

2021 August 20

To: Dr. Margaret Meixner, Director SOFIA Science Mission Operations
Re: SOFIA Science Users Group (SUG) Meeting# 18 – Report

The SOFIA Science Users Group (SUG) held its 18th meeting virtually on Tuesday 10 August 2021. The primary discussion topics between SUG members and the SOFIA Science Mission Operations (SMO), led by Drs. Margaret Meixner, SMO Director, Bernhard Schulz, SMO Co-Director, assisted by James Jackson, Associate Director for Research, SOFIA Science Center, and Naseem Rangwala, NASA Project Scientist for SOFIA are captured in the meeting Agenda. Expanded details and charts presented at the SUG meeting are available at:
<https://www.sofia.usra.edu/science/sofia-overview/advisory-groups/sofia-users-group-sug>

The SUG appreciates efforts by the SMO and NASA to maintain SOFIA flight opportunities in the continuing COVID-19 environment. The SUG lauds the SMO for the forward-focused mission messaging now a fiber of all presentations and their new science driven approach to the Senior Review process.

Below are highlights and recommendations based on the SMO staff presentations and conversations, which were consensus items derived from the SUG's impressions (not necessarily in rank order, but thematically grouped). We have itemized each highlight (16 action items) for clarity and to enable specific reference to recommendations and actions in future discussions.

[SUG18 – 1] SUG Charter Revision

The SUG welcomes the revision to the SUG charter which reemphasizes the SUGs role in advising the SMO on policies and practices that serve to enhance the community's science return from SOFIA. In addition, clarity to the structure and term of the SUG membership establishes the proper means to maintain continuity of SUG understanding of the project, while providing a clear rotation to bring new community insight to the discussion. The SUG requests that this charter be posted on the SUG website and periodically reviewed on a regular basis by the SMO, the SUG Chair, and NASA during collaborative assessments of the advisory structure for SOFIA.

[SUG18 – 2] FORCAST

The SUG was pleased by the SMO's firm commitment that FORCAST will continue to be maintained as a facility instrument on SOFIA and offered as a scientific capability for the foreseeable future in any hemisphere of deployment.

[SUG18 – 3] GREAT

The SUG welcomes that GREAT will be offered in Cycle 10 and expressed a hope that a solution can be found for supporting this instrument when the instrument PI retires. GREAT has been a very productive science instrument and its loss would be disappointing. The plans for short-term hires of two hardware experts and visiting scientists are welcomed. The SUG recognizes the scientific value of a Terahertz heterodyne receiver on SOFIA and encourages the SMO to ensure that any capability gap is minimized.

[SUG18 – 4] INSTRUMENT ROADMAP

The SUG encourages the SMO and NASA to move expeditiously with the next phases of the new instrument roadmap now that the HAWC+ upgrade activities have commenced. The SUG advises, with concurrence from NASA, aggressive pursuit and selection of enabling technologies for the mid/far infrared spectrometers identified as priorities in the road mapping exercise. The SUG notes that the latter development timeline is tight (commissioning notionally in 2027). For SOFIA to maintain its stature as a science platform with innovative impact, this deployment challenge must be met.

[SUG18 – 5] COMMUNITY SCIENCE SUPPORT

The SUG concurs with the SMO's assessment that enhanced productivity and publications rates from SOFIA user community are essential to the long-term success of SOFIA in the extended mission phase of operations. The SUG was pleased with the SMO's creative approach to address these issues by re-envisaging the investigator funding model and endorses the proposed changes. The SUG reflects that the proposed increase in baseline funding and release schemes for successful Priority 1 and 2 investigative teams, if approved by NASA, will begin to address the fiscal needs of proposing teams for data analysis, potentially leading to more rapid dissemination of SOFIA science in the literature. The SUG advises the SMO to track the outcomes of this pivot in the funding model as a metric to quantify the impact on science productivity.

[SUG18 – 6] PROGRAMMATIC OPPORTUNITY BALANCE

The SUG endorses the SMO's current intent to maintain programmatic balance and community science opportunities by leveling time awarded to legacy science projects within a range of 25% to 30% of the available time in a given cycle. However, the SUG recognizes the importance of the legacy science projects' ability to provide the SOFIA user community with large coherent archival data sets. The SUG advises the SMO to carefully reevaluate internal prioritization mechanism to increase the likelihood that fully implemented legacy programs have overall completion rates that are high (> 75%).

[SUG18 – 7] MULTI-CYCLE SCIENCE

The SUG endorses the SMO plan to solicit a small number of multi-cycle projects in the Cycle 10 call. These could open up a new category of time-domain science that SOFIA is well-suited to implement. The pilot program should allow the SMO to evaluate community interest, effects on scheduling, scientific impact, etc.

[SUG18 – 8] SURVEY SCIENCE

The SUG is pleased that Survey Proposals remains as a separate proposal category in future call for proposals.

[SUG18 – 9] SOUTHERN DEPLOYMENT CADENCE AND SUITCASE DEPLOYMENT

The recent experiment of a [4fly-2off-4fly-2off...] flight line cadence for southern deployments has returned enhanced science, lower operations costs, and enhanced the effectiveness and morale of the flight teams. The SUG encourages continued application of this operations model and notes that the new frequency may enable certain types of new time domain science. The SUG also encourages continued use of suitcase deployments to complete innovative, time-sensitive, and highly ranked science projects from the community.

[SUG18 – 10] THREE-YEAR INSTRUMENT DEPLOYMENT SCHEDULES

The SUG strongly endorses adoption of a long range, 3-year notional instrument deployment schedule for all facility instruments. In particular, the SUG advises the SMO to ensure rotation of all instruments in the southern deployment plan on a regular basis to enhance GO opportunities. The SUG also suggests this flexibility apply to any and all suitcase deployment opportunities. This rotation plan should be included in the call for proposals documentation released to the community commencing with the Cycle 10 call.

[SUG18 – 11] ARCHIVAL DATA ANALYSIS CALLS

The SUG endorses continued use of Archival Data Analysis call for proposals to utilize the expanding set of high-quality SOFIA data products within the NASA IPAC Infrared Science Archive (IRSA) repository. The SUG advises the SMO to continue the \$1.5M+ (USD) investment associated with this independent announcement of opportunity. The SUG also advises the SMO to eventually synchronize the archival data analysis call into the body of the normal proposal cycle calls, similar to the approach taken by other NASA missions. Lastly the SUG was encouraged that many early career researchers had been successful SOFIA awardees in the first archival proposal cycle.

[SUG18 – 12] INVESTIGATOR COMMUNICATIONS

The SUG discussed at length continued fractured and incomplete communications between the SMO and investigators regarding issues such as informing PIs of the pending flight schedules, the exact execution time frame for particular program targets, the anticipated release of quality assessed data products into the IRSA archive from these flight campaigns for investigator retrieval and analysis, etc. The SUG strongly advises the SMO to communicate more effectively and in particular, in a timelier manner directly with program PIs to enable these teams to plan internal resource standup and coordinate complementary observations or modelling efforts.

[SUG18 – 13] COMMUNITY ENGAGEMENT AND OUTREACH

The SUG was delighted at the rollout of a reinvigorated and expanding community engagement effort by the SMO. The SUG encourages continued investment in innovative community engagement activities, including further highlighting the SOFIA internship experiences, direct outreach to traditionally overlooked institutions (including HBUC, HSIs, and Tribal Colleges) to engage a diverse work force talent stream, and the Airborne Ambassadors program. These commitments serve important STEM goals within NASA’s strategic portfolio and broaden SOFIA’s impact.

The SUG was pleased to hear about the successful summer talk series in partnership with the ALMA observatory and encourages further cross-facility engagements of this type as a channel to reach a wider user community.

The SUG encourages the SMO to continue enabling virtual participation in future workshops and conferences even after in-person meetings resume. This mode enables a larger number and wider variety of participants to engage in SOFIA-related science conversations who otherwise would not be able attend in person.

[SUG18 – 14] PYTHON PIPELINE RELEASES

The SUG applauds the successful release of two SOFIA pipelines to GitHub and endorses the SMO’s intent for future delivery of these tools in well documented Jupyter-notebooks accompanied by new tutorial reviews. For pragmatic reasons, the SUG advises that both pip installs and conda installs be maintained as pull options for these data pipelines. The SUG recommends that the SMO advise the proposing community in any call for proposals about the current release status of these “local-pipeline” codes, and clearly document the limitations and/or advantages that reduction of SOFIA data products may have with these packages as opposed to the data products served from the IRSA repository. The SUG advise the SMO to carefully track

the internal FTE demands associated with bug-fixes, use inquiries, and vetting of code-forks (enhancements) from the SOFIA user community.

[SUG18 – 15] SOFIA IRSA DATA PRODUCTS

The SUG notes some deficiencies in the meta-data associated with pulled SOFIA data products from the IRSA archive server and some difficulties in query support. The SUG advises the SMO to work closely with their IRSA point-of-contacts to ensure that the users of SOFIA archival data accessed from the IRSA repository have detailed explanation of data file structures, fits header keywords, and quality assurance flag definition. The SUG recommends expanding query-engine search parameters to include classes of objects (like stellar classification) using associated meta-data from SIMBAD or other general astronomical databases. The SUG notes that a flexible and easily queried SOFIA data product archive is essential for community science productivity and publication.

[SUG18 – 16] FUTURE SUG MEETING DATES

The SUG requests the SMO consider scheduling the next SUG (#19) meeting in early December 2021, the exact date to be decided after polling the SUG membership.

Respectfully,



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