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Gravity Probe B Relativity Mission

PROCEDURE FOR

Artificial Star #2 Focal Scan Procedure

GP-B P0228 Rev -

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GP-B Procedure Document 228

Artificial Star #2 Focal Scan Procedure

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

Objective:

To verify that the focal point of the Science Telescope is located at the roof prism image divider.

Success criteria:

The focal position of the telescope with respect to the roof edge being measured to within 0.020".

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 scan data related to verifying the telescope performance specifications is in a format of relative numbers. Therefore, no calibration is required for the procedure.

Initial Configuration:

- Telescope under test:
  Dwg No: 25091-201 Rev - _____.
  Telescope Serial No. _____.
- Telescope probe attached to Artificial Star #2.
- Procedure Start Date: _____.

Ground Support Equipment required:

- Telescope room temperature readout electronics.
- Centris 650 computer with data acquisition system.

Expendable Materials required:

- None.

1. Procedure for a scan:

1.1. Align the star so that the image forms on the telescope axis to within 1 arc sec.

1.2. Turn on the star servo per procedure P0223.

1.3. Crank the star focus adjust cw all the way (0 turns position).

1.4. Open the application FocusScan v.1.0 if it is not already open. The application is on MacIntosh Centris 650 located in Telescope Lab.

1.5. Set all the parameters as indicated in table 1 below. Set A Mtr # to Tip X.

1.6. Click the run arrow in the application to start the scan.

1.7. Make sure that no one is allowed to touch the star during the scan.

1.8. When the scan is complete, the run busy signal will disappear.

1.9. A set of files of the name: Scan_Dir#_date will be created.

Here:

Dir can be either x or y for the scan direction

is the serial number of the scan of the day

date is the date in the format of m/d/y

1.10. Record the file names in table 2 below.

1.11. Set A Mtr # to Tip Y and repeat procedures 1.6 through 1.10.

1.12. Procedure 1 complete.

Signed: _____ Date: _____

2. Data Analysis

2.1 Plot the scan data with Igor Pro v.2.0.2 software.

2.2 Normalize the data in the range of 0 to 10 arcsec

2.3 Calculate the slope in the 1 arc sec range centered at the optical axis.

2.4 Plot the slope as a function of the position from the expected focal point. The peak of such plot indicates where the focal point is.

2.5 The position of the focal point from the roof edge is:

_____ inches.

3. Completion status:

Success: _____

Fail: _____

Reason if fail: _____

Table 1. Application Parameter Settings

Button Name	Setting	Inspector Stamp
Function	Init & Run	
Serial Port	IP Serial B	
Scan Type	X Scan	
Init Mtr Mvmnt	Rewind	
Mtr Spd (stps/sec)	100	
Mtr/PZT	Stp Mtr	
# Grids	100	
Tot # Stps	8000	
Init A	0.50	
Init B	0.50	
A Mtr #	Tip X or Tip Y	
B Mtr #	NOT USED	
Init Mov Dirtn	Positive	
Sample Rate (1/sec)	NOT USED	
# Samples/Chan	NOT USED	
Sample Mode	Slope	
Seq #	1	
A/D Brd #	6	
Chan Seq.	0 - 0, 1-1, ... 7-7	
Gains	0-7: 100	
Starting	0.2	
Fit	0.6	
Preamp Gain	1 for RT and 100 for LT	
# pts	250	
# of slp Avrg	10	
Data Rate	2500.00	

Table 2. File Names for Focus Scans

File Path Name: _____.

Temperature	Scan Sequence #	Date	Scan Axis	Position from focal point
