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Gravity Probe B Relativity Mission

Payload Magnetometer Thermal Vacuum Procedure

GP-B Procedure

P0897 Rev -

Prepared by: Paul Shestople	Date
Reviewed by: Ernie Eufer Payload Magnetometer Designer	Date
Approved by: William Bencze Payload Electronics Manager	Date
Approved by: Rich Whelan System Engineering	Date
Approved by: Dorrene Ross GP-B Quality Assurance	Date

Table of Contents:

1.0 Revision History

Rev Level	Comments/notes	Date	Revised By
-	First release of this test procedure	27-Jan-2001	

2.0 Scope:

This procedure details the operations required to thermally vacuum test a GPB Payload Magnetometer, LMMS PN 8A00877, by performing Payload Magnetometer Full Functional Test Procedure at two temperatures. One of four payload magnetometer will be calibrated; the other three will be qualified by similarity.

3.0 Device Under Test (DUT):

Record the serial number of the Device Undergoing Test, or DUT.

Payload Magnetometer	SN:	

Test Operator:	Name:	

Start of test:	Date: Time:	

4.0 Formal Requirements Verification

This procedure verifies by test the following Payload Magnetometer requirements:

4.1 S0356 Rev C, section 3.2.2.5.1 - Magnetometer Baseplate Operational Temperature Range

4.2 S0356 Rev C, section 3.2.2.5.2 - Survival Test Temperature Range

5.0 Reference Documents

5.1	EJINC PD MAG-001 Rev A	Payload Magnetometer Full Functional Test
5.2	S0356, Rev B	Payload Magnetometer Specification

6.0 Test Facilities

6.1 Primary facility: End Station 3 : Main Lab (HEPL 175), Stanford University

6.2 Alternate facility (specify):_____

7.0 QA Provisions:

7.1 This procedure shall be conducted on a formal basis to its latest approved and released version. The QA Program Engineer (D. Ross) and the government representative (ONR/R. Gurr) shall be notified 24 hours prior to he start of this procedure. QA may monitor the execution of all or part of this procedure should they elect to do so.

QA notification time/date:

Date/time:_____	Date/time:_____
GP-B QA (D. Ross)	Gov't Rep (R. Gurr)

7.2 Upon completion of this procedure, the Payload Magnetometer REE and the GP-B QA manager shall certify her/his concurrence that the procedure was performed and accomplished in accordance with the prescribed instructions by signing and dating his approval at the end of this procedure.

8.0 Test Personnel

This test procedure is to be conducted only by the following personnel, or others designated by the Payload Magnetometer REE at the time of test (redline names in below as required)

8.1 Ernie Eufer

8.2 Paul Shestople

8.3 Other: _____

9.0 General Instructions

9.1 Redlines can be initiated by the test personnel listed in Section 8.0 and must be approved by QA.

9.2 Test operators shall read this procedure in its entirety and resolve any apparent ambiguities prior to beginning this test.

9.3 Any nonconformance or test anomaly should be reported by via a Discrepancy Log (D-LOG). Refer to the Quality Plan, P0108, for guidance. Do not alter or break test configuration if a test failure occurs; notify quality assurance.

9.4 Only the following persons have the authority to exit/terminate this test or perform a retest: test operators listed in Section 8.0 and GP-B QA.

10.0 Hardware Safety Requirements:

10.1 This assembly is not ESD sensitive

10.2 Connector mating:

10.2.1 Examine all mating connectors before attempting to mate them.

10.2.2 Remove any foreign particles. Look for any damaged pins or sockets.

10.2.3 Do not force the coupling action if excessive resistance is encountered.

10.2.4 Ensure that key-ways are aligned when mating connectors.

11.0 Test Equipment

The following support hardware will be used and the applicable information for the instruments shall be recorded below. Hand-written additions to this list may be made in the space provided.

Item	Equipment Description	Qty	Make	PN	SN	Cal Due
1.	Flight Magnetometer Sensor	1	APS	900-1130-R PLMAG (4A03)	03	N/A
2.	TVAC Chamber	1	SU		01	N/A
3.	PL Magnetometer Electronics PWA, Flight Equivalent	1	LMMS	8A00877		N/A
4.	Magnetometer Cable	1	SU			N/A
5.	Strip Chart Recorder	1				
6.	Data Logger	1				
7.	Magnet	1				
8.						
9.						
10.						
11.						
12.						
13.						

12.0 Procedure

	Step	P/F	Notes
12.1	Mount the Payload Magnetometer into the TVAC chamber. Annotate orientation in the space provided below, or in an attached note.		
12.2	Annotate the connector mate in the mate/demate log.		
12.3	While at ambient pressure and temperature, perform the following Aliveness test.		
12.3.1	**Power on unit.**		
12.3.2	Measure input power to PWA Record +15V _____mA Record -15 V _____mA		
12.3.3	Record voltages for three axis X:_____ Y:_____ Z:_____		
12.3.4	Verify all sensor outputs are responsive to field change.		
12.3.5	**Power off unit.**		

12.4	Close the TVAC chamber.		
12.5	Vacuum the chamber to less than 10^{-5} Torr.		
12.6	Reduce temperature of DUT to -81°C (± 5°C). This may be done concurrently with step 12.5.		
12.7	While at -81°C (± 5°C) and vacuum, perform the following Aliveness test.		
12.7.1	**Power on unit.**		
12.7.2	Measure input power to PWA Record +15V _____mA Record -15 V _____mA		
12.7.3	Record voltages for three axis X:_____ Y:_____ Z:_____		
12.7.4	Verify all sensor outputs are responsive to field change.		
12.7.5	**Power off unit.**		
12.8	Increase temperature of DUT to +46°C (± 5°C).		
12.9	While at 46°C and vacuum, perform the following Aliveness test.		
12.9.1	**Power on unit.**		
12.9.2	Measure input power to PWA Record +15V _____mA Record -15 V _____mA		
12.9.3	Record voltages for three axis X:_____ Y:_____ Z:_____		
12.9.4	Verify all sensor outputs are responsive to field change.		
12.9.5	**Power off unit.**		
12.10	Reduce temperature of DUT to -81°C (± 5°C).		
12.11	Increase temperature of DUT to +46°C (± 5°C).		
12.12	Reduce temperature of DUT to -81°C (± 5°C).		
12.13	While at -81°C (± 5°C) and vacuum, perform the following Aliveness test.		
12.13.1	**Power on unit.**		
12.13.2	Measure input power to PWA Record +15V _____mA Record -15 V _____mA		
12.13.3	Record voltages for three axis X:_____ Y:_____ Z:_____		
12.13.4	Verify all sensor outputs are responsive to field change.		
12.13.5	**Power off unit.**		
12.14	Increase temperature of DUT to +46°C (± 5°C).		
12.15	While at +46°C (± 5°C) and vacuum, perform the following Aliveness test.		
12.15.1	**Power on unit.**		
12.15.2	Measure input power to PWA		

	Record +15V _____mA Record -15 V _____mA		
12.15.3	Record voltages for three axis X:_____ Y:_____ Z:_____		
12.15.4	Verify all sensor outputs are responsive to field change.		
12.15.5	**Power off unit.**		
12.16	Decrease temperature to 25°C (± 5°C).		
12.17	Vent TVAC chamber to 1 ATM		
12.18	Open TVAC chamber.		
12.19	Perform a final Aliveness test.		
12.19.1	**Power on unit.**		
12.19.2	Measure input power to PWA Record +15V _____mA Record -15 V _____mA		
12.19.3	Record voltages for three axis X:_____ Y:_____ Z:_____		
12.19.4	Verify all sensor outputs are responsive to field change.		
12.19.5	**Power off unit.**		
12.20	Remove DUT from TVAC chamber.		

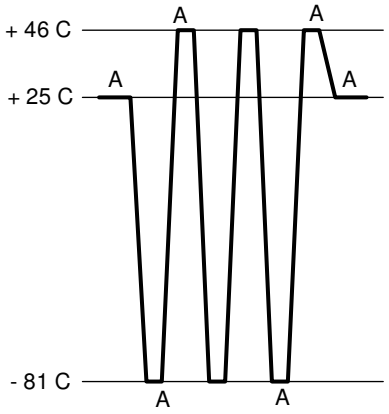

Figure 1: Temperature Profile

13.0 Completion of procedure:

	P/F	Notes
13.1 Return DUT to storage container		
13.2 Attach all notes and called procedures to this procedure		

14.0 Certification:

I certify that this procedure was performed in whole and that the data recorded above is complete and accurate.

Test Engineer		Date	

This is to certify that the information obtained under this test procedure is as represented and the documentation is completed and correct.

GSS Representative		Date	
Quality Assurance		Date	