

# SUG16-1: Response to SUG15 Report

- No response required

# SUG16-2: Leadership

The SUG encourages the Director to continue to explore and implement actions that center on community building relationships, especially those with other NASA missions and appropriate ground-based observatories that have capabilities (e.g., beam sizes, mapping efficiencies) that complement SOFIA instruments and legacy science programs

- Community building actions will be discussed by Jim Jackson

# SUG16-3 Project Performance Metrics

The SUG requests that the science impact of SOFIA be carefully tracked, collecting outcomes assessment data using standard metric criteria employed within the fields of astrophysics, planetary sciences, theory, and instrumentation. The SUG requests that these production measures be reported to the SUG on a regular basis.

- The SMO has expended considerable effort to automate the collection of key metrics, especially publications, citations, and h-index. We have reported these metrics to the SUG above.

The SUG recommends that the SMO use new tools available through the NASA Astrophysics Data System (ADS) repository to examine the “click-through and read” statistics associated with SOFIA related publication as a secondary gauge of impact.

- The SMO will examine the effort required to automate the "click-through and read" statistics.

# SUG16-4: FORCAST

The SUG reiterates the importance of FORCAST as an important strategic instrument in the SOFIA portfolio. This instrument provides the only means to conduct science that cannot be duplicated in any NASA missions or ground-based facilities. The potential decommissioning or withdrawal of this instrument must carefully be considered by the SMO, in consultation with various user communities in advance.

- Follow-up on the "water on the sunlit portion of the Moon" result will keep FORCAST available for at least one or two more years. We are in the process of reviewing the optimal rotation of instruments for future cycles.

# SUG16-5 GREAT

The SUG encourages the SMO to work collaboratively with the GREAT team to understand whether additional flights within the Cycle 9 period can be supported to backfill lost Cycle 8 Priority 1 science.

- The notional Cycle 9 schedule includes 46 GREAT GO flights. The GREAT team guarantees support for at least 30 flights.

The SUG requests the SMO develop and provide a prospectus for the long-term, future use and support of this instrument on SOFIA.

- The SMO is working with NASA on a plan for GREAT. We will present more details in a separate presentation.

# SUG16-5 Future SOFIA Instrumentation

- The SMO and NASA worked together to develop an Instrument Road Map to chart a potential course for future SOFIA instrumentation. The Road Map will be presented in a separate presentation.

The SUG is seriously concerned with the perceived instability of the SOFIA Project wrought by the frequent cadence of NASA reviews and the vacillation on long-term commitments. This environment impacts both US and German instrument teams contemplating participation in major new SOFIA instrument builds. The SUG recommends the SMO work with NASA and other stakeholders to project confidence into the SOFIA instrument roadmap.

- To be discussed in the Project Presentation.

# SUG16-6 Instrument Flight Readiness

- The SMO has updated its procedures for releasing data (only instrument modes that have calibration issues are held back from release) and notifying users of delays (investigators are now notified if pipeline processing is experience delays).

# SUG16-7 Joint Proposal Initiatives

The SUG encourages the SMO to pursue additional joint proposal opportunities (beyond the current NRAO Greenbank agreement) between SOFIA and other NASA missions (such as HST and JWST) and observatory facilities to enhance science return and productivity impact. The NASA IRTF was identified as one high-merit ground-based facility for such joint opportunities. Other representative facilities to explore collaborations could include mm/sub-mm observatories such as APEX, the ARO Kitt Peak 12-m and the SMA Mt. Graham 10-m single dish facilities and the SMA interferometer. Joint opportunities should be widely publicized to the broader astronomical community through newsletters and press releases from both/all partners, for example, in addition to the SOFIA Calls for Proposals.

- The Green Bank joint proposal opportunity resulted in 3 successful joint programs.
- SMO is piloting a joint science program with Hubble Space Telescope.
- SOFIA accepted three proposals supporting JWST ERS and GT programs.
- SMO will explore partnerships for Cycle 10 with other observatories.

# SUG 16-8 Target of Opportunity Science in the Time Domain

The SUG discussed several high impact target of opportunity (TOOs) and other time domain science cases that require multiple visits to a target that may span several months or years, involve various instruments, and potentially observatory cycles. Clarity was not evident in SMO policies and procedures to effectively execute these science programs, especially if these are Priority 1 allocations that can be carried over. The SUG requests the SMO to identify and establish processes to facilitate such science.

- SOFIA's airborne astronomy scheduling constraints make it difficult to respond quickly and adjust schedules for ToO. Changing the planned schedule comes at a scientific cost to other programs.
- The SMO plans to institute a standing DDT/ToO/time variability time allocation panel who will review ToO and monitoring triggers as well as P1 and P2 carry-overs and make recommendations to the Director about scientific impact and priority.

# SUG 16-9 Proposal Planning Tools

The SUG recommends the SMO to continue enhancement of proposal planning tools to reflect conditions that actually are encountered during typical flight profiles. As technical reviews of proposals are carrying greater weight, it is incumbent on the SMO to provide the best tools to investigators for accurate signal-to-noise estimates under a variety of conditions, enabling optimization of science hour requests and maximization of program feasibility. The SUG requests additional information regarding how the new forward modelling of flight conditions (NASA GEOS based) compares to models using total water column.

- The SMO is considering how best to do this for Cycle 10. One could use "average" conditions based on season and location (based on historical weather data). The issue though is the large variability due to day-to-day weather, source elevation, and geographic location. We can use the historical data however to make better flight plans (e.g., avoid Texas in the summer, or fly over the Pacific more often).

# SUG 16-10 Python Code Transition

The SUG advises that the SMO review whether release of Python reduction pipelines and techniques used therein are ITAR compliant. 5 The SUG requests that the SMO review and enhance Python Jupyter notebooks and other cookbooks documentation (found off the <http://www.sofia.usra.edu> Documentation for Data Products landing page). These Python routines should be Python3 compliant using Astropy 4.0 release packages and should be regularly reviewed and refreshed to keep them current.

- We plan to release pipeline code under USRA copyright and a 3-clause BSD (open source) license, as approved by NASA. We have not yet verified that all of the release contents are ITAR compliant. While we do not anticipate any ITAR issues, we will verify compliance before the final release to the public. Following the public release of the pipelines, we plan to create Jupyter notebooks (or similar) to provide users with step-by-step examples of how to run the pipelines and calibrate data. The software versions and dependencies used by these tools will be consistent with those of the released pipelines (Python 3.7, Astropy > 4.0; other package versions will be specified with the release). As we create these new tutorials, we will also review and update the currently existing Jupyter notebooks as necessary.

# SUG16-11 Alternative Southern Hemisphere Bases

SOFIA flights from New Zealand (several week duty-station out of NSF facilities in Christchurch) are scientifically highly advantageous due to the enhanced number of flight hours above the troposphere and the rich target environment at southern declinations. The SUG encourages the SMO to continue work to identify alternative sites for short duration “hot-shot” or brief “suit-case” deploys and assess the logistical feasibility through a pilot exercise during Cycle 9.

- SOFIA is committed to two long deployments and one short "suitcase" deployment in Cycle 9. NASA is vetting potential alternative sites.

# SUG16-12 Housekeeping

The SUG requests the SMO update the SUG membership list to reflect the current composition of the committee (<https://www.sofia.usra.edu/science/sofia-overview/advisory-groups/sofiausers-group-sug>).

- Done