STANFORD UNIVERSITY
W.W. HANSEN EXPERIMENTAL PHYSICS LABORATORY
GRAVITY PROBE B, RELATIVITY GYROSCOPE EXPERIMENT
STANFORD, CALIFORNIA 94305-4085

(PTP) FWD SRE REV C INSTALLATION

GP-B PAYLOAD VERIFICATION TEST II OPERATIONS ORDER

P0538A
ECO 1191
29 August, 2000

PREPARED _____ _____
H. Yengoyan Date

APPROVED _____ _____
K. Pearce, Systems Test Engr. Date

APPROVED _____ _____
M. Taber, Test Director Date

APPROVED _____ _____
H. Moskowitz, Safety Engineer Date

APPROVED _____ _____
D. Ross, Quality Assurance Date

APPROVED _____ _____
S. Buchman, Hardware Manager Date

REVISION RECORD

REVISION	ECO	PAGES	DATE
A	1191	Procedure was revised to update wording for Payload Verification Test II and personnel changes.	8/31/00

1. SCOPE

This procedure provides authority to install the two SRE brackets and four Rev. C SRE units (two on each bracket) onto the neck of the Science Mission Dewar to be used during Payload Verification Testing II.

NOTE

Flight hardware, protect parts and assemblies to prevent magnetic contamination and physical damage.

2. REFERENCE DOCUMENTS

2.1. Procedures

Not applicable

2.2. Drawings

8A01961GSE - FWD Electronics Mounting GSE Bracket, Rev. NC

5856126 – Bracket, Front, FWD Elec Mounting (GP-B), Rev. A

5856127 – Bracket, Rear, FWD Elec Mounting (GP-B), Rev. A

2.3. FIGURES

Not applicable

2.4. SUPPORTING DOCUMENTATION

GP-B Bolt Torque Specification, LMMS-5834972

GP-B Magnetic Control Plan, LMMS-5835031

GP-B (FIST) Preliminary Hazards Analysis, LMMS-F314446

GP-B (FIST) Safety Plan, LMMS- F314447

FIST Emergency Procedures SU/GP-B P0141

3. GENERAL REQUIREMENTS

3.1 Quality Assurance

Integration shall be conducted on a formal basis to approved and released procedures. The QA program office shall be notified of the start of this procedure. A Quality Assurance Representative, designated by D. Ross shall be present during the procedure and shall review any discrepancies noted and approve their disposition. Upon completion of this procedure, the QA Program Engineer, D. Ross or her designate, nominally R. Leese, will certify her concurrence that the effort was performed and accomplished in accordance with the prescribed instructions by signing and dating in the designated place(s) in this document. Discrepancies will be recorded in a D-log or as a DR per Quality Plan P0108.

3.2 Red-line Authority

Authority to red-line (make minor changes during execution) this procedure is given solely to the Test Director or his designate and shall be approved by the QA Representative. Additionally, approval by the Hardware Manager shall be required, if in the judgment of the Test Director or QA Representative, experiment functionality may be affected.

3.3 Personnel

The following personnel are qualified to perform this procedure:

- Haig Yengoyan
- Tom Welsh
- Mike Taber
- Dave Murray
- Terry McGinnis

See section 3.1 for details on which Quality Assurance personnel are required to be notified and/or witness this procedure.

3.4 Safety

In case of any injuries obtain medical treatment: at:

LMMS **Call 117** Stanford University **Call 9-911**

3.4.1 The GP-B (FIST) Safety Plan, LMSC-F314447, discusses safety design, operating and maintenance requirements which the R&DD program office has adhered to. These requirements

should be reviewed for applicability at any facility outside of R&DD (e.g. Stanford University) where FIST hardware is operated.

3.5 Hazards Analysis

The GP-B (FIST) Preliminary Hazards Analysis, LMSC-F314446, discusses hazards inherent in R&DD-developed FIST hardware in greater detail.

4. CONFIGURATION REQUIREMENTS:

4.1 SMD mounted in SMD test stand with the work platforms and scaffolding attached.

5. HARDWARE REQUIREMENTS

The Dewar and accompanying build hardware are very delicate. Be sure to handle them with care so that they do not become damaged.

NOTE

Take all necessary precautions not to let anything physically damage the Science Mission Dewar or particulate onto its surfaces.

5.1 Hardware Required:

Qt. 4	Rev. C SRE EU Units
Qt. 2	8A01961GSE-101 SRE Bracket Assembly
Qt. 2	5856126-101 Front Bracket Assembly
Qt. 2	5856127-101 Rear Bracket Assembly
Qt. 4	SRE Bracket Dog Ears (two 2” wide, and two 1.5” wide)
Qt. 1	Torque wrench 10-120 in-lbs.
Qt. AR	Fasteners for attaching support rods and bracket
Qt. AR	Hand tools (Alan wrenches, screw drivers, etc.)

6. OPERATIONS:

Operator _____.

Date Initiated_____.

Time Initiated_____.

6.1 Configuration Requirements:

SMD mounted in SMD test stand with the work platforms and scaffolding attached.

7. NOTIFICATION

7.1 Safety Notification

Safety shall be notified 24 hours in advance prior to the start of any work performed. Record who was contacted, the date, and time below.

Contact: _____
Date and Time: _____

7.2 Quality Assurance Notification

PTD to notify the Quality Engineer 24 hours in advance prior to the start of any work performed. Record who was contacted, the date, and time below.

Contact: _____
Date and Time: _____

7.3 ONR Notification

Quality Engineer to notify ONR 24 hours in advance prior to the start of any work performed. Record who was contacted, the date, and time below.

Contact: _____
Date and Time: _____

8. INSTALLING THE SRE BRACKETS AND REV. C SRE'S

8.1 Mounting SRE Brackets onto the Dewar

8.1.1 Begin by removing the –106 and –107 cross braces and one –108 stop block from the fully assembled 8A01961GSE-101 SRE

Brackets.

8.1.2 Verify all remaining fasteners have lock washer under their screws.

8.1.3 Per Note 7 torque all 1/4-28 screws in the two brackets to 70±7 in-lbs. per the 5834972 GP-B Bolt Torque Specification. Record information below.

Torque Wrench Asset Number _____
Calibration Due Date _____
Final Torque Value _____

8.1.4 Product Assurance to witness torque.

QA Witness _____

8.1.5 Mount each SRE bracket (less the –106 and –107 cross braces and one –108 stop block) onto the forward electronic mounting brackets (5856126 & 5856127) using the 8 each .875 long 10-32 screws. Make sure to mount the SRE bracket with the forward side pointed up.

8.1.6 Per Note 7 torque the 10-32 screws to 25±2 in-lbs. per the 5834972 GP-B Bolt Torque Specification.

Torque Wrench Asset Number _____
Calibration Due Date _____
Final Torque Value _____

8.1.7 Product Assurance to witness torque.

QA Witness _____

8.1.8 Repeat steps 8.1.5 and 8.1.6 for the second SRE bracket. Record data below.

Final Torque Value _____

8.1.7 Product Assurance to witness torque of the second SRE bracket. Make sure to use the same torque wrench as in section 8.1.6.

QA Witness _____

Approval of Section 8.1

Approved: _____ Date: _____
Integration Engineer

Discrepancies if any:

Approved: _____ Date: _____
PTD

Approved: _____ Date: _____
QA Representative

Approved: _____ Date: _____
Integration Manager

8.2 Mounting the Rev. C SRE Units

CAUTION

The Rev. C SRE Units are ESD Sensitive. Use appropriate ESD protection when handling the units.

8.2.1 After each SRE bracket is mounted on the neck of the dewar, bring 4 each of the Rev. C SRE units up next to the dewar.

8.2.2 Verify the orientation of the SRE units onto the SRE brackets. The SRE units are to have the squid connector pointing up toward the sunshade and the two adjusting screw holes are to point out for easy access.

8.2.3 Lift one SRE unit onto the bracket oriented in the correct position and rest its weight against the bottom stop block.

8.2.4 While one person is holding the SRE in place, the other person will attach the two dog ears onto the 1.5" and 2" arms using the 4 each 1.5" 1/4-28 screws. Tighten the screws hand tight.

8.2.5 Repeat this operation for the second SRE unit.

8.2.6 After both SRE units are installed on the bracket, install the second stop block and torque the two 1/4-28 x 1.5" screws per Note 7 to 70 ± 7 in-lbs. per the per the 5834972 GP-B Bolt Torque Specification. Make sure that there are lock washers on each screw.

Torque Wrench Asset Number _____
Calibration Due Date _____
Final Torque Value _____

8.2.7 Product Assurance to witness torque.

QA Witness _____

8.2.8 While one person holds the SRE units to prevent them from falling forward, the second person will replace one set of dog ears with the appropriate cross brace. Screw the cross brace down with the 1/4-28 screws hand tight.

8.2.9 Repeat this operation for the second cross brace.

8.2.10 Torque all 1/4-28 screws in the cross braces per Note 7 to 70±7 in-lbs. per the 5834972 GP-B Bolt Torque Specification.

Torque Wrench Asset Number _____
Calibration Due Date _____
Final Torque Value _____

8.2.11 Product Assurance to witness torque.

QA Witness _____

8.2.12 Repeat operations 8.2.6 through 8.2.10 for the second SRE bracket.

8.2.13 Product Assurance to witness the torque for step 8.2.6 for the second SRE bracket. Make sure to use the same torque wrench used in section 8.2.6.

Final Torque Value _____
QA Witness _____

8.2.14 Product Assurance to witness the torque for step 8.2.10 for the second SRE bracket. Make sure to use the same torque wrench used in section 8.2.10.

Final Torque Value _____
QA Witness _____

8.2.15 Verify all screws were torqued and the SRE units are correctly oriented.

8.2.16 After the SRE units are installed, measure the electrical resistance between the SRE units and the 5856126 & 5856127 mounting brackets. The resistance is to be less than 0.0025 Ohms. Record data below.

First SRE unit to mounting bracket _____ Ω

Second SRE unit to mounting bracket_____ Ω

8.2.17 Product Assurance to witness measurement.

QA Witness _____

Approval of Section 8.2

Approved: _____ Date: _____
Integration Engineer

Discrepancies if any:

Approved: _____ Date: _____
PTD

Approved: _____ Date: _____
QA Representative

Approved: _____ Date: _____
Integration Manager

9. PROCEDURE COMPLETED

The results obtained in the performance of this procedure are acceptable:

Test Engineer _____ Date _____

PTD _____ Date _____

Discrepancies if any:

The information obtained under this assembly and test procedure is as represented and the documentation is complete and correct:

Integration Manager _____ Date _____

QA Representative _____ Date _____

Quality Assurance _____ Date _____