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# Observatory Status

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SOFIA Users Group

17 June 2020

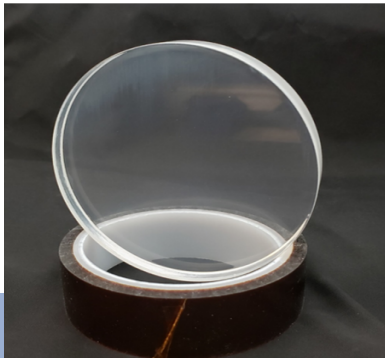
# Observatory Hardware

- On March 13, SOFIA's last flight of Cycle 7 landed
  - the remainder of GREAT OC7M flight series was canceled
- SOFIA was safely stored in its hangar in Armstrong B703 at the Palmdale (Los Angeles World Airport) site, GREAT was removed and team returned to Germany
- A science instrument (FORCAST) was kept cold, and SMO prepared flight plans and instruments for earliest possible return to flight; updated every time RTF date changed
- Work was under way to repair the ELT antenna, it continued until Stage 4 was declared and resumed
- On June 8, a full maintenance crew began the planned "A-check" of the aircraft

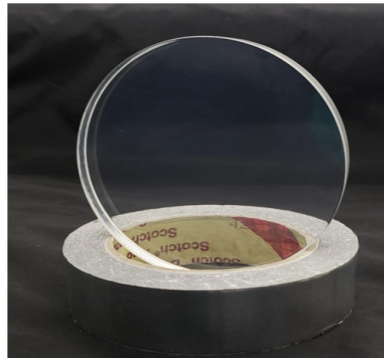
# Science Instruments

- Current Status of each Science Instrument:
  - HAWC+: Cool@ LN<sub>2</sub>
  - FIFI-LS; FORCAST; EXES & GREAT: warm in labs
- FORCAST Spare Entrance window Procurement
  - Obtained spare FORCAST entrance window; set back because cloudy
  - Redelivered window is flawless and acceptable for flight

Before Touch-Up



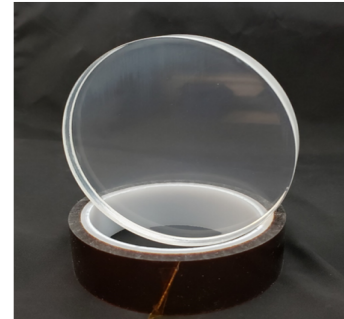
After Touch-Up



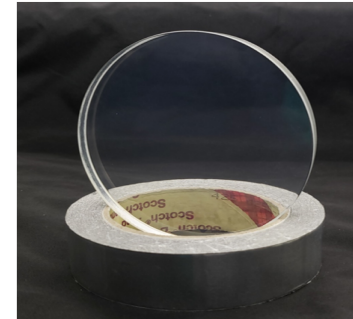
# Science Instruments

- Current Status of each Science Instrument:
  - HAWC+: Cool@ LN<sub>2</sub>
  - FIFI-LS; FORCAST; EXES & GREAT: warm in labs
- FORCAST Spare Entrance window Procurement
  - Recently received spare FORCAST entrance window. Window is flawless and is acceptable for flight

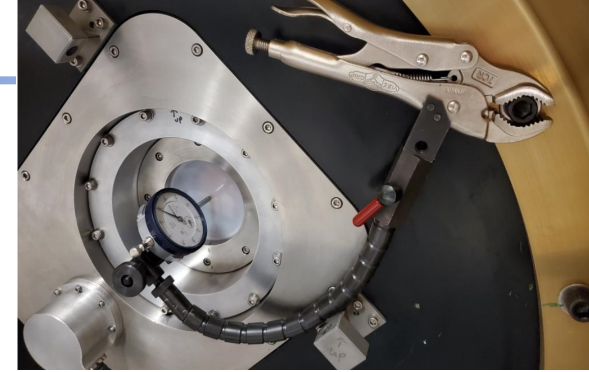
Before Touch-Up



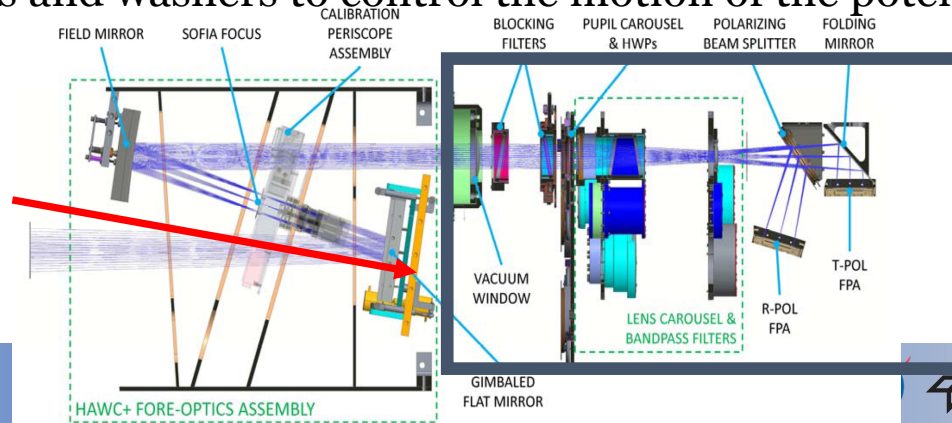
After Touch-Up



# Science Instruments: HAWC+ Repairs



- Entrance window replaced
  - Problem: Vacuum leak detected near the entrance window
  - Investigation: Revealed crack in the HDPE window
  - Solution: Replaced with new HDPE window
- Image Elongation issue addressed
  - Problem: Recent HAWC+ series images were elongated in X-direction
  - Investigation: Revealed issues with potentiometers causing gimbal drift
  - Solution: Installed springs and washers to control the motion of the potentiometers.
  - Tests pending on TAAS



# Science Instruments: HIRMES cancellation

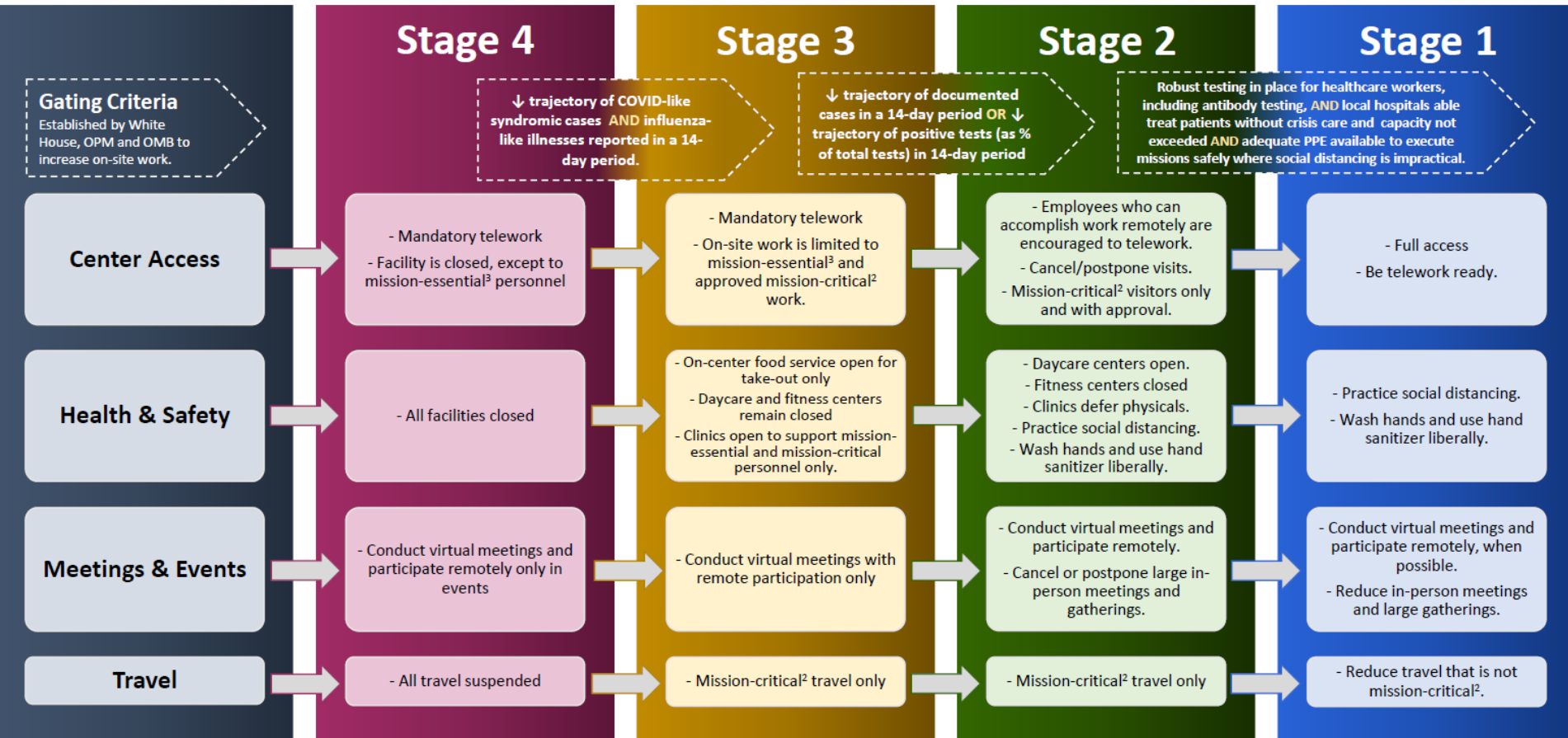
- HIRMES is not continuing its schedule plan to become a facility instrument (April 3, 2020)
- Full SI development stopped and facilities stored at Goddard
- NASA is considering HIRMES a technology demonstration on the detectors
- The SOFIA project is to come up with a plan for future instrument development possibilities.
  - *See Roadmap presentation this SUG by Jackson*

# Effects of COVID-19 Pandemic (1)

- NASA Ames and Armstrong Centers went to Stage 4
  - Armstrong to Stage 3 on March 17
  - Mandatory telework
  - On-site staff only to prevent harm to equipment (cryo service)
- Centers dropped to Stage 3 on June 8
  - Maintenance crew resumed work on aircraft ELT antenna
  - Planned maintenance (A-check) initiated

# NASA Framework for Return to On-Site Work (as of 3 May 2020)

\* This guidance applies to NASA civil servants. Contractors employees should reach out to their management.



1. All travel to or from centers at Stage 3 or higher, or to countries at Level 3 or higher, requires an approved Request for Travel Exception form. The [Request for Travel Exception](#) form is available on the NASA People website. For the latest CDC international travel information, go to <https://www.cdc.gov/coronavirus/2019-ncov/travelers/index.html>.

2. **Mission critical:** work that must be performed to minimize the impact on mission/project operations and/or schedules and cannot be performed remotely or virtually.

3. **Mission essential functions:** As described in the COOP, during an emergency, NASA's Primary and Mission Essential Functions (PEFs) are those functions that are essential to the continuity of operations and are focused on protecting life and property as well as insuring agency leadership and control of the agency.



# Options that were considered for Return to Science Flights

	6-Jul	13-Jul	20-Jul	27-Jul	3-Aug	10-Aug	17-Aug	24-Aug	31-Aug	7-Sep	14-Sep	21-Sep
<b>A2: current plan</b>	HA(1)	HA(4)	HA(2)			GR	GR	GR	GR	GR	GR	
<b>B: late deploy w/GREAT</b>	HA(1)	HA(4)	HA(2)	FI(4)				GR	GR	GR	GR	
<b>C: late deploy w/HAWC+</b>	<del>HA(1)</del>	<del>HA(4)</del>	<del>HA(2)</del>	FI(4)	FI(1)			HA	HA	HA	HA	
<b>D: late deploy w/FIFI</b>	<del>FI</del>	FI	FI	HA	HA	HA		FI	FI	FI	FI	
<b>F: no deployment</b>	HA(1)	HA(4)	HA(2)	FI(4)	FI(4)	FO	FO	HA	HA	HA	EX	EX

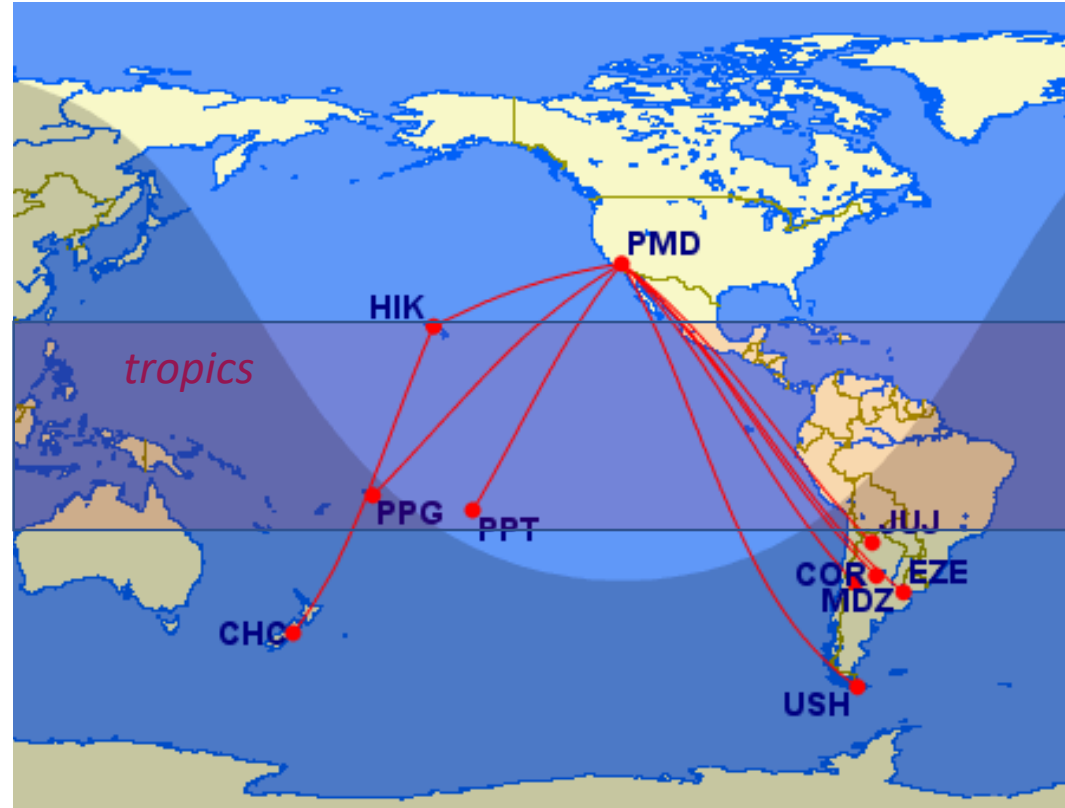
# Options for flight bases (1/2)

- SOFIA is considering other bases that can:
- access astronomical targets at declinations below  $-25^\circ$  best observed from the South
- utilize July & August when nights are short and Northern atmospheric  $H_2O$  is high
- collaboration with other countries' agencies
- be alternative to New Zealand.



## Options for flight bases (2/2)

- High H<sub>2</sub>O down to Tropic of Capricorn (23S latitude)
  - Best tropical: single-hop to Papeete (**PPT**) at 17.6S
- Poor weather at Tierra del Fuego
  - No suitable field below 40S?
- Ideal latitudes 37S to 51S
  - experience from CHC and simulated flight plans from candidate bases
  - Closest to ideal range: Buenos Aires (**EZE**) at 34.8S



# Return to Flight: Operational Safety

- NASA Armstrong and Ames developing plans for safe return to workplace upon transition from Stage 3 to 2
- SOFIA project developed plan for operations
  - On-board crew limited: 3 flight crew, 10 mission crew
  - Cloth masks required of mission crew during entire mission
  - Workstations requiring close quarters identified and staff in them required to wear masks
  - Aircraft interior workspaces disinfected after each flight
  - Close contact log when within 6 feet of others
  - N95 masks during instrument installations, critical lifts

# Summary: Observatory Status

- SOFIA halted operations during OC7M (GREAT) and cancelled the planned OC7N (FORCAST) and OC7O (EXES) series
- Cycle 8 was planned to start April 25
  - *See presentation this SUG by De Buizer for current Cycle 8 plans*
- The observatory is in good physical condition and science instruments are ready to go
- A safety plan was made and the project believes it is safe to conduct SOFIA flight operations