

2021 February 10

To: Dr. Margaret Meixner, Director SOFIA Science Mission Operations
Re: SOFIA Science Users Group (SUG) Meeting# 17 – Report

The SOFIA Science Users Group (SUG) held its 17th meeting virtually (via RingCentral™) on Tuesday 26 January 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, 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 COVID19 environment. The SUG lauds the SMO for successfully conducting a Call for Proposals initiating the Dual-Anonymous Peer Review (DAPR) proposal format in Cycle 9 and successfully concluding the review process in a remote environment.

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 for clarity and to enable specific reference to recommendations and actions in future discussions.

[SUG17 – 1] MARKET MESSAGING

The SUG advises the SMO, led by the Director, to establish a set of crisp messaging points that should be used at all SOFIA-related presentations to market the scientific opportunities to stakeholder communities. SOFIA must have a consistent set of exciting lean-forward talking points in order capture the imagination, intellectual assets, innovative talents, and creative enthusiasm of the science community. Clear brand-recognition is now required to up-market SOFIA as an indispensable part of NASA's mission portfolio that delivers transformative science. Providing a slide set on SOFIA that can be downloaded by the community for use in their own SOFIA science talks would also be useful.

[SUG17 – 2] FORCAST

FORCAST provides *unique* opportunities to conduct fundamental and high impact science investigations from high and low mass star formation, stellar evolution, solar system small bodies to exploration of water deposits shadowed in lunar polar regions. FORCAST capabilities are also complementary to JWST. The SUG is unanimous in its consensus that FORCAST be maintained as a facility instrument on SOFIA for the foreseeable future.

The SUG further recommends that the SMO remove any language in the Call for Proposals that conveys to the user community any uncertainty regarding FORCAST's availability and flight-line-readiness to conduct any and all science programs that the SOFIA Time Allocation Committee (TAC) deems scientifically meritorious.

[SUG17 – 3] HAWC+ Upgrade

The SUG endorses the proposed HAWC+ detector upgrade initiative and the intent to rapidly implement the necessary procurement, and the aggressive schedule for integration and test. However, the SUG strongly advises the SMO and the NASA project office approach this opportunity with an overall systems approach, wherein appropriate trade studies are examined through consultation and collaboration with detector experts and the original instrument team to identify value-added optimization strategies.

The SUG also strongly advises the SMO to consider investment of resources to develop data reduction pipelines and observational procedures to fully characterize potential new modes of HAWC+, including scan-mode polarimetry in spatially complex astrophysical source environments (especially those which have no clean offset positions). These activities could be investigated in collaboration with potential users, resulting in thorough documentation and enhancing community exchange with SOFIA.

[SUG17 – 4] GREAT

The SUG is pleased that the SMO and the NASA project office are actively engaging with the GREAT team to explore continued long-term access to this instrument. The SUG encourages the SMO to advance operational knowledge transfer from the GREAT team to the SMO scientific staff to potentially enable off-loading of operational and observing effort internally in the event that GREAT is fully integrated into the SOFIA-supported instrument portfolio beyond 2023.

[SUG17 – 5] TARGET OF OPPORTUNITY AND TIME DOMAIN SCIENCE

The SUG commends the SMO for standing-up a target-of-opportunity (ToO) TAC to advise the Director on identifying high impact science opportunities proposed by the community, including Director's Discretionary Time (DDT) requests, and means to effectively implement these opportunities within the flight campaigns in a given cycle.

The SUG requests at its next meeting, updates on the SMO processes established to coordinate and effect SOFIA's response to ToO science opportunities. The SUG also suggest that the SMO explore ways to support time-domain science, including accepting a small number of multi-cycle projects such that they do not have to re-submit each cycle call to complete their science.

[SUG17 – 6] ARCHIVAL DATA ANALYSIS CALL

The SUG reflects that the Archival Data Analysis call released to the community is substantial in scope and is a bold attempt to enhance the scientific utilization and impact of a variety of SOFIA

data products. The SUG recommends the SMO carefully assess if this initiative delivers the desired increase in publication productivity and to analyze how SOFIA data either stand alone or contribute to broader science programs that crosscut through a variety of facilities, both ground- and space-based, as well as simulation and modelling projects.

The SUG requests at its next meeting an initial de-brief on the archival proposal demand, the types of archival data called out for use (i.e., legacy survey data, director’s discretionary time programs, unpublished principal investigator data sets, etc.), and the time scales and types of deliverables expected from the selected and funded proposals.

[SUG17 – 7] PROGRAMMATIC OPPORTUNITY BALANCE

The SUG advises the SMO that the current balance between large legacy science projects and individual guest observer investigations should not be further skewed to the former in any given cycle (which now includes a two-year carry-over). The SUG comments that maintaining a sufficient fraction of available science time to general guest observing programs serves to provide greater opportunities to expand the SOFIA user base and provides better entrepreneurial use of the facility that often has great discovery potential.

[SUG17 – 8] SUITCASE DEPLOYMENTS

The use of suitcase deployments to alternative bases of operation can provide the community opportunities to maximize science with SOFIA and return the ideal of “anytime, anywhere” back into the capabilities of the mission. The SUG recommends that SMO not restrict such science opportunities to a select set of instruments, rather carefully examining the potential of the scientific impact of proposed investigations. Rotating deployments among all the instruments is encouraged. Proposers see that certain instruments never get deployed, and thus, do not propose Southern science targets for them making the lack of proposal pressure a self-fulfilling, yet artificial, outcome.

[SUG17 – 9] INSTRUMENT ROADMAP

The SUG appreciated the overview of the SOFIA Instrument Roadmap and looks forward to the release of the full report. The proposed concepts could substantially increase SOFIA’s capabilities. The SUG encourages the SMO and NASA to maintain SOFIA’s support of a wide range of science cases, including those that arise from new discoveries as well as those that were not captured in the science grid as presented.

[SUG17 – 10] PYTHON MIGRATION

The SUG notes the progress to releasing SOFIA data reduction pipelines to the community through the use of well-documented Jupyter-notebooks accompanied by new tutorial reviews. The SUG recommends that the SMO widely disseminate release of these data-tools and clearly specify a public release date, after consultation with the relevant designee from the NASA Office of the Chief Information Officer (CIO) to ensure compliance with appropriate NASA Policy

Directives and Procedural Requirements that are directly related to Information Security and Cybersecurity.

[SUG17 – 11] COMMUNITY ENGAGEMENT

The SUG commends the SMO for identifying specific actions to inform and engage the astronomical community about SOFIA. The SUG endorses the concept of a mid- to far-infrared summer school that appeals to and captures a wide audience of participants, from undergraduates at small institutions to investigators at NASA centers. One goal of such workshops should be to improve archival research productivity by pivoting around the theme that SOFIA provides access to the “creation wavelengths.”

The SUG strongly advises that the SMO reach out and robustly engage the Solar System community. The SUG also advises that the community engagement efforts extend to international observers.

The SUG encourages the SMO to advocate in the community the value of SOFIA for PhD research and track both instrumental, observational, and archival-based theses aggressively.

[SUG17 – 12] FLIGHT LINE HOURS

The SUG supports the goal of increasing the number of flight hours available for science, but is concerned as to how this will be accomplished with a smaller budget. The SUG requests more details on the plans for this initiative and desires to be briefed at a future SUG meeting.

[SUG17 – 13] FUNDING MODELS

The SUG encourages the SMO to examine the efficacy of the current PI funding models, especially now that Priority 2 proposals can be potentially carried over cycles. Large gaps between initial partial funding and release of the funding balance upon completion of observations may not be the best profile that positions teams for prompt analysis and publication of SOFIA data products.

Respectfully,



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