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Gravity Probe B Relativity Mission

GYROSCOPE COMMISSIONING PROBE INSERTION PROCEDURE

GP-B P0273 Rev -A

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GYROSCOPE COMMISSIONING PROBE INSTALLATION PROCEDURE

This procedure is to be performed only by persons listed as certified operators of the gyroscope acceptance facilities.

Equipment: Gyroscope Commissioning Probe (G.C.P.)
Alcatel Leak Detector
100 liters liquid helium
1 full tank of helium gas (optional)
Overhead crane
Air-lock
G.C.P. clean room
Baratron gauge
55-pin cable extension for instrumentation readout
Load cell and associated digital readout

Cleanliness precautions:

The probe should be inspected prior to insertion for any loose objects that could fall into the lead bag during this procedure. If necessary the probe should be rinsed off with filtered air. The shutter on top of the dewar should be cleaned thoroughly before placing the air-lock on it.

ESD precautions:

When making electrical connections to the top flange a ground strap should be worn and grounded to the dewar.

Conditions:

Procedure P0204 completed.

Procedure:

I. Leak check probe using ***Alcatel leak detector only***. _____

II. After completing leak check, ***close Vatterfly valve*** and ***backfill with helium gas***. Repeat this procedure ***twice***. After the last backfill, ***leave 1 torr of helium gas in the vacuum can***. _____

III. Check that dewar ***LHe level is 100%*** (Keep 100 liters available) _____

IV. Is there sufficient ***Helium gas available for purging***? _____

V. ***Insert plugs*** into bolt holes on top flange. _____

VI. Assemble hoist, lifting fixture and air-lock (remember to feed the ***baritron, instrumentation and load cell cables*** before attaching the assembly to the probe) _____

VII. Connect probe and lift into the air-lock. Pay close attention to the load cell reading. The load cell should read; ***probe plus air-lock : 380 - 400 lbs***. _____

VIII. ***REMOVE THE RADIATION BAFFLES*** and close the shutter. Place probe/air-lock onto dewar. _____

IX. Attach Helium gas purge line. Set up liquid helium transfer but do not allow transfer to begin. Use as necessary. _____

X. Start LabView data acquisition program.Write to disk and to network. _____

XI. Connect oxygen sensor to the air lock and monitor the O_2 %. When it reaches < 2 % open the shutter and begin lowering the probe. _____

Installation of the gyroscope commissioning probe into the ultra-low field dewar

XII. Note ***vacuum can pressure*** before opening the shutter. _____torr _____

XIII. Open the shutter and begin lowering the probe into the dewar ***maintaining positive pressure***. This can be observed by keeping the ball in the clear venting cylinder levitated. You can use either the gas purge or liquid helium transfer as is necessary.

XIV. ***Monitor the vacuum can pressure periodically***. Also note the liquid helium level. _____

Start	_____torr	_____He %
20 minutes:	_____torr	_____He %
40 minutes:	_____torr	_____He %
1 hour:	_____torr	_____He %
80 minutes:	_____torr	_____He %
100 minutes:	_____torr	_____He %
2 hours:	_____millitorr	_____He %

Continue lowering the probe maintaining the boiloff flow such that the ball in the flow gauge is located in the middle. If the rate should increase beyond this point stop the insertion and wait for the proper rate of boiloff to resume.

XV. Remove the air-lock and disconnect the instrumentation and baritron cables.Take out the plugs from the bolt holes in the top flange and fasten at least 4 screws. (You will need to use the hoist again after removing the air-lock to position the top flange so that the bolt holes line up.) _____

XVI. Remove the shutter. _____

XVII. Remove the lifting fixture and position the probe under the pumping system. Connect the probe to the vacuum pump and begin pumping up to the vatterfly valve. _____

XVIII. Attach the following:

1. Solid instrumentation cable. _____
2. Spin-Up gas line. _____
3. Helium gas backfill line. _____
4. Spin-Up exhaust line. _____
5. Suspension cables. _____
6. SQUID cables. _____

XIX. Pump out the following gas lines:

1. Spin-Up manifold _____
2. Helium purge _____
3. Spin-Up exhaust manifold _____
4. Exhaust manifold bypass line _____

XX. Note the final vacuum can pressure and LHe level:

At completion: _____millitorr _____He %