGTSETPT value=25	_____ OK
2.5	Verify IUGTPWR > 0%	_____ OK
2.6	Verify IUGTHTRPV max voltage 25 to 28V	_____ V
2.7	Verify IDPU LD Current at around 0.7A periodic	_____ mA
2.8	Verify UGT Temperature Response	_____ C _____ C _____ C _____ C
2.9	/ILGTSETPT 25	_____ OK
2.10	Verify ILGTPWR > 0%	_____ OK
2.11	Verify ILGTHTRPV max voltage 25 to 28V	_____ OK
2.12	Verify LGT Temperature Response after ~ 10min and ~50%	_____ C _____ C _____ C _____ C
3	Test Backup Heaters	
3.1	/IPWMMODE CP=0,RAS=OFF,UGT=Backup,LGT=Backup	_____ OK
3.2	Set SETPTs to 27 or so to verify backup heaters really heat.	_____ OK
3.3	Verify Backup on UGT and LGT Heater mode	_____ OK
3.4	Verify IUGTHTRBV max voltage 25 to 28V	_____ V
3.5	Verify ILGTHTRBV max voltage 25 to 28V	_____ V
3.6	Record Peak IDPU Current	_____ mA
3.7	Verify UGT and LGT temperature Increases	_____ OK
3.8	Estimate Heating Rate (degrees/min here) @50%	_____ d/m
3.9	RAS heater on setpt 25%	
3.10	Record Temperature	
3.10	Record Temperature after 1 min	
4	Turn OFF Heaters	
4.2	/IUGTSETPT 20	_____ OK
4.3	/ILGTSETPT 20	_____ OK
4.4	/IDPUDISARM HTR	_____ OK

Procedure Complete

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Date/Time: _____

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3 Problems / Notes

System	Description of Problem