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GP-B Telescope "Removal of Particulate Contamination from Telescope" P0398 Rev -

May 29, 1998

Prepared: _____ Date _____
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Approved: _____ Date _____
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Approved: _____ Date _____
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Approved: _____ Date _____
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Approved: _____ Date _____
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REMOVAL OF PARTICULATE CONTAMINATION FROM TELESCOPE

- for use following particulate contamination of telescope described in Discrepency Report 134 and Science Document 329.
- At least one qualified flight part handler (per P0282) must be present during all steps of this procedure.
- also use *GP-B Telescope Image Divider Assembly (IDA) General Alignment and Bonding Procedures* (SUGP-B P0282) for procedures concerning safety; personnel; work area requirements; fixture cleaning and acceptance; flight part inspection, handling, storage, and cleaning; redline authority; and sign-off and recording requirements.

CAUTION:

- The telescope is heavy, delicate, and somewhat irreplaceable with multiple critical surfaces that can be easily damaged or contaminated by normal handling. Compliance with the above defined safe handling practices is critical.

CAUTION:

- If at any time during this procedure flight hardware is not live monitored, verify that all flight hardware is seismically secured and protected against airborne contamination.

WARNING:

- Some of the solvents, detergents, and/or bonding agents used in this procedure may be flammable, toxic, or reactive. Consult P0282 for information about specific chemicals.

- This plan may be interrupted at any time by the telescope personnel involved for further evaluation. ONR notification is required before beginning this procedure.

1) Unbag the telescope and place it in the class 100 work area (clean bench) of the telescope clean room in a verticle position.

2) Carefully inspect all available surfaces of the telescope using a bright light scattering method (150 Watt white light gooseneck lamp). Pay special attention to surfaces of the relay lenses, fold mirrors, and DPA lenses. Document observations including locations and descriptions of any particulates or other contaminations..

3) Cover vent holes of the IDA and Metering Tube with Kapton tape and/or clean polyethylene sheeting.

4) Carefully remove contamination from the outside surfaces of the telescope from the top (reticle plate and DPA's) down (including outsides of metering tube and baseplate) using the less aggressive methods described in P0361 (briefly: a) light blowing with DI

air; b) touch-off with (Methanol moistened) polyester swabs; c) wipe with (Methanol moistened) polyester cloths; d) iterate as required, use judgement to select order). When possible, collect removed contaminants for evaluation.

5) Repeat step 2, searching for tenacious contaminants. Review further before utilizing more aggressive cleaning methods (i.e. snow cleaning, rinsing, or using cleaning agents).

6) As possible, inspect interior of IDA. As possible, attempt to inspect knife edges. Document observations.

7) As possible, inspect interior of main optics section. Document observations.

8) Remove covers from metering tube vent holes.

9) Prepare a custom "vacuum hose" capable of reaching various internal surfaces of the main telescope body (use no "glassy" materials). Thoroughly clean the inside and outside of all tubing and fixtures. Put a protective teflon tip on the "wand" at the end of the hose. Wrap any hard surfaces that may contact the telescope with Kapton tape.

10) Cover any surfaces or edges of the telescope which may contact any tooling with Kapton tape.

11) Connect the vacuum hose assembly to a clean room appropriate pump (i.e diaphragm, turbo, or peristaltic) and purge any remaining contaminants from the system by operating the pump for several minutes in a clean room environment (at least 2' from the floor and any clean room intake vents). Keep any potential sources of particulate contamination (i.e paper) at least 5' away from the pump intake.

12) Insert the vacuum wand into the interior of the metering tube through the access holes near the forward plate and "suck up" any observable contaminants, as possible avoid contact between the tooling and all critical surfaces of the telescope. Document removed contaminants.

13) Remove the vacuum assembly and repeat step 7. Reverse the flow of air through the vacuum hose and purge for at least 1 minute.

14) Insert the vaccuum wand into the telescope and attempt to dislodge any particles clinging to the sidewall of the metering tube, hidden in unobservable locations, or that were not previously removed by suction.

15) Remove the vacuum assembly and repeat step 7.

16) Iterate steps 12-15 until no further changes in the state of particulate contamination occur, or until no further improvements occur.

17) Review further before utilizing more aggressive cleaning methods described in P0361 (i.e. snow cleaning, rinsing, or using cleaning agents).

18) Utilize further cleaning methods selected by review as required and repeat step 7.

19) Secure telescope as required in class 100 work area. (Perform this step whenever the telescope is not live monitored.)

Attachments: Completion Report, SUGP-B dwg #25091

P0398 COMPLETION REPORT

Prerequisites:

authorized flight part handlers: K.Bower, J.Gwo
environment approved: air count <10, thermal/humidity ok -- KB _____
ONR notification: E.Ingraham

Step 1) completed 4/25/98 -- KB/JG _____

Step 2) completed 4/25/98, see S0329 (section 2) -- KB/JG/EI _____

Step 3) completed 4/28/98, Kapton tape used. -- KB _____

Step 4) completed 4/28/98 (all areas except post IDA beam zones). Some larger particles collected in Methanol solution for analysis. -- KB _____

Step 5) All particles removed easily except for "watermarks". Review required.

Step 6) completed 4/28/98, see S0329 (section 2) -- KB/JG _____

Step 7) completed 4/25/98, see S0329 (section 2) -- KB/JG/EI _____

Step 8) completed 4/29/98 -- JG _____

Step 9) completed 4/29/98 -- KB _____

Step 10) completed 4/29/98 -- JG/KB _____

Step 11) completed 4/29/98 -- KB/JG _____

Step 12) completed 4/29/98, see S0329 (section 3) -- KB _____

Step 13) completed 4/29/98 -- KB/JG _____

Step 14) completed 4/29/98 -- KB _____

Step 15) completed 4/29/98, see S0329 (section 3) -- KB _____

Step 16) 7 iterations completed 4/29/98, diminishing return on improvement observed, see inspection report (part 3) -- KB _____

Step 17) review required, preliminary decision reached on 4/29/98 -- no further cleaning required. -- J.Turneaure/EI

Step 18) currently not to be completed

Step 19) completed 4/25/98, 4/28/98, 4/29/98, 4/30/98 -- KB _____

Procedure Completed: _____ _____