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

RECEIVING THE FLIGHT GMA FROM MOOG

GP-B ENGINEERING PROCEDURE

P0941 Rev –

2 September, 2002

PREPARED	R. Stephenson, GMA Engineer	Date
APPROVED	C. Gray, GMA REE	Date
APPROVED	H. Moskowitz, Safety	Date
APPROVED	R. Pressburg, Quality Assurance	Date
APPROVED	R. Brumley, Hardware Manager	Date

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A SCOPE

This procedure provides the instructions for receiving the flight GMA from Moog. It includes appropriate signoff and inspection of the GMA by QA, bonded stores, Stanford receiving, and engineering team.

B SAFETY

The GMA is a gas pressure vessel. Under normal operations, the GMA requires no safety measures or equipment beyond those required for the use of a supply gas cylinder.

C QUALITY ASSURANCE

C.1 QA Notification

The QA program office and ONR representative shall be notified 24 hours prior to the start of this procedure. A Quality Assurance Representative, shall be present during the procedure and shall review any discrepancies noted and approve their disposition. Upon completion of this procedure, the QA Program representative, will certify 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.

C.2 Red-line Authority

Authority to redline (make minor changes during execution) this procedure is given solely to the Test Engineer or his designate and shall be approved by the QA Representative.

C.3 Discrepancies

Discrepancies will be recorded in a D-log or as a DR per Quality Plan P0108.

D TEST PERSONNEL

The Test Engineer shall be Chris Gray or an alternate that he shall designate. The Engineer has overall responsibility for the implementation of this procedure and shall sign off the completed procedure and relevant sections within it.

E REQUIREMENTS

E.1. Electrostatic Discharge Requirements

N/A

E.2. Lifting Operation Requirements

GMA requires at least two persons to lift out of container.

E.3. Hardware Equipment Requirements

Flight GMA

Cart for mounting GMA

Clamps

Class 100 down flow hood

ECU FEU

Cables to connect ECU FEU to Flight GMA

CSTOL "Flight GMA to ECU Functional Test"

Tin Snips

Box Knife

E.4. Instrument Pretest Requirements

All test equipment requiring calibration shall be entered in this procedure.
Calibratable item:_____ Calibration due:_____

Calibratable item:_____ Calibration due:_____

E.5. Configuration Requirements

GMA work will be performed under Class 100 flow hood or in clean room.

E.6. Constraints and Restrictions

Normal clean room practices apply.

F REFERENCE DOCUMENTS

P0920, "Flight GMA to ECU Functional"

G OPERATIONS

G.1. Verify Appropriate QA Notification

QA Notified_____ ONR Notified_____

G.2. Verify Availability of required personnel.

Verify that personnel representing Stanford Quality Assurance, Stanford Bonded Stores, Stanford Receiving, are available to accept the GMA

G.3 Receipt of GMA

Started on: _____

Note: Mark off each step of procedure as it is completed.

3.1 Set up the class 100 down flow hood in FIST Ops prior to receipt of the GMA will arrive.

3.2 Set up the ECU FEU in FIST Ops and verify it is ready to be connected to the Flight GMA.

3.3 Clean and prepare the GMA mounting cart and clamps and place them under the flow hood in FIST Ops.

3.4 Gather all necessary personnel prior to arrival of GMA at Stanford.

3.5 Verify that Stanford Receiving, Stanford QA, and Stanford Bonded Stores have the necessary paperwork (invoices, labels, etc) prepared**. Note: The GMA is flight hardware and, as such, cannot have labels affixed to it.**

3.6 When FedEx arrives, assist them in unloading GMA from truck.

- GMA will be moved into the FIST OPS area using a forklift.
- Prior to moving the GMA into the FIST OPS area with the forklift, verify GMA is secure.

  Quality_____

3.7 Inspect the packaging of the GMA for signs of damage and verify the shock indicators have not been activated. Remove the GMA. (Record all damage in D-Log)

Quality_____

3.8 Sign for the GMA from Fed Ex as received and enter into the procurement database.

Stanford Receiving: _____ Date: _____

3.9 Remove lid from shipping container and check shock recorder. Shock recorder indicator lamp should be green. If shock recorder is not green note in the D-Log the color shown.

Quality_____

3.10 If no further work is to be accomplished until the next day replace lid on the container. Verify container is secure. Quality_____

3.11 Remove lid from shipping container and check shock recorder. Shock recorder indicator lamp should be green. If shock recorder is not green note in the D-Log the color shown.

Quality_____

3.12 Remove shock recorder (if available) from GMA crate.

Quality_____

3.13 Remove GMA from crate.

3.14 Visually inspect the outer packaging for rips or other damage. Record in D-Log any discrepancies found. Quality_____

3.15 Carefully remove outer Mylar bag from GMA.

3.16 Visually inspect the GMA packaging for rips or other damage. Verify that center bag still appears hermetically sealed. Record in D-Log any discrepancies found.

Quality_____

3.17 Visually inspect GMA for damage and sign here. If damage is found, stop procedure and initiate Discrepancy Report process.

GMA appears undamaged.

S&MA MSFC Representative _____Date: _____

GMA RE _____ Date: _____

Stanford QA _____ Date: _____

3.18 Sign the GMA into Bonded Stores as flight hardware.

Stanford Bonded Stores: _____ Date: _____

3.19 Sign the GMA out of Bonded Stores for testing.

GMA Engineer: _____ Date: _____

Stanford Bonded Stores: _____ Date: _____

3.20 Place GMA under the flow hood.

3.21 Carefully remove the center bag from the GMA.

3.22 Visually inspect the GMA packaging for rips or other damage. Verify that inner bag still appears hermetically sealed. Record in D-Log any discrepancies found.

Quality_____

3.23 Perform a particle check under the flow hood to verify a clean environment before opening the GMA. Counts must read an average of less than 5 per 0.1 liter sample before GMA is opened.

Particle test passed: Test engineer _____ Date_____

Quality_____

3.24 Remove the GMA from the inner bag and place on cart.

3.25 Clamp the GMA frame securely to the cart.

3.26 Inspect GMA for particles or any indication that cleanliness has been compromised. Record in D-Log any discrepancies found. Quality_____

3.27 Inspect GMA to verify that all pressure ports (fill-and-drain valves and gamah fittings) are still securely capped. Record in D-Log any discrepancies found.

Quality_____

3.28 Visually inspect GMA for damage. Record in D-Log any discrepancies found.

GMA appears clean and undamaged.

S&MA MSFC Representative _____Date: _____

GMA RE _____ Date: _____

Stanford QA _____ Date: _____

3.29 Remove the shock and humidity sensors from the GMA (humidity sensor should still be blue).

3.30 Remove desiccant bags from GMA.

3.31 Analyze the 15G's Shock Sensors (3 each) for activation. If activated record findings in D-log. Quality_____

3.32 Connect the ECU FEU to the GMA.

3.33 Run the Flight GMA to ECU functional test, P0920.

3.34 Attach the shock recorder graph to this procedure (if applicable).

ECU functional passed.

ECU operator _____ Date_____

GMA Engineer _____ Date _____

QA representative _____ Date _____

G.4 PRE-TEST CHECKLIST

DATE	PROCEDURE #	CHECKLIST ITEM	COMPLETED	REMARKS
		1. VERIFY THE TEST PROCEDURE BEING USED IS THE LATEST REVISION.		
		2. VERIFY ALL CRITICAL ITEMS IN THE TEST ARE IDENTIFIED AND DISCUSSED WITH THE TEST TEAM.		
		3. VERIFY ALL REQUIRED MATERIALS AND TOOLS ARE PRE-STAGED AND AVAILABLE IN THE TEST AREA.		
		4. VERIFY ALL HAZARDOUS MATERIALS INVOLVED IN THE TEST ARE IDENTIFIED TO THE TEST TEAM.		
		5. IF HELIUM IS TO BE USED VERIFY THAT A BLUE "HELIUM" TAG IS AROUND THE NECK OF THE HELIUM CYLINDER.		
		6. VERIFY ALL HAZARDOUS STEPS TO BE PERFORMED ARE IDENTIFIED TO THE TEST TEAM.		
		7. VERIFY EACH TEAM MEMBER KNOWS THEIR INDIVIDUAL RESPONSIBILITIES.		
		8. CONFIRM THAT EACH TEST TEAM MEMBER CLEARLY UNDERSTANDS THAT HE/SHE HAS THE AUTHORITY TO STOP THE TEST IF AN ITEM IN THE PROCEDURE IS NOT CLEAR. **NOTE**: **DURING A HAZARDOUS OPERATION THE TEST WILL ONLY BE STOPPED WHEN IT IS SAFE TO DO SO**.		
		9. CONFIRM THAT EACH TEST TEAM MEMBER CLEARLY UNDERSTANDS THAT HE/SHE HAS THE AUTHORITY TO STOP THE TEST IF THERE IS ANY ANOMALY OR SUSPECTED ANOMALY **NOTE: DURING A HAZARDOUS OPERATION THE TEST WILL ONLY BE STOPPED WHEN IT IS SAFE TO DO SO**		
		10. NOTIFY MANAGEMENT OF ALL DISCREPANCY REPORTS OR D-LOG ITEMS IDENTIFIED DURING THE PROCEDURE. IN THE EVENT AN INCIDENT OCCURS DURING PROCEDURE PERFORMANCE, MANAGEMENT WILL BE NOTIFIED IMMEDIATELY.		
		11. CONFIRM THAT EACH TEST TEAM MEMBER UNDERSTANDS THAT THERE WILL BE A POST-TEST TEAM MEETING.		
		TEAM LEAD SIGNATURE:		

G.5 POST-TEST CHECKLIST

DATE	PROCEDURE #	CHECKLIST ITEM	COMPLETED	REMARKS
		1- VERIFY ALL STEPS IN THE PROCEDURE WERE SUCCESSFULLY COMPLETED.		
		2- VERIFY ALL MINOR/MAJOR DISCREPANCIES DISCOVERED DURING TESTING ARE PROPERLY DOCUMENTED.		
		3- ENSURE MANAGEMENT HAS BEEN NOTIFIED OF ALL MINOR/MAJOR DISCREPANCIES.		
		4- ENSURE THAT ALL STEPS THAT WERE NOT REQUIRED TO BE PERFORMED ARE PROPERLY IDENTIFIED.		
		5- IF APPLICABLE SIGN-OFF TEST COMPLETION.		
		TEAM LEAD SIGNATURE		

H PROCEDURE SIGN OFF

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

Approved: _____ Date: _____
Test Engineer

Approved: _____ Date: _____
C. Gray, GMA REE

Approved: _____ Date: _____
QA Representative