

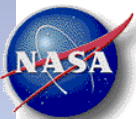
A Fully Reflective Tertiary Mirror ?

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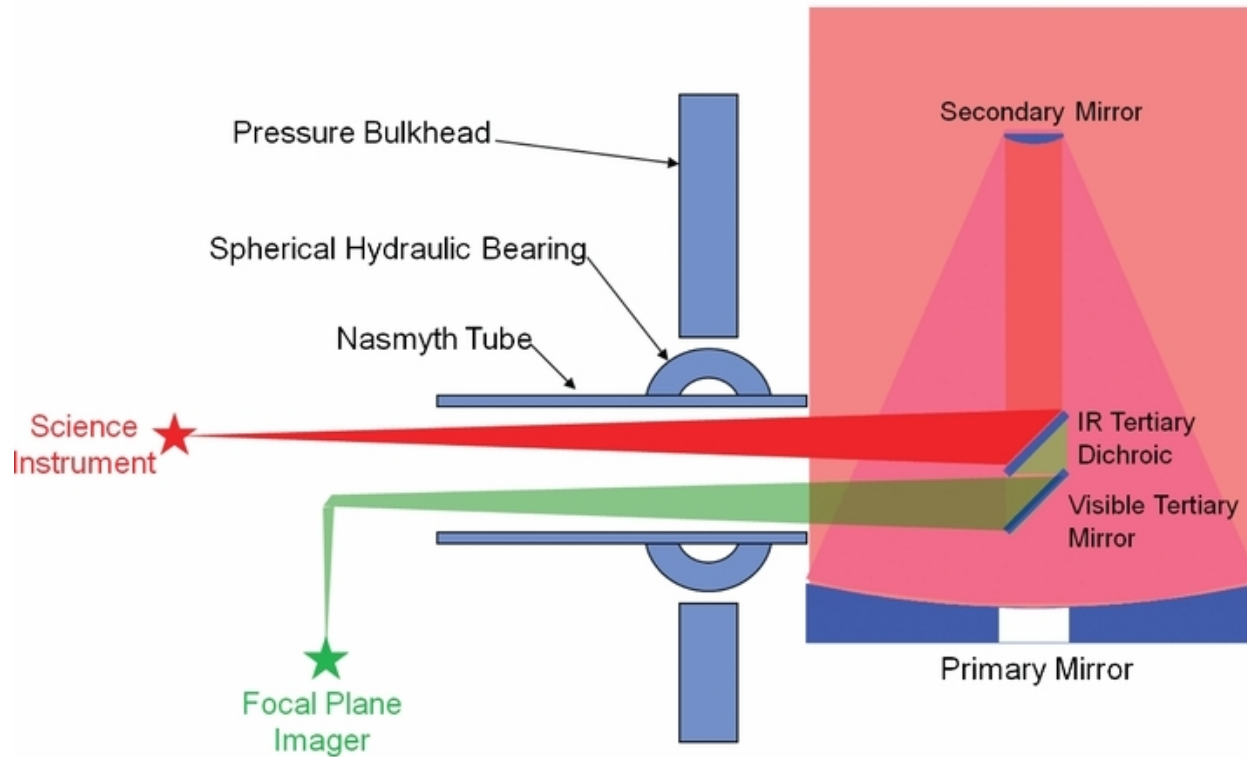
November 18, 2015

Baseline

- SOFIA Program is considering / evaluating the need of a fully reflective tertiary mirror.
- I am looking for feedback from the user community and the SI PIs on the scientific benefit of such a tertiary.
- A fully reflective tertiary option must be scientifically motivated:
 - Enable/support core scientific goals of SIs
 - Has strong support from users (enable science demands from users)

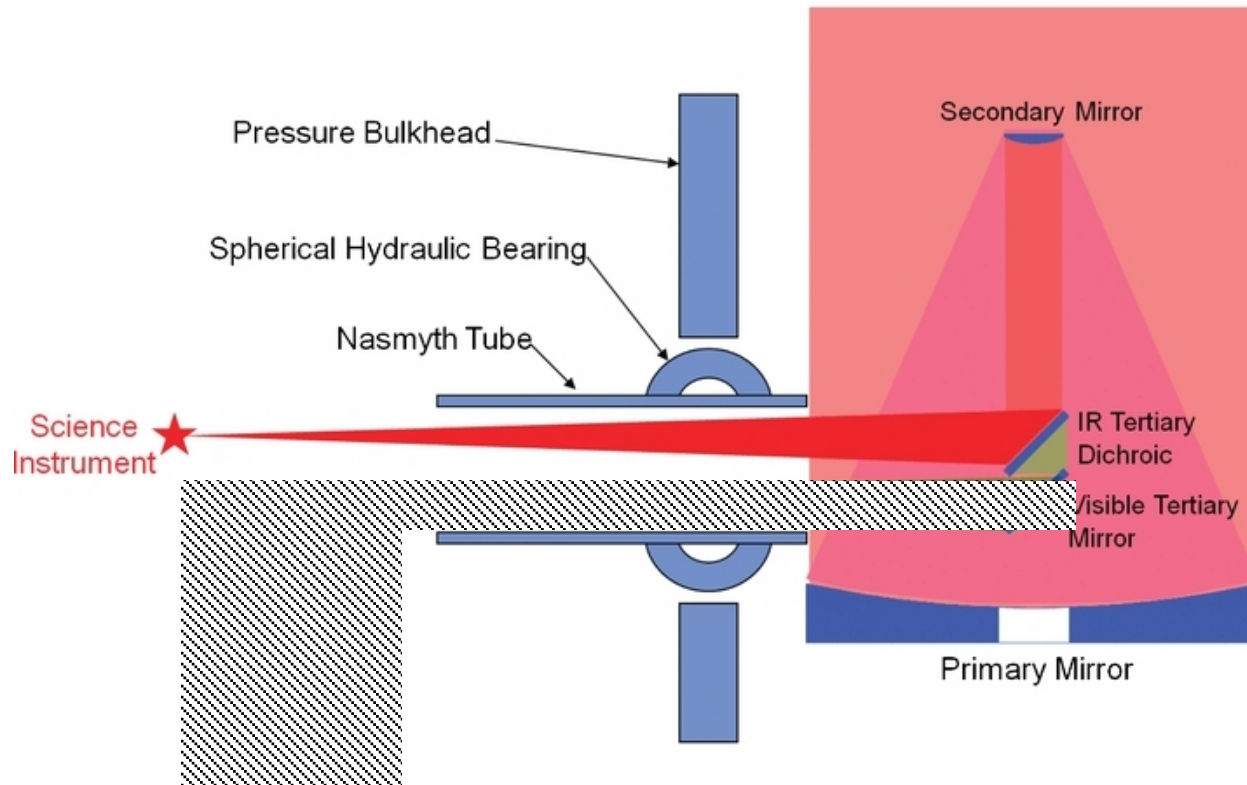


M3 Baseline



The current tertiary (M3) consists of an infrared dichroic which reflects IR light to the SI, and passes the visible light through to a silvered mirror underneath. The silvered mirror sends the visible light to the focal plane imager.

M3 Baseline



With a fully reflective M3 tracking cannot be performed with the FPI. The FFI would then be used for tracking, since the FPI would have no light path. We are currently upgarding the FFI/WFI imagers.

Pointing Stability

- The pointing stability with FPI is measured to be 0.19 arcsec RMS from 106 measurements in Cycle 2 and 3
- Tracking with (current) FFI is somewhat degraded.

Baseline

- HIPO

- The gain in throughput realized by the aluminized tertiary translates to a S/N ratio higher by a factor between $\sqrt{2}$ and nearly 2, depending on the wavelength (0.4–0.8 μm). Another way to look at this is that the SOFIA telescope with the dichroic tertiary has the same throughput as a telescope smaller in diameter by the same factor.

- EXES

- Strong desire for using a fully aluminized tertiary to reduce the emissivity of the telescope system, As EXES will be background-limited, reducing the background will increase our sensitivity. If the pointing performance of SOFIA is accurate enough to put a target close enough to our slit that we can find it quickly based on signal through EXES. If we find that we can function with the fully aluminized tertiary, we would choose to do so.

Baseline

- HAWC

- no strong need at this time for an aluminum tertiary. With regard to polarization measurements, it might be desirable to have a dichroic with heavier gold coating (to reduce the instrumental polarization). This would give some of the benefits of a solid aluminum mirror (lower polarization) without completely giving up focal-plane tracking.

