



SOFIA Cycle 6 Schedule

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14 November 2017





Cycle 6 Response: Summary



	US Queue	German Queue	Total
Hours Offered	500	75	575
Proposals Received	198	27 ¹	225
Joint US/DE Impact Proposals			1
Hours Requested	2038	133	2171
Oversubscription Rate	4.1	1.8	3.78

¹Joint impact proposal counted only once in US queue



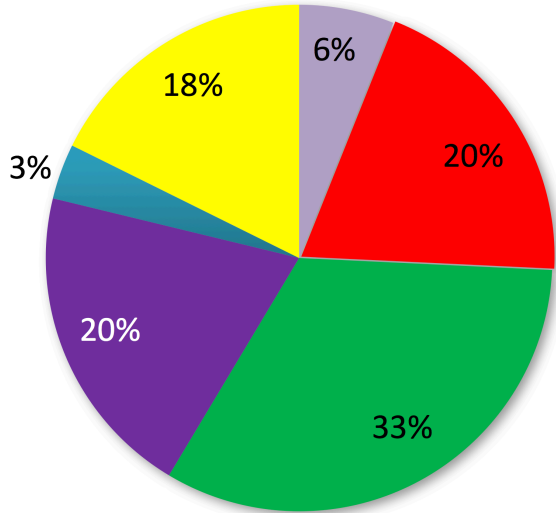


Cycle 6 Response: Proposal requests



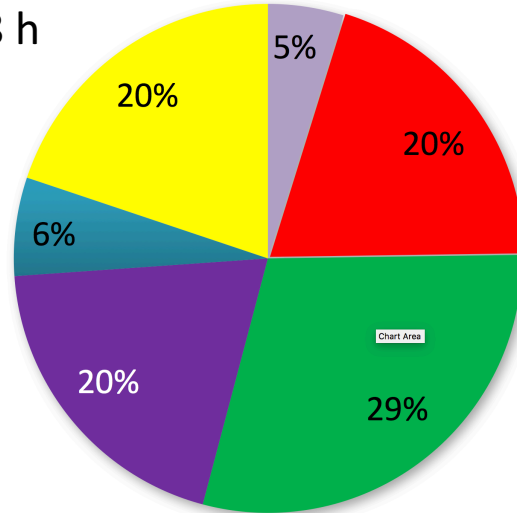
of Proposals by science – US queue

198



Requested Time by science – US queue

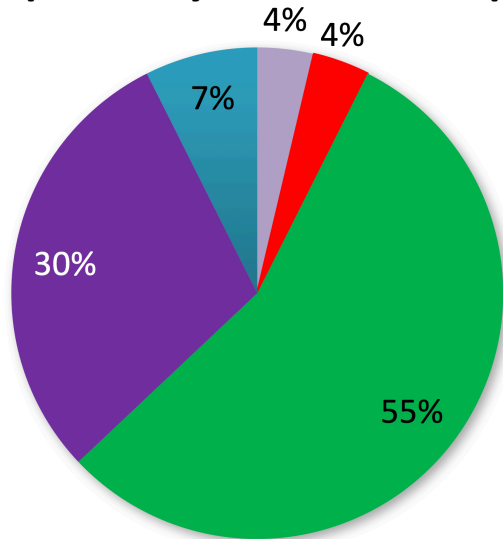
2038 h



- Solar System
- Stars and CSM
- ISM
- Star Formation
- Galactic Center
- Extra Galactic

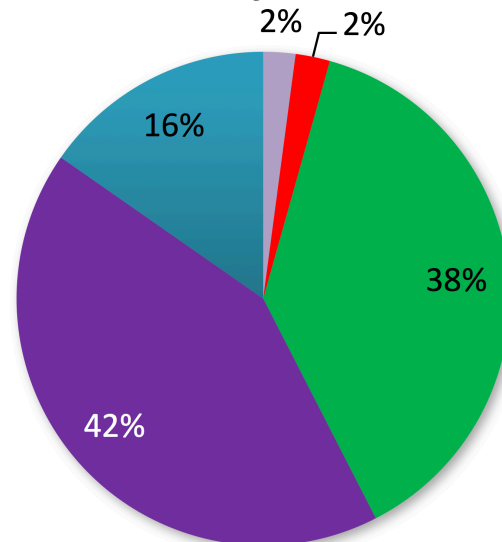
of Proposals by science – DE queue

27



Requested Time by science – DE queue

133

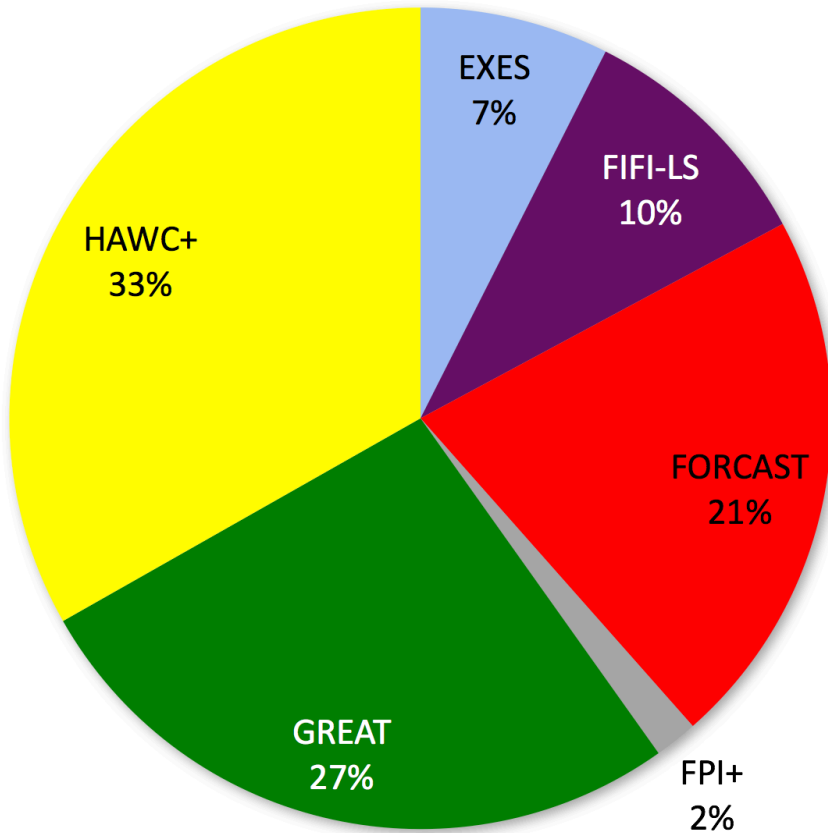




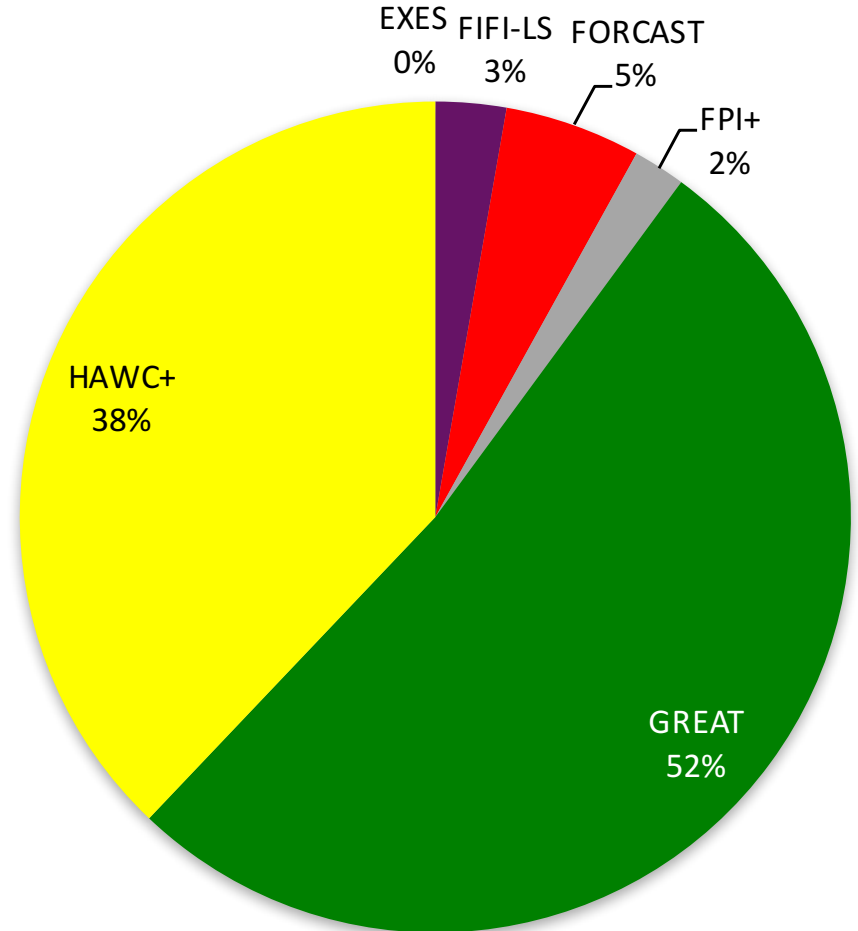
Cycle 6 Response: Proposal time requests



Proposals by Instrument – US queue



Proposals by Instrument – DE queue

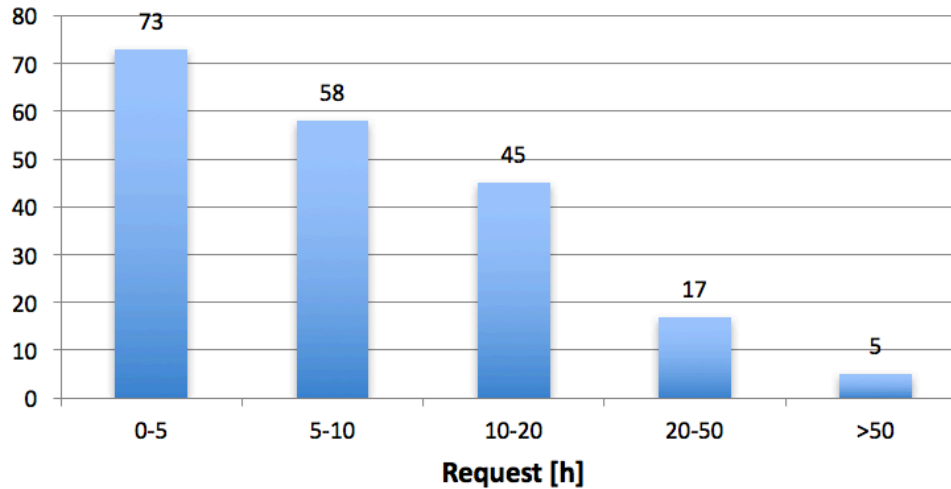




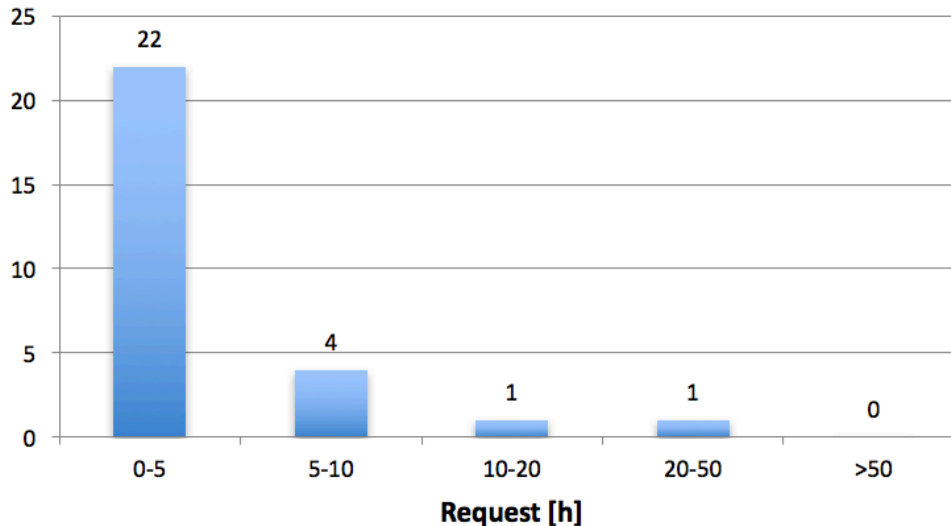
Cycle 6 Response: Proposal requests



Proposal # by total request - US queue



Proposal # by total request - DE queue





Selection Process (1/3)



- Evaluations
 - Technical review of feasibility & compliance with CfP conducted by SMO
 - Science review of proposals by Time Allocation Committees
 - US TAC met in San Jose August 14-16, 2017
 - German TAC met in Stuttgart September 11-12, 2017 and approved by the GSSWG on September 13, 2017
 - Recommendations from both TACs were combined in discussion with Hans Zinnecker (former SMO Deputy Director who presided over German TAC) and Holger Jakob (current acting SMO Deputy Director)
 - Some adjustments of numerical ratings were necessary to normalize results between 5 separate US TAC panels and the single German TAC panel
- Prioritized list of programs was produced (Priority 1, Priority 2, Priority 3, and “Don’t Do”)
 - No determination was made at this point whether all “Priority 1” rated programs could actually be scheduled (some were mutually exclusive)





Selection Process (2/3)



- Calendar
 - General layout was guided by Cycle Scheduler runs
 - Only included Priority 1 & 2 observations for ~470h
 - SOFIA Program constructed Cy6 Draft lego October 19, 2017
 - Cycle starts Feb 3, 2018 and ends Feb 7, 2019
 - 109 Science Flights, 27 contingency flights
 - GREAT and HAWC+ deployed to Southern Hemisphere
 - Three maintenance/upgrade periods
 - Standard template for instrument changes
 - Use 75% of 579.5 h (= 434.6h = 385.2h[US] + 49.4h[DE]) for Priority 1 & 2 proposals
- Short Term Scheduler (STS)
 - Once general layout was determined, individual STS runs were used to schedule the campaigns
 - If highly rated proposals could not be scheduled by STS, they were not selected (i.e. wrong instrument on deployment) – several highly rated programs were eliminated at this point.





Cycle 6 Daily Overview – Page 1 of 2



Cycle 6 Start																		ARC (TBD)										
OC#6 A FORCAST						OC#6 B HAWC+												OC#6 C GREAT LFA/HFA										
2 Flights			SI Rem	SI Install	SI Install	5 Flights			SI Rem	SI Install			5 Flights LFA/HFA															
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	31
February -- 2018																		March -- 2018										

LA County Airshow (TBD)

OC#6 C GREAT LFA/HFA						OC#6 D FIFI-LS												Maintenance / Upgrades #16										AFRC Safety Day						
SI Rem			SI Install	3 Flights			SI Rem			Eng LO			SI Rem			Eng LO			Chk Fit			SI Install												
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							
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
March -- 2018																		April -- 2018																

OC#6 E EXES												OC#6 F HAWC+																						
SI Install			8 Flights			SI Rem			SI Install			SI Install			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	1	2	3	4	5	6	7	8	9	10	11	12
April -- 2018												May -- 2018																						

OC#6 F HAWC+						OC#6 G GREAT LFA/HFA						Aircraft Prep						NZ		OC#6 H (NZ) GREAT														
SI Rem			SI Install			3 Flights LFA/HFA			Aircraft Prep			Ferry CHC - 2 flts Time		Media	Orient	8 Flights LFA/HFA			Soft cont.	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							
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
May -- 2018												June -- 2018																						

Soft cont												OC#6 H (NZ) GREAT												COSPAR Pasadena, CA (TBD)										
Soft cont.			Swap	Down	Prep	8 Flights 4G/HFA			Soft cont.	Post	Down	Prep	Soft cont.			SI Rem.	Down	SI Install			8 Flights			Soft cont.	Post	Down	Prep	Soft cont.			OC#6 I (NZ) HAWC+			
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	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
June -- 2018												July -- 2018																						

EAA AirVenture Oshkosh, Wisconsin (TBD)												OC#6 J FORCAST																						
Crew Rest			SI Rem.	MD Inst.			Maintenance / Upgrades #17			CR			Eng LO	Chk Fit	MD Rem	SI Install	SI Install			10 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							
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
July -- 2018												August -- 2018																						

Key Observing Cycle: 6 Baseline Science Flights: TBD Baseline RHs: TBD Planned Science Flights*: 109 Estimated RHs*: 872 (*Year to date + Estimate)

S 7 (black text with no fill)	Weekend day	H 4 (day of week box H or GH w red fill)	US or German Holiday	F 6 (bold white text, purple fill, bold border)	Instr. Commissioning Flight	F 6 (bold white text, blue fill, bold border)	Observing Flight	F 6 (bold white text, green fill, bold border)	Ferry/Maint./Non-Sci Flight	★ F 6 (white star on day of week)	Educator on Flight	F 6 (single slash through day and date)	Return to Base (RTB) Flight
F 6 (bold border)	Work day	G 6 (bold border)	Line Operations	F 6 (day box with purple fill)	Contingency Instr. Comm. Flight	F 6 (day box with blue fill)	Contingency Obser. Flight	F 6 (day box with green fill)	Contingency Ferry/Maint./Non-Sci Flt	★ F 6 (yellow star on date)	Media/VIP on Flight	F 6 (x through day and date)	Canceled Flight
F 8 (day and date shown in red)	AFRC Regular Day Off	F 6 (day and date box filled with lt. green)	Possible Maint/Up. Check Fit	F 6 (bold white text, light blue fill, bold border)	Deployment Observing Flights	S 28 (colored fill only lower half, bold bdr.)	Short Flight	S 13 (two colored fill)	Half Sci. & Half Ferry/Maint./Non-Sci	F 6 (orange fill on day of week)	Key Projects	F 6 (light orange fill on day of week)	Deployment Key Projects





Cycle 6 Daily Overview – Page 2 of 2



OC#6 J FORCAST													OC#6 K HAWC+																					
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							
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
August -- 2018													September -- 2018																					

Baltimore Fleet Week (TBD)

ARC (TBD)

OC#6 K HAWC+													OC#6 L EXES																		
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				
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
October -- 2018													November -- 2018																		

24/7 Coverage Required

P46/Wirtanen #1

OC#6 M FIF-LS						OC#6 N GREAT																												
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							
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
November -- 2018													December -- 2018																					

P46/Wirtanen #2

233rd AAS Meeting, Seattle, WA

OC#6 N GREAT													OC#6 O FORCAST																					
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	H	W	T	F	S	S	M	H	W	T	F	S	S	M	T	W	T	F	S
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
December -- 2018													January -- 2019																					

Maintenance / Upgrades #18																											
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
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 -- 2019													February -- 2019														

Cycle 7 Start

Key Observing Cycle: 6 Baseline Science Flights: TBD Baseline RHs: TBD Planned Science Flights*: 109 Estimated RHs*: 872 (*Year to date + Estimate)

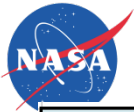
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F 6 (black text w/ day box grey fill)	Work day	F 6 (bold border)	Line Operations	F 6 (day box with purple fill)	Contingency Instr. Comm. Flight	F 6 (day box with blue fill)	Contingency Obser. Flight	F 6 (day box with green fill)	Contingency Ferry/Maint./Non-Sci Flt	★ F 6 (yellow star on date)	Media/VIP on Flight	F 6 (x through day and date)	Canceled Flight
F 8 (day and date shown in red)	AFRC Regular Day Off	F 6 (day and date box filled with lt. green)	Possible Maint/Up. Check Fit	F 6 (bold white text, light blue fill, bold border)	Deployment Observing Flights	S 28 (colored fill only lower half, bold bdr.)	Short Flight	S 13 (two colored fill)	Half Sci. & Half Ferry/Maint./Non-Sci	F 6 (orange fill on day of week)	Key Projects	F 6 (light orange fill on day of week)	Deployment Key Projects



Distributed: 27 October 2017

Slide Revision: 27 October 2017





Determination of hours offered



CYCLE	6
Cycle Start	2/2/18
Cycle End	2/1/19

Non-Commissioning Contingency Flts	27
Contingency %	25%

Inputs	
Total Flight Opportunities	109
US Commissioning Flights	0
German Commissioning Flights	0
# hours per flight	8
Planned Mission Capacity	100%
Loss of RH due to Sci Instr capability:	
Number of flights	0.0
Reduction in RH / flight	0.0
Deadlegs and Other Overhead	0.0
Calibration hrs per flight	1.1
DDT percentage:	7%
US GTO (hours)	30.0
US Hours Carried from Prior Cycle	16.0
DE Hours Carried from Prior Cycle	4.0

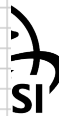
Supporting/Intermediate Computations:	
US commissioning hours:	0 US commissioning hour equals # of US commissioning flights times hours per flight
German commissioning hours:	0 German commissioning hour equals # of German commissioning flights times hours per flight
# planned science flights:	109 Total flight opportunities minus US and German commissioning flights
Non-commissioning hours before reduction:	872.0 Number of planned science flights times number of hours per flight times planned mission capacity
Total reduction of RH	0.0 Reduction in research hours due to specific reduced hours per flight
Planned non-commissioning hours total:	872.0 Adjusted for reduced HAWC+ hours per flight
Director Discretionary Time:	61.0 To provide the highest opportunity for impactful science results, DDT basis of calculation is all non-calibration RH hours. By subtracting off the calibration hours, we are effectively 8.4 Estimated Calibration Time for DDT 52.6 Allocable DDT
Revised RH Baseline After DDT Subtracted	811.0 New RH Baseline After DDT Subtracted
80/20 baseline:	NASA: 648.8 80% of Planned non-commissioning hours (after DDT) DLR: 162.2 20% for Planned non-commissioning hours (after DDT)
DLR GTO (GREAT, FIFI-LS and Consortium Time)	81.1 Per German policy, up to 50% 33% of time goes to GTO/consortium with balance for competed community science. (9/30/15: Per Erick, DLR has modified their policy so that 33.3% is GTO, 66.7% is competed)
Calibration / Overhead hours required:	NASA: 89.2 NASA GTO is interspersed into regular observing flights, and therefore, shares calibration and other overhead/dead leg time with general observations. Calculation for NASA DLR: 11.2 German GTO is conducted by per-flight basis and therefore carries its own calibrations and other overhead. Calculation for German calibration hours and other overhead time

Computation of CFP (using intermediate calculations)			
	NASA	DLR	
80/20 baseline after DDT:	648.8	162.2	
GTO (to be subtracted):	30.0	81.1	
Calibration, Deadlegs, Other Overhead (to be subtracted)	89.2	11.2	
GO Hours carried from prior cycle	16.0	4.0	P1+P2 (75%)
C/P hours:	513.6	65.9	579.5 434.6
Priority 1 Allocation 25%	128.4	16.5	144.9
Priority 2 Allocation 50%	256.8	33.0	289.8
Total DDT	61.0		
DDT Calibration	8.4		
Allocable DDT	52.6		

	NASA	DLR	Total
Max Available RH (100%)	697.6	174.4	872.0
Less DDT	48.8	12.2	61.0
Adjusted RH	648.8	162.2	811.0
GTO	30.0	81.1	111.1
Calibration	89.2	11.2	100.4
Max Available GO Hours (100%)	529.6	69.9	599.5
GO Hours Carried from prior cycle	16.0	4.0	20.0
GO Available for Current Cycle	513.6	65.9	579.5
Percentage of Total RH given to GO			68.8%

Sanity checks:	
% non-commissioning hours for NASA:	80%
% non-commissioning hours for DLR:	20%
Percent of C/P hours for NASA:	89%
Percent of C/P hours for DLR:**	11%

** Percent of C/P hrs for DLR is < 20% because of German policy to use 1/3 of their "C/P allocation" towards Guaranteed Time for German SI teams





Determination of hours offered



Computation of CFP (using intermediate calculations)						
			NASA	DLR		
		80/20 baseline after DDT:	648.8	162.2		
		GTO (to be subtracted):	30.0	81.1		
		Calibration,, Deadlegs, Other Overhead (to be subtracted)	89.2	11.2		
		GO Hours carried from prior cycle	16.0	4.0	<i>P1+P2 (75%)</i>	
		CfP hours:	513.6	65.9	579.5	434.6
<i>Priority 1 Allocation</i>	25%	<i>Priority 1</i>	<i>128.4</i>	<i>16.5</i>	<i>144.9</i>	
<i>Priority 2 Allocation</i>	50%	<i>Priority 2</i>	<i>256.8</i>	<i>33.0</i>	<i>289.8</i>	
Total Not to Exceed 75%						
		Total DDT	61.0			
		DDT Calibration	8.4			
		Allocable DDT	52.6			



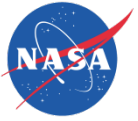


Selection Process (3/3)



- Consideration of “Thesis enabling” (TE) programs
 - A TE program provides two years of funding for a graduate student (capped at \$100k per year), if a highly ranked proposal provides critical and significant data for the student’s thesis
 - A TE program is automatically carried over into the next observing cycle if not completed within Cycle 6
 - 10 proposals were submitted as “thesis enabling” (6 US and 4 non-US)
 - 2 proposals selected as “thesis enabling” (1 Survey + 1 Priority 2)





Summary of Cycle 6 Selections



	US + INT hours	German hours	Total hours	US + INT numbers	German numbers	Total numbers
P1	130	18	148	24	4	28
P2	248	31	279	43	12	55
P1+P2	378	49	427	67	16	83
P3	275	21	296	44	7	51
Survey	90	0	90	3	0	3
Thesis-enabling	50	0	50	1 "Survey" + 1 "P2"	0	2



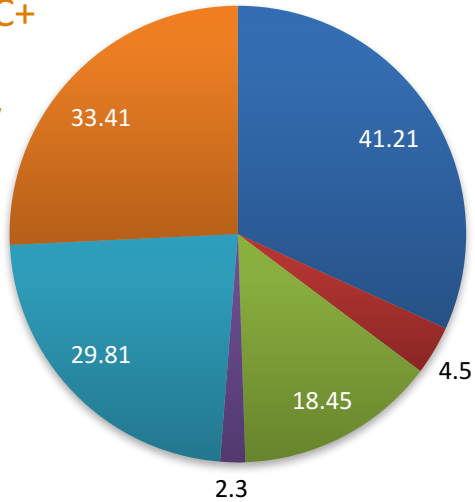


Summary of Cycle 6 Selections

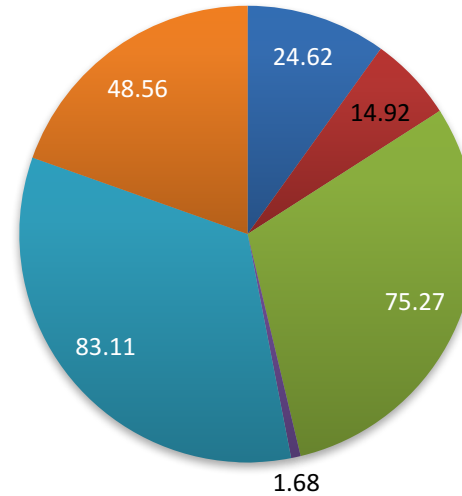


US Priority 1: 129.7h

Note: HAWC+ overheads significantly reduced!

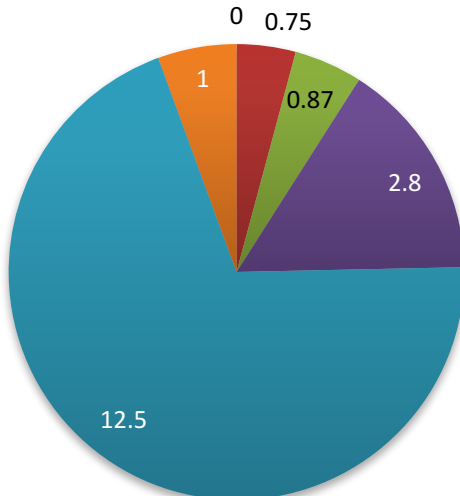


US Priority 2: 248.2h

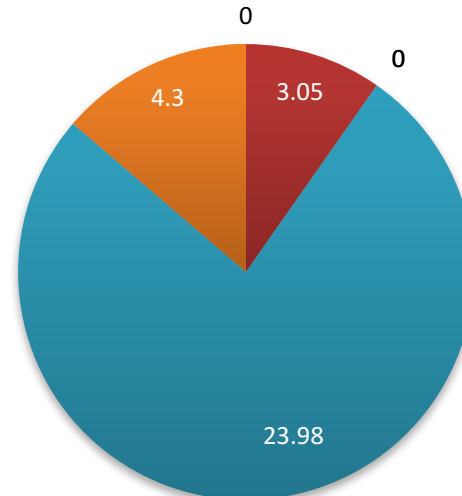


- EXES
- FIFI-LS
- FORCAST
- FPI+
- GREAT
- HAWC+

DE Priority 1: 17.9h



DE Priority 2: 31.3h



- EXES
- FIFI-LS
- FORCAST
- FPI+
- GREAT
- HAWC+

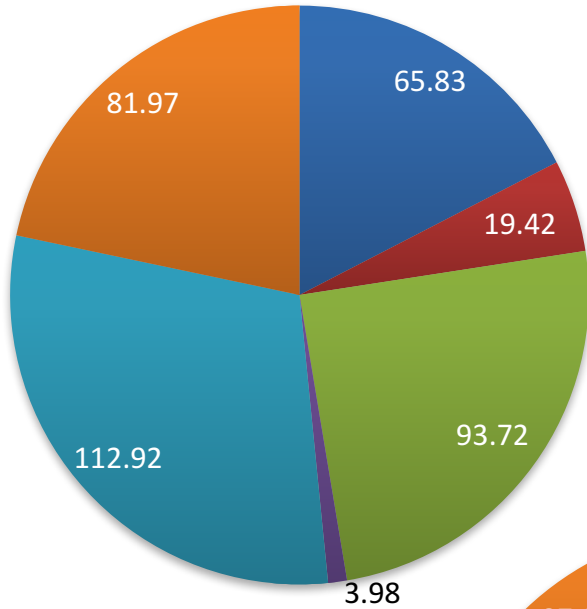




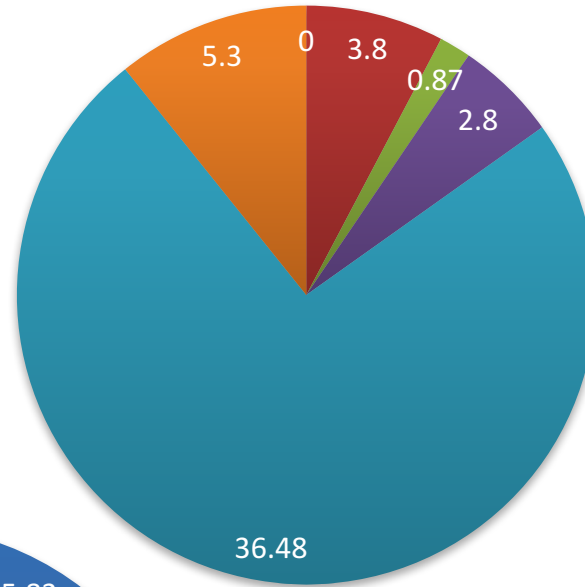
Summary of Cycle 6 Selections



US Priority 1+2: 377.8h



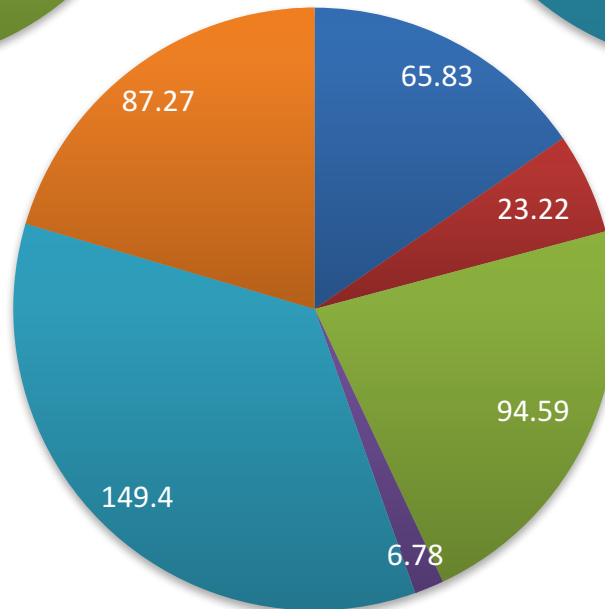
DE Priority 1+2: 49.3h



- EXES
- FIFi-LS
- FORCAST
- FPI+
- GREAT
- HAWC+

Note: HAWC+ overheads significantly reduced!

US+DE Priority 1+2: 427.1h

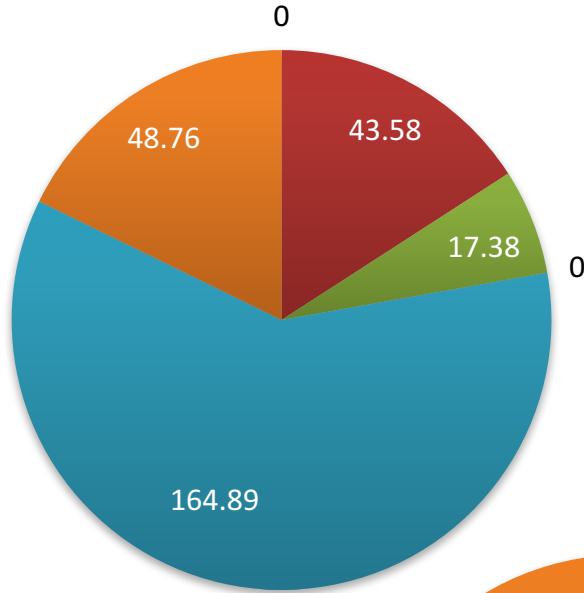




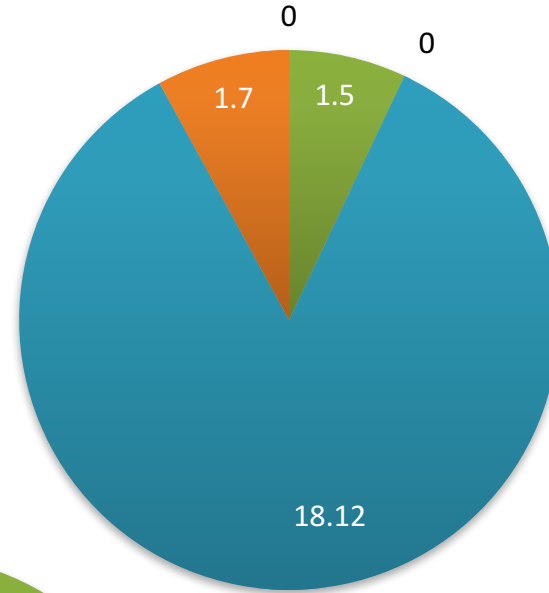
Summary of Cycle 6 Fillers



US Priority 3: 274.6h



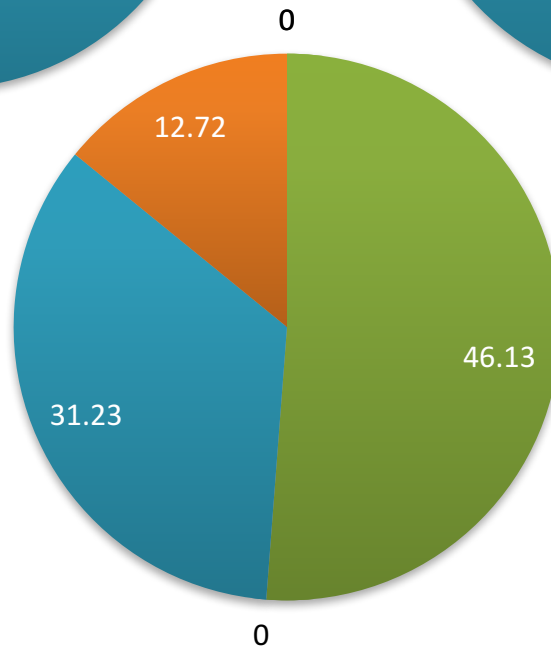
DE Priority 3: 21.3h



- EXES
- FIFi-LS
- FORCAST
- FPI+
- GREAT
- HAWC+

Note: HAWC+ overheads significantly reduced!

US Survey: 90.1h





Decrease of HAWC+ Overhead



- The original estimate of HAWC+ overheads were based on theoretical considerations + margin
 - Estimates included settling time after chops and nods as well as settling time after rotation of the quarter-wave plate for polarization measurements
 - Analogous original theoretical estimates for FORCAST grisms underestimated the settling time by large margins leading to incorrect observing times when FORCAST was first used. This in turn led to loss of several observing programs, because too little exposure time on-target was available for the planned legs
- The HAWC+ team did not want to repeat FORCAST's mistake and therefore multiplied the expected settling times by a "fudge factor".
 - Experience on the airplane showed, however, that the theoretical settling times were actually *too long*; the additional on-target time gained was not immediately fixed in USPOT, because the instrument sensitivity was still unknown
 - After the HAWC+ repair (heat switch swap, fixing non-functioning pixels in the detectors, ADR hold time) the sensitivity increased. It made no sense to continue using the old overhead times.
 - After adjusting the HAWC+ overhead, all HAWC+ proposed observations were recalculated, leading to significant decreases of necessary HAWC+ observing times with the same sensitivity.

