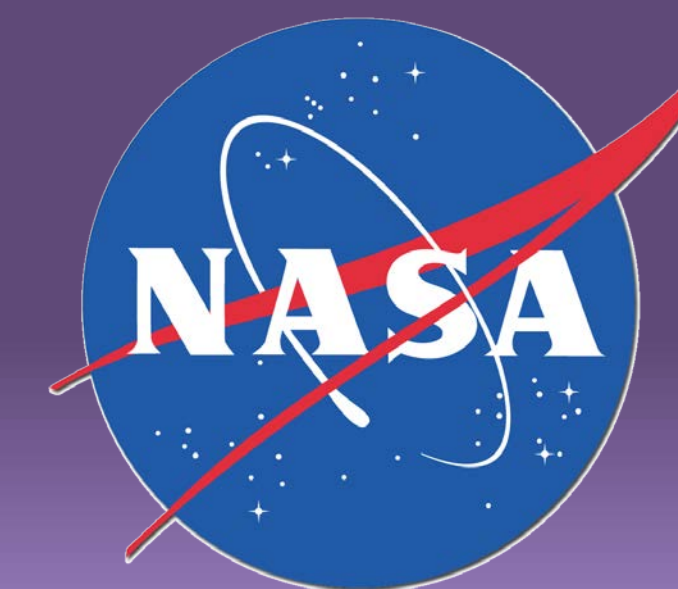




Enhancing The Effectiveness Of The Telescope Assembly Alignment Simulator



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High-resolution Airborne Wideband Camera-plus (HAWC+)

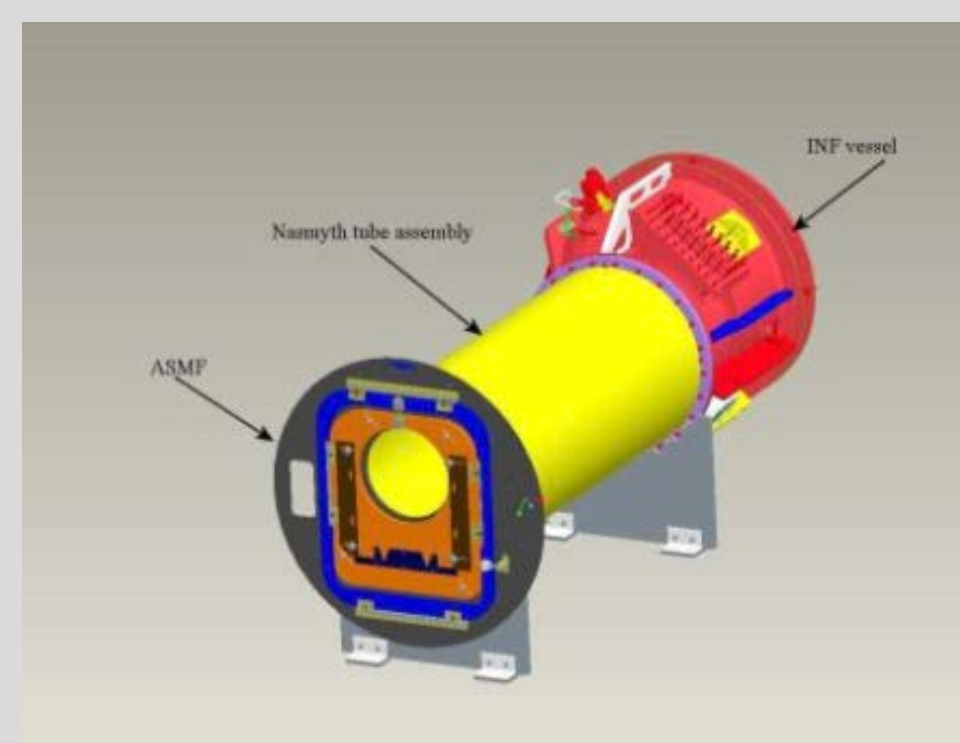
SOFIA



SOFIA - Stratospheric Observatory for Infrared Astronomy is a 747sp Boeing aircraft modified to carry a 2.7m telescope. This unique aircraft uses infrared light to study the hidden universe, create a greater understanding of local galaxies, and observe the history of our universe.

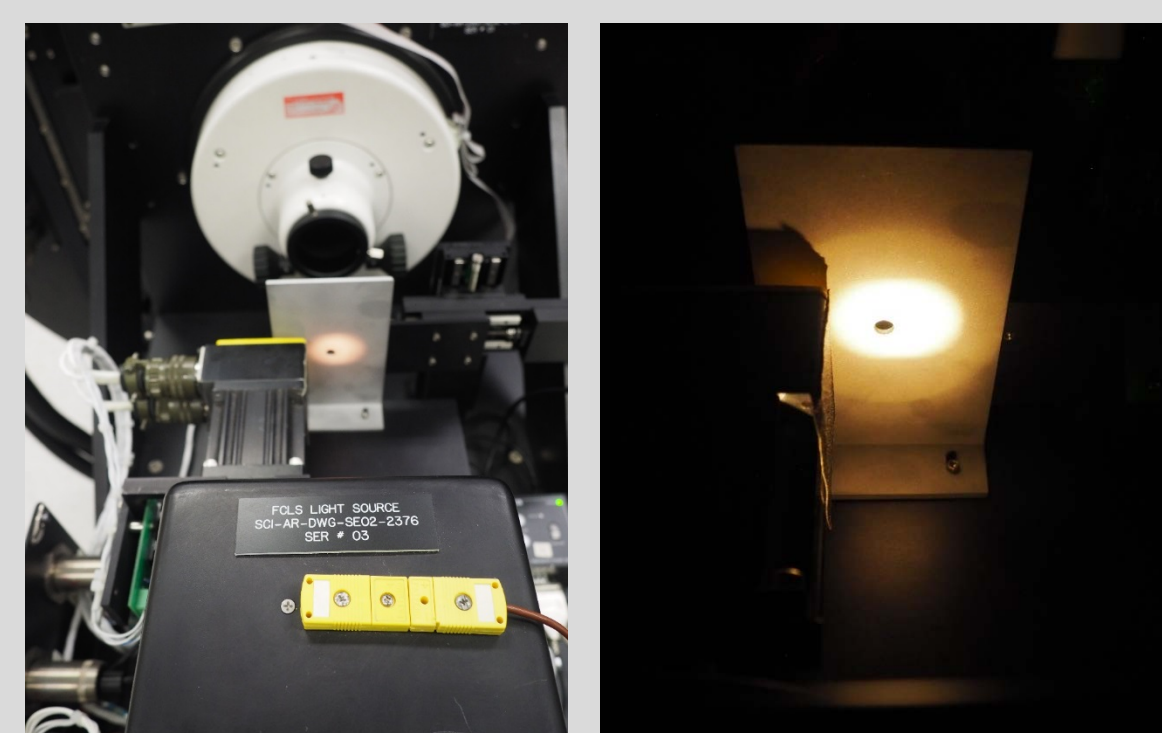
TAAS

TAAS - Telescope Assembly Alignment Simulator. It is the machine that simulates the telescope on SOFIA and also mimics infrared starlight.



FCLS

Background: Focus Chop Light Source (FCLS) is the instrument used to simulate a light source on the TAAS. There are 6 different aperture holes with different sizes on the FCLS. They are: 5mm, 3mm, 2mm, 1mm, 0.5mm, 200µm, 100 µm and a light source to simulate different brightness of starlight.



Light source in front of aperture hole

FCLS Alignment Process

These are images of 5mm aperture during the calibrating process.



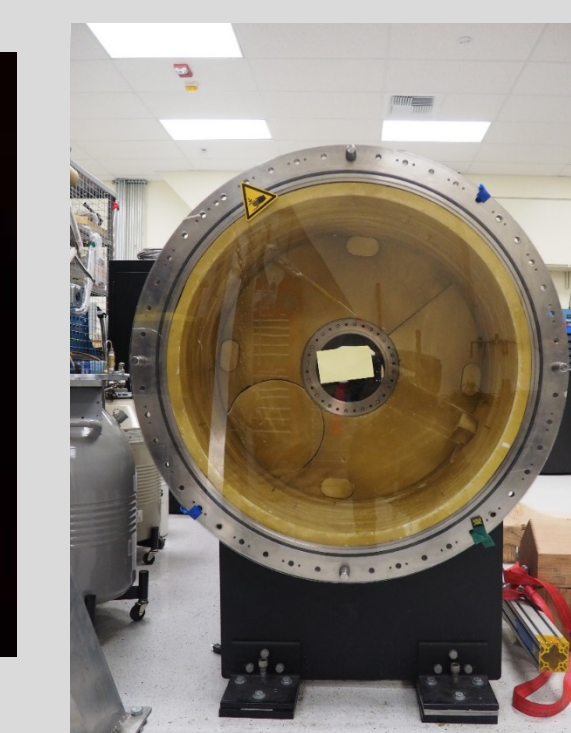
Predetermined Position
Fig. 1



During alignment:
Fig. 2

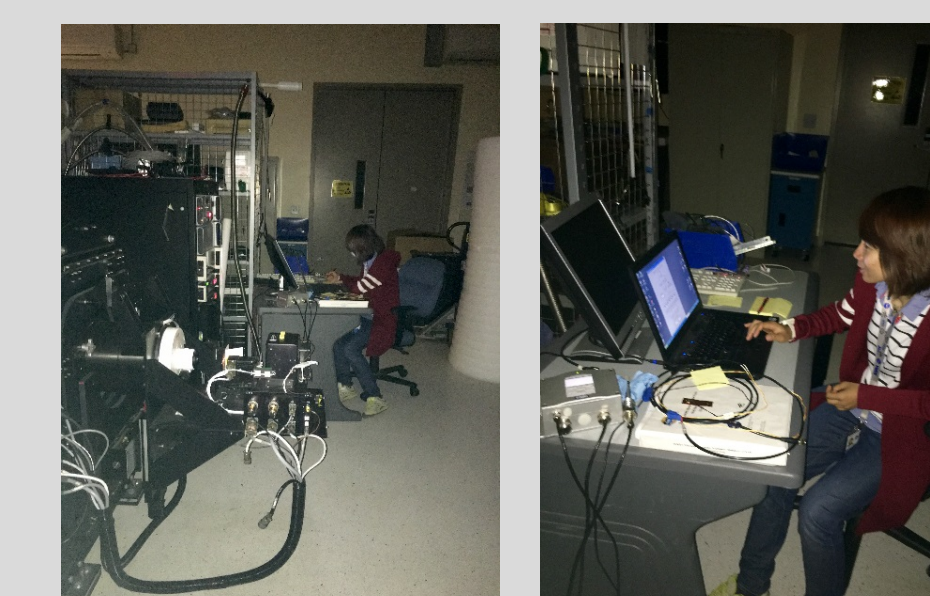


After/In Focus:
Fig. 3



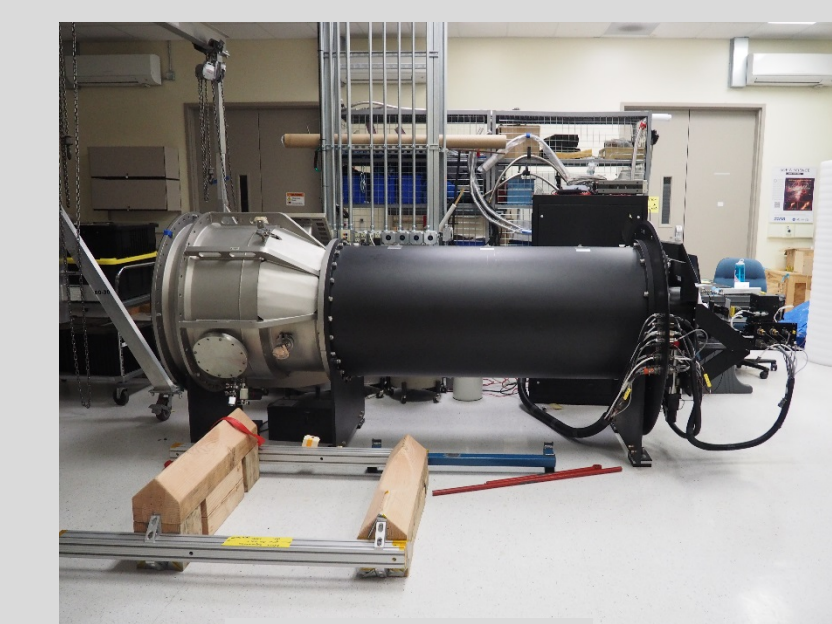
Front of TAAS, image is seen on the yellow note

In order to align the FCLS, the research team had to make adjustments on the predetermined aperture position to find an ideal image. The original image was previously determined by prior research teams. However, upon investigation these positions were not as accurate as they could have been. Therefore, the current research group worked to calibrate and realign the telescope assembly to a focused, ideal image. Figure 3 shows what the ideal image looks like: a circle of light. The focused image is aligned with the light source and two mirrors. Therefore, the overall telescope assembly is aligned. There is a problem that the research team noticed: the brightness of the light. There is always a brighter spot of light on the top left of every image for each aperture hole.



FCLS Future Work

Calibration of the TAAS is done in a dark lab room. Therefore, the computer should be placed on the other side next to the front of the TAAS, for easier and safer viewing of the change in alignment. Also, future work needs to investigate why there is a consistency in the brighter light spot on the top left of every image.



The TAAS

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