

Gravity Probe B Procedure for Payload Verification

PREPARE AND VERIFY PROBE CONFIGURATION FOR SHIPMENT

P0799 Rev B

ECO 1355

4 February, 2002

Prepared by: B. Muhlfelder

Revised by: M. Taber

Approvals:

Program Responsibility	Signature	Date
<i>M. Taber</i> Cryo-ops Test Director		
D. Ross GP-B Quality Assurance		
<i>R. Brumley</i> Payload Technical Manager		

Revision Record:

Rev	Rev Date	ECO #	Summary Description
A	8/13/01	1299	Removed references to Acoustic Test and other minor updates; Appendix 2 made optional
B	2/4/02		Modified for move to B159

Acronyms and Abbreviations:

Acronym / Abbreviation	Meaning

1. SCOPE

This procedure covers the verification (inspection) that the probe is ready for shipment to B159.

2. APPLICABLE DOCUMENTS

P0476 EOS/ESD Risk Mitigation Procedure

3. GENERAL REQUIREMENTS

3.1 Environmental Requirements

N/A

3.1.1. Magnetic Contamination

N/A.

3.1.2 Cleanliness Requirements

N/A.

3.2 Integration Personnel

3.2.1 Procedure Director

Persons authorized to be Test Director for this procedure are Rob Brumley, Mike Taber or Barry Muhlfelder. He has overall responsibility for the implementation of this procedure and shall sign off the completed procedure.

3.2.2 Authorized Personnel

R. Brumley
Bruce Clarke
Barry Muhlfelder
Dave Hipkins
Bob Farley
Mike Taber
Gary Reynolds
Ken Bower
Tom Welsh

3.3 Safety

Safety of both hardware and personnel must be maintained at all times. Probe safety notes apply to this procedure. Measures shall be taken (e.g., by tethering) as appropriate to prevent damage to the probe by dropping tools or other articles while working over the payload. Grounding straps shall be worn by personnel touching electrical connectors on the probe.

3.4. Quality Assurance

All assembly and testing shall be conducted on a formal basis to approved and released assembly and test procedures. A Quality Assurance representative shall review and document any discrepancy noted during this procedure and approve its disposition. A QA representative shall be present during this procedure unless otherwise indicated by the test director. Upon completion of this procedure, the QA representative will certify his/her concurrence that the effort was performed and accomplished in accordance with the prescribed instructions by signing and dating his/her approval line at the end of the procedure. D-Logs and discrepancies shall be used per the Stanford QA plan P0108.

3.5. REDLINE AUTHORITY

B. Muhlfelder
M. Taber
R. Brumley

3.6. Prerequisites

Configuration: Probe C installed in the flight dewar per 65113-1C34292. Nominal LHe temperature is 4.2 K.

4. Probe Configuration for Shipment

Flight Hardware Configuration: Probe C installed into the flight dewar, and dewar integrated with spacecraft

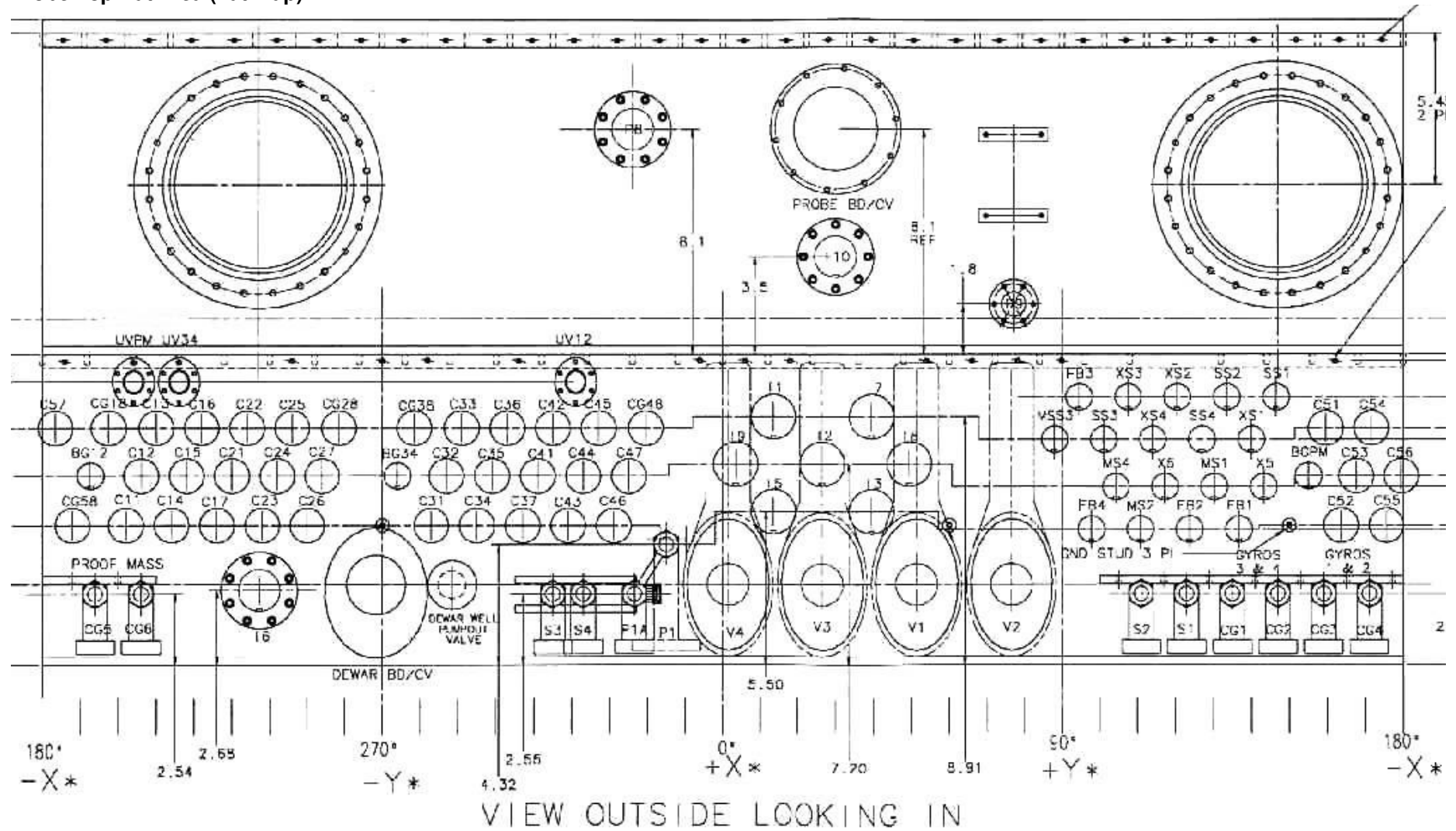
Configuration of Probe after completion of this procedure is given In Table 1 below:

Table 1 Transport to Lockheed Martin B159 Configuration:

Payload Definition/ extent: Probe C integrated into Science Mission Dewar per 65113-1C34292
Additional Hardware Installed Probe GSE / non-flight hardware Tophat connector. savers + caps (includes fiber optic conn. covers) Vatterfly Valve covers (2 x 6" & 4 x 2.5") Buffer lines w/valves on caging inlets Protective cover on Probe burst disk Evacuated cap on Well burst disk Protective cover (provided and installed by LMCO for the entire Space Vehicle) Additional Flight Hardware Sunshade (with non-flight protective cover) installed on window 4 Flight plumbing lines connected to spinup valves (S1-S4) and at P1a

Prepare and Verify Probe Configuration for Shipment

Probe Top Hat Area (flatwrap):



5. Procedure Operations

5.1 Ensure the items listed in Table 2 either conforms to the configuration specified, or have flight hardware attached. Cases where flight hardware has been attached shall be noted in the comments column. Any removed equipment shall be bagged and tagged.

Note: The following table content was derived from LM Dwg 1C34355, "Probe C to SU External Interfaces", Rev C.

Table 2

Probe Item	Description, Function, Part No., other info	Transportation Config. (i.e. capped?)	Configuration confirmation	QA verification	Comments
C11 THRU C17	SUSPENSION, GYRO 1, 1C34188-101, REYNOLDS P/N 467-7072	7 Capped and taped to guard against rotation, PN 07418-S4355 9534			
CG18	SUSPENSION GROUND, GYRO 1, 1C34188-101, REYNOLDS P/N 467-7072	1 Capped and taped to guard against rotation, PN 07418-S4355 9534			
C21 THRU C27	SUSPENSION, GYRO 2, 1C34188-101, REYNOLDS P/N 467-7072	7 Capped and taped to guard against rotation, PN 07418-S4355 9534			
CG28	SUSPENSION GROUND, GYRO 2, 1C34188-101, REYNOLDS P/N 467-7072	1 Capped and taped to guard against rotation, PN 07418-S4355 9534			
C31 THRU C37	SUSPENSION, GYRO 3, 1C34188-101, REYNOLDS P/N 467-7072	7 Capped and taped to guard against rotation, PN 07418-S4355 9534			
CG38	SUSPENSION GROUND, GYRO 3, 1C34188-101, REYNOLDS P/N 467-7072	1 Capped and taped to guard against rotation, PN 07418-S4355 9534			
C41 THRU C47	SUSPENSION, GYRO 4, 1C34188-101, REYNOLDS P/N 467-7072	7 Capped and taped to guard against rotation, PN 07418-S4355 9534			
CG48	SUSPENSION GROUND, GYRO 4, 1C34188-101, REYNOLDS P/N 467-7072	1 Capped and taped to guard against rotation, PN 07418-S4355 9534			
C51 THRU C57	SUSPENSION, PROOF MASS, 1C34188-101, REYNOLDS P/N 467-7072	7 Capped and taped to guard against rotation, PN 07418-S4355 9534			
CG58	SUSPENSION GROUND, PROOF MASS, 1C34188-101, REYNOLDS P/N 467-7072	1 Capped and taped to guard against rotation, PN 07418-S4355 9534			

Prepare and Verify Probe Configuration for Shipment

Probe Item	Description, Function, Part No., other info	Transportation Config. (i.e. capped?)	Configuration confirmation	QA verification	Comments
BG12	UV BIAS GROUND. GYRO 1 & 2, 1C34190-101,	Connector Saver - 6 Pin Connector, 942-005-MA35SN; Cap - 6 Pin Connector, DCR09N09CA-248059701 Tape on Cap			
BG34	UV BIAS GROUND, GYRO 3 & 4, 1C34190-101, note 5	Connector Saver - 6 Pin Connector, 942-005-MA35SN; Cap - 6 Pin Connector, DCR09N09CA-248059701 Tape on Cap			
BGPM	UV BIAS GROUND, PROOF MASS & SPARE, 1C34190-101, note 5	Connector Saver - 6 Pin Connector, 942-005-MA35SN; Cap - 6 Pin Connector, DCR09N09CA-248059701 Tape on Cap			
SS1	DC SQUID CABLE 1C34190-101, note 5	Connector Saver - 6 Pin Connector, 942-005-MA35SN; Cap - 6 Pin Connector, DCR09N09CA-248059701 Tape on Cap			
SS2	DC SQUID CABLE, 1C34190-101, note 5	Connector Saver - 6 Pin Connector, 942-005-MA35SN; Cap - 6 Pin Connector, DCR09N09CA-248059701 Tape on Cap			
SS3	DC SQUID CABLE, 1C34190-101, note 5	Connector Saver - 6 Pin Connector, 942-005-MA35SN; Cap - 6 Pin Connector, DCR09N09CA-248059701 Tape on Cap			
SS4	DC SQUID CABLE, 1C34190-101, note 5	Connector Saver - 6 Pin Connector, 942-005-MA35SN; Cap - 6 Pin Connector, DCR09N09CA-248059701 Tape on Cap			
MS1	DC SQUID CABLE, 1C34190-101, note 5	Connector Saver - 6 Pin Connector, 942-005-MA35SN; Cap - 6 Pin Connector, DCR09N09CA-248059701 Tape on Cap			

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Probe Item	Description, Function, Part No., other info	Transportation Config. (i.e. capped?)	Configuration confirmation	QA verification	Comments
MS2	DC SQUID CABLE, 1C34190-101, note 5	Connector Saver - 6 Pin Connector, 942-005-MA35SN; Cap - 6 Pin Connector, DCR09N09CA-248059701 Tape on Cap			
MSS3	DC SQUID CABLE, 1C34190-101, note 5	Connector Saver - 6 Pin Connector, 942-005-MA35SN; Cap - 6 Pin Connector, DCR09N09CA-248059701 Tape on Cap			
MS4	DC SQUID CABLE, 1C34190-101, note 5	Connector Saver - 6 Pin Connector, 942-005-MA35SN; Cap - 6 Pin Connector, DCR09N09CA-248059701 Tape on Cap			
FB1	DC SQUID CABLE, 1C34190-101, note 5	Connector Saver - 6 Pin Connector, 942-005-MA35SN; Cap - 6 Pin Connector, DCR09N09CA-248059701 Tape on Cap			y
FB2	DC SQUID CABLE, 1C34190-101, note 5	Connector Saver - 6 Pin Connector, 942-005-MA35SN; Cap - 6 Pin Connector, DCR09N09CA-248059701 Tape on Cap			
FB3	DC SQUID CABLE, 1C34190-101, note 5	Connector Saver - 6 Pin Connector, 942-005-MA35SN; Cap - 6 Pin Connector, DCR09N09CA-248059701 Tape on Cap			
FB4	DC SQUID CABLE, 1C34190-101, note 5	Connector Saver - 6 Pin Connector, 942-005-MA35SN Cap - 6 Pin Connector, DCR09N09CA-248059701 Tape on Cap			
XS1	DC SQUID CABLE, 1C34190-101, note 5	Connector Saver - 6 Pin Connector, 942-005-MA35SN Cap - 6 Pin Connector, DCR09N09CA-248059701 Tape on Cap			

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Probe Item	Description, Function, Part No., other info	Transportation Config. (i.e. capped?)	Configuration confirmation	QA verification	Comments
XS2	DC SQUID CABLE, 1C34190-101, note 5	Connector Saver - 6 Pin Connector, 942-005-MA35SN; Cap - 6 Pin Connector, DCR09N09CA-248059701 Tape on Cap			
XS3	DC SQUID CABLE, 1C34190-101, note 5	Connector Saver - 6 Pin Connector, 942-005-MA35SN; Cap - 6 Pin Connector, DCR09N09CA-248059701 Tape on Cap			
XS4	DC SQUID CABLE, 1C34190-101, note 5	Connector Saver - 6 Pin Connector, 942-005-MA35SN; Cap - 6 Pin Connector, DCR09N09CA-248059701 Tape on Cap			
X5	DC SQUID CABLE, 1C34190-101, note 5	Connector Saver - 6 Pin Connector, 942-005-MA35SN; Cap - 6 Pin Connector, DCR09N09CA-248059701 Tape on Cap			
X6	DC SQUID CABLE, 1C34190-101, note 5	Connector Saver - 6 Pin Connector, 942-005-MA35SN; Cap - 6 Pin Connector, DCR09N09CA-248059701 Cap			
I1	INSTRUMENTATION, 1C34616-101, note 4	Connector Saver - 55 Pin Connector, 942-005-ME35SN-9648; Cap - 55 Pin Connector, 07418-S2453-17A-12954			
I2	INSTRUMENTATION, 1C34616-101, note 4	Connector Saver - 55 Pin Connector, 942-005-ME35SN-9648; Cap - 55 Pin Connector, 07418-S2453-17A-12954			
I3	INSTRUMENTATION, 1C34616-101, note 4	Connector Saver - 55 Pin Connector, 942-005-ME35SN-9648; Cap - 55 Pin Connector, 07418-S2453-17A-12954			
I5	INSTRUMENTATION, 1C34616-101, note 4	Connector Saver - 55 Pin Connector, 942-005-ME35SN-9648; Cap - 55 Pin Connector, 07418-S2453-17A-12954			

Prepare and Verify Probe Configuration for Shipment

Probe Item	Description, Function, Part No., other info	Transportation Config. (i.e. capped?)	Configuration confirmation	QA verification	Comments
I6	INSTRUMENTATION, 1C34616-101, note 4	Connector Saver - 55 Pin Connector, 942-005-ME35SN-9648; Cap - 55 Pin Connector, 07418-S2453-17A-12954			
I7	INSTRUMENTATION, 1C34616-101, note 4	Connector Saver - 55 Pin Connector, 942-005-ME35SN-9648; Tape on Cap - 55 Pin Connector, 07418-S2453-17A-12954			
I8	INSTRUMENTATION, 1C34616-101, note 4	Connector Saver - 55 Pin Connector, 942-005-ME35SN-9648; DPA 55 Pin Connector Shorting Plug, TRE-SP-I8-GSE, TRE-SP-I9-GSE			
I9	INSTRUMENTATION, 1C34616-101, note 4	Connector Saver - 55 Pin Connector, 942-005-ME35SN-9648; DPA 55 Pin Connector Shorting Plug, TRE-SP-I8-GSE, TRE-SP-I9-GSE			
I10	INSTRUMENTATION, 1C34616-101, note 4	Connector Saver - 55 Pin Connector, 942-005-ME35SN-9648; Tape on Cap - 55 Pin Connector, 07418-S2453-17A-12954			
UV12	OPTICAL CABLE, GYRO 1 & 2, 1C34185-103, LEMO PCA.OO.052.GAST12	Aluminum Cap with tape			
UV34	OPTICAL CABLE, GYRO 3 & 4, 1C34185-103, LEMO PCA.OO.052.GAST12	Aluminum Cap with tape			
UVPM	OPTICAL CABLE, PROOF MASS & SPARE, 1C34185-103, LEMO PCA.OO.052.GAST12	Aluminum Cap with tape			
S1	SPIN UP INLET, GYRO 1, 1C34266-101, GAMAH FWB141T04-35-18-D	Capped flight connection line for S/U and P1A, GAMMAH-FWB141T04-35-8D-96D08			
S2	SPIN UP INLET, GYRO 2, 1C34266-101, GAMAH FWB141T04-35-18-D	Capped flight connection line for S/U and P1A, GAMMAH-FWB141T04-35-8D-96D08			
S3	SPIN UP INLET, GYRO 3, 1C34266-101, GAMAH FWB141T04-35-18-D	Capped flight connection line for S/U and P1A, GAMMAH-FWB141T04-35-8D-96D08			
S4	SPIN UP INLET, GYRO 4, 1C34266-101, GAMAH FWB141T04-35-18-D	Capped flight connection line for S/U and P1A, GAMMAH-FWB141T04-35-8D-96D08			

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Probe Item	Description, Function, Part No., other info	Transportation Config. (i.e. capped?)	Configuration confirmation	QA verification	Comments
CG1	CAGING LINE INLET, GYRO 3 & 4, IC34198-101, GAMAH FWB141T04-35-1B-D	Buffer Valve GSE for S/U and Caging Lines and P1A, GAMMAH-FWB141T04-35-8D-96D08.			
CG2	CAGING LINE INLET, GYRO 3 & 4, IC34198-101, GAMAH FWB141T04-35-1B-D	Buffer Valve GSE + Cap for S/U and Caging Lines and P1A, GAMMAH-FWB141T04-35-8D-96D0			
CG3	CAGING LINE INLET, GYRO 2, IC34198-101, GAMAH FWB141T04-35-1B-D	Buffer Valve GSE for S/U and Caging Lines and P1A, GAMMAH-FWB141T04-35-8D-96D08.			
CG4	CAGING LINE INLET, IC34198-101, GAMAH FWB141T04-35-1B-D (Gyro 2)	Buffer Valve GSE + Cap for S/U and Caging Lines and P1A, GAMMAH-FWB141T04-35-8D-96D0			
CG5	CAGING LINE INLET, IC34198-101, GAMAH FWB141T04-35-1B-D (Gyro 1 Circuit)	Buffer Valve GSE for S/U and Caging Lines and P1A, GAMMAH-FWB141T04-35-8D-96D08. This is connected to caging ballast tank.			
CG6	CAGING LINE INLET, , IC34198-101, GAMAH FWB141T04-35-1B-D (Gyro 1 Circuit)	Buffer Valve GSE + Cap for S/U and Caging Lines and P1A, GAMMAH-FWB141T04-35-8D-96D0			
P1	PRESSURE SENSE LINE, IC34179-701, GAMAH FWB141T05-42-1B-D	Gamah cap			
P1A	PRESSURE SENSE LINE, IC34179-102, GAMAH FWB141T04-35-1B-D	Capped flight connection line for S/U and P1A, GAMMAH-FWB141T04-35-8D-96D08			
P9	PRESSURE SENSOR, 1C34179-102, GAMAH FWB141T04-35-1B-D	Not installed			
P9	ALTERNATE PRESSURE SENSOR, 1C34148-101, C-SEAL FLANGE	Not installed			

5.2 Ensure the probe conforms to Table 3 configuration. Removed equipment shall be bagged and tagged. The location of the removed hardware shall be indicated in the Table below.

Table 3

Probe Item	Description, Function, Part No., other info	Transportation Config. (i.e. capped?)	Configuration confirmation by REE	QA verification	Location of removed hardware	Comment
	Exhaust VAT Valves (V1 - V4) vacuum port.	Non-flight covers installed with pumpout port shall secured to the cap body.				
	Electrical connection for Exhaust VAT Valves (V1 - V4)	Connector Saver for VAT Valve Connector, 941-903M15-1859831; Cap Plug for 2 1/2" VAT Valve Connector, MS 90376-16R				
	VAT Valves on Leakage Gas pumpout ports (LV1, 2) on Cross Flange vacuum port	Non-flight covers installed with the gauge and the pumpout port shall secured to the cap body.				
	Electrical connection for VAT Valves on Leakage Gas pumpout ports (2) on Cross Flange	for VAT Valve Connector, 941-903M15-1859831; Cap Plug for 6" VAT Valve Connector, MS 90376-18Y				
	Dewar Well Pumpout Port (located on Probe)	Capped				Covered in payload prep procedure (P0885)
	Well Burst Disk	Capped and pumped				
	Probe Burst Disk	Dust cap installed and taped				
	Cross Flange/ Window 4 Interface	Sunshade with protective cover installed.				

6. PROCEDURE COMPLETION

Procedure Director _____ Date _____

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

Quality Assurance _____ Date _____