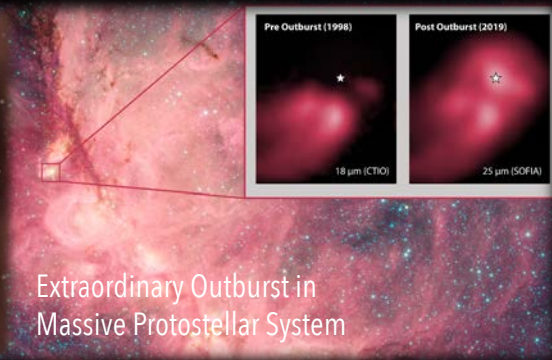
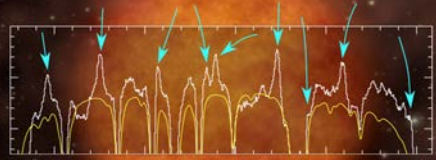




Magnetic field properties in a galactic merger remnant

Surprisingly young nebula RCW120 hints at formation of stars in the early universe

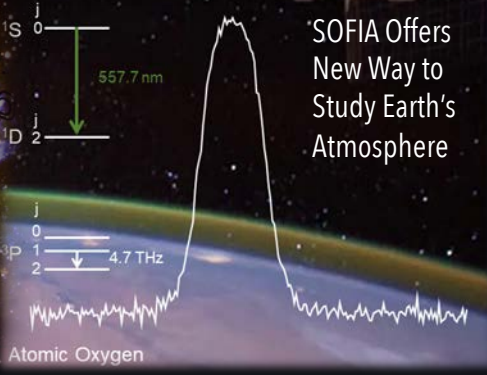
Carbon Dioxide in AGB star envelope



Extraordinary Outburst in Massive Protostellar System



[CII] map of the Fireworks galaxy: calibration for distant galaxies



SOFIA Offers New Way to Study Earth's Atmosphere



Flights Flown from Germany 2021

SOFIA Project Update Naseem Rangwala, Project Scientist

SOFIA Landing in French Polynesia July 19th, 2021 for its annual Southern Hemisphere deployment. *Credit: DSI/Florian Behrens*



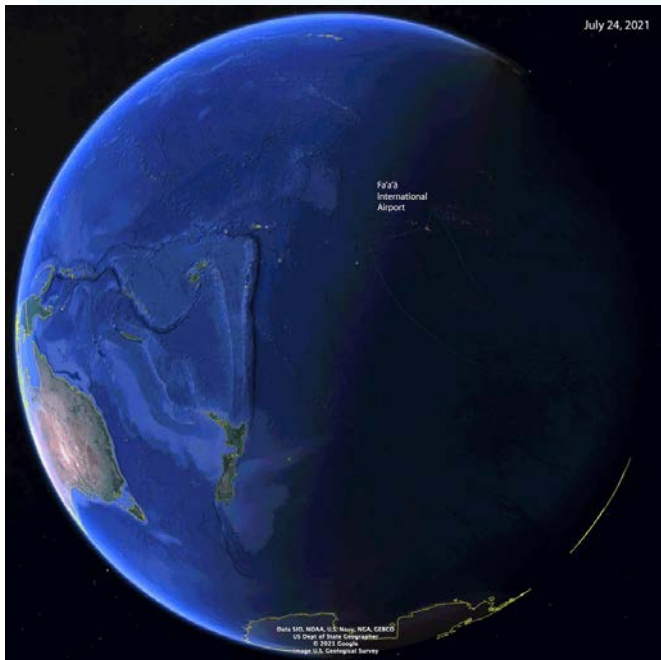
SOFIA successfully deployed to Germany in Feb 2021 during a global COVID pandemic; obtained high-quality science data; completed 15 of 20 planned science flights.



SOFIA News – fresh off the press



- ◆ SOFIA is currently conducting Southern Hemisphere observations from French Polynesia
 - 8 successful flights (as off Aug 9th)
 - GREAT and HAWC+ instruments
 - Legacy/Pilot programs: HyGal, FEEDBACK, SIMPLIFI and Galactic Center



SOFIA first 3 flight paths from French Polynesia
Credit: Leslie Proudfit



SOFIA at Tahiti International Airport



Credit: Andy Barry



Michael Toberman
(Deputy PM Operations)



Andy Barry
(SOFIA Chief Pilot)



Mike Gaunce
(Mission Manager)



Ed Harmon
(Mission Manager)



Ed Ingraham
(Health, Safety & Mission Assurance)

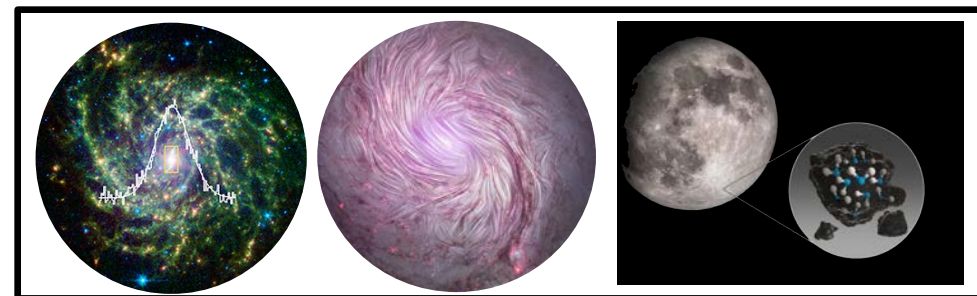
John Wong
Mission Operations

SOFIA News – fresh off the press

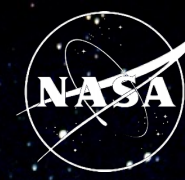


◆ 2022 Senior Review – Finished Blue Team Review

- **Compelling Science Vision**
 - Unique Capabilities in the mid-IR/far-IR
- **More Observing hours: Northern & Southern**
- **Ability to re-invent**
 - New instruments and upgrades (Instrument Roadmap)
- **Community Building**
 - SOFIA provides critical infrastructure for the Far-IR community and instrumentalists
- **Crewed Mission/Human Element**
- **Training the Next Generations; diversity & inclusion**



SOFIA News – fresh off the press



◆ 2022 Senior Review – Finished Blue Team Review

➤ Compelling Science Vision

- Unique Capabilities in the mid-IR/far-IR

➤ More Observing hours: Northern & Southern

➤ Ability to re-invent

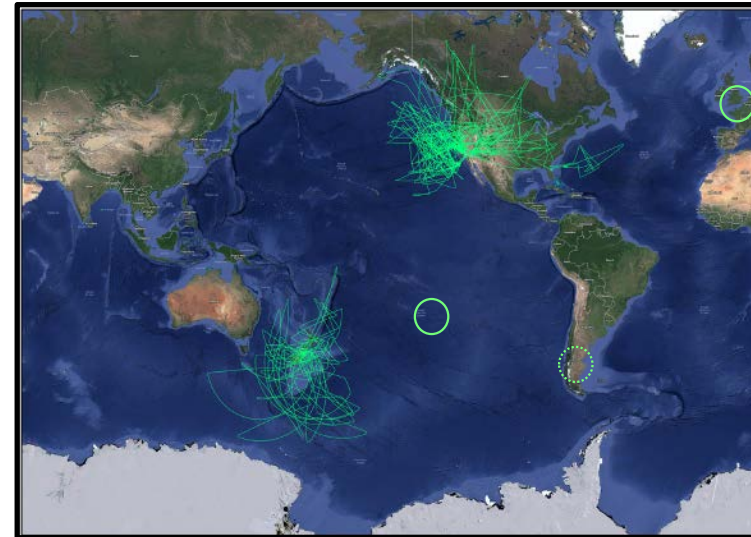
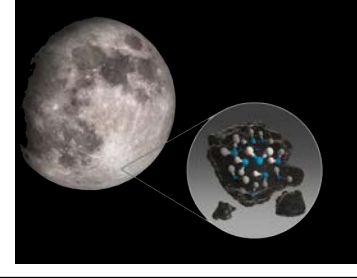
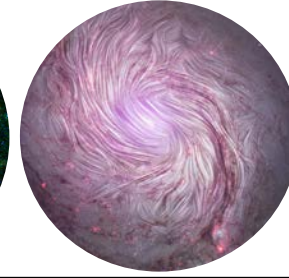
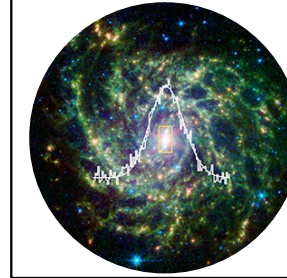
- New instruments and upgrades (Instrument Roadmap)

➤ Community Building

- SOFIA provides critical infrastructure for the Far-IR community and instrumentalists

➤ Crewed Mission/Human Element

➤ Training the Next Generations; diversity & inclusion



SOFIA News – fresh off the press



◆ 2022 Senior Review – Finished Blue Team Review

➤ Compelling Science Vision

- Unique Capabilities in the mid-IR/far-IR

➤ More Observing hours: Northern & Southern

➤ Ability to re-invent

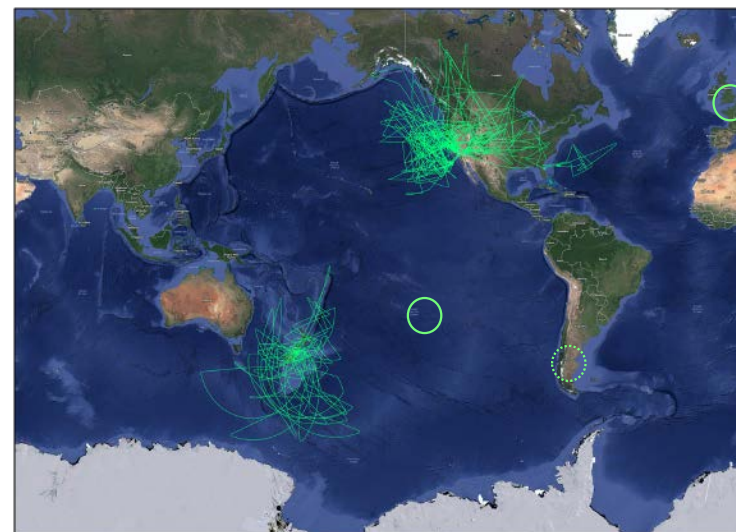
- New instruments and upgrades (Instrument Roadmap)

➤ Community Building

- SOFIA provides critical infrastructure for the Far-IR community and instrumentalists

➤ Crewed Mission/Human Element

➤ Training the Next Generations; diversity & inclusion

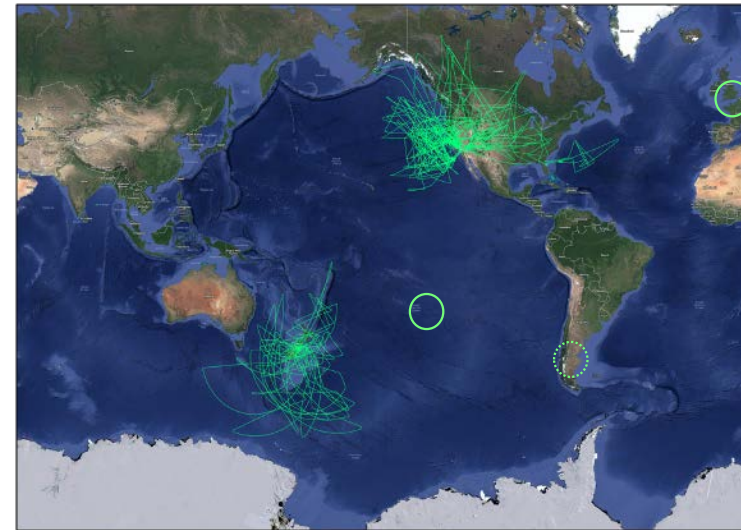
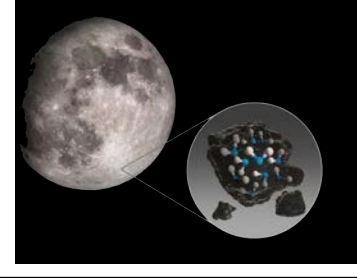
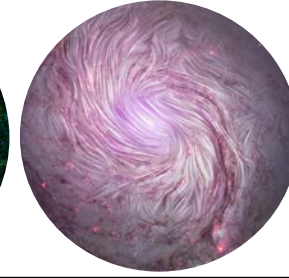
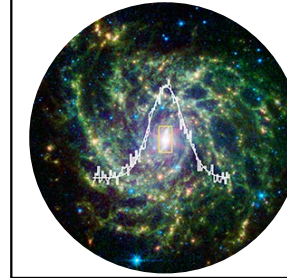


SOFIA News – fresh off the press



◆ 2022 Senior Review – Finished Blue Team Review

- **Compelling Science Vision**
 - Unique Capabilities in the mid-IR/far-IR
- **More Observing hours: Northern & Southern**
- **Ability to re-invent**
 - New instruments and upgrades (Instrument Roadmap)
- **Community Building**
 - SOFIA provides critical infrastructure for the Far-IR community and instrumentalists
- **Crewed Mission/Human Element**
- **Training the Next Generations; diversity & inclusion**



SOFIA News – fresh off the press



◆ 2022 Senior Review – Finished Blue Team Review

➤ Compelling Science Vision

- Unique Capabilities in the mid-IR/far-IR

➤ More Observing hours: Northern & Southern

➤ Ability to re-invent

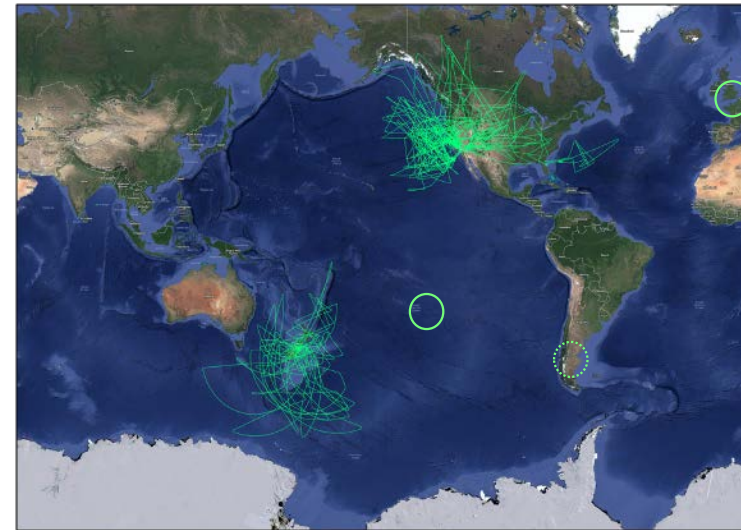
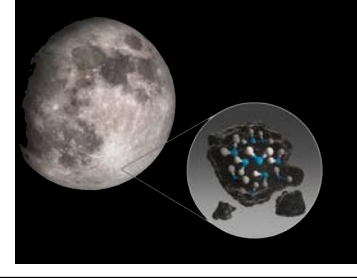
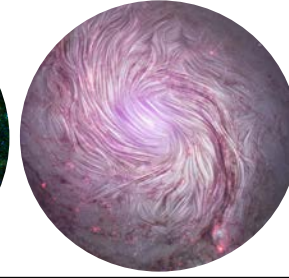
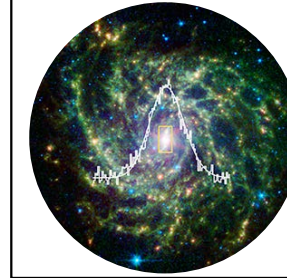
- New instruments and upgrades (Instrument Roadmap)

➤ Community Building

- SOFIA provides critical infrastructure for the Far-IR community and instrumentalists

➤ Crewed Mission/Human Element

➤ Training the Next Generations; diversity & inclusion



SOFIA News – fresh off the press



◆ 2022 Senior Review – Finished Blue Team Review

➤ Compelling Science Vision

- Unique Capabilities in the mid-IR/far-IR

➤ More Observing hours: Northern & Southern

➤ Ability to re-invent

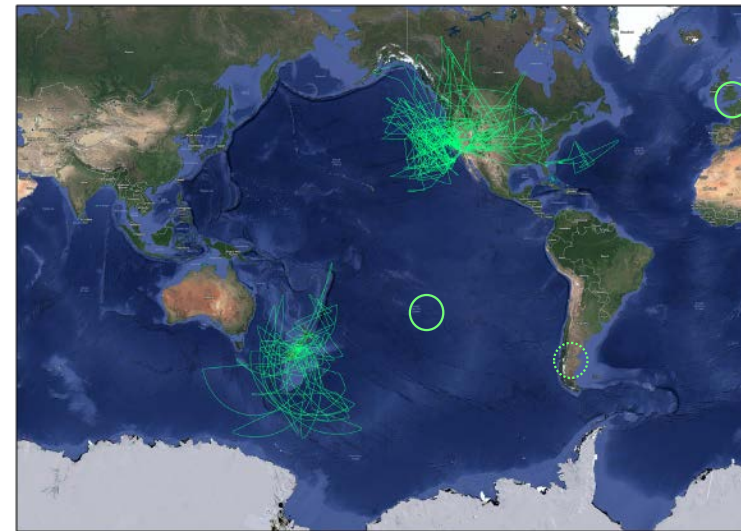
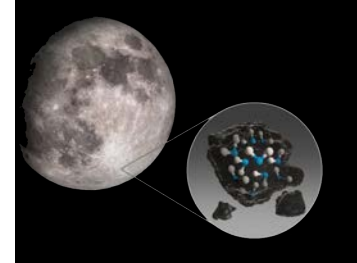
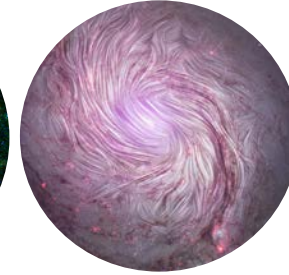
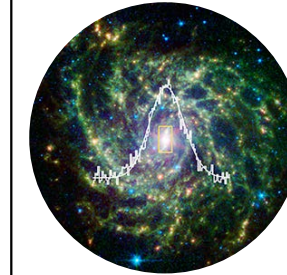
- New instruments and upgrades (Instrument Roadmap)

➤ Community Building

- SOFIA provides critical infrastructure for the Far-IR community and instrumentalists

➤ Crewed Mission/Human Element

➤ Training the Next Generations; diversity & inclusion

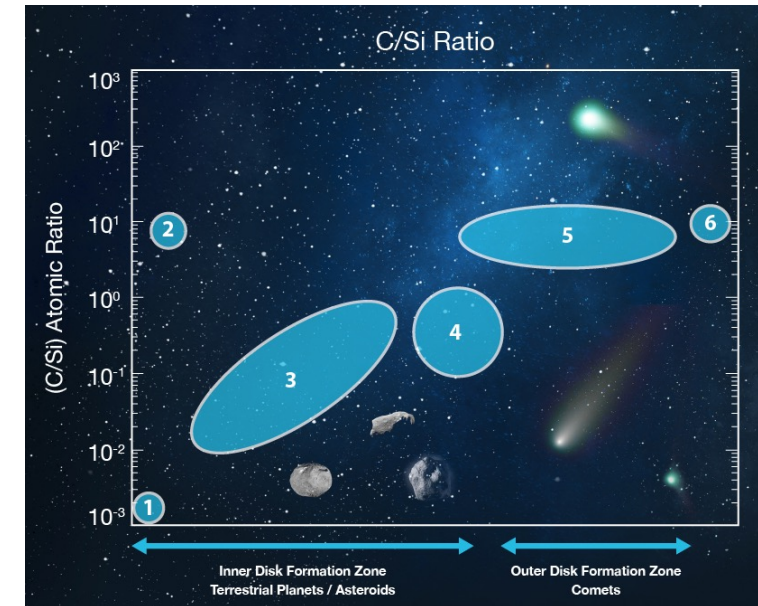


SOFIA Update (since Jan 2021)



◆ Increasing SOFIA's Scientific Return

1. Successfully completed Germany deployment in Feb-March 2021
 - Germany deployment was put together in record time
2. Completed implementation of the 5th contingency flight – to boost program completion rate
3. Southern Hemisphere initiative
 - New site established (French Polynesia) – deployed July 2021
 - First suitcase deployment planned for March 2022
 - Argentina and Chile site survey expected in the Fall (COVID impact)
4. Increasing productivity of our current instrument suite: GREAT, EXES, & HAWC+
5. Investing in mission's Impact & training the next generation
6. Increasing observatory's reliability. Examples are:
 - Purchasing more (newer) engines and other spare parts
 - Study on implementing broadband internet on SOFIA is complete



SOFIA Comet Studies Explore the Carbon Gradient in the Solar System (Woodward et al. 2021)

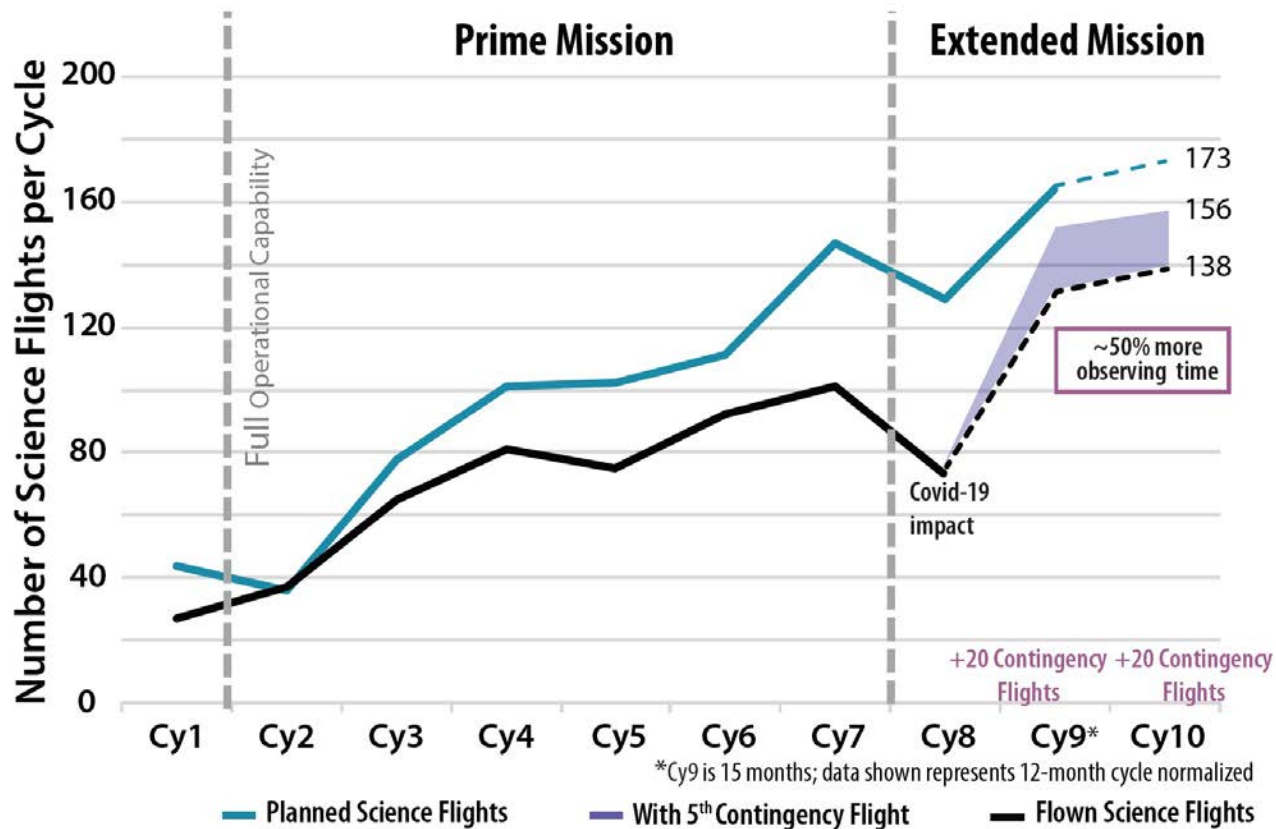
Credit: NASA/G. Hogan/L. Proudfit/C. Woodward

SOFIA Update (since Jan 2021)



◆ Increasing SOFIA's Scientific Return

2. Completed implementation of the 5th contingency flight - to boost program completion rate



Credit: Brian Grist

- Historical trend for planned (teal) and achieved (black) science flights.
- Projections for Cycles 9 & 10 are shown by dashed lines.
- Shaded region shows potential increase in (realized) observing time from adding contingency flights
- The research hours offered to the community are directly proportional to the science flights planned.

Research Hour (RH) Plan vs. Actual Achieved

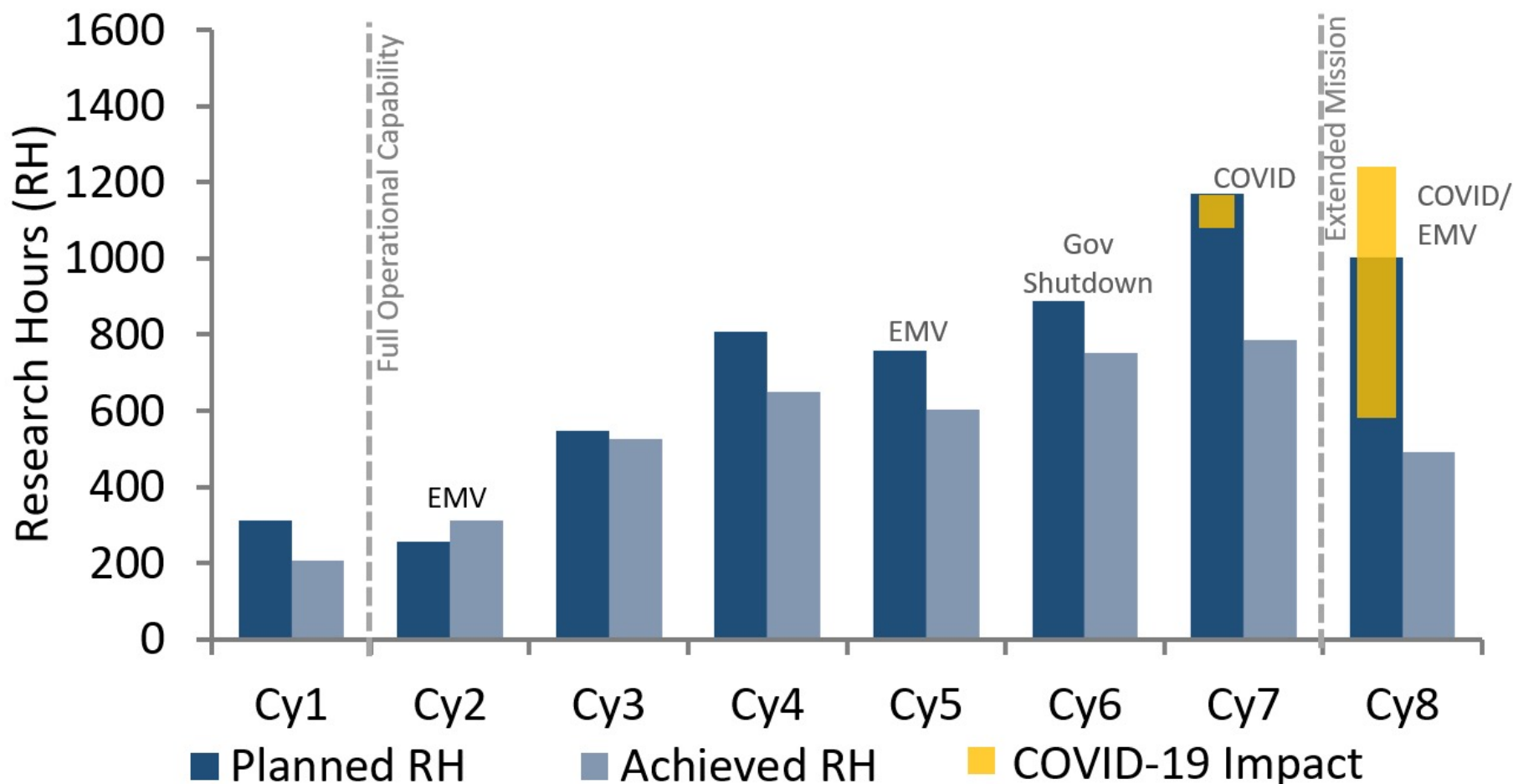


Data through
31-Jul-2021

COVID-19
Impact



Brian Grist
(Project Planning and
Control; Scheduler)



EMV: Extended
Maintenance Visit

Note: Cycle 6 planned numbers include the planned
before baseline adjusted due to government shutdown

Note: Cycle 8 start significantly
delayed due to COVID -19

Credit: Brian Grist



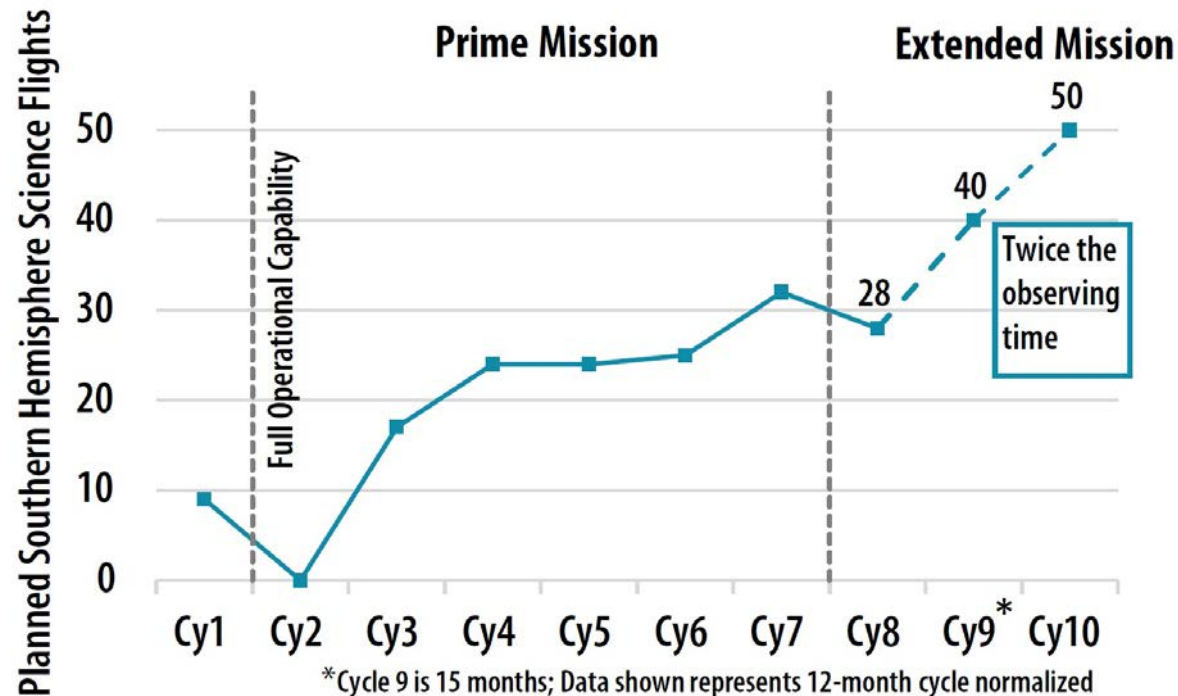
SOFIA Update (since Jan 2021)



◆ Increasing SOFIA's Scientific Return

3. Southern Hemisphere Observing

- New site established (French Polynesia) – deployed July 2021
- First suitcase deployment planned for March 2022
- Argentina and Chile site survey expected in Fall (COVID impact)



Planned observing opportunities in the Southern Hemisphere to increase starting Cycle 9

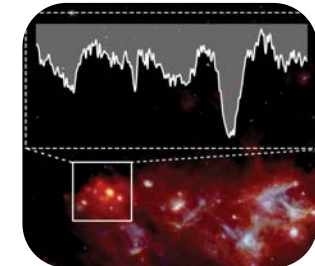
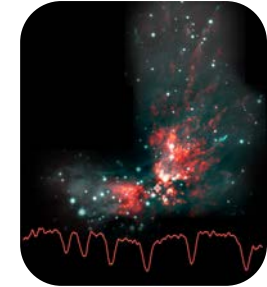
SOFIA Update (since Jan 2021)



◆ Increasing SOFIA's Scientific Return

4. Increasing productivity of our current instrument suite: GREAT, EXES, & HAWC+

- EXES: transiting to facility instrument on Oct 1, 2021 is on track (B. Reach talk)
 - Project also investing in the TEXES archive to support EXES science and community
- GREAT Future Operations Initiative (complete):
 - Project added substantial resources to continue operations till Cy11 to finish our commitments and for orderly ramp down (B. Reach talk)
 - Project also invested in spare local oscillators
 - *Collaborative effort between NASA, DLR, GREAT PIs and the SMO leadership*
- HAWC+ upgrade: Proposal received and under review by SOFIA and Ames management (on going; behind schedule)



Nancy Rustemeyer
(Science Instrument
Development Manager)

SOFIA Update (since Jan 2021)



Increasing Mission's Impact

5. Mission's Impact & training the next generation

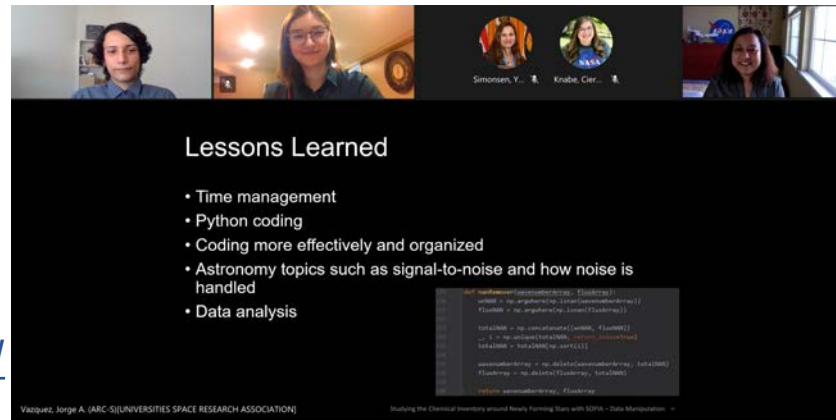
- Mission's outreach geared towards high school and undergraduate students; 3 highly successful events with US consulate/German schools/undergrads during deployment; virtual outreach to students in French Polynesia schools (upcoming)
- AAA (SETI program) teachers return!
- Establishing SOFIA internship program - geared towards underrepresented groups
- SOFIA mission blog is now live
- Possible SOFIA deployment to Ames for Far-IR school (additional outreach local community colleges and educators)



Outreach events organized with the US consulate in Cologne, Germany



<https://blogs.nasa.gov/sofia/>



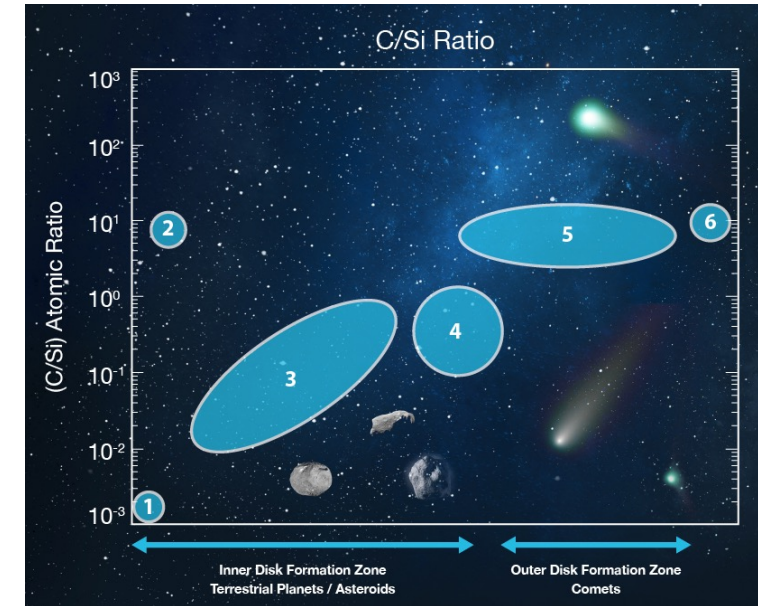
Maggie McAdams (Associate Project Scientist)

SOFIA Update (since Jan 2021)



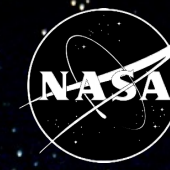
◆ Increasing SOFIA's Scientific Return

1. Successfully completed Germany deployment in Feb-March 2021
 - Germany deployment was put together in record time
2. Completed implementation of the 5th contingency flight - to boost program completion rate
3. Southern Hemisphere initiative
 - New site established (French Polynesia) - deployed July 2021
 - First suitcase deployment planned for March 2022
 - Argentina and Chile site survey expected in the Fall (COVID impact)
4. Increasing productivity of our current instrument suite: GREAT, EXES, & HAWC+
5. Investing in mission's Impact & training the next generation
6. Increasing observatory's reliability. Examples are:
 - Purchasing more (newer) engines and other spare parts
 - Study on implementing broadband internet on SOFIA is complete

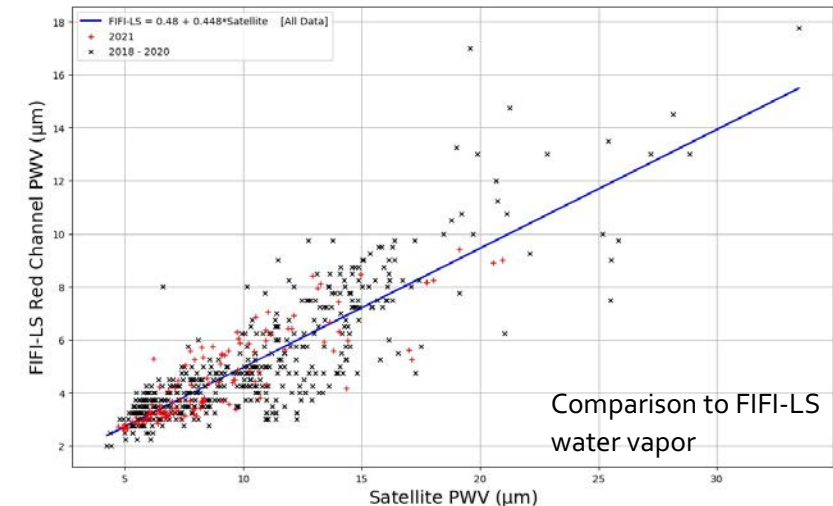
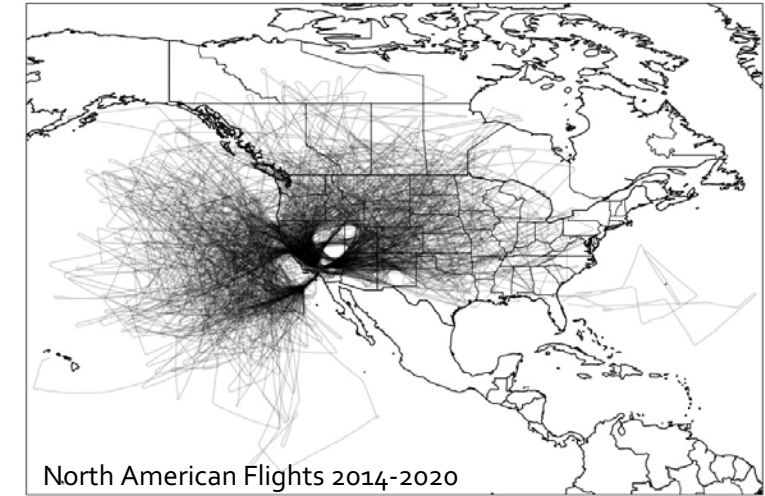


SOFIA Comet Studies Explore the Carbon Gradient in the Solar System
Credit: NASA/G. Hogan/L. Proudfit/C. Woodward

Water Vapor Tracking



- ◆ Project continuing to track the zenith precipitable water vapor (PWV) along the flight paths using satellite data
 - Water Vapor forecast updated for the SOFIA mission briefs
 - Flight plans will either be updated or swapped with another flight plan based on the 36-hour water vapor forecast (SMO initiative underway to develop tools/procedure).



Credit: Doug Hoffman
Deputy Project Scientist

Summary



◆ We have taken all the steps and implemented recommendations based on community's input to put SOFIA on a path to become the best observatory it can be.

- ◆ SOFIA is **your** observatory
 - You (the community) are our major stakeholder
 - We need your support to be our messengers to the rest of the community about SOFIA's scientific accomplishments and transformative changes to increase SOFIA's impact and productivity

Thank you for listening!

SOFIA Principal Investigators



Emily Levesque
U. Washington



Elena Redaelli
Max Planck



Charles Woodward
U. Minnesota



Sue Ann Mao
Max Planck



Matt Hankins
Caltech



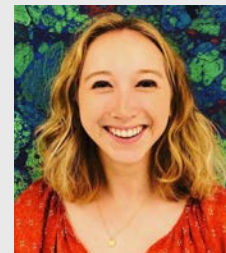
Enrique Lopez
Rodriguez SOFIA



Casey I. Honniball
NASA GSFC



Mikako Matsuura
Cardiff University



Maggie Thompon
UC Santa Cruz



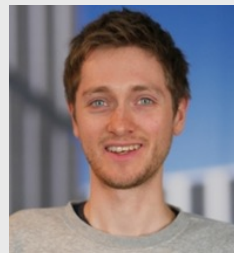
Graham Harper
Trinity College



Alexander Tielens
Leiden University



Thushara Pillai
Boston University



Andrew Barr
Leiden University



Kevin Cooke
U. Kansas



Thomas Bisbas
U. Cologne



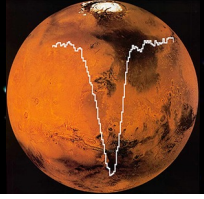
David Nuefeld
John Hopkins



Cornelia Pabst
Leiden University



Irina Smirnova-
Pinchukova MPIA



SOFIA Project Organization (high level)

Reference Chart

