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

FWD SRE EU REINSTALLATION

GP-B SCIENCE MISSION DEWAR OPERATIONS ORDER

1 November, 1999

PREPARED	H. Yengoyan	Date
APPROVED	M. R. Anderson, Systems Test Engr.	Date
APPROVED	M. Taber, Test Director	Date
APPROVED	J. Janicki, Safety Engineer	Date
APPROVED	D. Ross, Quality Assurance	Date
APPROVED	S. Buchman, Hardware Manager	Date

1. SCOPE

This procedure provides authority to remove two Rev. C SRE units and their associated bracket and replace it with one SRE Engineering Unit and its bracket onto the neck of the Science Mission Dewar.

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

8A01861GSE – TRE Simulator Bracket

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 PTD 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 PTD or QA Representative, experiment functionality may be affected.

3.3 Personnel

The following personnel are qualified to perform this procedure:

- Haig Yengoyan
- Paul Ayres
- 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. 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.

4.1 Hardware Required:

Qt. 1 SRE Engineering Unit
Qt. 1 8A01861GSE TRE Simulator Bracket
Qt. 6 Rectangular Washer to Mount the SRE EU
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 the SRE and bracket
Qt. AR Hand tools (Alan wrenches, screw drivers, etc.)

5. OPERATIONS:

Operator _____.

Date Initiated_____.

Time Initiated_____.

6. NOTIFICATION

6.1 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: _____

6.2 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: _____

6.3 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: _____

7. REMOVING THE REV. C SRE'S AND SRE BRACKET

7.1 Mounting SRE Brackets onto the Dewar

7.1.1 Begin by removing the –106 2" Cross Brace and replacing it with the two 2" wide dog ears on the 8A01961GSE-101 SRE Bracket. Secure the dog ears on the bracket using the same fasteners used to hold the –106 brace.

7.1.2 Remove the –107 1.5" Cross Brace and replacing it with the two 1.5" wide dog ears on the 8A01961GSE-101 SRE Bracket. Secure the dog ears on the bracket using the same fasteners used to hold the –107 brace.

7.1.3 After the dog ears are all attached, remove one of the –108 Stop block from the bracket.

7.1.4 Once the stop block is removed, remove one 2" and one 1.5" dog ear and slide out one of the Rev. C SRE units. Two people will be needed to perform this operation.

7.1.5 Repeat operation 7.1.4 for the second Rev. C SRE Unit.

7.1.6 After the two SRE units are removed from the bracket, unscrew the 8 each .875 long 10-32 screws that hold bracket to the dewar's two aluminum mounting brackets.

Approval of Section 7.1

Approved: _____ Date: _____
Integration Engineer

Discrepancies if any:

Approved: _____ Date: _____
QA Representative

Approved: _____ Date: _____
Integration Manager

7.2 Mounting the SRE Engineering Unit

CAUTION

The SRE Engineering Unit is ESD Sensitive. Use appropriate ESD protection when handling the unit.

7.2.1 Mount the 8A01861GSE TRE Simulator Bracket onto the dewar's aluminum mounting brackets using the 8 each .875 long 10-32 screws used to hold the 8A01961GSE bracket to the dewar.

7.2.2 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 _____

7.2.3 Product Assurance to witness torque.

QA Witness _____

7.2.4 Lift the SRE engineering unit onto the TRE simulator bracket and oriented in the correct direction.

7.2.5 While one person is holding the SRE in place, the other person will attach the 6 each .75 long 10-32 screws and 6 each rectangular washers. Tighten the screws hand tight.

7.2.6 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 _____

7.2.7 Product Assurance to witness torque.

QA Witness _____

7.2.8 Verify all screws were torqued and the SRE unit is correctly oriented.

7.2.9 After the SRE unit is installed, measure the electrical resistance between the SRE unit and the dewar's mounting brackets (5856126 & 5856127). The resistance is to be less than 0.0025 Ohms. Record data below.

Ohm Meter Asset Number _____
Calibration Due Date _____
SRE unit to mounting bracket _____ Ω

7.2.10 Product Assurance to witness measurement.

QA Witness _____

Approval of Section 7.2

Approved: _____ Date: _____
Integration Engineer

Discrepancies if any:

Approved: _____ Date: _____
QA Representative

Approved: _____ Date: _____
Integration Manager

8. PROCEDURE COMPLETED

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

Test Engineer _____ 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 _____