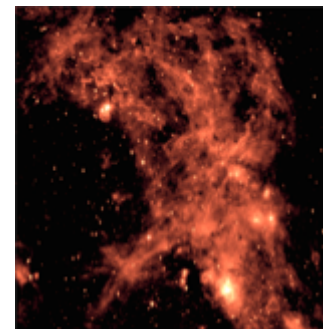
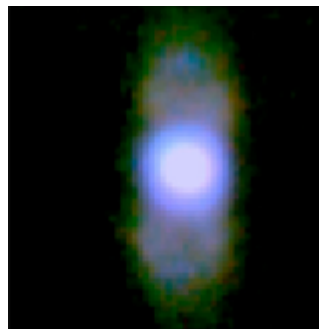
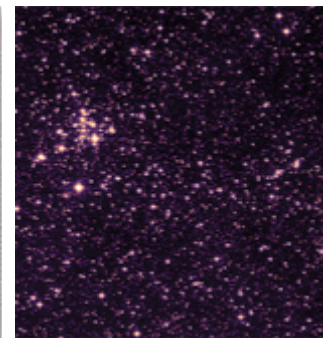
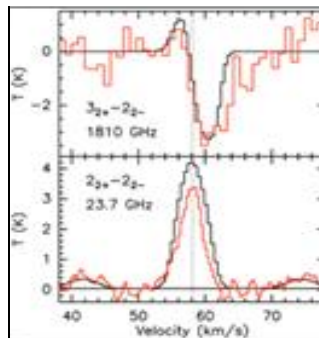
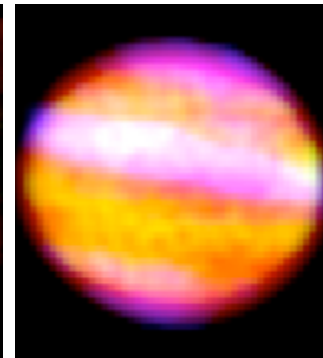
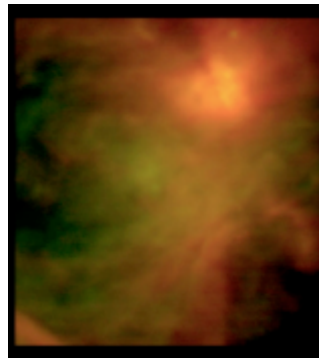


SOFIA Program Update October 20, 2014



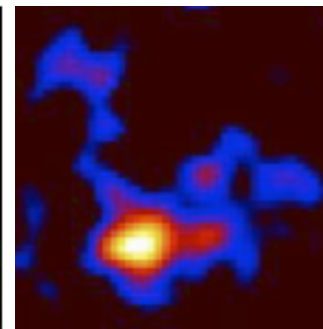
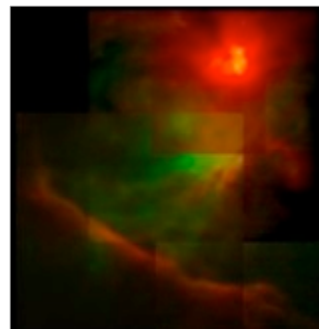
Presented to:

SOFIA Users Group (SUG) Meeting #6

Presented by:

Eddie Zavala, NASA SOFIA Program Manager

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Overview

Program Focus

HMV Status

Budget Update

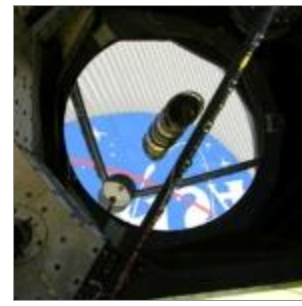
SWG, SIAT, SSAR and OIG
(Working Groups, Reviews & Audits)

SOFIA Schedule

Program Manager's Request

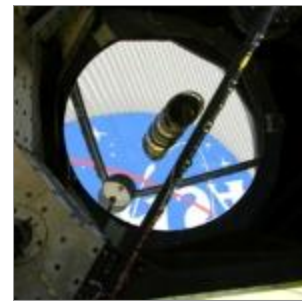
As a result of the budgetary feedback, reviews, and audits last fiscal year, the SOFIA Program will begin the **immediate and urgent work of optimizing the Science Program and emphasize scientific productivity**

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

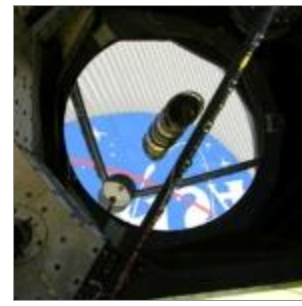
- Experienced a 2-week impact to the ferry flight to Palmdale (now scheduled for November 28, 2014)
- All TA heavy maintenance is proceeding well with “no significant findings”
- Very few aircraft inspections findings associated with structural corrosion inspections
- Aircraft inspection findings were 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

- ü March 4, 2014 : FY15 President's Budget Request (PBR)
 - ü March 11, 2014: FY14 Operating Plan
 - No change to overall SOFIA Program plans **(GOOD)**
 - ü April 24, 2014: House of Representative Budget Report (PBR mark-up)
 - SOFIA Reinstated at \$70M, Bill passed by House **(GOOD)**
 - ü 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)**
 - ü October 2014: FY 15 Appropriation
 - Passed Continuing Resolution on September 18, 2014 and is effective through December 11, 2014 **(GOOD)**
 - ü 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**

- 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)

- ü Demonstrated that FY15 PBR is insufficient in either schedule or budget to execute any path forward
- ü Allowed for the development of contingencies that are more flexible and viable within the DLR/NASA partnership
- ü 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)
- ü Corrected the perception that not conducting the HMTV would result in a non-airworthy / un-flyable aircraft
 - Provided analysis that demonstrated ability to defer the HMTV up to 1-year with increased costs
 - Allowed for 1-month HMTV delay to allow budget process to proceed
 - Provided the opportunity to continue SOFIA flights in June 2014
- ü Program successfully satisfied SSAR Panel of ability to execute a viable science program within the budgetary range (\$70M/yr - \$87M/yr)

- **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, 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 backload 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.

- 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 Panel feedback consistent with OIG Audit Report

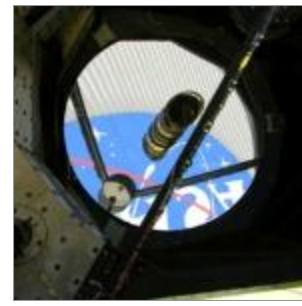
- 2. “...needs to focus on those unique areas of science that are only accessible to the SOFIA platform and instruments...prove that it is capable of unique and powerful science...competitive relative other NASA science programs.”
 - Observatory leadership, SOFIA’s advisory committees, and outreach efforts “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 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

Aircraft & TA Heavy Maintenance																											Ferry							
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	H	F	S							
26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
October -- 2014														November -- 2014																				

HMV & all Observatory Functional Checks Complete																																		
SMM Install					Install HIPO	Fcn'l	LO(F)		Observatory Functional Flights							Rem HIPO	Maintenance / Upgrades																	
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	H	F	S	S	M	T	W	H	F	S
30	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3
December -- 2014															January -- 2015																			

Maintenance / Upgrades											Observatory Cycle #2-G GREAT												Observing Cycle #2 H FORCAST											
LO(F)		LO(F)		Eng Fit	Rem MD	GREAT Install		Prep	LO(F)		GREAT Flights			Channel Swap	GREAT Flights			SI Rem	Install	6 Flights				Remove										
S	M	T	W	T	F	S	S	S	M	T	W	T	F	S	S	H	T	W	T	F	S	S	M	T	W	T	F	S						
4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7
January -- 2015															February -- 2015																			

All 1st Gen SI Commissioning Complete																												
EXES Commissioning Part 2																		OC 21										
Install				LO(F)		LO(F)		3 Flights														1 Fit	Remove					
S	M	T	W	T	F	S	S	H	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	
8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27									
February -- 2015																												

- 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

Cycle 3 Draft (Page 1 of 2)



All 1st Gen SI Commissioning Complete Cycle 3 Start

EXES Commissioning Part 2														OC#2 EXES				OC#3 A EXES				OC#3													
Install		LO(F)		LO(F)		F		S		S		M		T		W		SI Rem.		SI Install		SI Install		SI Install		SI Install		SI Install		SI Install					
S	M	T	W	T	F	S	S	H	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S
8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
February -- 2015																		March -- 2015																	

OC#3 B										Program Managed Margin										MD Inst		Maintenance / Upgrades																									
3 Flights (cont.)					SI Rem.					S					S					M		T		W		T		F		S		S		M		T		W		T		F		S			
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S					
15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
March -- 2015												April -- 2015																																			











Maintenance / Upgrades										MD Rem		upGREAT Commissioning										SI Rem																				
SI Install					Inst/Prep					Prep					EM&LO					Cont LO					M		T		W		T		F		S							
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S
19	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
April -- 2015										May -- 2015																																

SI Install										OC#3 C										Prep										OC#3 D																																			
3 Flights					SI Rem.					S					S					M					T					W					T					F					S																				
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S																							
24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
May -- 2015										June -- 2015																																																							

OC#3 D										OC#3 E										Prep										Ferry										SI Rem										Maintenance / Upgrades																								
10 Flights					SI Rem					SI Install / align / tune					6 Flights					W					T					F					S <th colspan="5">S</th> <th colspan="5">M</th> <th colspan="5">T</th> <th colspan="5">W</th> <th colspan="5">T</th> <th colspan="5">F</th> <th colspan="5">S</th>					S					M					T					W					T					F					S				
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S																									
28	29	30	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31										
June -- 2015										July -- 2015																																																																

Maintenance / Upgrades										MD Rem		SI Install										OC#3 F																																						
SI Install					SI Rem					S					S					M					T					W					T					F					S															
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S											
2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
August -- 2015										September -- 2015																																																		

AFRC "RDO" indicated by red text for future analysis of impacts

Observing Cycle			Key	
OC	Planned Flights	RHs *		RTB Flight
3	77	548		Canceled Flight
* These values assume an 89% reliability factor				Actual Flight / Line Ops
				Holiday
				German Holiday
				Observing Flight
				Instrument Commissioning
				Engineering Flights
				Observatory Integration & Maintenance
				Deployment Observing Flights

OC#3														OC#3 G														OC#3 H						
11 Flights														SI Rem	SI Install	LO	4 Flights														SI Rem	SI Install		
S	H	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
8	7	4	3	2	1	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6	7	8	9	10
September -- 2015														October -- 2015																				

OC#3 H														OC#3 I																				
8 Flights														SI Rem	SI Install	10 Flights																		
S	H	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14
October -- 2015														November -- 2015																				











OC#3 I														OC#3 J																				
10 Flights														SI Rem	SI Install	8 flights														SI Rem				
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
November -- 2015														December -- 2015																				

Maintenance / Upgrade														HAWC+ Commissioning Part 1																				
														SI Install	EMI	Line Ops																		
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
December -- 2015														January -- 2016																				

HAWC+ Comm Pt 1														OC#4 A (TBD)																				
3 Flights														SI Rem																				
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
January -- 2016														February -- 2016																				

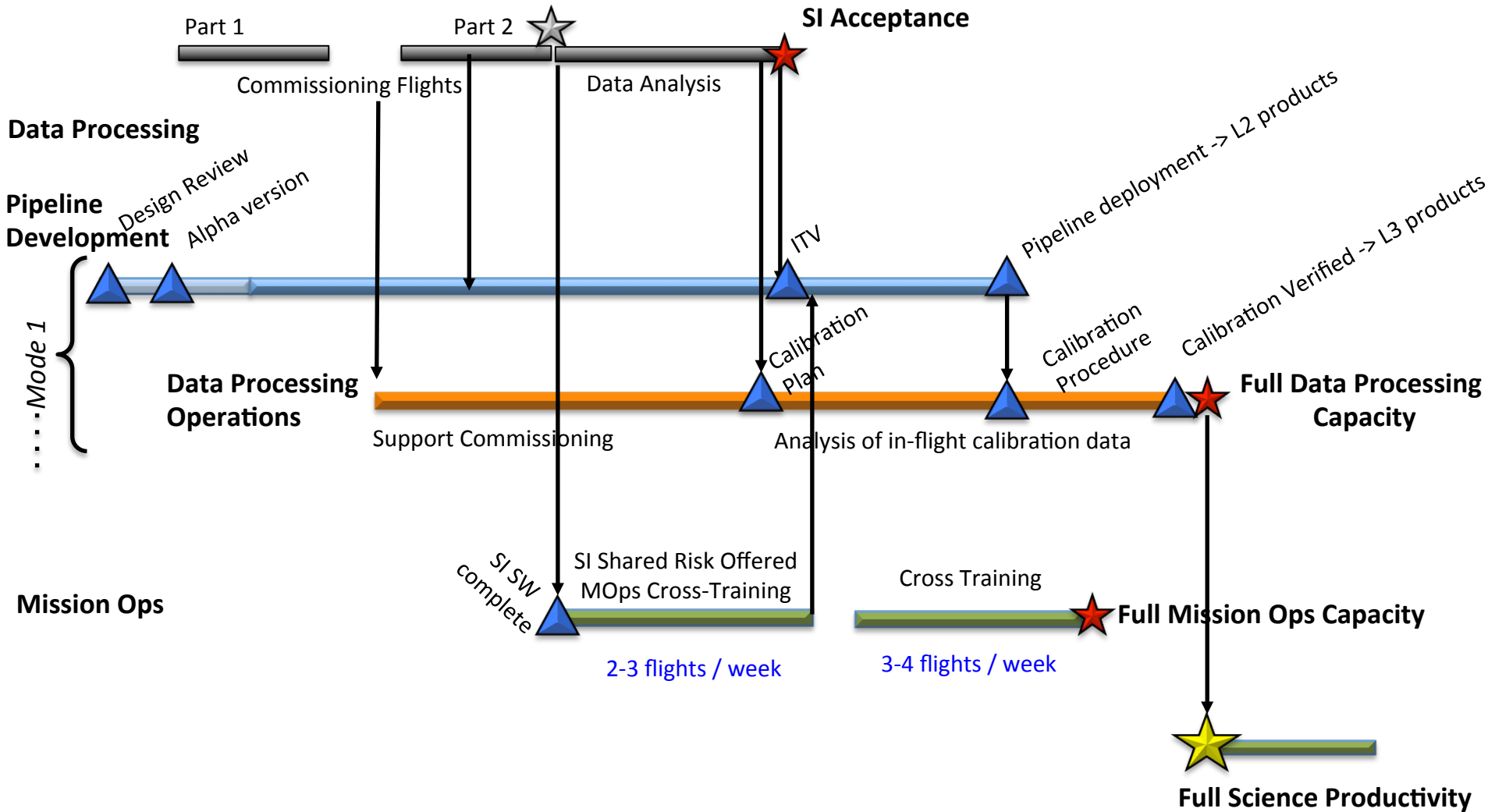
HAWC+ Commissioning Part 2														OC#4 B (HAWC+)				OC#4 C (TBD)																
Install														LO	3 Flights				SI Rem															
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
28	29	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	1	2	3	4
Feb. -- 2016														March -- 2016				April -- 2016																

AFRC "RDO" indicated by red text for future analysis of impacts

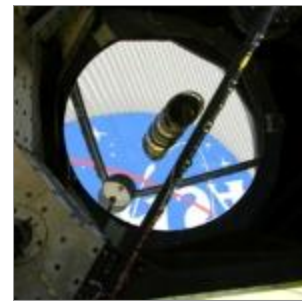
Observing Cycle			Key			
OC	Planned Flights	RHs *		RTB Flight		Observing Flight
3	77	548		Canceled Flight		Instrument Commissioning
				Actual Flight / Line Ops		Engineering Flights
				Holiday		Observatory Integration & Maintenance
				German Holiday		Deployment Observing Flights

* These values assume an 89% reliability factor

S.I. Development



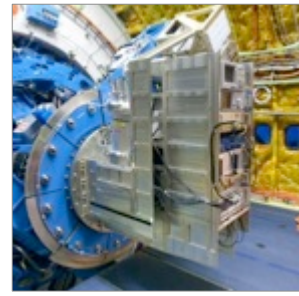
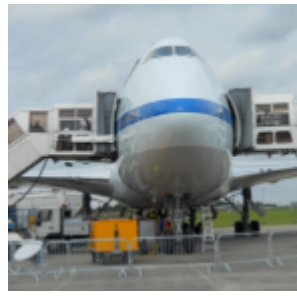
- ü SOFIA Schedule
- ü Budget Situation
- ü HMOV – Strategy for Future Maintenance
- ü Explanation of MCCA Upgrade
- ü Future SI Plan – Concern about time to get new instruments on the Observatory



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)



Chart Revision
9-18-14
★ FOC 2/21/14

V&V										Remove M. Dum.	Align	Cycle 1 End										Cycle 2 Start																		
Fit										Install		SI Prep		L.O.		2 Flights				Channel Swap		2 Flights		Remove	Install		L.O.		FLITECAM with HIPO Com. Part 2								4 Flights			
S	H	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	H	T	W	T	F	S						
19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22						
January -- 2014															February -- 2014																									

Safety Day

Observ. Cycle #2-A FLIPO										FIF-LS Comm. Part 1										Observ. Cycle #2-B FORCAST														
2 Flights				Remove	Install		LO		EMI/LO		Eng Fit		2 Flights		Remove	Install		LO		Flights								Remove						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
23	24	25	26	27	28	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
February -- 2014										March -- 2014																								

EXES Comm Part 1 / EXES Observing										FIF-LS Comm Part 2										OC #2-C FIF-LS Science - 3 flights					★ KDP-E					OC #2-D FORCAST				
Install		EMI		LO		2 Flights				Remove	Install		LO		2 Flights		Remove			Install		Flights			Remove									
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3
March -- 2014					April -- 2014										May -- 2014																			

Call for Cycle 3 Proposals

OC #2-D FORCAST				Remove	Install		EMI/L.O.		Observatory Cycle #2-E GREAT				5 Flights		Install FORCAST	Critical MCCS / TA L.O. (v. 40)					OC 2# F FORCAST (v. 39)													
Flights				Remove	Install		EMI/L.O.		H/L2 Configuration		Channel Swap		L1/L2		Remove	Critical MCCS / TA L.O. (v. 40)					OC 2# F FORCAST (v. 39)													
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	H	T	W	T	F	S	S	M	T	W	T	F	S
4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7
May -- 2014															June -- 2014																			

HMV Deployment

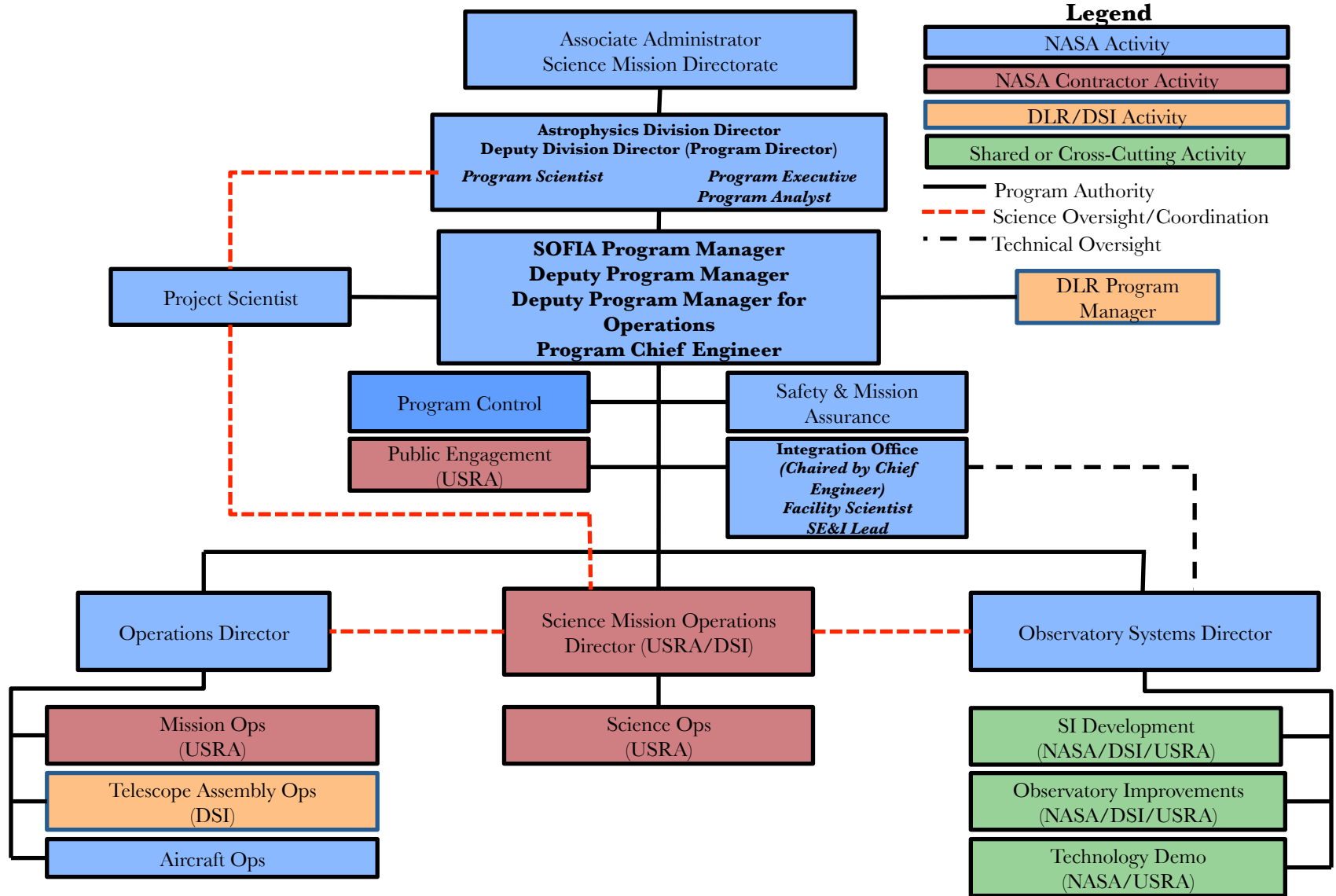
OC 2# F FORCAST					V&V	Remove	Engine #3 Change				SMM Removal/HMV Prep				Ferry		Aircraft & TA Heavy Maintenance										Hyd. Off							
S	GH	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6	7	8	9	10	11	12
June -- 2014															July -- 2014																			

Pwr. Off	Aircraft & TA Heavy Maintenance																																	
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
July -- 2014										August -- 2014																								

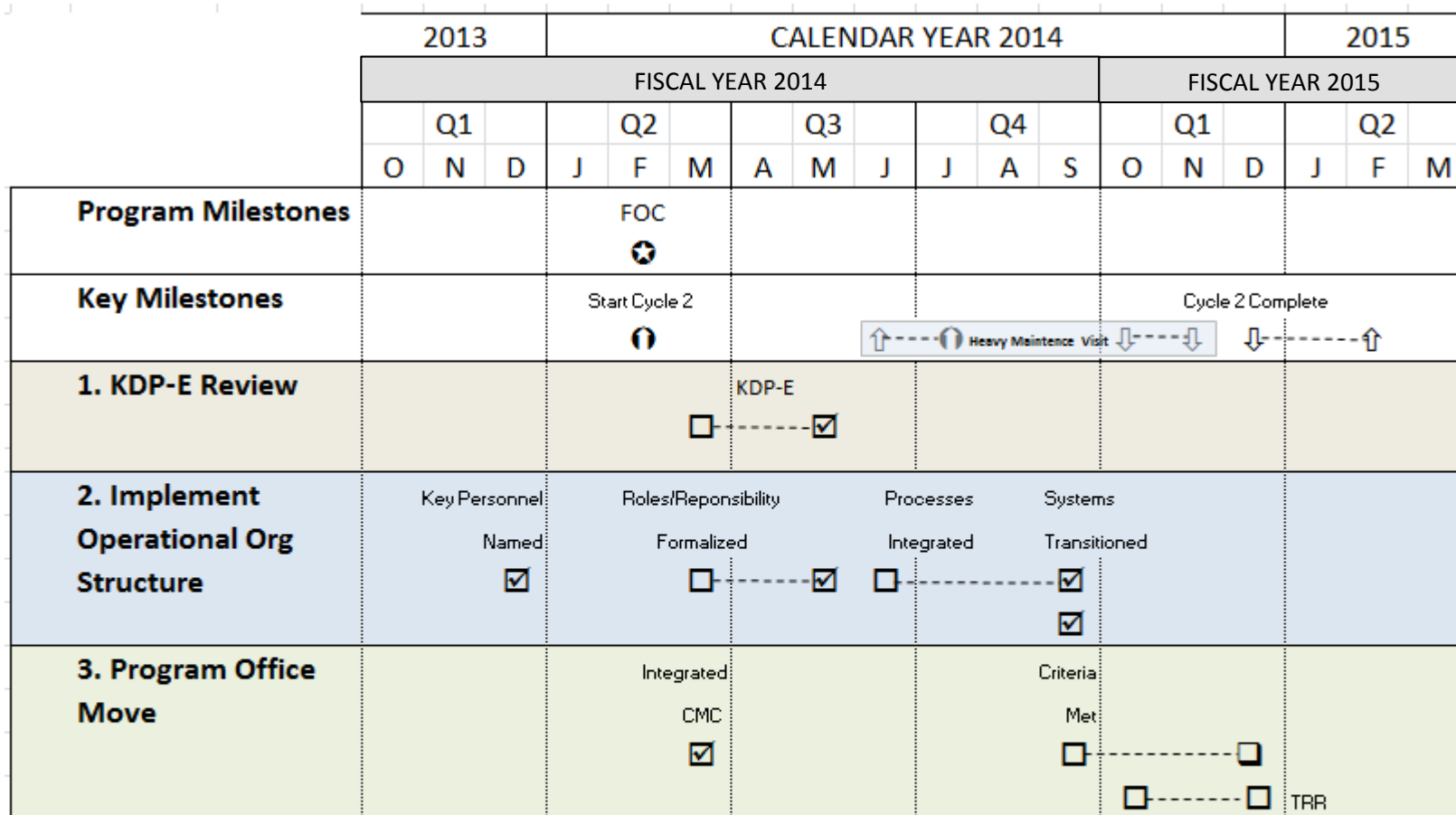
Observing Cycle			Key	
OC	Planned Flights	RHs *		RTB Flight
2	37	273		Canceled Flight
				Actual Flight / Line Ops
				Holiday
				German Holiday
				Observing Flight
				Instrument Commissioning
				Engineering Flights
				Observatory Integration & Maintenance
				Deployment Observing Flights

* These values assume an 89% reliability factor

SOFIA Organization for Operations Phase



Transition Timeline Summary



Completed Activities		Upcoming Activities	
<input checked="" type="checkbox"/>	Aug 2014 Transition Management Team (8/19)	<input type="checkbox"/>	Sept 2014 Review of Draft Transition Plan
<input checked="" type="checkbox"/>	Aug 2014 HMV Progress Review Complete (8/29)	<input type="checkbox"/>	Sept 2014 Transition Management Team (9/30)
<input checked="" type="checkbox"/>	Sept 2014 Transition Management Team (9/16)	<input type="checkbox"/>	Oct 2014 Transition Summary Brief / Proposal