REPORT OF THE SOFIA USERS GROUP (SUG), MARCH 12, 2012

1.0 INTRODUCTION

The first meeting of the SOFIA Users Group (SUG) took place on March 12, 2012 at the SOFIA Science Center, Building N211, Conference Room 205, NASA Ames Research Center, Moffett Field, CA. The SUG is a newly constituted advisory group that replaces the former SOFIA Science Steering Committee (SSSC) and is charged with providing input to the SOFIA Project by a representative sample of the scientific community of users and potential users. The SOFIA Users Group Charter and the agenda for the March 12, 2012 SUG meeting and the SUG membership may be viewed and downloaded on the internet at:

http://www.sofia.usra.edu/Science/advisorygroups/sug/SUG_001/index.html

Members attending the March 12, 2012 SUG meeting were Bob Gehrz, (chair), Lee Armus, Imke de Pater, Jochen Eislöffel (by speaker phone), Urs Graf, Al Harper, and Di Li.

The SUG thanks the SOFIA Project personnel involved in supporting the meeting and preparing the informative presentations.

2.0 OVERVIEW OF THE STATUS OF THE SOFIA PROJECT

The SUG was very impressed with the progress that the project has made since science flights began in the fall of 2010. It is apparent from the presentations showing recent FORCAST and GREAT results that SOFIA is realizing its potential to be a unique and major contributor to science at the forefront of infrared and millimeter wave science. Of particular note are the discoveries of new embedded protostellar candidates in the Orion Nebula, interstellar mercaptans (SH) in dark molecular clouds in the direction of W49N, red shifted ammonia absorption in the dark cloud CHIIR G34.3 due to possible protostellar in-fall, and OD absorption towards the line-of-sight of the low mass propostar IRAS 16293. The very successful June 23, 2011 observation of a stellar occultation by Pluto demonstrated SOFIA's capabilities to travel anywhere, any time to optimize observations of transient events. We are pleased to hear that 30 papers reporting interesting SOFIA results will soon appear in special issues of the Astrophysical Journal Letters and Astronomy and Astrophysics.

We congratulate the Project on having developed a realistic and functional plan for ramping up to full operational capability by 2014. The plans for bringing on new first generation science instruments (SIs) and for increasing flight hours seem reasonable and will facilitate the production of many more exciting science results. It is gratifying to see that the program to improve image quality is on track to meet the level one specification by 2014.

Overall, the solicitation for Cycle One observing proposals went well and resulted in a high oversubscription in the number of hours requested. This indicates that the recent efforts on the Project to arouse community interest in exploiting SOFIA''s unique capabilities has been highly successful. The plans to develop SSPOT as a user friendly planning tool looked good and were received enthusiastically. We note with approval that a Beta release was issued to the SUG for evaluation on Friday, April 13, 2012 by Ralph Shuping as this report was in final preparation.

3.0 ISSUES ARISING DURING THE SUG DISCUSSIONS

We review here issues identified during SUG discussion that we would like the SOFIA Project to consider for action.

3.1 Director's Discretionary Time Awards (DDT)

We suggest that the SOFIA Project consider adopting the HST model for the release of DDT time awards to the general community. In the case of HST, DDT observations obtained as part of a DDT Program generally do not have a proprietary period and are generally made available immediately to the astronomical community. In special cases, HST DD proposers may request and justify proprietary periods.

3.2 Unified Peer Review for all US/German Proposals and Technical Pre-Review

Maximizing the scientific output of SOFIA will require careful scrutiny to avoid duplicate observations and science programs. We believe that this objective can best be achieved with a unified proposal call and review. The current system with split review cycles can lead to confusion within both communities. For example, in the Basic Science call and the Cycle I call of SOFIA, the AO and the submission deadline for the US community and the German community differed by about two to three weeks, with those for the German community coming later, leading to uncertainty about whether programs ranked under one review would overlap with those ranked in the other review. In a unified call, proposals would be reviewed and ranked uniformly by one TAC. After the review, the US and German science directors would have the authority to make appropriate time allocation decisions, reflecting the percentage requirements for certain partners. The merging of the processes and the TACs could have a few immediate advantages: 1) higher management efficiency 2) less time spent reviewing proposals, 3) avoidance of duplicates, and 4) encouragement of the formation of teams that produce better focused science proposals.

We strongly urge a pre-TAC technical review of all proposals for at least Cycle-2 and perhaps beyond. These will be needed until the GI community becomes familiar with the instruments. We realize that a review of all proposals may tax an already thin staff and suggest that an alternative here would be for the TAC to request reviews for a subset of proposals about which they have technical reservations. At a minimum, technical reviews of accepted proposals are a good idea. Proposal acceptance should be provisional on passing this technical review. If problems are found, the next steps would be at the discretion of the Director (fix if possible, reject if not practical).

3.3 Helping Observers to Get the Most out of their Data

Maximizing the scientific impact of SOFIA requires that Guest Observers (GIs) who are not SI specialists be able to get the most out of their data and to be able to publish important new results promptly. We were told that the Observatory plans to put a strong effort into the creation of software for data reduction pipelines. This will certainly help less-experienced users, and may help to speed up publication of SOFIA data. On the other hand, since it is currently planned that these pipelines will not be made available to users to carry out their own re-reduction, both GIs and SIs may not be able to get much more out of the data than offered by the pipeline data provided by the Project. We think that enough flexibility in data reduction should be given, so that users are able to get the most out of the data. Limited Project resources might be best used

by restricting the number of offered and supported SI observing modes such as was done with the *Spitzer* Space Telescope. This approach may be preferable to trying to generate support software for a large number of modes. Careful consideration should be given to construction of the most efficient and technically transparent observing sequences. AORs should be designed so that prospective observers can clearly understand whether their proposed observations are feasible.

The SUG believes that the size of the grants awarded to successful observers is well below what is required to produce adequate analysis and timely publication of the data, a problem that threatens to severely limit the impact of SOFIA observations on the scientific forefront. We are not sure how the Project can solve this problem but suggest that a vigorous and frank dialog be initiated within the Project and with NASA about how to address this problem. In particular, NASA proposals that deal with HST data are usually rejected as HST funds those projects. Science analysis funding is low enough for SOFIA that additional funds from outside the SOFIA program might be brought to bear.

3.4 Optimizing SOFIA to Respond to Targets of Opportunity

Much has been made during SOFIA's development phase about its ability to respond rapidly (even in flight on appropriate occasions) to important transient astrophysical events and to fly anywhere/anytime to observe these targets of opportunity (ToOs). This capability has been a major source of support for SOFIA as a national scientific priority among members of several important communities. The Project needs to keep this objective firmly in mind in developing mission operations strategies and mission support software. It will not take much back-sliding to preclude the viability of many types of ToO observations. The Project also needs to articulate a strategy for inserting ToO observations into the flight schedule and a stated policy for how ToO obervations impact regularly scheduled GI observations.

3.5 Planning Observations with SOFIA and Using SPT to Generate Proposals

During the Cycle One proposal process, it became apparent that estimating the impact of the overheads of various observing modes was exceedingly difficult if not impossible. Proposers need to understand more clearly how to handle overheads and whether overheads make some observations that would appear to be straightforward take too long to consider viable.

The current version of SPT needs considerable improvement. One major problem was that non-ASCII characters cut and pasted into STP proposals could seriously corrupt a draft submission. The problem of detecting and dealing with non-ASCII characters has been successfully dealt with by numerous observing proposal and publication submission tools. The SOFIA project should consult with other projects on solutions to this problem.

3.6 Flight Hours on SOFIA

The SUG understands the constraints that have limited the number of flight hours available during Cycle One. However, given the large cost of the SOFIA Project, the community would like to see a substantial increase in the number of available flight hours as soon as possible. It seems that it would not be unreasonable to expect at least a doubling of the available flight hours for cycle 2.

3.7 Outreach

We believe that the propose SOFIA science conferences are a great idea. In the beginning, these should be cross disciplinary as was done for *Spitzer*. Later, as the SOFIA data base is enlarged, the topics of science conferences could focus more narrowly on specific subdisciples.

Respectfully submitted on behalf of the SOFIA Users Group,

Robert D. Gehrz, Chair April 16, 2012