Stanford University
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Gravity Probe B Relativity Mission
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GP-B Telescope
"Load Testing of Fixturing Used for Bonding the Telescope to the Quartz Block"
P0456 Rev -

Janury 14, 1999

Prepared: _____ Date _____
Ken Bower, Telescope Assembly

Approved: _____ Date _____
Sasha Buchman, Hardware Manager

Approved: _____ Date _____
Ben Taller, Quality Assurance

LOAD TEST OF SIA BOND FIXTURING

- for SUGP-B P0200(SM) *Bonding the Telescope to the Quartz Block*

- This operation is to be conducted by Ken Bower or his designee with an assistant as required. Any observers may be present subject to environmental constraints (cleanroom capacity and/or restrictions, if applicable).

- If this operation is performed in a non-cleanroom environment (less than class 1,000), then all fixturing must be recleaned to comply with the requirements stated in P0200(SM) and the related references to P0059.
- This weights used in this test exceed 50 lbs. Care should be used to prevent personal injury due to improper lifting and handling. Care should be applied to prevent personal injury in the event of fixture failure which could result in falling weights.
- Redline authority for this procedure is granted to Ken Bower.

1) Set up the Precision Manipulator simulator. This equipment's sole purpose is to substitute for the Precision Manipulator and its support plate which have been independently proof tested to the higher levels required for probe manipulation.

   Set-up approved:_____
   Ken Bower

2) Install three telescope support plate extension cables into the Precision Manipulator simulator by inserting one end of each cable into a bolt hole on the simulator plate and secure with washers and nuts on the top side. Distribute the three cables approximately 120 degrees apart.

3) Install the three Delrin Fingers into the circular Telescope Support Plate, equally spaced. Insert a scew through an appropriate bolt hole and secure it to the finger. Do not tighten the screws at this time as it will be necessary for the fingers to rotate freely.

4) Install the Telescope Support Plate onto the free ends of the extension cables connected to the simulator plate by inserting the end of each cable through an appropriate hole in the plate and securing it with a washer and nut.

5) Using a level, adjust the nuts on each cable as required to level the Telescope Support plate to <0.1 degrees.

6) Swivel the three delrin fingers such that the lifting surfaces are pointed outwards. Raise the Telescope simulator from below until the lip is above the fingers. Swivel

the fingers inwards and tighten the nuts securing the fingers, locking them in place. Carefully lower the telescope simulator until it rests upon the fingers.

7) Install the eyebolt in the center of the telescope simulator. Suspend about 47.3 +5/-0 pounds (~21.5 +2/-0 kg) from the eyebolt for 10 minutes (2.5 G test). Remove the weights. If no failure occurred, proceed to step 8.

record weight applied:_____ Date/Time:_____

8) Move the eyebolt to the off-center location of the telescope simulator. Suspend about 27.1 +2/-0 pounds (~12.3 +1/-0 kg) from the eyebolt for 3 minutes (1.5 G off-center test). Remove the weights. If no failure occurred, proceed to step 9.

record weight applied:_____ Date/Time:_____

9) Remove the telescope simulator from the fingers by lifting and rotating it out of place without disturbing the rest of the fixturing.

10) Examine the the entire fixture for any damage, especially at the contact and securing locations of the delrin fingers. If no significant damage is present, proceed to step 11.

11) Loosen the nuts securing the fingers and verify that functional swiveling still occurs. Examine threaded section of delrin parts. If parts are still functional, then fixturing may be approved for P0200(SM).

12) Disassemble the fixturing and return all parts to be used for P0200(SM) (clean as required).

Procedure Completed on:_____

By:_____

Witnessed:_____

Approved:_____
Ken Bower