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Gravity Probe B Relativity Mission

PROCEDURE FOR

Science Telescope and Artificial Star #2 Alignment

GP-B P0222 Rev -

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GP-B Procedure Document 222

Science Telescope and Artificial Star #2 Alignment

R. E.: Suwen Wang
ESTIMATED DURATION: 1 day

Objective:

Align the Science Telescope with Artificial Star #2 to within 1 arc min.

Success Criteria:

Science Telescope responds properly to incident angle changes of the light from Artificial Star #2.

Requirements:

- Procedure to be performed by certified personnel only.
- Certified personnel include:
  Suwen Wang

Authority to redline this procedure:

Suwen Wang

Precautions:

- Science Telescope is well protected in the test probe in this procedure. No direct or indirect mechanical contact will be made to the telescope. Therefore, no special caution is needed in handling in this procedure.
- No special electrostatic handling precaution required.

Calibration:

- The alignment process does not have any impact in the telescope verification data. Therefore, no calibration is required for the procedure.

Ground Support Equipment Required:

- Telescope room temperature readout electronics.
- Oscilloscopes.

Expendable Materials required:

- Liquid nitrogen.

Initial Configuration:

- Telescope under test:
  Dwg No: 25091-201 Rev - _____.
  Telescope Serial No. _____.
- Procedures described in P0221 complete.

- Procedure Start Date: _____.

1. Procedures for star/telescope alignment:

1.1. Turn on the He-Ne laser for the alignment if it's not already turned on (See fig. 1).

1.2. Remove the alignment light plug from top of the star (See fig. 2).

1.3. Roll the reference mirror into the reference position (See fig. 3).

1.4. Check to see if the return beam is centered onto the stop aperture (See fig. 4). If not centered, adjust the 1" mirror holder to center it (See fig. 2).

1.5. Fill the pumping line LN trap with liquid nitrogen.

Signed: _____ Date: _____

1.6. Pump down the star vacuum chamber to 500 torr via a LN trap.

1.7. Move the reference mirror out of the reference position.

1.8. Adjust the dewar tilt stepper motors to center the return beam (See fig. 3).

1.9. Place the light plug back into its original place.

1.10. Turn on the laser diode for the star light source and adjust the current to about 11 mA (See fig. 2).

1.11. Now one should see signals on some of the telescope detectors.

1.12. If no signals can be seen on the detectors, procedures described in P0225 should be performed to establish the alignment. In this case, the telescope optical axis might very well be off from the reticle plate by more than 0.5 arc min.

1.13. The alignment process is complete.

Signed: _____ Date: _____

2. Completion status:

Success: _____

Success with P0225: _____

Fail: _____