

MAY 26, 2016

PROGRAM
UPDATE

SOFIA
*Stratospheric Observatory
for Infrared Astronomy*



Presented to:
SOFIA Users Group (SUG)
Meeting #9

Presented by:
SOFIA Program Manager
Eddie Zavala

*The SOFIA Observatory
studies astronomical
observations at
wavelengths between
0.3 and 1000 microns*

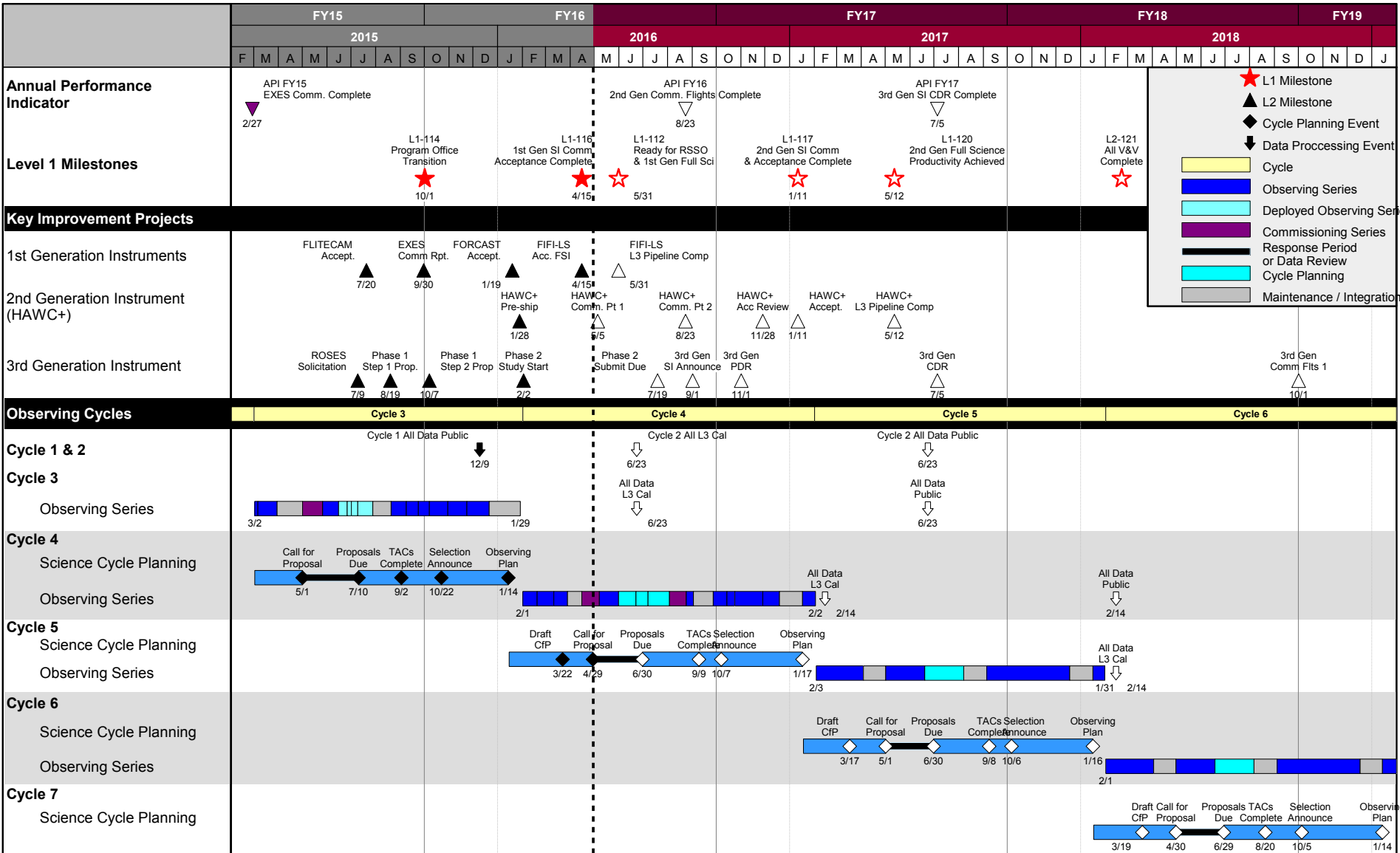


Recent Program Status

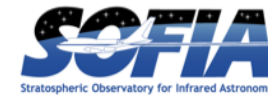


- Cycle 4 Science Flights are in progress, approximately 1/3 through the Cycle
- Program is making final preparations for deployment science flights in Christchurch, New Zealand
 - 7 ½ week, 3 instrument deployment from June 4 – July 26, 2016
 - Science instruments: upGREAT, FIFI-LS, and FORCAST
 - 25 science flights planned
- 1st Generation Science Instrument Acceptance is Complete
 - FORCAST, January 2016
 - FIFI-LS, April 2016
- 2nd Generation Science Instrument (HAWC+) commissioning flights started
 - Instrument delivered on February 2016
 - 1st Commissioning Flight Series completed
 - Temperature control issue to be addressed prior to next commissioning flight series in Fall 2016
- 3rd Generation Science Instrument solicitation
 - 2 Proposals in the Instrument Concept Phase, System Requirements Review completed in April 2016
 - On track for SI Selection in September 2016

SOFIA Top-Level Schedule



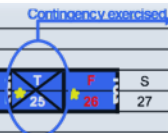
Cycle 4 Daily Overview - 1 of 2



Cycle 4 Start

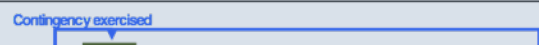
OC#4 A FORCAST																		OC#4 B FIFI-LS										
SI Install	LO	8 Flights								SI Rem	SI Install	SI Install										LO	SI Rem					
S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	H	T	W	T	F	S	S	M	T	W	T	F	S
30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27

February -- 2016



OC#4 B FIFI-LS										OC#4 C EXES										Maintenance / Upgrades #10								
SI Rem	SI Install	9 Flights								SI Rem	SI Install	SI Inst/LO				4 Flights				SI Rem	Eng LO							
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

March -- 2016



Maintenance / Upgrades #10										Autoland			EMI			Safety		HAWC+ Comm Pt 1			OC#4 D													
SI Rem	SI Install	Autoland		Eng LO		SI Install		SI Rem		Eng LO		LO		Day		LO		Autoland		Hanger		LO (H)		3 Commissioning 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							
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	4	5	6	7

April -- 2016

OC#4 D upGREAT (L1 LFA)										OC#4 E upGREAT																								
SI Install	LO	Prep	10 Flights							warm			Aircraft Prep			Ferry - 2 flts			Media		Prep		8 Flights											
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	31	1	2	3	4	5	6	7	8	9	10	11

May -- 2016

OC#4 E upGREAT										GREAT										OC#4 F FIFI-LS										OC#4 G FORCAST																																													
Post/Swap	Post					SI Rem.					Down					SI Install					8 Flights					Post					Down					Prep					SI Rem.					Down					SI Install					8 Flights					Post					Down					Prep				
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																																		
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	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	13	14	15	16											

June -- 2016

OC#4 G FORCAST										HAWC+ Comm Pt 2																																																		
Post	Down	Prep					Ferry					SI Rem.					Crew Rest					SI Install					LO					Prep					LO					3 Commissioning Flights																		
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																			
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	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

July -- 2016

Key										Observing cycle: 4										Planned science flights: 101										RHs*: 808										* Max available research hours										PMB sequence approval: March 2016									
S 7	Weekend day (black text with no fill)	H 4	US or German Holiday (day of week box H or GH w/ red fill)	F 6	Instr. Commissioning Flight (bold white text, purple fill, bold border)	F 6	Observing Flight (bold white text, blue fill, bold border)	F 6	Ferry/Maint./Non-Sci Flight (bold white text, green fill, bold border)	F 6	Educator on Flight (white star on day of week)	F 6	Return to Base (RTB) Flight (single slash through day and date)	F 6	Work day (black text w/ day box grey fill)	F 6	Line Operations (bold border)	F 6	Contingency Instr. Comm. Flight (day box with purple fill)	F 6	Contingency Obser. Flight (day box with blue fill)	F 6	Contingency Ferry/Maint./Non-Sci Flt (day box with green fill)	F 6	Media/VIP on Flight (yellow star on date)	F 6	Canceled Flight (x through day and date)	F 6	AFRC Regular Day Off (day and date shown in red)	F 6	Possible Maint/Up. Check Fit (day and date box filled with lt. green)	F 6	Deployment Observing Flights (bold white text, light blue fill, bold border)	S 28	Short Flight (colored fill only lower half, bold bdr.)	S 13	Half Sci. & Half Ferry/Maint./Non-Sci (two colored fill)	✓	Restored Flight (check mark below day)	U	Notional Unfunded Flight (yellow fill with U below day)																		

Cycle 4 Daily Overview - 2 of 2

MCCS

HAWC+ Comm Pt 2		OC#4 H HAWC+										SI Rem	Maintenance / Upgrades #11														Eng LO		FLT (TBD)					
3 Commissioning Flights			5 Flights							Eng LO			MD Install														Eng LO		FLT (TBD)					
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
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
August -- 2016											September -- 2016																							

OC#4 I FORCAST														OC#4 J FLITECAM							OC#4 K GREAT													
Rem MD		SI Install		8 Flights								SI Rem		SI Install		3 Flights			SI Rem		SI Install		14 flights											
S	M	T	W	T	F	S	S	GH	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
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
September -- 2016											October -- 2016																							

OC#4 K GREAT														OC#4 L HAWC+																				
Channel Swap		9 Flights												SI Rem.		SI Install		9 Flights																
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
Oct -- 2016											November -- 2016																		Dec -- 2016					

OC#4 L HAWC+														Maintenance / Upgrades #12																				
9 Flights		SI Rem		MD Install														SI Rem		SI Install														
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	H	T	W	T	F	S	S	H	T	W	T	F	S	S	H	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
December -- 2016											January -- 2017																							

Maintenance / Upgrades #12							OC#4 M EXES														OC#5 A (TBD)													
Eng LO		FLT (TBD)		MD Rem		7 Flights							SI Rem.		SI Install		9 Flights																	
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
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
January -- 2017											February -- 2017																							

PMB Approved → Cycle 5 Start

Key		Observing cycle: 4		Planned science flights: 101		RHS*: 808		* Max available research hours		PMB sequence approval: March 2016	
S 7 Weekend day (black text with no fill)	H 4 US or German Holiday (day of week box H or GH w/ red fill)	F 6 Work day (black text w/ day box grey fill)	F 6 Line Operations (bold border)	F 6 Instr. Commissioning Flight (bold white text, purple fill, bold border)	F 6 Observing Flight (bold white text, blue fill, bold border)	F 6 Contingency Instr. Comm. Flight (day box with purple fill)	F 6 Contingency Obser. Flight (day box with blue fill)	F 6 Ferry/Maint./Non-Sci Flight (bold white text, green fill, bold border)	F 6 Contingency Ferry/Maint./Non-Sci Flt (day box with green fill)	F 6 Educator on Flight (white star on day of week)	F 6 Return to Base (RTB) Flight (single slash through day and date)
F 6 AFRC Regular Day Off (day and date shown in red)	F 6 Possible Maint/Up. Check Flt (day and date box filled with lt. green)	F 6 Deployment Observing Flights (bold white text, light blue fill, bold border)	S 28 Short Flight (colored fill only lower half, bold bdr.)	S 13 Half Sci. & Half Ferry/Maint./Non-Sci (two colored fill)	F 6 Media/VIP on Flight (yellow star on date)	F 6 Canceled Flight (x through day and date)	F 6 Restored Flight (check mark below day)	U 6 Notional Unfunded Flight (yellow fill with U below day)			

- Cycle 5 Science Call for Proposal issued on April 29, 2016
- 63 total peer-reviewed publications as of May 2016
- Data processing commitments are being met with the exception of FIFI-LS
 - FIFI-LS Data pipeline readiness and Water Vapor Monitor (WVM) calibration dependency continuing to be addressed, pipeline readiness anticipated in May 2016
- Program decision to establish IRSA as the SOFIA archive, transition planning in work
- SOFIA's Budgetary Outlook is good
 - FY16 Budget appropriation restored current year budget to ~85M
 - FY17 President's Budget Request restores Program budget profile through 2021
 - Program completed annual budget plan / submission in April 2016

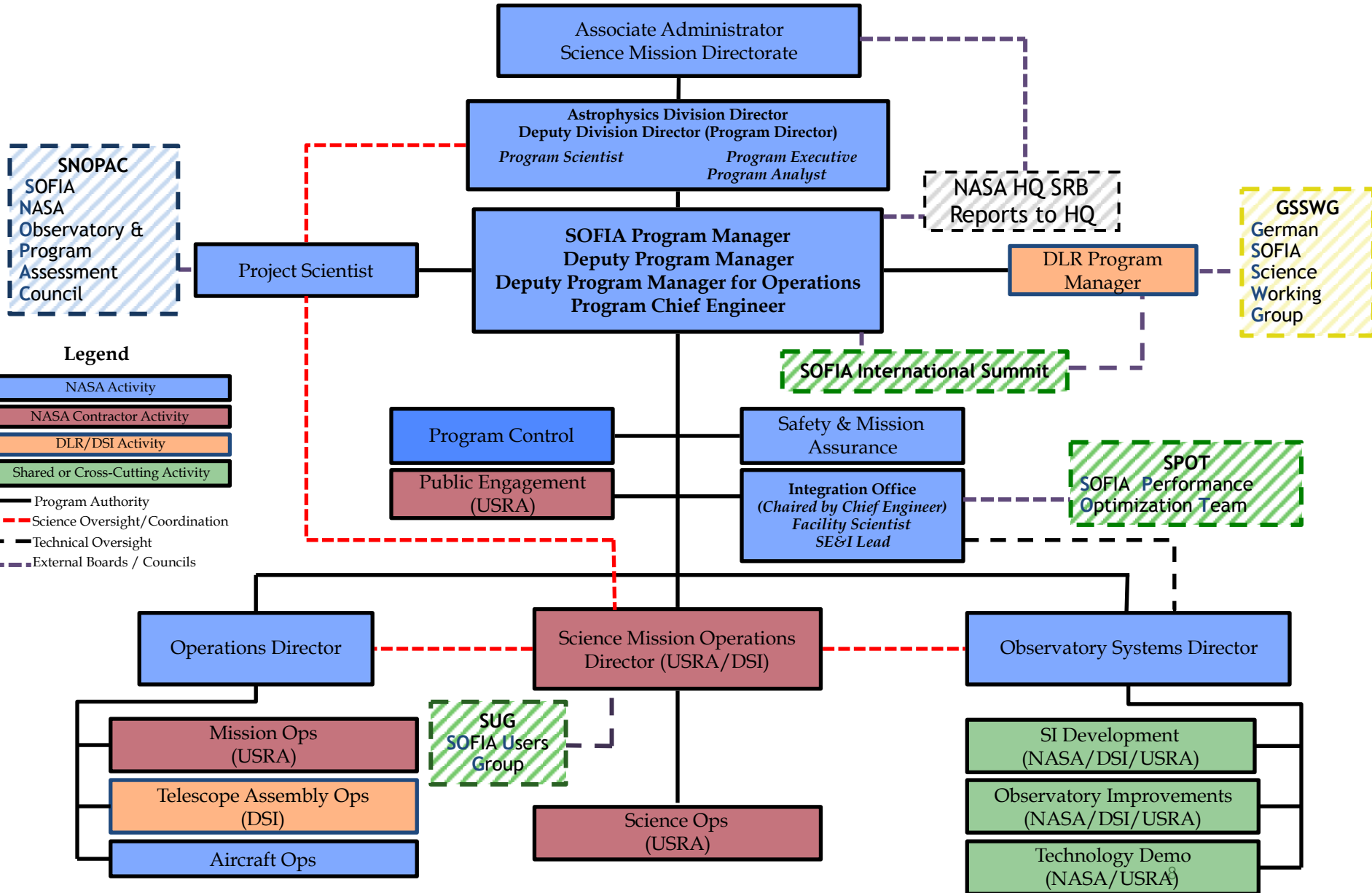
Recent Program Status



- Prioritized Improvement Projects to be completed within staffing and funding constraints
 - Water Vapor Monitor upgrade/data calibration procedure development
 - HAWC+ SI
 - Aircraft Communication System Upgrade (CPDLC)
 - TA Power System re-design
 - Gen3 SI
 - Fuel Farm
 - Cryo-cooler upgrade (needed to support approved upGREAT and 4GREAT upgrades through CY17)
 - Others to be phased in as science priorities dictate and within budget/staffing constraints

- SOFIA External Council
 - SOFIA International Summit Charter completed/approved by NASA and DLR on May 24, 2016
 - Membership being sought by DLR and NASA
 - Introductory telecon to be done as soon as possible
 - First meeting anticipated in September 2016

SOFIA External Councils



- A productive science investigation initiates with the response to a call for proposals
 - Goal: Achieve an over-subscription rate of 5 for the Cycle 5 Call for Proposals
 - Status: In progress. Awaiting Science Community response to CfP

- Availability of relevant scientific instruments
 - ✓ Goal: Complete acceptance of remaining 1st Generation facility-class science instruments (FORCAST, FIFI-LS) by December 2015
 - ✓ Status: Completed in April 2016
 - Goal: Complete 2nd Generation Science Instrument (HAWC+) Commissioning in Fall 2015
 - Status: In Progress. 1st Commission flights complete; temperature control issue to be addressed prior to 2nd Commissioning flight series in Fall 2016
 - Goal: Complete selection and project start of 3rd Generation Science Instrument in Fall 2016
 - Status: On track for instrument selection in September 2016

- Efficient and reliable flight opportunities
 - Goal: Sustain 3 flights per week with overall dispatch reliability of 90%; ~800 research hours per year
 - Status: Capacity in place, dispatch rate below goal at ~84%
 - Goal: Provide 80% of planned annual research hours with an average of 8.0 research hours per flight
 - Status: Slightly behind goal, making use of contingency flights as mitigation

- Rapid production of science ready data from reliable and accurate pipeline software
 - Goal: Level 2 data processed and archived within 5 working days
 - Goal: Level 3 data processed and archived within 15 working days
 - Goal: On-time public release of all science data after 1-year proprietary period
 - Overall status: Data delivery commitments being met with the exception of FIFI-LS. Working to establish FIFI-LS data pipeline readiness in May 2016

- Sufficient funding to investigators for the analysis of the results
 - ✓ Goal: Sustain continued funding rate of ~\$10K/hour
 - ✓ Status: Complete. Integrated into long-term Program Plan

- The publication and dissemination of unique and impactful science results and increased publication rate
 - Goal: Establish an average publication rate of 5-7 science papers per month
 - Status: Below goal. 10 science publications since last SUG meeting.