

Response to SOFIA Users Group Report from their 2nd Meeting

Compiled by W.T.Reach, Associate Director for Science

Introduction

The SOFIA Users Group (SUG) met on 2012 Sep 17 in Mountain View, CA. Presentations by the SOFIA staff were made; all of these were posted on the SOFIA website within 2 days. <http://www.sofia.usra.edu/Science/advisorygroups/sug>
The SUG asked questions during the presentations, and their advice was solicited on several issues.

Membership

The SUG members for the 2nd meeting were:

- Robert Gehrz (Univ. of Minnesota, Chair)
- Lee Armus (IPAC/Caltech)
- John Bally (Univ. of Colorado)
- Imke de Pater (Univ. of California)
- Jochen Eisloffel (State Observatory Tautenburg)
- Urs Graf (Univ. of Cologne)
- Al Harper (Yerkes Observatory, U. Chicago)
- Luke Keller (Ithaca College)
- Di Li (JPL)
- Keith Noll (NASA/Goddard)

All of the members were present except Di Li (did not participate) and Keith Noll (participated actively using webex and teleconference). Since this is only the second meeting of the committee, there was no need to discuss term limits. One member has requested to roll off; this was Keith Noll's last meeting and we thank him for his service. A new member will be appointed by the Director.

Advice Received

In planning for Cycle 2, advice was sought from the SUG regarding the appropriateness of offering instruments for usage before they had been used in flight. See the relevant presentation for the material actually presented and discussed. The new capabilities for potential offer during Cycle 2 include mid- and high-frequency observations with GREAT, observations with EXES, and observations with FIFI-LS. In all cases, the SUG was in favor of offering capabilities early, in a shared risk mode.

Response to SUG Issues

The SUG Chair provided a verbal debriefing to the staff after their executive session on the day of the meeting. A written report was received 2012 Oct 3. Here we respond to each of the issues that were enumerated in that report.

3.1 Announcing Up-to-date Information about the Timetable for Proposal Selections

The SUG noted that the SOFIA project delayed announcement of the successful proposals from April to August 2012, without communicating with the proposers.

The delays were made necessary by the amount of time needed for, and the schedule uncertainty due to, aircraft upgrades and onboard software testing. The Program wanted to ensure that we not select programs that required observatory capabilities that may not be achieved.

Notifications were made by the SOFIA website as to when the announcements would be made. On 2012 Jun 5, a statement by the Director and Deputy Director was posted outlining the reasons for the delay and tying the announcement to the end of the aircraft test operations in a time-dependent way. A copy of that announcement was sent to the proposal PIs. Here is a copy:

Dear SOFIA Cycle 1 Principal Investigators,

A large number of competitive proposals were received in response to the SOFIA Cycle 01 Call for Proposals. The US and German Time Allocation Committees, which met in April, have identified a collection of high priority science investigations for the Cycle. Currently SOFIA is undergoing a major set of planned upgrades that should produce significantly improved observatory performance. These upgrades include a new avionics system that meets modern standards, improvements in the telescope, and a more capable computer and control system for the observatory. While we at the Science Center are anxious to announce the results of the Call, we have decided to defer the announcement until after the first systems-level test of the new SOFIA, which is scheduled for late June. At that point we will have much better knowledge of the expected performance and observing schedule for Cycle 01. The SOFIA team appreciates the patience of the science community, and we look forward to a highly productive Cycle 01 observing period.

(On behalf of)

Erick Young SOFIA Science Mission Operations Director

Hans Zinnecker SOFIA Science Mission Operations Deputy Director

We pledge to communicate openly with our proposers, and ask for understanding that these are early days for scientific operation of SOFIA so that situations have been more fluid in the past than they will be in future proposal Cycles. All people interested in SOFIA and who believe information is missing from our webpages are encouraged to contact our helpdesk: sofia_help@sofia.usra.edu

3.2 Maintaining Flexibility to Allow GIs to Alter Observational Programs in Flight

The SUG recommends that clear policies be developed for Guest Investigators who participate in the SOFIA flights on which their observations are performed.

Due to the tight constraints on flight plans, only a fixed amount of time (a flight "leg") can be used for a target, and that amount of time is preset in order to avoid impacting the other observations and the route to the landing point. Within the leg on a given target, it is possible to make changes to the observations. The rule will be that the instrument scientist will make decisions about whether and how to change observations in flight. Given the high pressure of high-altitude operations, and the

short duration of most legs, we do not expect many changes to be possible in flight. Nonetheless, the SUG has a strong point that we must encourage flexibility in order to maximize scientific return on possible one-of-a-kind observations. We will act upon this SUG recommendation by developing “Guidelines for Guest Investigator Participation in Flight Operations,” to be given in draft form to Cycle 1 investigators and then posted on our website with future Calls for Proposals after iteration based on Cycle 1 operations.

3.3 Information about Accepted GI Proposals

The SUG recommends we change the webpage describing the Cycle 1 accepted proposals, to add the amount of observing time awarded for each. We have made this change for the US Queue, and the DSI has now tabulated the awarded time on the German announcement webpage.

3.4 Helping Observers to Get the Most out of their FORCAST Data

The SUG recommends we make a priority to deliver usable FORCAST data products to ensure that observers analyze their data and publish their results.

The archive products for FORCAST are FITS format, and they are calibrated into physical units. It may appear daunting to see the large number of files for a given observation, but this is largely due to a reality of observing in challenging spectral windows through the atmosphere. The high brightness of the sky makes it necessary to read the arrays often, and the variability makes it necessary to use the chopper to modulate the sky signal on a timescale shorter than the exposures. The FORCAST data products are already chop-nod combined by the pipeline. In addition to the calibrated data, we provided documentation on the Basic Science website:

http://www.sofia.usra.edu/Science/proposals/basic_science

We will solicit more feedback from observers in Basic Science to determine what assistance could be most effective. One thing we recognize is that the lack of a WCS in the headers will limit the usefulness of the data; however, we did not find the telescope-reported pointing to be accurate enough to report as a WCS during Basic Science. Faint targets will therefore be challenging to coadd. Observatory testing indicates this situation will be significantly improved in Cycle 1, and it is our intent to provide a WCS for the science data in the archive starting then.

3.5 Shared Risk Observations with New Science Instruments

The SUG recommends the Project clearly defines the meaning of “shared risk” for GIs. Consider making it mandatory for GIs to include SI PIs on proposals that are shared risk. Ensure enough Instrument Scientist resources to support proposal preparation and data reduction and analysis for shared-risk observations.

The nature of “shared risk” was defined in the Call for Proposals. We will attempt to clarify the definition for future calls. It is important to note that the risk sharing is between the Observatory and the Guest Investigator, *not* between the Science Instrument Principal Investigator and the Observatory. We will encourage proposers to consult with instrument PIs, but will not make it mandatory for their inclusion on submitted proposals. In cases where a proposal would involve commitment of a facility instrument PI’s time or resources beyond what they have already agreed to, we will treat them in the same

manner as Principal Investigator SI observing proposals, where the Principal Investigator is added as a co-I on *accepted* proposals.

With regard to instrument scientist support, we have limited resources and suggest that potential proposers with ideas that require shared risk observing modes, but who are not confident in their ability to deal with the observing preparation of data reduction, wait until such modes are commissioned or request that support (from the PI or SMO) in advance of submission.

3.6 Doing Science on the way to the Southern Hemisphere

The SUG recommends obtaining scientific observations on the ferry flights to the New Zealand deployment in 2013.

Such a scenario is in consideration. The tradeoffs are between science and crew rest+fuel cost, because an indirect flight (such as required for doing scientific observations) will take longer.

3.7 Non-sidereal Tracking Issues

The SUG believes it is imperative that SOFIA implement non-sidereal guiding as soon as possible, and that S-Spot should support overlays for non-sidereal targets.

For targets bright enough to be seen with high signal-to-noise in the focal plane imager, we can track on the target itself using current capabilities; this will enable observation of non-sidereal targets down to visual magnitude 12 using the upgraded focal plane imager (to be commissioned in early 2013). Observation by pointing at the predicted location, then updating to a new position occasionally (but less frequently than chop-nod cycles) can be performed now. Full implementation of non-sidereal tracking on the observatory, and overlays for moving targets using S-Spot are development activities upon which we can give status at an upcoming SUG meeting if requested.

3.8 Outreach

The SUG believes the Project should be more aggressive in getting invited to give SOFIA presentations at large conferences, both US and abroad.

We will continue our efforts at outreach to the scientific community and appreciate the encouragement from the SUG. The project tracks conferences relevant to SOFIA during weekly SOFIA Community Task Force (SCTF) teleconferences. For a meeting deemed important, the project initiates a discussion with the scientific organizing committee to explore the possibility of scheduling a SOFIA talk. The potential engagements are prioritized within our budget. There have been several invited SOFIA talks at conferences in the US and in other countries. Other meetings have been represented by SMO staff who, in addition to making their research presentations, are usually able to also present a general SOFIA poster. The Observatory is now in a period of transition as it ramps up to full operations, and science results are making their way into the published literature. We will keep in contact with our GIs, instrument PIs, and other SOFIA supporters to help us cover as many relevant conferences as possible.

3.9 The SOFIA Water Vapor Meter

The SUG recommends expediting development of the Water Vapor Monitor.

The SOFIA Water Vapor Monitor development system is currently installed in the aircraft and will be used in an indication-only mode with the resumption of flights in 2012 November. The final flight system is still under construction, but will be ready for installation in the aircraft in the aircraft maintenance downtime in 2013 January. Calibration of the WVM requires a high-resolution spectrometer, and will be undertaken when the GREAT instrument is re-flown in the summer of 2013 prior to the southern hemisphere deployment.

3.10 The Scheduling Process

The SUG requests a white paper on the scheduling process be posted on the "Information for Observers" webpage.

We will write such a white paper, or webpage, and post it for the Cycle 2 Call for Proposals.