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

FWD REV. C SRE & ECU ENGINEERING UNIT REMOVAL

GP-B SCIENCE MISSION DEWAR OPERATIONS ORDER

19 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 the remaining Rev. C SRE units, the ECU Engineering Unit, and their associated brackets in preparation for the removal of Probe-C from 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

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
- Chuck Warren
- 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. 3	SRE Rev. C and ECU Engineering Units (On the Dewar)
Qt. 1	8A01961GSE-101 SRE Bracket Assembly (On the Dewar)
Qt. 1	8A01961GSE-102 ECU Bracket Assembly (On the Dewar)
Qt. 4	SRE Bracket Dog Ears (two 2” wide, and two 1.5” wide)
Qt. 1	Torque wrench 10-120 in-lbs. (If Necessary)
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: _____

7. REMOVING THE REV. C SRE AND ECU ENGINEERING UNITS

7.1 Removing the Rev. C SRE and Mounting Bracket from the Dewar

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

7.1.1 Verify that all the Rev. C SRE test cables have been disconnected and the SRE is ready to be removed. If there are any cable(s) still attached, contact the SRE Test Engineer or his delegate to remove the cable(s) before proceeding.

7.1.2 Begin by removing the 8A01961GSE–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.

7.1.3 Remove the 8A01961GSE–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.

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

7.1.5 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.

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

7.1.7 After the two Rev. C 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.

7.2 Removing the ECU EU and Mounting Bracket from the Dewar

CAUTION

The ECU Unit is ESD Sensitive. Use appropriate ESD protection when handling the unit and associated cables.

7.2.1 Verify that all the ECU EU test cables have been disconnected and the ECU is ready to be removed. If there are any cable(s) still attached, contact the ECU Test Engineer or his delegate to remove the cable(s) before proceeding.

7.2.2 Begin by unscrewing the two 8A01961GSE–110 L brackets (which attaches the ECU to the –109 base plate) from the fully assembled 8A01961GSE-102 ECU Bracket Assembly. Do not remove the –110 brackets from the ECU Unit. Save all the fasteners for reuse.

7.2.3 After the brackets are unscrewed from the –109 base plate, lift the ECU Unit off of the base plate and unscrew the 8 each 10-32 x 1/2" long 100° flat head Phillips screws which hold the –109 base plate the dewar's two aluminum mounting brackets. Discard these screws if they appear worn.

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:

Payload Test Director _____ Date _____

QA Representative _____ Date _____

Quality Assurance _____ Date _____