SOFIA Program Update
October 20, 2014

Presented to:
SOFIA Users Group (SUG) Meeting #6

Presented by:
Eddie Zavala, NASA SOFIA Program Manager
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Program Focus

As a result of the budgetary feedback, reviews, and audits last fiscal year, the SOFIA Program will begin the **immediate and urgent work of optimizing the Science Program** and emphasize **scientific productivity**.

As members of the science community, the SOFIA Users Group (SUG) will provide critical input and feedback as part of this process.
Heavy Maintenance Visit (HMV) Status
HMV Status

- Experienced a 2-week impact to the ferry flight to Palmdale (now scheduled for November 28, 2014)
- All TA heavy maintenance is proceeding well with “no significant findings”
- Very few aircraft inspections findings associated with structural corrosion inspections
- Aircraft inspection findings were associated in the following areas
  - Flight Deck Frame replacement (behind FE station)
  - Left / Right Wing Gear Support fitting replacement
  - Left / Right Horizontal Tail bearing / trim actuator overhaul
  - Pylon inspections findings that required Boeing disposition from structures engineering
- Repairs schedule to be complete this week
- 4 week impact to the restoration of aircraft electrical power (October 22, 2014) but all systems are ready for electrical power checks
- HMV team is focused on required fixes to ensure safe and reliable operation when complete. We will have much better knowledge of the state of the aircraft (in every area) to streamline the future maintenance plan from LUMP to MSG-3 type.
Budget Update
Budget Update

- March 4, 2014: FY15 President’s Budget Request (PBR)
- March 11, 2014: FY14 Operating Plan
  - No change to overall SOFIA Program plans (GOOD)
- April 24, 2014: House of Representative Budget Report (PBR mark-up)
  - SOFIA Reinstated at $70M, Bill passed by House (GOOD)
- June 5, 2014: Senate Budget Report (PBR mark-up)
  - SOFIA Reinstated at $87M with verbiage referencing a Senior Review, Bill passage by Senate delayed / pending (GOOD)
- October 2014: FY15 Appropriation
  - Passed Continuing Resolution on September 18, 2014 and is effective through December 11, 2014 (GOOD)
- Received Program Guidance from SMD APD (technical & budgetary) for the CR Period (GOOD)
- Final FY15 Appropriation is TBD

Congress has provided strong feedback that SOFIA shall be continued
FY15 CR Guidance

- Program has entered FY15 in an excellent financial condition
- Program is fully funded for the CR period at the FY14 level of $84M
- Provided direction / authority to all contracts
- Program is to continue to implement the nominal FY15 plan
  - Complete and ramp down development activities as planned to meet entry conditions in the nominal FY15 plan
  - Hold flight capacity to 3 flights / week for the full year (includes SH Deployment)
  - Complete staffing plans/hiring to support the current capacity for the full year
  - Complete Cycle 3 Science selection process for the full year
  - Implement the proposed Airborne Astronomy Ambassador (AAA) Program for the full year
  - Maintain science critical development efforts through the CR period
  - Maintain all current capabilities (Science Instruments and Observatory Systems) through the CR period
- Implement the approved External Science Council structure ASAP
- 3rd Generation Science Instrument Call is on hold pending final budget
SWG, SIAT, SSAR, & OIG
(Working Groups, Reviews, & Audits)
SWG, SIAT, SSAR Outcomes

- Demonstrated that FY15 PBR is insufficient in either schedule or budget to execute any path forward
- Allowed for the development of contingencies that are more flexible and viable within the DLR/NASA partnership
- Demonstrated that delaying the Cycle 3 Call for Proposals would severely affect Science should SOFIA be allowed to continue in FY15
  - Decision to release Call with HQ approval (May 23, 2014)
- Corrected the perception that not conducting the HMV would result in a non-airworthy / un-flyable aircraft
  - Provided analysis that demonstrated ability to defer the HMV up to 1-year with increased costs
  - Allowed for 1-month HMV delay to allow budget process to proceed
  - Provided the opportunity to continue SOFIA flights in June 2014
- Program successfully satisfied SSAR Panel of ability to execute a viable science program within the budgetary range ($70M/yr - $87M/yr)
OIG Audit Report (1 of 2)

• OIG Audit Report, July 9, 2014
  – OIG conducted AFRC and ARC site visits, contract review, and several interviews with scientists, Guest Investigators, and science team members
  – “SOFIA remains capable of contributing to the scientific body of knowledge and many in the science community view the observatory as a valuable resource”
  – “SOFIA is exceeding both its planned science flight hours...and the operational reliability...strong indications that SOFIA has the potential for completing more than 960 research flight hours per year.”
OIG Audit Report (2 of 2)

- OIG Audit Report, July 9, 2014
  - “…identified several challenges SOFIA will face going forward...needs to ensure a consistent infusion of new technology, revise the methodology for calculating researcher funding, and re-evaluate the number of research hours SOFIA can fly per year.”
  - “…recommended (that) the SOFIA Program develop plans to conduct outreach to the scientific community, fund research projects based on complexity, and reduce the backlog of observational data; implement a formal review process for rescheduling flights; reassess annual research flight hour requirements, the appropriateness of SOFIA’s planned organizational restructuring, and the existing contract oversight…”

This is a good OIG report for the Program. It recognizes the proven capacity for science flight operations, reaffirms the scientific value / potential of the Program, and identifies areas for improvement.
SSAR Feedback (1 of 3)

• SOFIA Science Assessment Review Panel, June 18-19, 2014
  - Program successfully satisfied Panel of ability to execute a viable science program within the budgetary range ($70M/yr - $87M/yr)

Panel provided feedback consistent with OIG Audit Report
  - 1. “...science production should drive the program as opposed to flight science hours...production of scientifically impactful results”
  - “...formulate an efficient program that optimizes science production...initiates with responses to the Call for Proposal and culminates in the publication and dissemination of unique and impactful science results”
    “The path includes the availability of relevant scientific instruments, efficient and reliable flight opportunities, prompt delivery of raw data, rapid production of science ready data from reliable and accurate pipeline software, and sufficient funding to investigators...that leads to the publication and dissemination of the final result.”
SSAR Feedback (2 of 3)

SSAR Panel feedback consistent with OIG Audit Report

2. “...needs to focus on those unique areas of science that are only accessible to the SOFIA platform and instruments...prove that it is capable of unique and powerful science...competitive relative other NASA science programs.”

- Observatory leadership, SOFIA’s advisory committees, and outreach efforts “help the community identify the themes where SOFIA will have most impact over short and long terms.”
  - Near-term focus: Producing scientific results with current SIs
  - Long-term: Strategic plan providing perspective for the future will be a critical element for future reviews.
SSAR Feedback (3 of 3)

SSAR Panel feedback consistent with OIG Audit Report

- 3. “Changes must be made independent of the final budget”

- “need to be a productive member of the scientific landscape that is now far different than was imagined when SOFIA was first conceived.”
Next Steps: Programmatic Planning Priorities

• Near-term Program Office Planning Priorities (dependent on final FY15 budget)
  - Priority #1: Re-optimize Program based on feedback received from SRB, OIG, and SSAR
  - Priority #2: Maintain Progress toward achievement of Program Office Transition to Ames Research Center (ARC) from Armstrong Flight Research Center (AFRC) – January 2015
  - Re-optimization and Program Office Transition are separate and parallel activities

• Operationally, the Program will become more “science centric” and indexed to the Annual Science Cycle Call requirements and selection announcement
  - In alignment with a 3 flight per week template
  - All activities will be assessed based on the scientific priorities and contribution toward science productivity
  - Trades will be made based on scientific priority, scientific productivity, and the available budgetary trade space
SOFIA Schedule
Cycle 2 Schedule Revision

- **Ferry slip to November 28**
- **Attempts to recover all GREAT flights by moving them to early January**
- **FORCAST observing cycle 2H starts on January 27**
- Shortened Upgrade/Maintenance period by reducing some low/medium-priority Observatory enhancements
- Reduced test time for MCCS Rev 40 testing but it is sufficient
  - Can revert to Rev 39 in 4 hours or less

October 20, 2014  Program Update – SUG #6
Cycle 3 Draft (Page 1 of 2)

AFRC “RDO” indicated by red text for future analysis of impacts

<table>
<thead>
<tr>
<th>Observing Cycle</th>
<th>Planned Flights</th>
<th>RHs *</th>
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</thead>
<tbody>
<tr>
<td>OC 3</td>
<td>77</td>
<td>548</td>
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</table>

* These values assume an 89% reliability factor

- OC: Observing Cycle
- RHs: Required Hours
- Key:
  - RTB: Flight
  - C: Canceled Flight
  - H: Actual Flight / Line Ops
  - M: Holiday
  - G: Observatory Integration & Maintenance
  - F: Engineering Flights
  - AFRC: Deployment Observing Flights
  - “RDO”: Red Text for Future Analysis of Impacts

Program Update – SUG #6

October 20, 2014
Achieving Full Science Productivity

**S.I. Development**

- **Part 1**
  - Commissioning Flights

- **Part 2**
  - Data Analysis
  - SI Acceptance

**Data Processing**

- **Pipeline Development**
  - Design Review
  - Alpha version

- **Data Processing Operations**
  - Support Commissioning

**Mission Ops**

- **Mode 1**
  - Cross Training
  - SI Shared Risk Offered MOps Cross-Training

- **Full Mission Ops Capacity**
  - Full Data Processing Capacity
  - Full Science Productivity

**Notes**

- **2-3 flights / week**
  - 2-3 flights / week
  - Cross Training

- **3-4 flights / week**
  - 3-4 flights / week
  - Full Science Productivity
Topics Requested by SUG

- SOFIA Schedule
- Budget Situation
- HMV – Strategy for Future Maintenance
- Explanation of MCCS Upgrade
- Future SI Plan – Concern about time to get new instruments on the Observatory
Program Manager’s Request
Program Manager’s Request

- As a result of the budgetary feedback, reviews, and audits last fiscal year, the SOFIA Program will begin the **immediate and urgent work of optimizing the Science Program and emphasize scientific productivity**

- Request that the SOFIA Users Group (SUG) use the context of this update to provide input/feedback as structured by today’s meeting agenda
  - Maximizing Science
  - Large Observing Programs
  - Outreach Activities
  - Data Processing Issues
  - Agreement / Disagreement with OIG or SSAR
  - Other Feedback
Back-up Charts
### Cycle 2 Daily Overview (Completed)

#### Cycle 1 End

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>26 Mar</td>
<td>Installation of L1/L2</td>
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<tr>
<td>27 Mar</td>
<td>H/L2 Configuration</td>
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<tr>
<td>28 Mar</td>
<td>HMV Deployment</td>
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#### Cycle 2 Start

<table>
<thead>
<tr>
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<tr>
<td>29 Mar</td>
<td>Call for Cycle 3 Proposals</td>
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<td>30 Mar</td>
<td>SOFIA Flight Services</td>
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#### Flyback

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<tr>
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<td>Remove L1/L2</td>
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<tr>
<td>1 Apr</td>
<td>Remove H/L2</td>
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<tr>
<td>2 Apr</td>
<td>Critical MCCS / TA L.O. (v. 40)</td>
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#### EXOS Comm Part 1 / EXOS Observing

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<tr>
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<tr>
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#### FIFI-LS Comm Part 1

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#### FIFI-LS Comm Part 2

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#### Observatory Cycle #2-E GREAT

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#### Critical MCCS / TA L.O. (v. 40)

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#### OC #2-D FORCAST

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### Observing Cycle

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### Key

- **Observing Flight**
- **Instrument Commissioning**
- **Engineering Flights**
- **Observatory Integration & Maintenance**
- **Deployment Observing Flights**

### Observations

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<th>Objective</th>
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*These values assume an 89% reliability factor.*

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**Note:** This schedule is subject to change and may be updated as more information becomes available. Please refer to the official SOFIA website for the most current information.
SOFIA Organization for Operations Phase

Legend
- NASA Activity
- NASA Contractor Activity
- DLR/DSI Activity
- Shared or Cross-Cutting Activity
- Program Authority
- Science Oversight/Coordination
- Technical Oversight

Program Update – SUG #6
October 20, 2014
# Transition Timeline Summary

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<thead>
<tr>
<th>Program Milestones</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
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## Completed Activities
- **Aug 2014**: Transition Management Team (8/19)
- **Aug 2014**: HMV Progress Review Complete (8/29)
- **Sept 2014**: Transition Management Team (9/16)

## Upcoming Activities
- **Sept 2014**: Review of Draft Transition Plan
- **Sept 2014**: Transition Management Team (9/30)
- **Oct 2014**: Transition Summary Brief / Proposal