

Proposal Tools Webinar

SOFIA Science Center

August 9, 2019

Overview Presentations

09:00 am — SOFIA Overview

09:20 am — SOFIA's Instruments and
General Observing Strategies

09:50 am — Proposal Steps, Tips, and
Tools

10:10 am — 20 min Break

Worked Examples

10:30 am — FORCAST imaging

10:50 am — FORCAST grisms

11:10 am — FIFI-LS spectroscopy

11:40 am — GREAT mapping

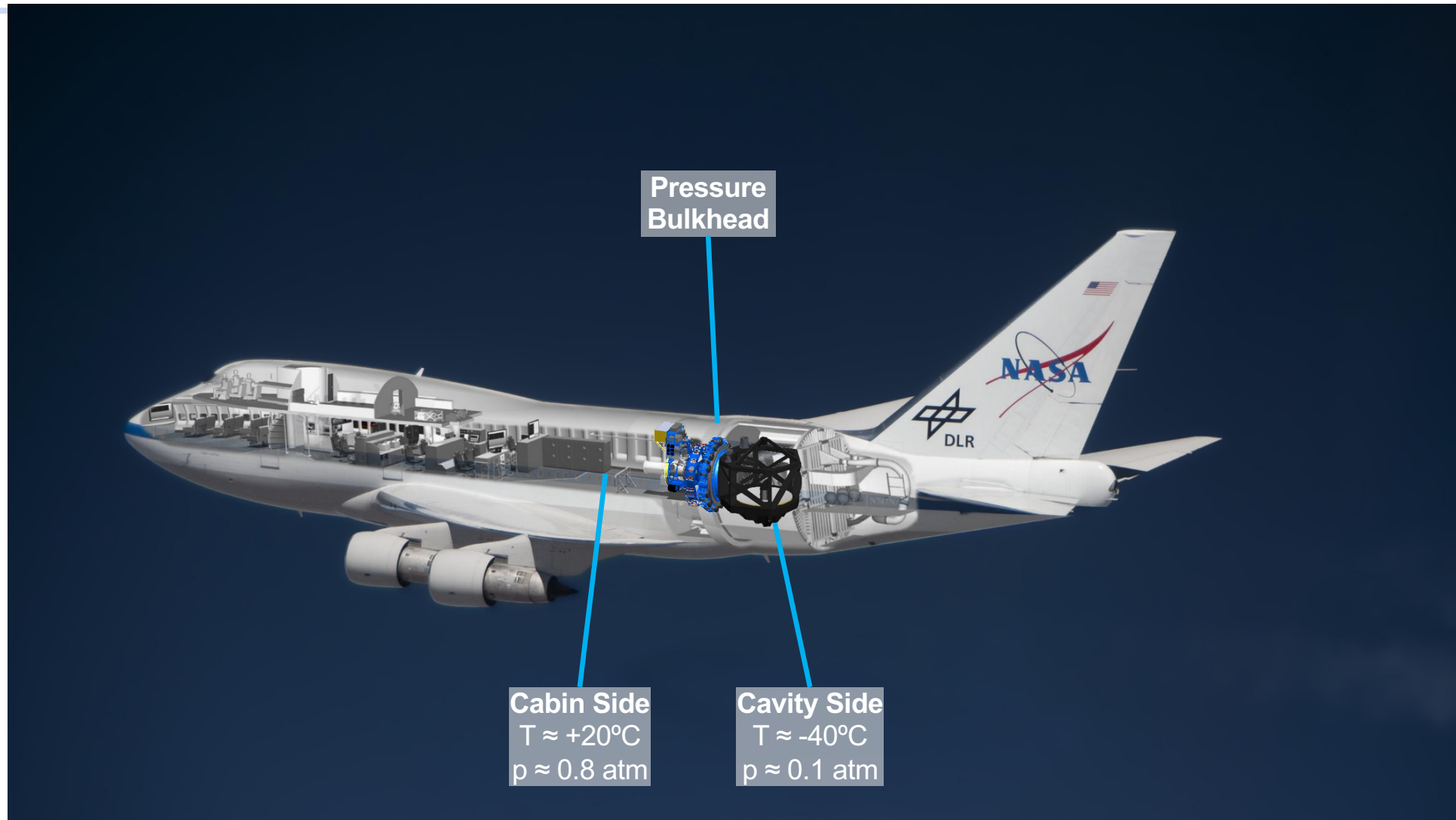
12:10 pm — HAWC+ polarimetry

12:30 pm — open ended Q&A

How was the webinar? <https://bit.ly/2YTQNzK>

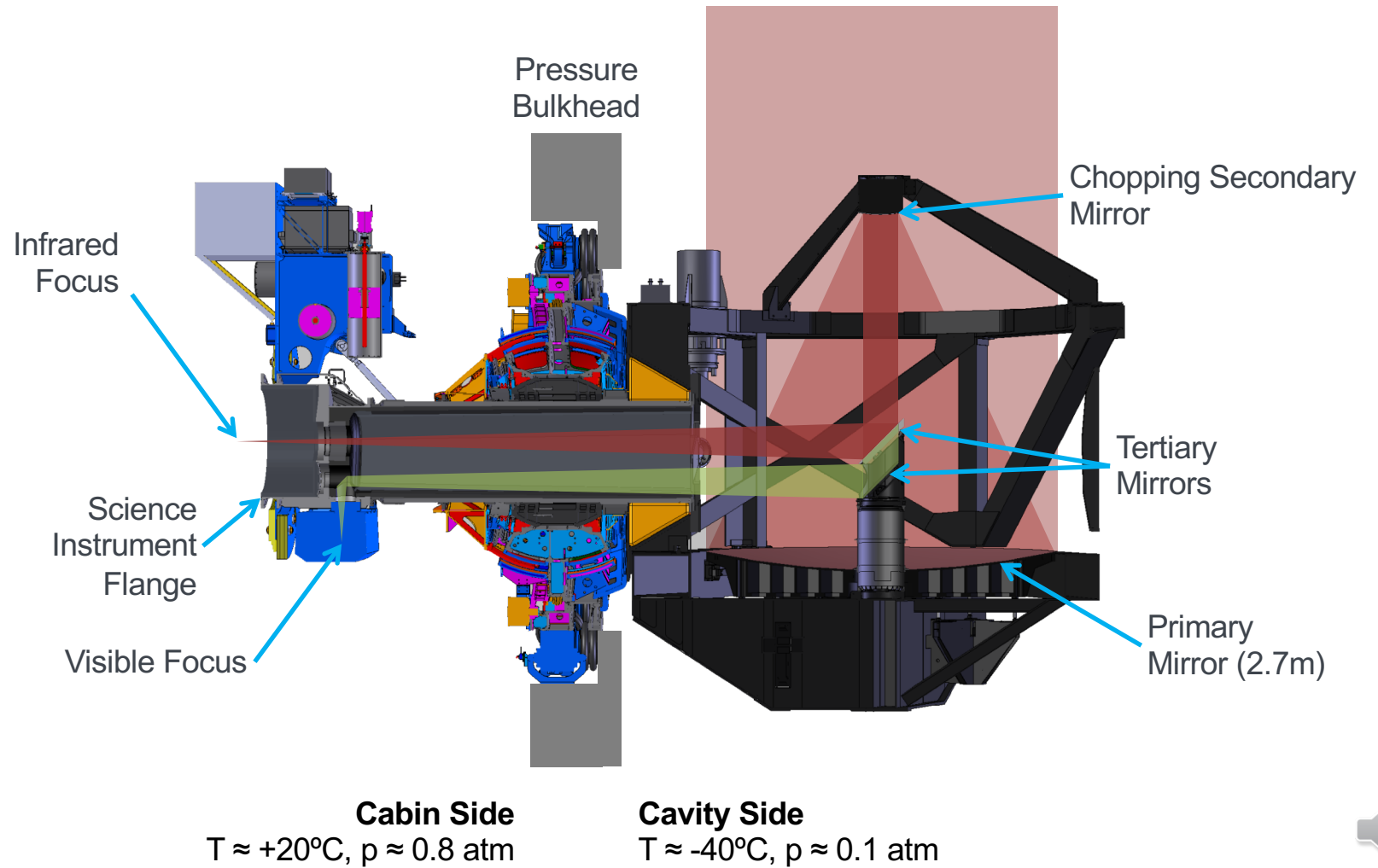


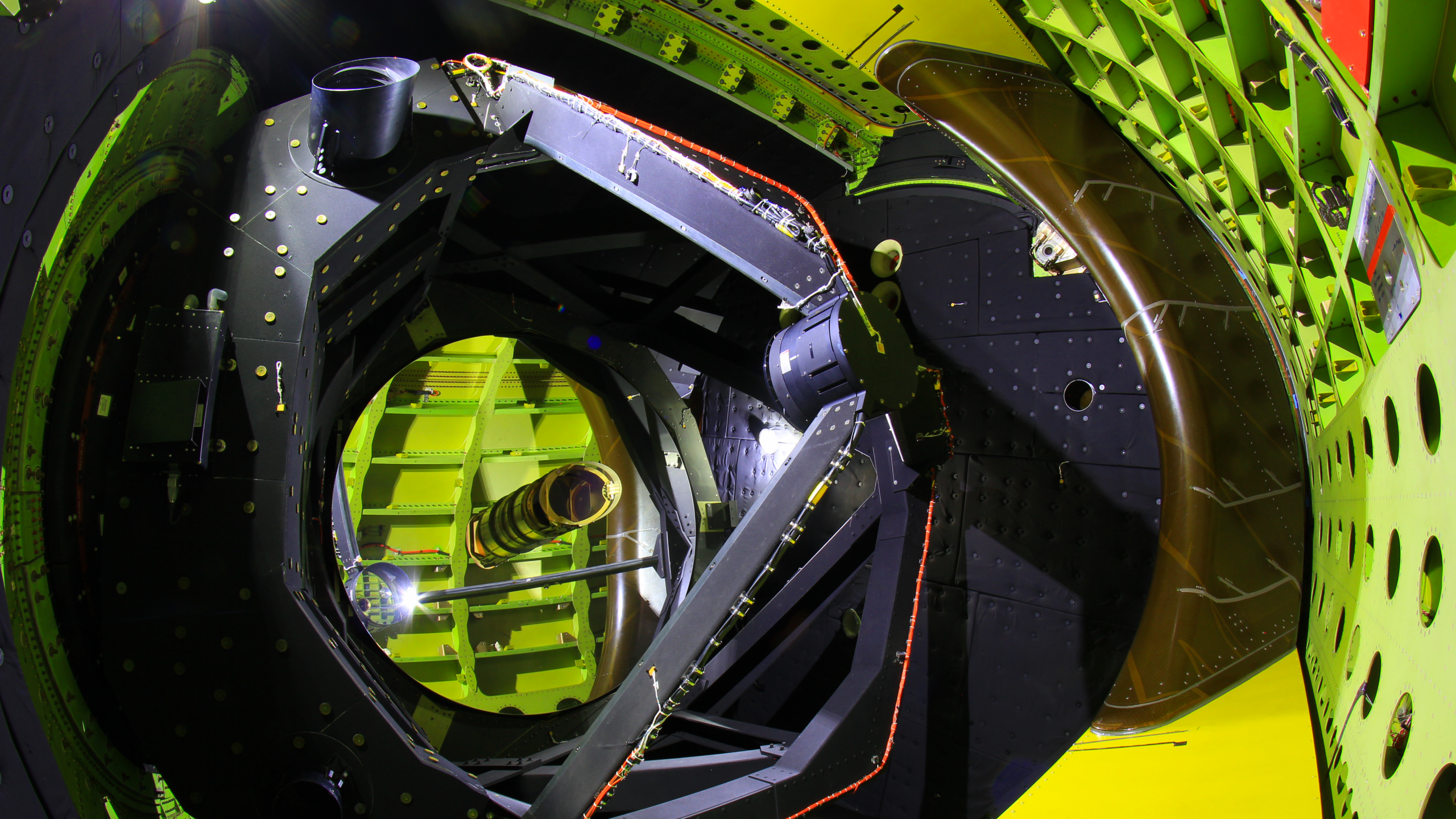
SOFIA Overview

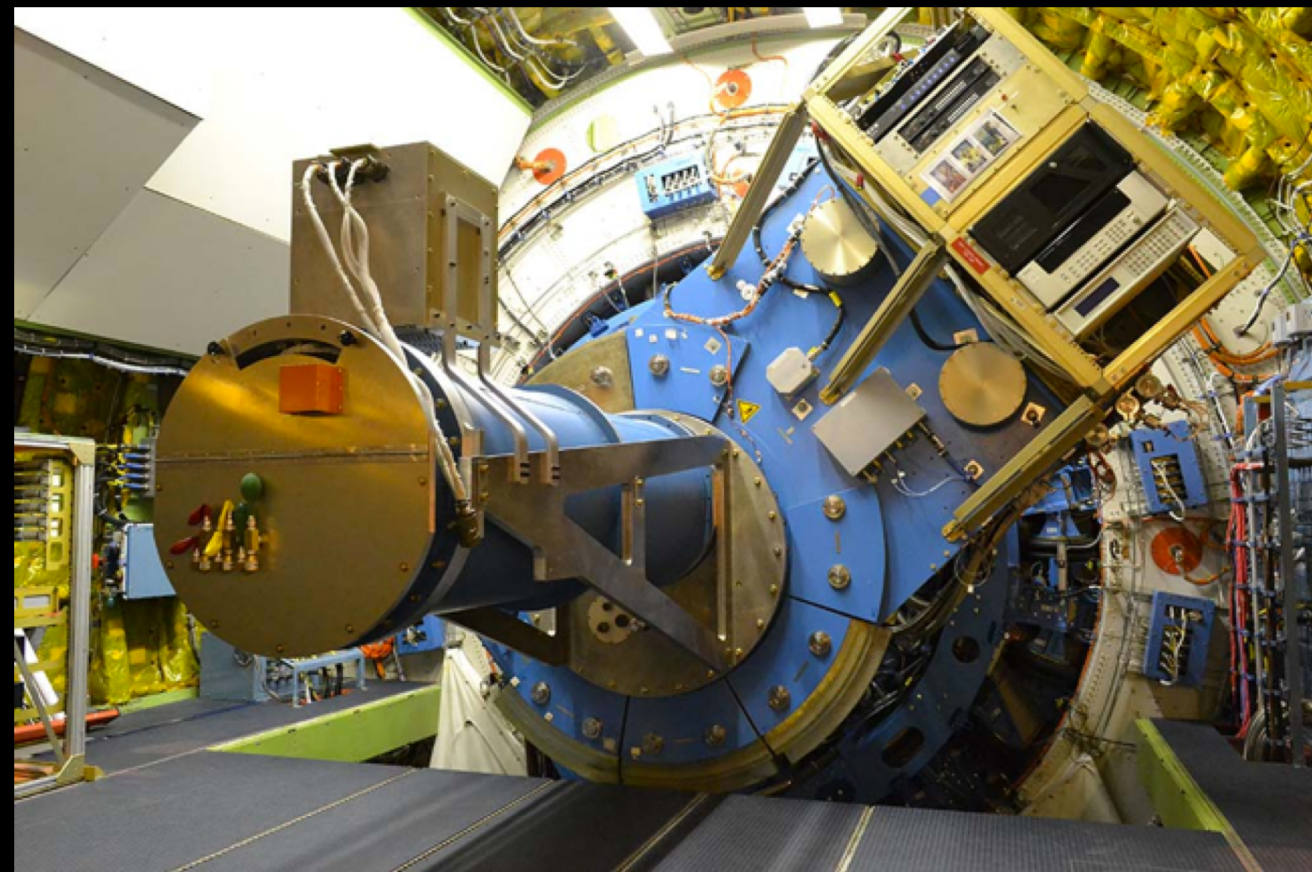
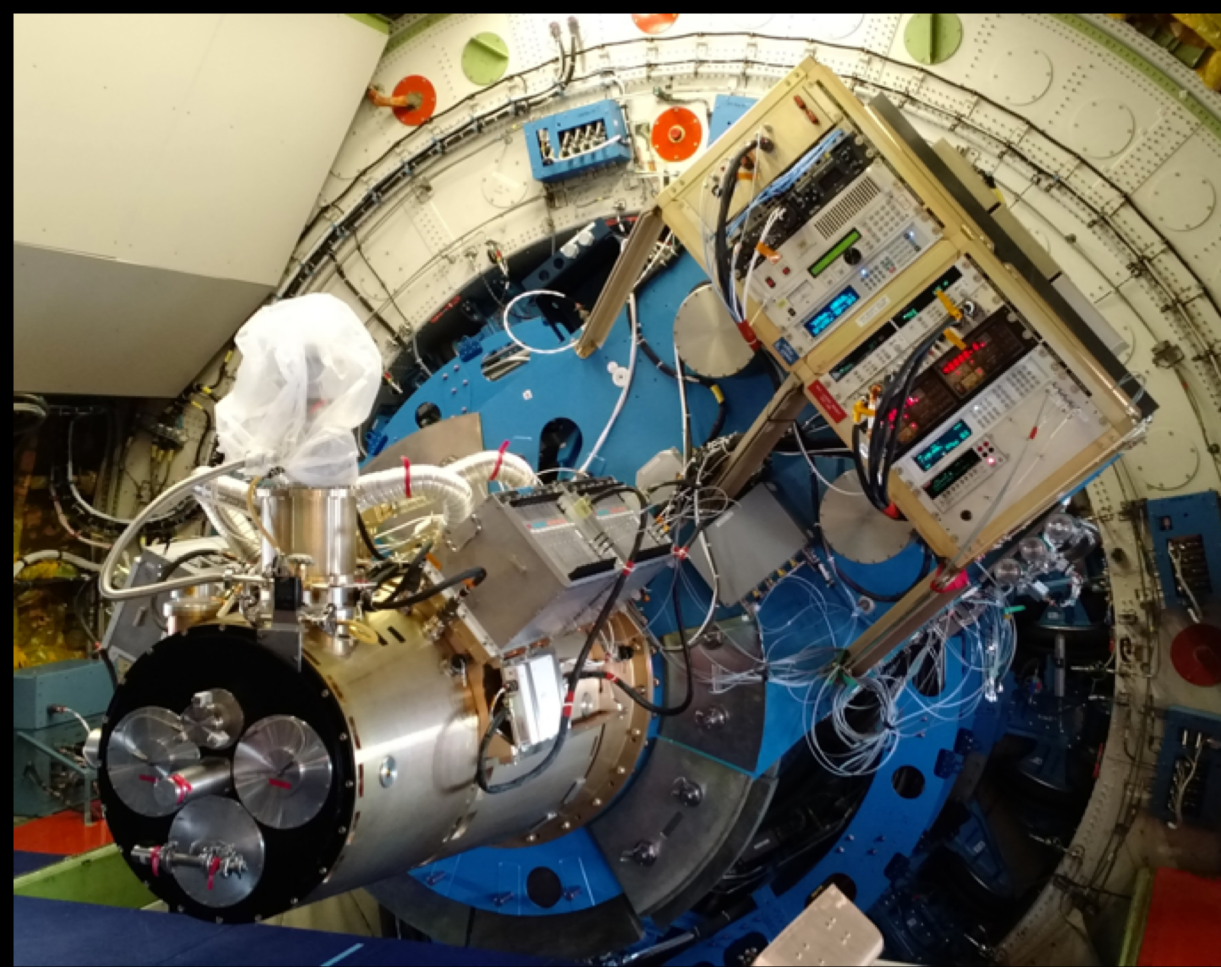


SOFIA Telescope Assembly

- Diffraction limited for $\lambda \gtrsim 35\mu\text{m}$
- Beam size in arcsec: $\lambda(\mu\text{m})/10$
- Mass: 17t
- Spherical bearing (3-axes)
- Active stabilization: gyros and star trackers in closed-loop
- Built in Germany

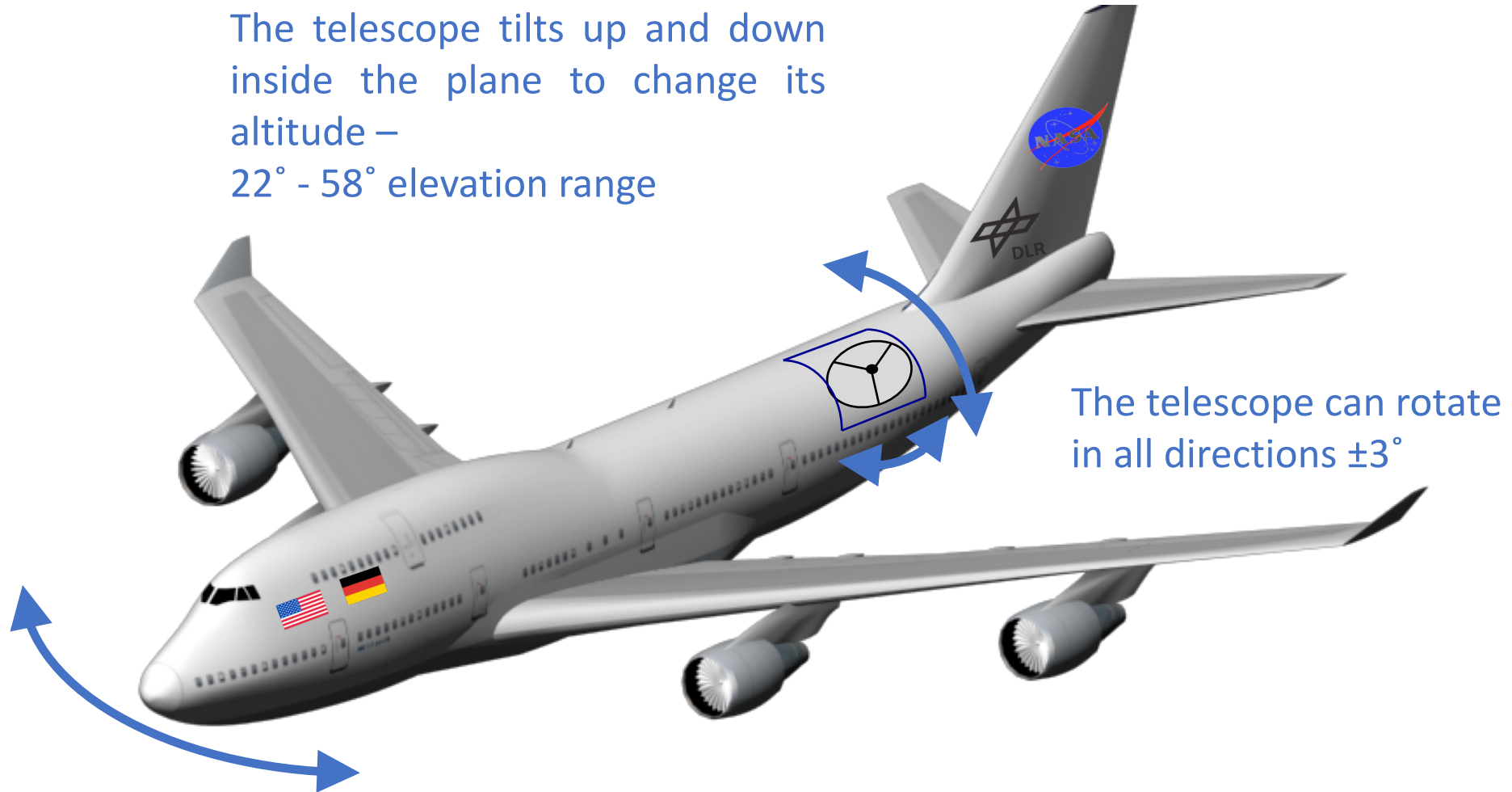






Airborne Observatory Alt-Az

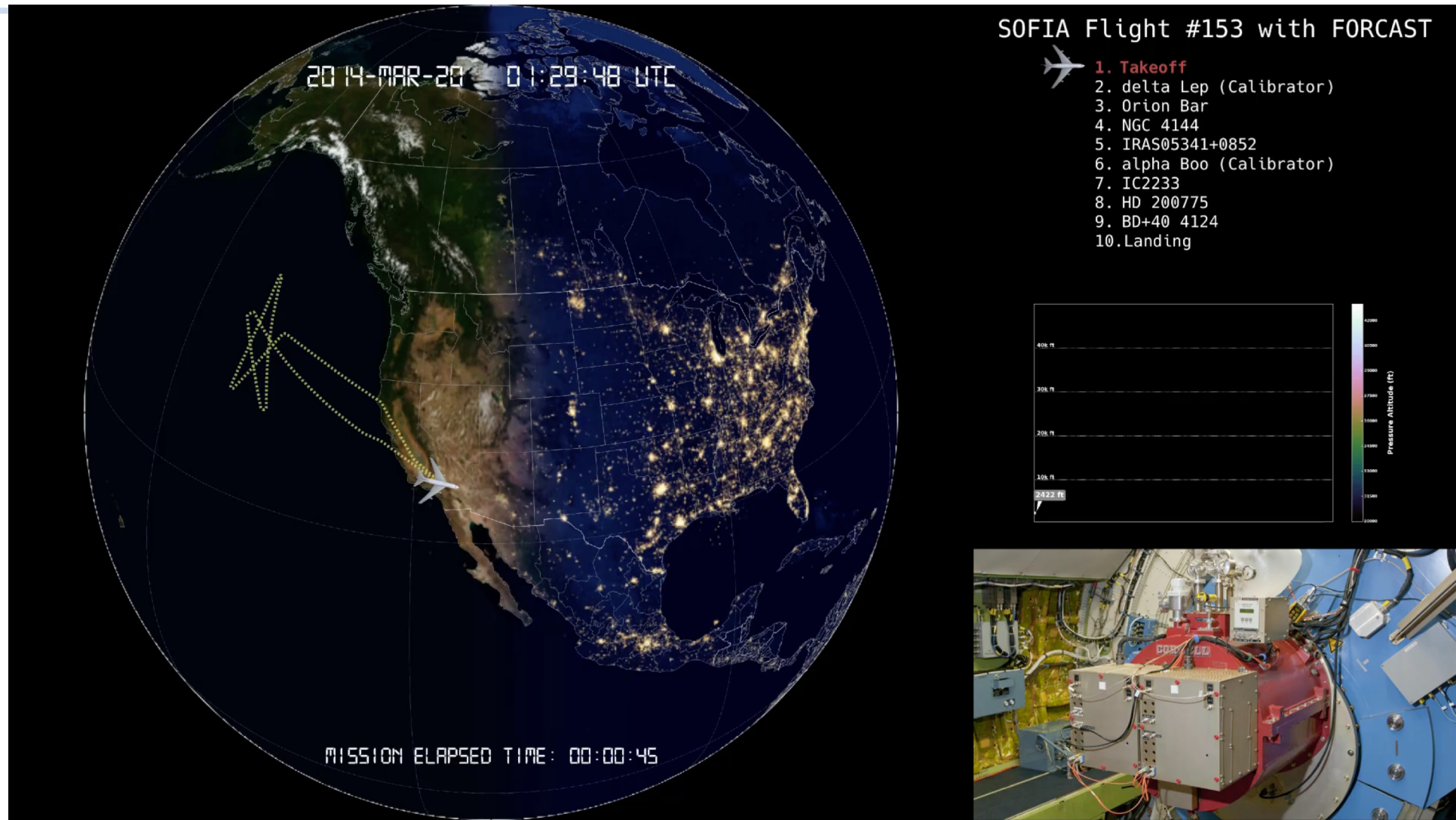
The telescope tilts up and down inside the plane to change its altitude –
22° - 58° elevation range



The telescope can rotate in all directions $\pm 3^\circ$

The plane steers left and right to change azimuth

A Completed Flight Plan!



Water Vapor

- SOFIA flies above ~99% of water vapor in the atmosphere, ***but remaining 1% is still significant...***
 - *SOFIA PWV: 4 – 27 mic. (45k – 35k)*
 - *MK PWV: 0.8 – 4.5 *mm* (weather)*
- Telluric absorption can affect both spectroscopy and sensitivity.
- ATRAN models used in sensitivity calculations on SITE.

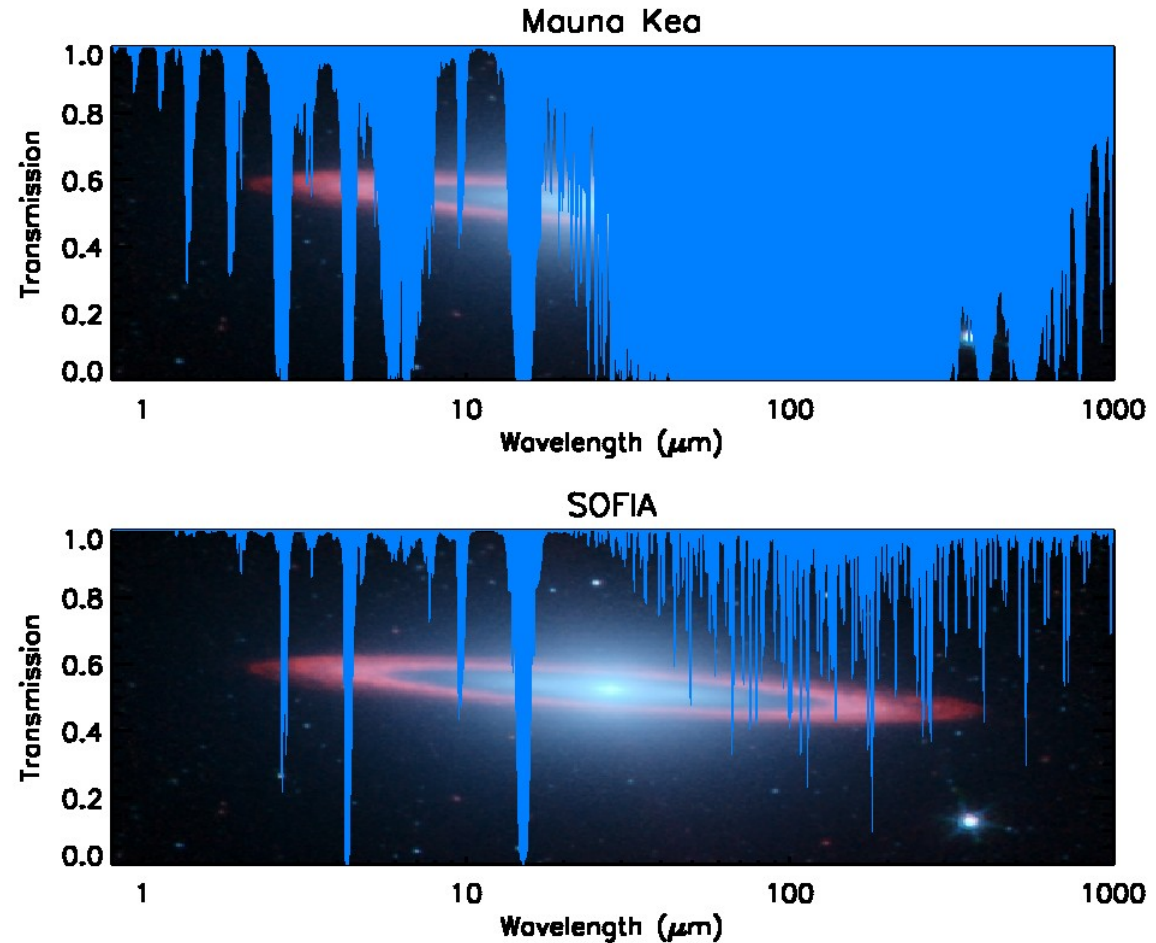


Image Quality

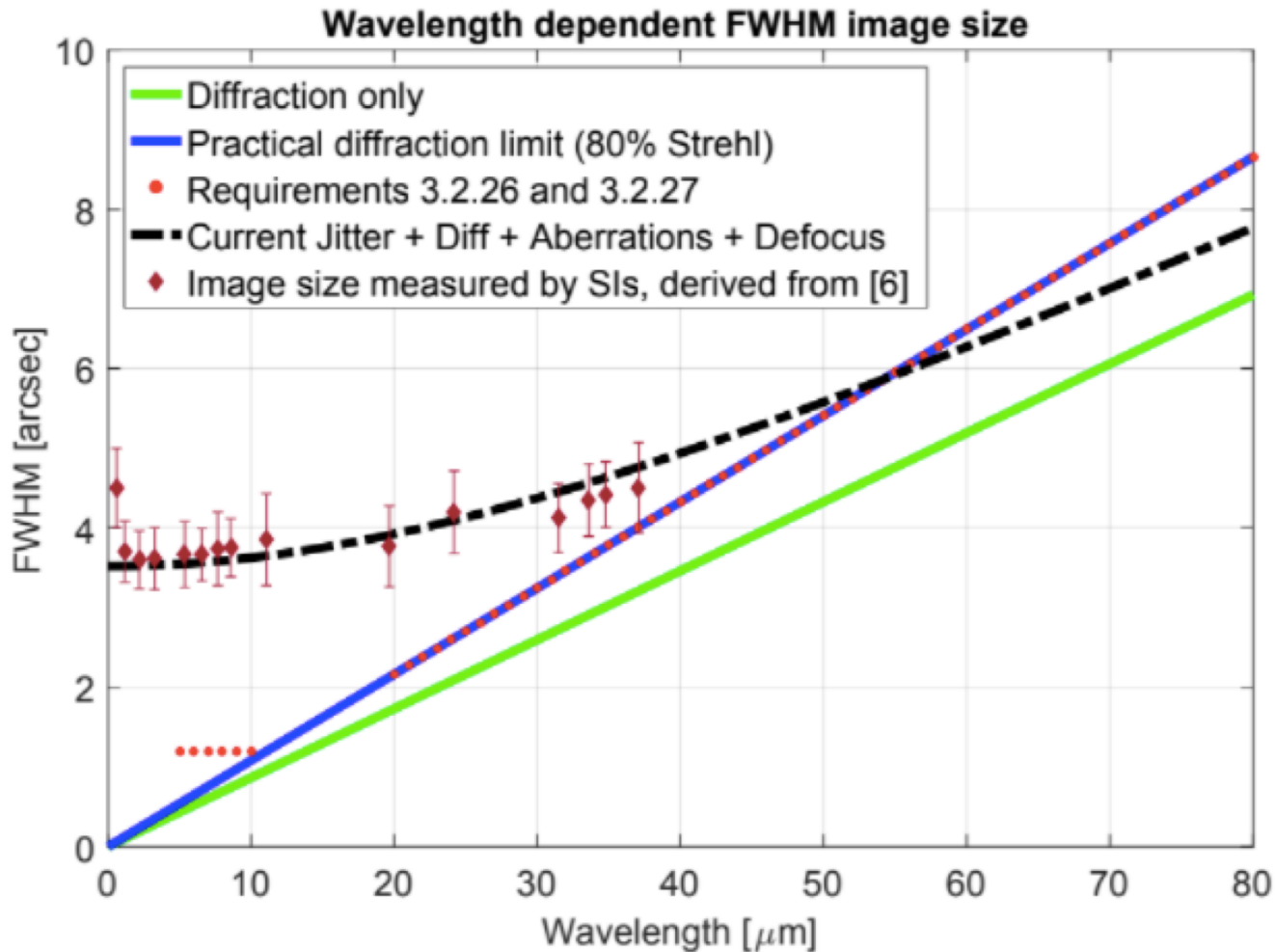


Image stabilization – Pointing is handled by Focal Plane Imager, 8' FOV with 50 Hz updates to the tip-tilt secondary mirror. PSF FWHM starts at around 3.5" at short wavelengths and asymptotes to diffraction limits at longer wavelengths. PSF contribution comes from Pointing jitter + Diffraction + Aberrations + Defocus



off on
Tip / Tilt Movements of the Secondary Mirror

Data reduction and archival

- Once a flight series is finished, data are reduced and archived. They are accessible through the SOFIA Data Cycle System (DCS):
 - <https://dcs.sofia.usra.edu/dataRetrieval/SearchScienceArchiveInfo.jsp>
 - GOs are then notified via email and provided links for data retrieval.
- ***Note that the SOFIA archive is moving to IRSA:***
 - <https://irsa.ipac.caltech.edu/Missions/sofia.html>
- ***Proprietary period is typically 1 year from completion of processing and archiving.***
- **Facility Instruments** (FORCAST, FIFI-LS, and HAWC+): data are pipelined and archived at the SOFIA Science Center typically within a month or so.
- **PI instruments** (EXES, GREAT): data are reduced by the instrument teams and then passed to the SOFIA Science Center for archival.
- Additional resources are available at the SOFIA Data Products and Analysis page:
 - <https://sofia.usra.edu/science/proposing-and-observing/data-products>

SOFIA on the Web

SOFIA Information

- Website: <https://www.sofia.usra.edu/science>
 - Proposal Documents
 - Proposal Tools
 - **Cycle 8 Observer's Handbook**
- Archive
 - DCS: <https://dcs.arc.nasa.gov/>
 - IRSA: partial now, will become sole archive in 2020:
<https://irsa.ipac.caltech.edu/Missions/sofia.html>
- Helpdesk:
sofia_help@sofia.usra.edu