



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

(PTP) SRE, TRE, ECU, & GSS REMOVAL

GP-B PAYLOAD VERIFICATION TEST II OPERATIONS ORDER

P0845
23 May, 2001

PREPARED _____
H. Yengoyan Date

APPROVED _____
K. Pearce, Systems Test Engr. Date

APPROVED _____
W. Bencze, Test Director Date

APPROVED _____
H. Moskowitz, Safety Engineer Date

APPROVED _____
D. Ross, Quality Assurance Date

APPROVED _____
W. Bencze, Payload Electronics Mgr. Date

REVISION RECORD

REVISION	ECO	PAGES	DATE

1. SCOPE

This procedure provides authority to remove the SRE, TRE, ECU, and GSS electronics and associated flight cables, which were temporarily installed onto the neck of the Science Mission Dewar for use during Payload Verification II Phase B.

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

8A00631 – FWD Payload Electronics Install Drawing (GP-B), Rev. A

8A00848 – Forward SRE Assembly Rev. C

8A00918 – Telescope Readout Electronics Assy. Rev. D

8A00841 – FSU Assy (ECU) Rev. -

8A00846 – FSU Assy (GSS) Rev. -

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

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

8A00557- W400 Aft SRE A to Fwd SRE A Power, Rev NC

8A00558- W401 Aft SRE A to Fwd SRE A Digital, Rev NC

8A00561- W404 SRE A HLD's, Rev NC

8A00562- W405 Aft SRE A to Fwd SRE B Digital, Rev NC

8A00563- W406 Aft SRE A to Fwd SRE B Pwr, Rev NC

8A01285- W450 & W451 Fwd SRE A to Top Hat, Rev B

8A01286- W453 & W454 Fwd SRE B to Top Hat, Rev B

8A01287- W460 TRE B to Top Hat I8, Rev D

8A01288- W461 TRE A to Top Hat I9, Rev D

8A01317- W412 & W413 Fwd SRE to Top Hat, Rev A

8A01410-W456 TRE to Fwd SRE, Rev A

8A01411- W457 TRE to Fwd SRE, Rev A

8A01412- W458 TRE to Fwd SRE, Rev NC
8A01413- W459 TRE to Fwd SRE, Rev NC
8A00469- ECU (W300,301,302) UV Lamp/Switch Cable Assy, Rev A
8A01959- ECU (W303) Final Filters Cable Assy, Rev A
8A00533- ECU (W303A) FEE P12A To Top Hat I2 Cable Assy, Rev A
8A01546- ECU (W309) P8 To EV 1&2 and LV1 Cable Assy, Rev D
8A01416- ECU (W309A) EV 1&2 Extension Cable Assy, Rev A
8A01547- ECU ((W310) P9 To EV 3&4 and LV2 Cable Assy, Rev D
8A01417-ECU (W310A) EV 3&4 Extension Cable Assy, Rev A
8A00543-ECU (W311) A Aft To Fwd Cable Assy, Rev B
8A00548-ECU (W312) B Aft To Fwd Cable Assy, Rev B
8A01548-ECU (W314) Magnetometer 1&3 Cable Assy, Rev A
8A01549-ECU (W315) Magnetometer 2&4 Cable Assy, Rev A
8A01550-ECU (W316) Support Ring & Vacuum Gauge Cable Assy, Rev A
8A01268-ECU (W350) J9 to J802 & FEE J805A Cable Assy, Rev A
8A01418-ECU (W351) J10 To J805 & FEE J802A Cable Assy, Rev
8A01473-101 W550 ACU To FSU GFAB (A) Cable Assy, Rev A
8A01471-101 W551 ACU To FSU Power Cable Assy, Rev B
8A01474-101 W558 ACU To FSU GFAB (B) Cable Assy, Rev A
8A01434-101 W414 SRE to ACU Timing Cable Assy, Rev NC
178-6005-36N (Reynolds Industries PN) W510 thru W516
FSU to Top Hat Hi-Voltage Cable Assy

2.3. FIGURES

Not applicable

2.4. SUPPORTING DOCUMENTATION

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. Safety, ONR and the QA program office shall be notified 24 hours before 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 Payload Technical 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
- Bob Farley
- Mike Taber
- Dave Murray
- Bruce Clarke
- William Bencze
- Lou Yamanishi
- Larry Catanzano
- Bud Swihart

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:

Stanford University **Call 9-911**

4. CONFIGURATION REQUIREMENTS:

4.1 SMD mounted vertically in the SMD test stand with the work platforms and scaffolding attached. The forward electrical boxes are installed on the neck of the SMD and all associated test cables have been removed and/or unplugged from the boxes.

5. HARDWARE REQUIREMENTS

The Dewar, SRE, TRE, ECU, and GSS Units 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 Flight Electronic Boxes and Science Mission Dewar or particulate onto its surfaces.

5.1 Hardware Required:

Qt. 1	8A00848-101 SRE A Assembly
Qt. 1	8A00848-102 SRE B Assembly
Qt. 2	8A00918-101 TRE Assembly
Qt. 1	8A00841-101 ECU Assembly
Qt. 4	8A00846-101 GSS Assembly
Qt. 1	Torque wrench 10-120 in-lbs.
Qt. AR	Hand tools (Allen wrenches, screw drivers, etc.)

6. VERIFICATION REQUIREMENTS

No requirements are being verified during this procedure.

7. OPERATIONS:

Operator _____.

Date Initiated _____.

Time Initiated _____.

8. NOTIFICATION

8.1 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: _____

8.2 Quality Assurance Notification

The Test Director is 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: _____

8.3 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: _____

9.0 SRE AND TRE FLIGHT CABLE REMOVAL

CAUTION

CABLE REMOVAL REQUIRE CONTACT WITH ESD SENSITIVE ELECTRONICS. USE APPROVED ESD PROTECTION.

9.1 Remove the following SRE and TRE flight cables:

- 1) 8A00557-101-W400 Aft SRE A to Fwd SRE A Power
- 2) 8A00558-101-W401 Aft SRE A to Fwd SRE A Digital
- 3) 8A00561-101-W404 Aft SRE A to Fwd SRE A HLD
- 4) 8A00562-101-W405 Aft SRE A to Fwd SRE B Digital
- 5) 8A00563-101-W406 Aft SRE A to Fwd SRE B Power
- 6) 8A01285-101-W450 Fwd SRE A to Top Hat
- 7) 8A01285-102-W450 Fwd SRE A to Top Hat
- 8) 8A01286-101-W453 Fwd SRE B to Top Hat
- 9) 8A01286-102-W454 Fwd SRE B to Top Hat
- 10) 8A01317-101-W412 Fwd SRE A to Top Hat
- 11) 8A01317-102-W413 Fwd SRE B to Top Hat
- 12) 8A01287-101-W460 TRE B to Top Hat
- 13) 8A01288-101-W461 TRE A to Top Hat
- 14) 8A01410-101 W456 TRE A&B to SRE A&B (2 Cables)
- 15) 8A01411-101 W457 TRE A&B to SRE A&B (2 Cables)
- 16) 8A01412-101 W458 TRE A&B to SRE A&B (2 Cables)
- 17) 8A01413-101 W459 TRE A&B to SRE A&B (2 Cables)

9.1.1 Cap connectors and wrap connector bodies with bubble wrap or equivalent.
Prepare cables for delivery to LMMS Bldg. 205 flight stores.

9.1.2 Product Assurance to verify cable removal and packaging.

QA Verification _____

10. SRE FLIGHT ELECTRONICS BOX REMOVAL

10.1 Removing the SRE Units from the SMD

CAUTION

The SRE Units are ESD Sensitive. Use grounding wrist straps for ESD protection when handling the units.

- 10.1.1 Two people who are properly ESD grounded are required for this operation. While one person firmly holds the F/N 2 SRE A Assembly Serial # 001, a second person is to remove the six 10-32 x 7/8" socket head cap screws and #10 washers. Refer to the 8A00631 drawing. Place the washers and screws into a labeled bag and store for future use. If the screws are worn, then discard them.
- 10.1.2 Repeat step 9.1.1 for the F/N 12 SRE B Serial # 002 Assembly.
- 10.1.3 After the SRE Units are removed, contact the REE or QE for routing the assemblies for storage. Label the units as Flight so that they will not be moved or tampered with.

11. TRE UNITS FROM THE SMD.

CAUTION

The TRE Units are ESD Sensitive. Use grounding wrist straps for ESD protection when handling the units.

- 11.1 Two people who are properly ESD grounded are required for this operation. While one person firmly holds the F/N 1 TRE Assembly, a second person is to remove the eight 10-32 x $\frac{3}{4}$ " socket head cap screws and #10 washers. Refer to the 8A00631 drawing. Place the washers and screws into a labeled bag and store for future use.
- 11.2 Repeat for step 9.2.1 for the second TRE Unit.
- 11.3 After the TRE Units are removed, contact the REE or QE for routing the assemblies for storage. Label the units as Flight so that they will not be moved or tampered with.

12. ECU FLIGHT CABLE REMOVAL.

12.1 Remove following ECU flight cables:

- 1) 8A00469-101 W300 ECU UV Lamp/Switch
- 2) 8A00469-102 W301 ECU UV Lamp/Switch
- 3) 8A00469-103 W302 ECU UV Lamp/Switch
- 4) 8A01959-101 W303 ECU Final Filters
- 5) 8A00533-101 W303A ECU P12A To Top Hat I2
- 6) 8A01546-101 W309 ECU P8 To EV 1&2 and LV1
- 7) 8A01416-101 W309A ECU EV 1&2 Extension
- 8) 8A01547-101 W310 ECU P9 To EV 3&4 and LV2
- 9) 8A01417-101 W310A ECU EV 3&4 Extension
- 10) 8A00543-101 W311 ECU A Aft To Fwd
- 11) 8A00548-101 W312 ECU B Aft To Fwd
- 12) 8A01548-101 W314 ECU Magnetometer 1&3
- 13) 8A01549-101 W315 ECU Magnetometer 2&4
- 14) 8A01550-101 W316 ECU Support Ring & Vacuum Gauge
- 15) 8A01268-101 W350 ECU J9 to J802 & FEE J805A
- 16) 8A01418-101 W351 ECU J10 To J805 & FEE J802A
- 17) 8A01315-101 W352 ECU Dewar J801
- 18) 8A01291-101 W354 ECU J7 To Top Hat I7
- 19) 8A01289-101 W355 ECU J5 To Top Hat I5
- 20) 8A00532-101 W356 ECU J1 To Top Hat I1
- 21) 8A01318-101 W357 ECU J3 To Top Hat I3, SRE A&B J4
- 22) 8A01290-101 W358 ECU J6 To Top Hat I6
- 22) 8A01962-ECU (W608) P9 Pressure Sensor

12.2 Cap connectors and wrap connector bodies with bubble wrap or equivalent. Package for shipment to LMMS Bldg. 205 flight stores.

12.3 Product Assurance to verify cable removal and packaging.

QA Verification _____

13.0 ECU REMOVAL FROM THE SMD.

CAUTION

The ECU Unit is ESD Sensitive. Use grounding wrist straps for ESD protection when handling the unit.

- 13.1 Two people who are properly ESD grounded are required for this operation. While one person firmly holds the F/N 3 ECU Unit, a second person is to remove the eight 10-32 x 3/4" socket head cap screws and #10 washers. Refer to the 8A00631 drawing. Place the washers and screws into a labeled bag and store for future use.
- 13.2 After the ECU is removed, contact the REE or QE for routing the assembly for storage. Label the unit as Flight so that it will not be moved or tampered with.

14. GSS FLIGHT CABLE REMOVAL.

- 3) Remove the following GSS cables:
 - 4) 8A01473-101 W550 ACU To FSU GFAB (A)
 - 5) 8A01471-101 W551 ACU To FSU Power
 - 6) 8A01474-101 W558 ACU To FSU GFAB (B)
 - 7) 8A01434-101 W414 SRE to ACU Timing
 - 8) 178-6005-36N (Reynolds Industries PN) W510 thru W516
FSU to Top Hat Hi-Voltage Cable A
- 14.2 Cap connectors and wrap connector bodies with bubble wrap or equivalent. Package for shipment to LMM Bldg. 205 flight stores.
- 14.3 Product Assurance to verify removal and packaging.

QA Verify _____

15. REMOVING GSS UNITS FROM THE SMD

CAUTION

The GSS Units are ESD Sensitive. Use grounding wrist straps for ESD protection when handling the units.

- 15.1 Two people who are properly ESD grounded are required for this operation. While one person firmly holds one of the F/N 4 GSS Units, a second person is to remove the eight 10-32 x 3/4" socket head cap screws and #10 washers. Refer to the 8A00631 drawing. Place the washers and screws into a labeled bag and store for future use. If the screws are worn, then discard them.
- 15.2 Repeat step 9.4.1 for the remaining GSS Assemblies.
- 15.3 After the GSS Units are removed, place each unit inside an ESD bag and place it in the FSU storage container. Contact the REE or QE for routing the assemblies for storage.

16. PROCEDURE COMPLETED

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

Test Engineer _____ Date _____

Payload Test Dir. _____ 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 Manager _____ Date _____