



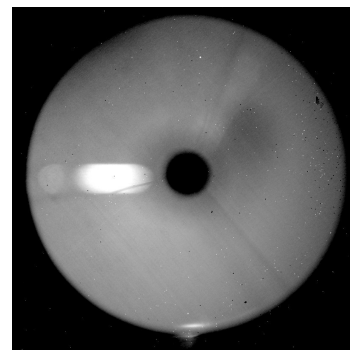
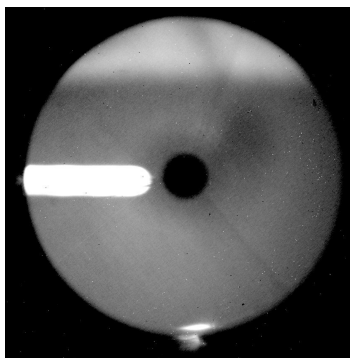
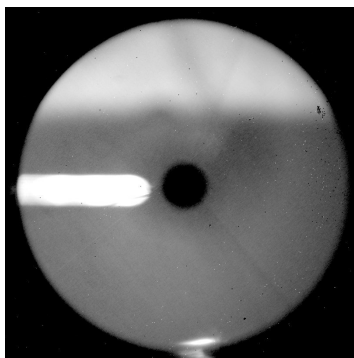
SOFIA Telescope Assembly: Black Spider Baffles Overview

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02, November 2016



- Background illumination sourced from SOFIA #1 Engine; problem captured in Pupil Images during 2015 occultation campaign

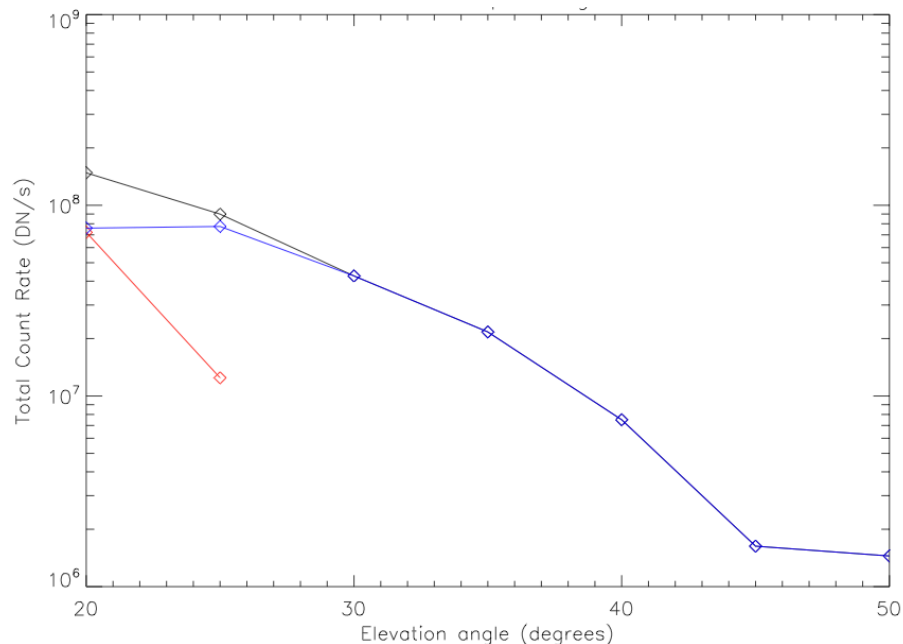


EL (deg):

20

25

40



2.2 micron Background In Pupil:

Spider emission [BLUE]

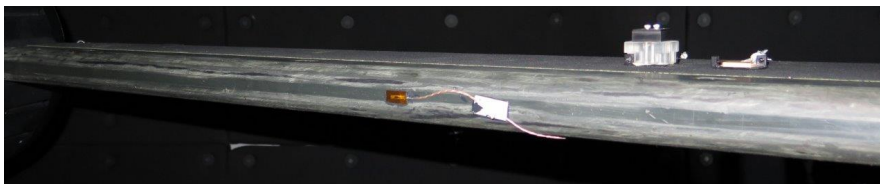
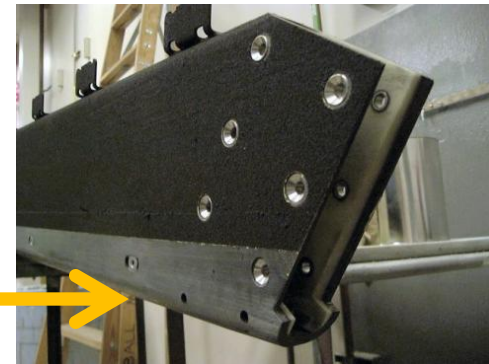
Primary Mirror surface emission [RED]

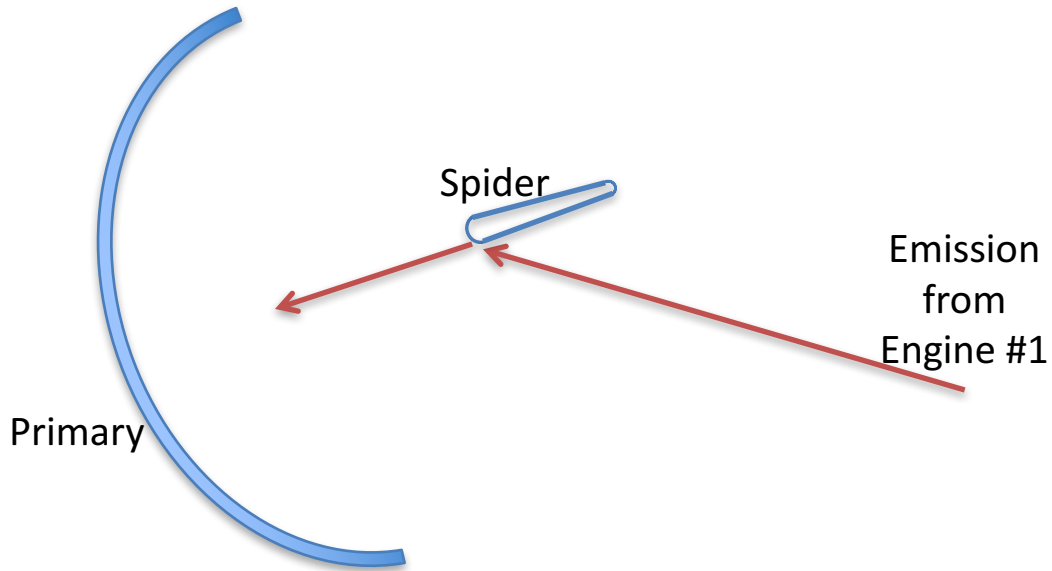


- **Engine #1 has direct line of sight into the Cavity.** The TA Spiders receive hot engine tail cone flux, even at fairly high elevations.

- **Current state of Spiders:**

- Unfinished, large radius, rounded edges
- Reflect 10% (min.) broad band IR
- Intent was to accept Reflecting Spider Covers



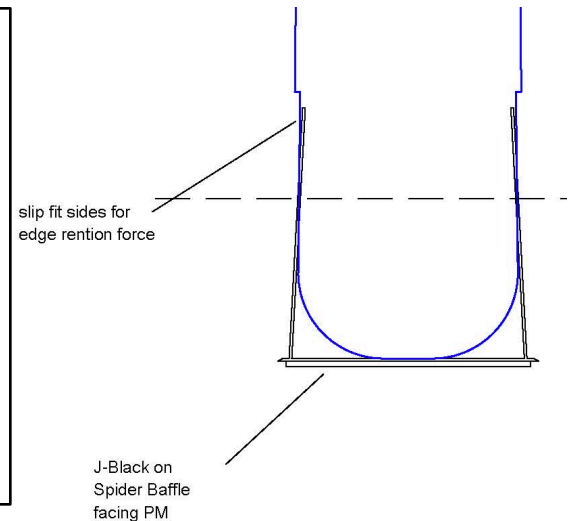


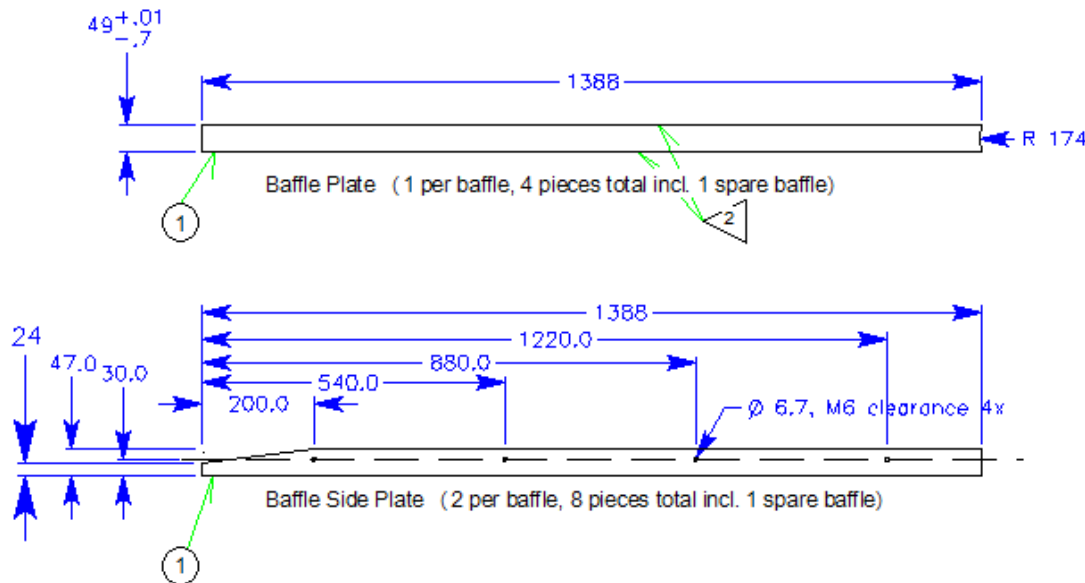
Knife-edge outer baffle, formed as sharply as possible

Stray light coating on surface facing Primary Mirror to prevent second reflection

Mitigate increase in obscuration: $\leq 0.5\%$

Lowest profile fasteners (1.2 mm)



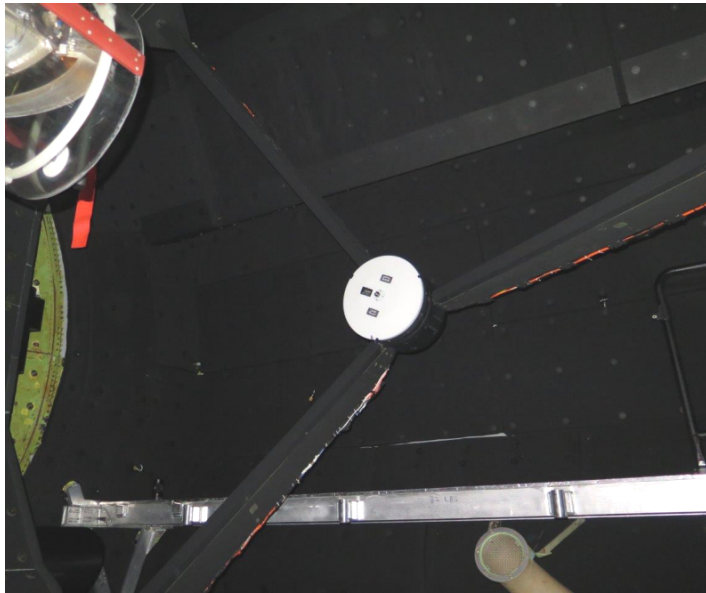


Carbon Fiber, for Spider CTE match

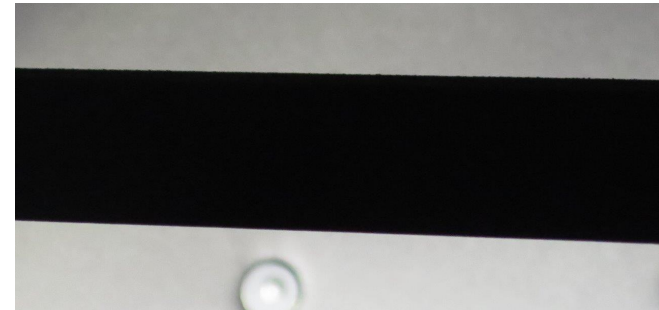
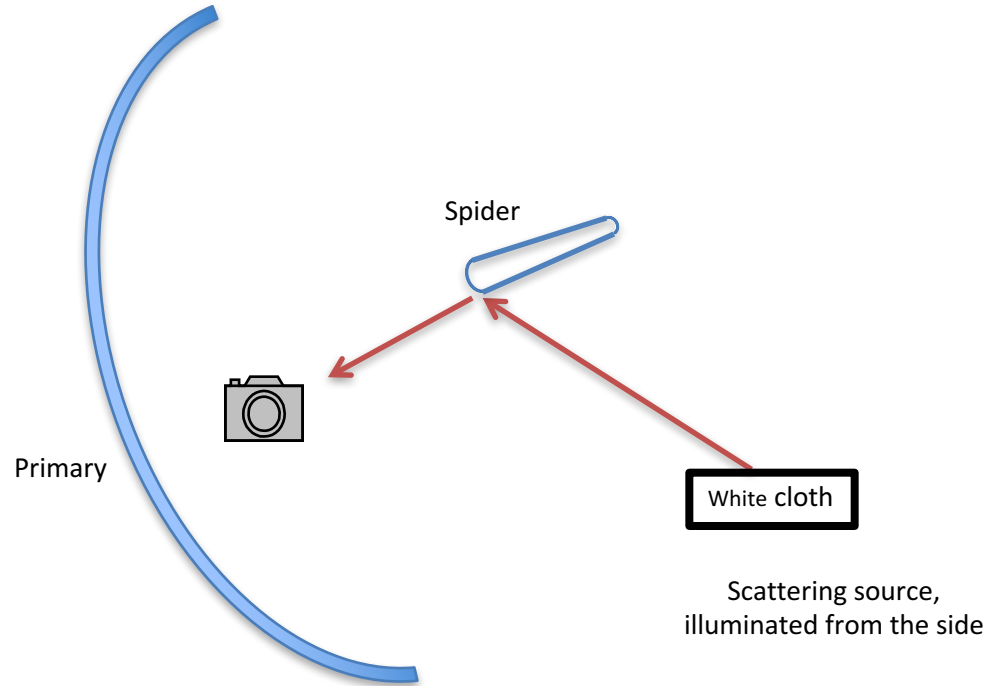
Each weighs ~300 g incl. fasteners



Black Spider Baffles – on-ground Verification

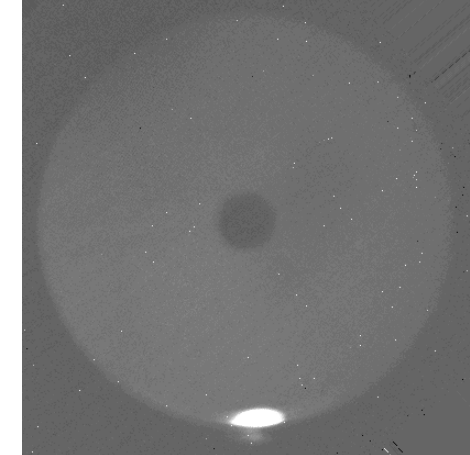
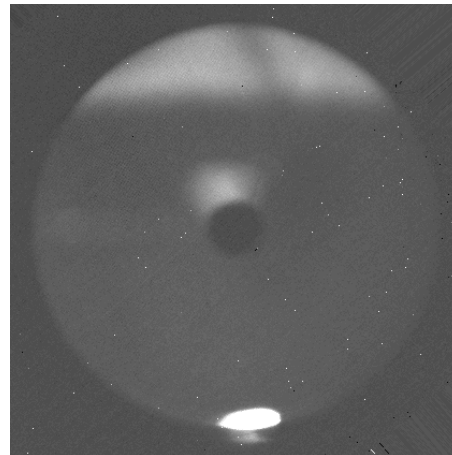
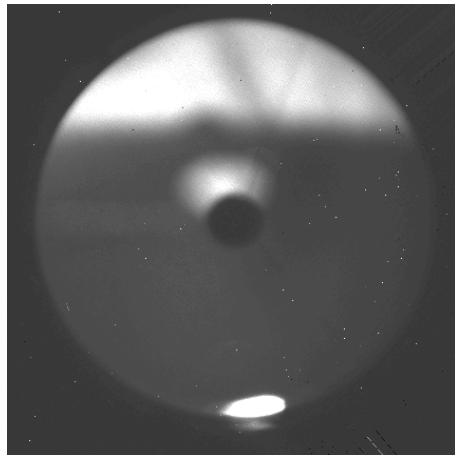
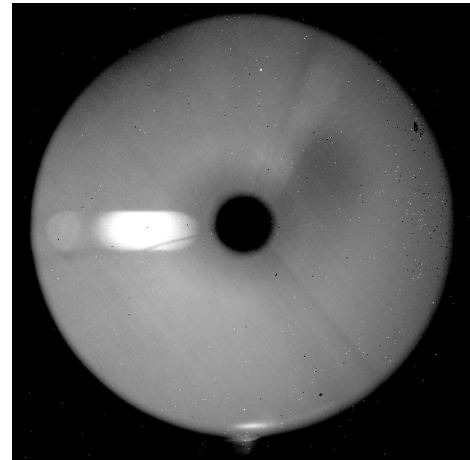
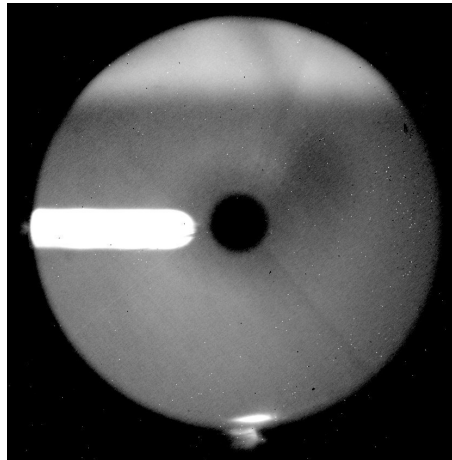
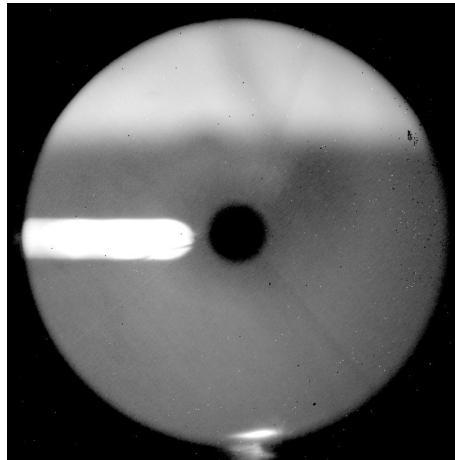


Test fit &
First stray light, 10aug2016



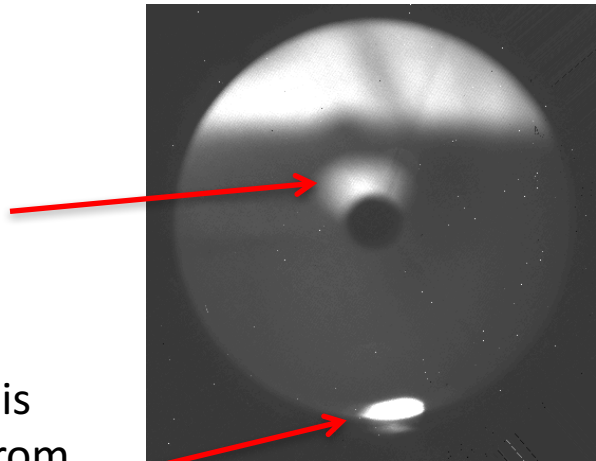
Black Spider Baffles

- Previous FLITECAM pupil images vs new pupil images (with baffles)

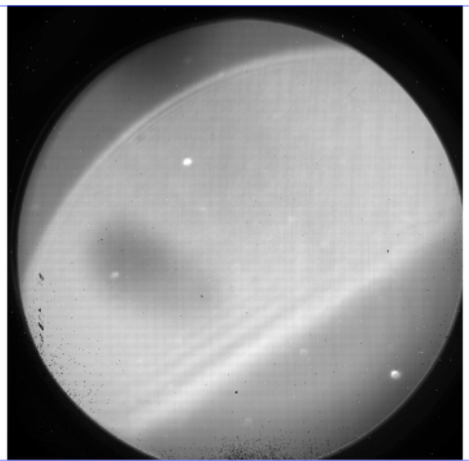


Additional Artifacts

“New” item is M2 button reflecting scattered Primary Mirror emission



Pupil



Focal Plane

“Old” item, and next problem to fix, is now believed to be Engine #1 glint from edge of the Secondary Mirror. If so, this might be solved via steady hand and a *Sharpie!*

