Response to SUG 18 Report

Bill Reach
December 2021
SUG18-1: SUG Charter Revision
Revised charter posted [DONE]

SUG18-2,3: FORCAST, GREAT

We acknowledge feedback on efforts to retain these instruments for observations. Both instruments were offered in Cycle 10.
SUG18-4: Instrument Roadmap

SUG advises aggressive pursuit of enabling technologies for future instruments.

SMO is empowering a Facility Scientist and recommending a Technology Assessment Review by mid-2022, to down-select the type of instrument to be solicited in Step 2 of the Roadmap.

SUG18-5: Community Science Support

SUG concurred with proposed changes in grant funding. Those changes are now in effect for Cycle 10 (Call released 2021 October).
SUG18-6: Programmatic Balance

• *SUG* endorsed 25-30% Legacy projects. SMO is maintaining this as target for Cycle 10 selection.

• *SUG* encouraged practices to get Legacies to >75% completion.

SMO prioritizing legacy completion and is on track.

Need to maintain balance for regular GO proposals.

<table>
<thead>
<tr>
<th>ProgId</th>
<th>Title</th>
<th>Award (hr)</th>
<th>Started</th>
<th>Observed+Scheduled through 2021-Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>07_0077</td>
<td>FEEDBACK</td>
<td>96</td>
<td>2019-May</td>
<td>71%</td>
</tr>
<tr>
<td>07_0189</td>
<td>FORCAST Galactic Center</td>
<td>32</td>
<td>2019-May</td>
<td>83%</td>
</tr>
<tr>
<td>08_0012</td>
<td>Extragalactic Magnetic Fields</td>
<td>156</td>
<td>2020-Jan</td>
<td>66%</td>
</tr>
<tr>
<td>08_0038</td>
<td>HyGAL</td>
<td>81</td>
<td>2021-Feb</td>
<td>43%</td>
</tr>
<tr>
<td>08_0186</td>
<td>FIELDMAPS</td>
<td>41</td>
<td>2020-Sep</td>
<td>52%</td>
</tr>
</tbody>
</table>
SUG18-7: Multi-Cycle Science

SUG endorsed solicitation of multi-cycle projects in the Cycle 10 call. This new proposal type was included in the Cycle 10 call.

SUG18-8: Survey Science

SUG endorsed maintaining survey proposals. Surveys were included in the Cycle 10 call.
SUG18-9: Suitcase Deployments

SUG encourages continued use of suitcase deployments. SOFIA is planning its first March/April suitcase southern deployment in 2022 (Cy 10), with two more in Cycle 11.

SUG18-10: 3-Year Deployment Schedule

SUG endorsed adoption of 3-year notional deployment schedule.

Schedule was included in the Cycle 10 Call, covering through 2024.

<table>
<thead>
<tr>
<th>When</th>
<th>Instrument</th>
<th>Flights</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022-Nov</td>
<td>FIFI-LS</td>
<td>8</td>
</tr>
<tr>
<td>2023-Mar</td>
<td>EXES</td>
<td>8</td>
</tr>
<tr>
<td>2023-Jul</td>
<td>HAWC+/GREAT</td>
<td>32</td>
</tr>
<tr>
<td>2023-Nov</td>
<td>GREAT</td>
<td>8</td>
</tr>
<tr>
<td>2024-Mar</td>
<td>FIFI-LS/HAWC+</td>
<td>32</td>
</tr>
<tr>
<td>2024-Jul</td>
<td>FORCAST</td>
<td>8</td>
</tr>
</tbody>
</table>
SUG18-11: Archival Calls

SUG endorsed continuing funding archival research at $1.5M/year, and synchronizing with the observing call. A stand-alone archival research call will be in 2022 late spring. Synchronization can be discussed.
Flight schedules are subject to change. To track SOFIA’s flights in real time, search our tail number ‘N747NA’ on a flight tracking website.

<table>
<thead>
<tr>
<th>Cycle 9 Flight Series</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Series ID</strong></td>
</tr>
<tr>
<td>OC9A</td>
</tr>
<tr>
<td>OC9B</td>
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<tr>
<td>OC9C</td>
</tr>
<tr>
<td>OC9D</td>
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<tr>
<td>OC9E</td>
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<tr>
<td>OC9F</td>
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<tr>
<td>OC9G</td>
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<tr>
<td>OC9H</td>
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<tr>
<td>OC9I</td>
</tr>
<tr>
<td>OC9J</td>
</tr>
<tr>
<td>OC9K</td>
</tr>
</tbody>
</table>
SUG advises SMO to communicate more effectively with observers on pending flight schedules, execution time of targets, and data releases.


Execution time of targets: communicated after director’s review of flight plans, about 4 weeks before series. A predictive version could be made as part of long-range planning, but it would be misleading given frequent changes in flight schedule.
SUG18-12: Investigator Communications (2/2)

• Data releases: Observers are automatically notified as soon as data are sent to IRSA, and they receive quality assessment report from the instrument scientists after all processing of a series. If data processing will take more than 3 weeks from the end of a flight series, a note goes to all affected observers including an offer to send the unfinished processing to them.

• SMO is considering an improved guest observer experience using third-party software, to replace the present email-driven practice.
SUG18-13: Community engagement

SUG delighted at increased outreach and encouraged to continue and include traditionally overlooked institutions for diversity. Encourage continuing virtual workshops.

Separate presentation on Outreach at thus SUG meeting.
SUG18-14: Python Pipeline Releases (1/2)

SUG applauds the release of FORCAST and FIFI-LS pipelines and endorses future delivery of Python pipelines.

• The FLITECAM pipeline was released 9/27/21 with accompanying documentation and tutorials. HAWC+ and EXES Python pipelines are expected to be released in FY22.

SUG recommends advising the proposing community about the release status of pipeline code and documenting differences between self-reduced and archival data products.

• New pipeline releases are announced in the SOFIA newsletter.

• Differences between archived and self-processed data are addressed in the FAQ on the Data Pipelines page. User manuals and change notes are posted for every version of the pipeline, to assist users in evaluating whether reprocessing would be beneficial.
SUG18-14: Python Pipeline Releases (2/2)

SUG recommends advising the proposing community about the release status of pipeline code and documenting differences between self-reduced and archival data products.

- New pipeline releases are announced in the SOFIA newsletter.
- Differences between archived and self-processed data are addressed in the FAQ on the Data Pipelines page. User manuals and change notes are posted for every version of the pipeline, to assist users in evaluating whether reprocessing would be beneficial.

SUG advises tracking internal FTE demands associated with external requests related to the pipelines.

- The SOFIA DPS team plans to track internal FTE demands associated with external requests; so far, they have been minimal. The initial plan is to respond to requests on a best effort basis, prioritizing internal support over external requests as needed.
SUG18-15: SOFIA IRSA Data Products

SUG noted deficiencies in metadata with some SOFIA products. Effort continues on repairing the metadata for older data products. For the vast majority of data (Cycle 4 and later) there are very few issues.

SUG recommends ability to search by object type. A keyword/abstract search mechanism was deployed in the 2021 IRSA release. Object type itself is not presently a keyword but could be a future upgrade that SMO will suggest for IRSA.
SUG18-15: SOFIA IRSA Data Products

SUG suggests IRSA needs detailed explanation of data file structures, fits header keywords, and quality assurance flag definition.

Detailed information is available on the front page of the IRSA/SOFIA archive: [https://irsa.ipac.caltech.edu/Missions/sofia.html](https://irsa.ipac.caltech.edu/Missions/sofia.html)

Screen shots are included in the following two pages to guide to the relevant information. Suggestions for packaging changes are welcome.
Stratospheric Observatory for Infrared Astronomy (SOFIA)

**SOCIA Archive**  
**Abstract Search**  
**Documentation**

**Mission Characteristics**

**Description:** SOFIA is a Boeing 747SP aircraft modified to accommodate a 2.5 meter reflecting telescope. Its instruments provide researchers with access to a wavelength coverage from the optical to the submillimeter (0.35 - 655 μm).

**Wavelength:** 0.35 - 655 μm

**Area Coverage:** Targeted

**Instruments:**
- FORCAST mid-infrared camera and spectrograph (Herter et al. 2018)
- GREAT heterodyne spectrometer (Risacher et al. 2018)
- FIFI-LS far-infrared spectrometer (Fischer et al. 2018)
- EXES echelle spectrograph (Richter et al. 2018)
- FPI+ focal plane imager (Pfüller et al. 2018)
- HAWC+ far-infrared camera and polarimeter (Harper et al. 2018)
- FLITECAM near-infrared camera and spectrograph (McLean et al. 2006)
- HIPO high speed imaging photometer for occultations (Dunham et al. 2004)

**Time Coverage:** 25 May 2010 - present

**Science Products Generated:** Observation data and calibration files

**Acknowledgement:** Information for Authors

**SOFIA Legacy Programs:**

<table>
<thead>
<tr>
<th>Program Description</th>
<th>Imaging Type</th>
<th>Data Access</th>
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</thead>
<tbody>
<tr>
<td>Radiative and Mechanical Feedback in Regions of Massive Star Formation</td>
<td>GREAT spectra</td>
<td>Data Access</td>
</tr>
<tr>
<td>Constraining Recent Star Formation in the Galactic Center</td>
<td>FORCAST imaging</td>
<td>Data Access</td>
</tr>
<tr>
<td>HyGAL: Characterizing the Galactic Interstellar Medium with Hydrides</td>
<td>GREAT spectra</td>
<td>Data Access</td>
</tr>
<tr>
<td>FIELDMAPS: Filaments Extremely Long and Dark: A Magnetic Polarization Survey</td>
<td>HAWC+ imaging</td>
<td>Data Access</td>
</tr>
<tr>
<td>SOFIA Heralds a New Era of Measuring the Magnetic Fields of Galaxies</td>
<td>HAWC+ imaging</td>
<td>Data Access</td>
</tr>
</tbody>
</table>

**Other Resources:**

- **SOFIA Science Center**: SOFIA home page
- **Proposal Information**: SOFIA proposal information, including the SOFIA Archival Research Program
- **SOFIA Observing Documentation**: Observer's Handbooks and other documentation for all instruments
- **SOFIA Data Processing Documentation**: Data Handbooks
- **SOFIA Data Analysis Documentation**: Cookbooks and analysis tools
- **Youtube Tutorials**: Tutorial videos about the SOFIA Archive
- **Known Data Product Issues**: List of known issues with SOFIA data products
- **SOFIA Archive Known Issues**: List of known issues with the SOFIA Archive
Information about the publicly available FIFI-LS and FORCAST data pipelines is available here.

**Data Handbooks**

The Guest Observer (GO) Data Handbooks and pipeline Users Manuals describe data products, processing steps, calibration procedures, and known issues.

**EXES [pdf]**
**FIFI-LS [pdf]**
**FLITECAM [pdf]**
**FORCAST [pdf]**
**HAWC+ [pdf]**

* - The pipeline Users Manuals are provided for FIFI-LS, FLITECAM, and FORCAST. These include all of the information found in the GO Handbooks plus additional information about the pipeline software.
Information about the publicly available FIFI-LS and FORCAST data pipelines is available here.

Data Handbooks

Levels

Data Products Timeline

Quality Assurance and Known Issues

Summary of QA Process and Keywords
Calibrated FORCAST imaging data processed before Cycle 3 (2015) do not include the on-source integration time listed in their headers. The document FORCAST Imaging Exposure Time outlines the procedure for calculating the on-source integration time in Level 2 and 3 merged and co-added data files for these observations.

Catalog of Known Issues for each Observing Series.