SOFIA
Science Metrics Update

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Astrophysics Advisory Committee
NASA Headquarters
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APAC Request for More Information

- At April 2017 APAC meeting, we presented some statistics on trends by the Observatory.
- APAC members requested additional insight into whether changes to Guest Observer (GO) program and community outreach (implemented since in 2015) have led to changes in the program's scientific output.
- This presentation focuses on the GO Program.

Background Information – GO Program

- One Call for Proposals per Year for the Guest Observer (GO) Program
- SOFIA has two independent TACs (Telescope Allocation Committees), US and German, that rank GO proposals scientifically, with a review of their technical feasibility for the unique operational needs of an airborne observatory.
- Proposers from other countries are part of the US-TAC time.
- US: German time is 80:20 ratio per NASA/DLR SOFIA Joint Program Plan.
- GO Program began with Basic Science (call released Apr 28, 2010).
  - Two instruments available – FORCAST and GREAT
  - Limited number of science flights.
  - Prior to the full operational capability
- Full Operational Capacity reached in May 2014 during Cycle 2.
- Increased funding for GOs & large impact programs began in Cycle 4.
  - Proposals were due June 2015
  - Observations made in calendar year 2016

Background Information – GO Hours Available

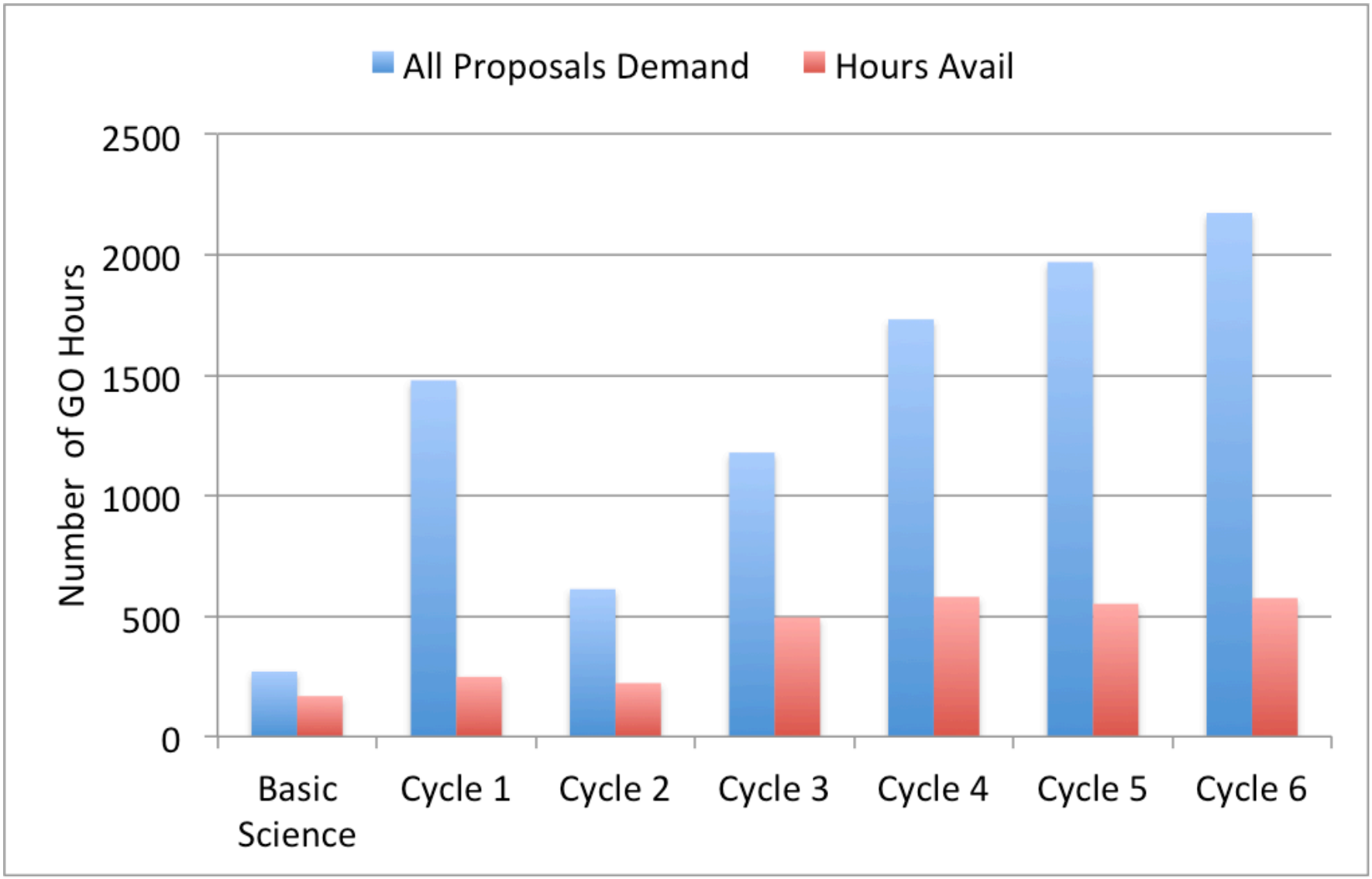
- Time on the observatory with door open is split among Guest Observer (GO), Instrument Guaranteed Time (GTO), Calibration/Engineering, and Director's Discretionary Time (DDT).
- Call for Proposals for GO time has had different allocations each Cycle.

	Period	Duration (months)	Total GO Hrs Avail
Basic Science	June 2011 – Sep 2011	4	168
Cycle 1	June 2013 -Feb 2014	7	248
Cycle 2 [1,2]	Feb 2014 - Feb 2015	12	222
Cycle 3	Mar 2015 - Jan 2016	11	495
Cycle 4	Feb 2016 – Jan 2017	12	585
Cycle 5	Feb 2017 – Jan 2018	12	551
Cycle 6 [3]	Feb 2018 – Feb 2019	12	575

[1] May 2014 Start of KDP-E (transition from Phase D to Phase E (full operations).
[2] Heavy Maintenance Period in Cycle 2, lowered available flight opportunities.
[3] Proposals due June 30, 2017. TAC will meet in August /Sept with selections announced October 2017.

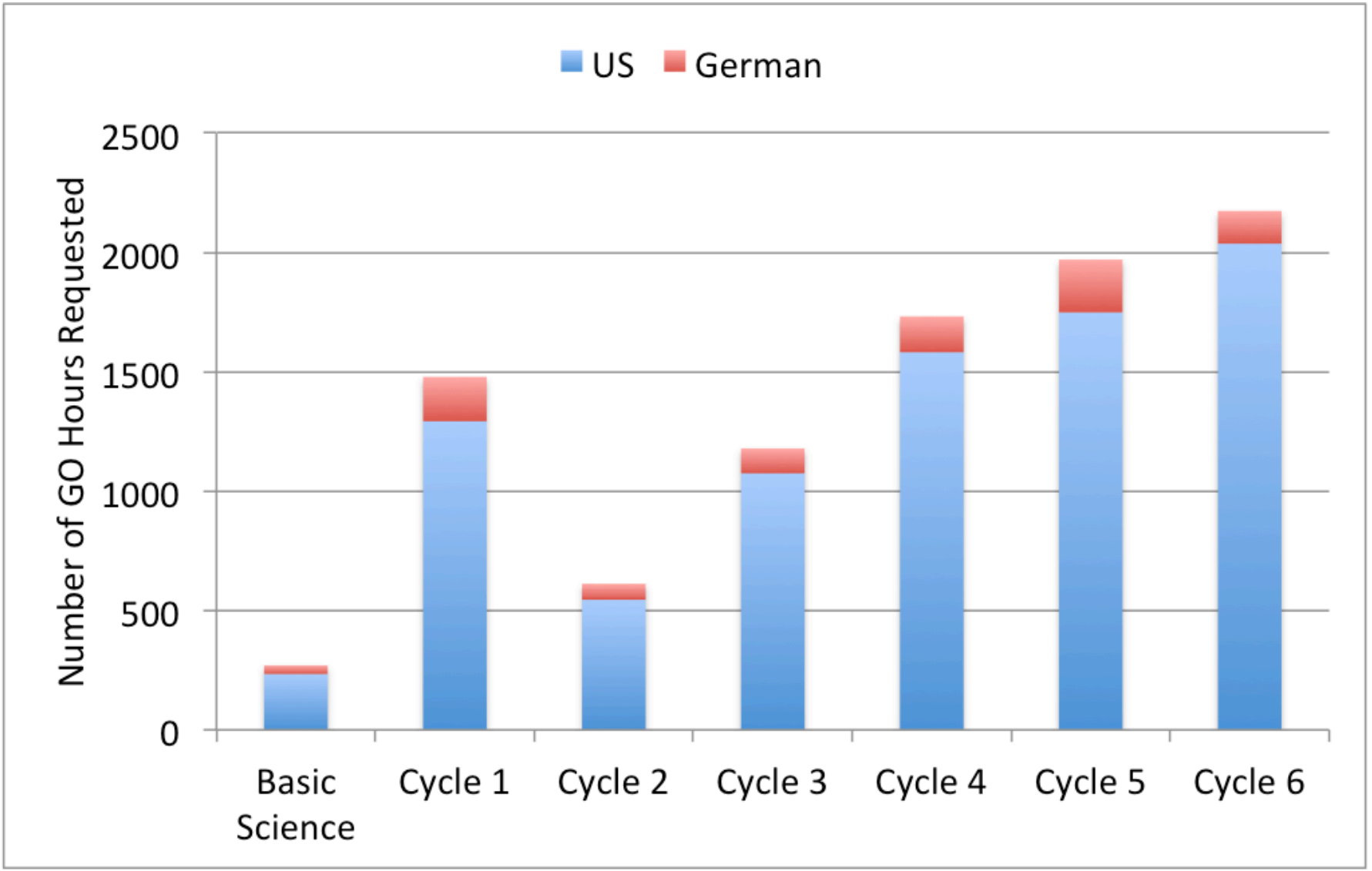
Demand for SOFIA Telescope Time

- Demand for SOFIA has outpaced the increased available hours



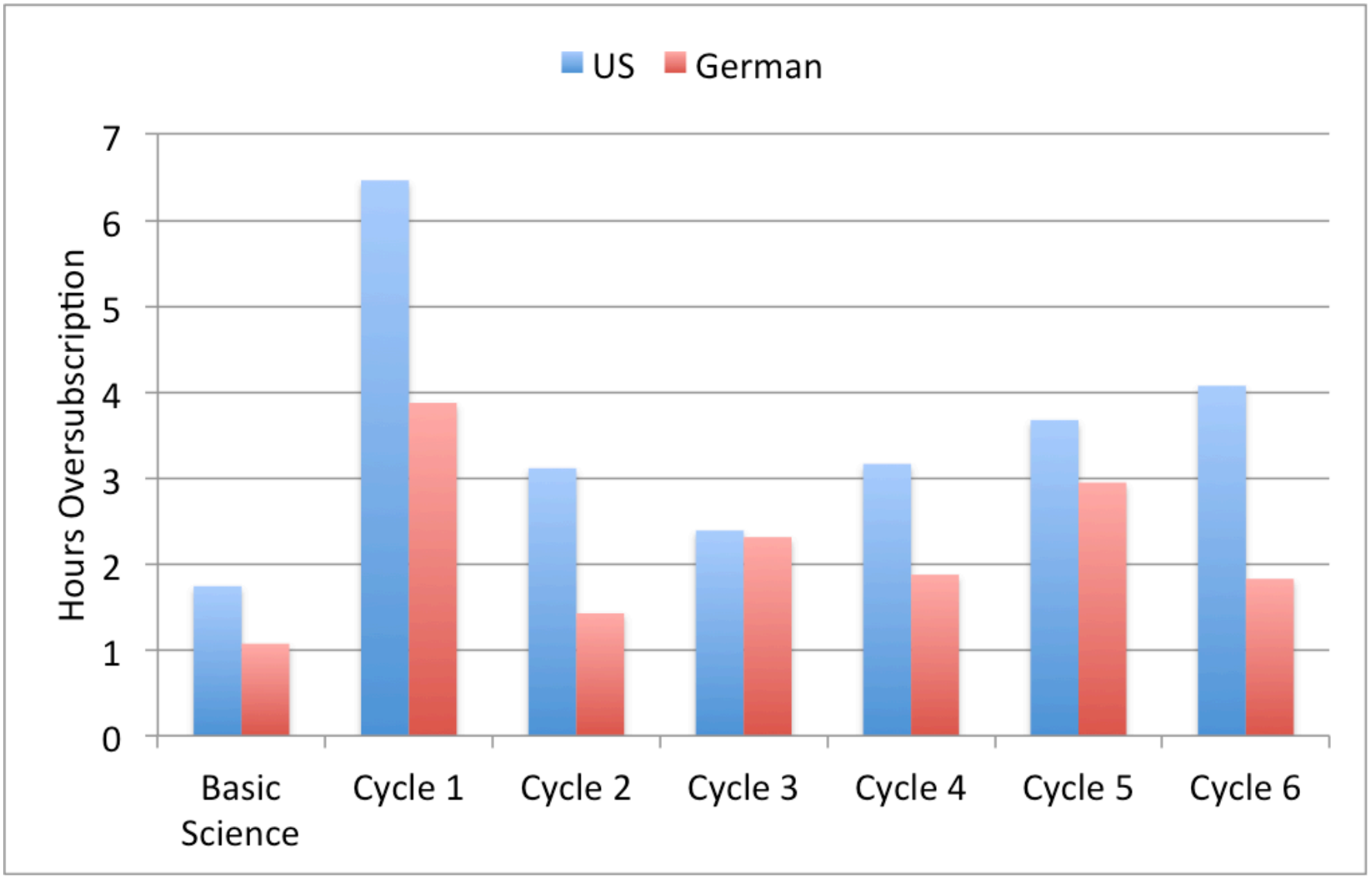
Demand for SOFIA Telescope Time

- Requested GO hours per cycle increasing since Cycle 2



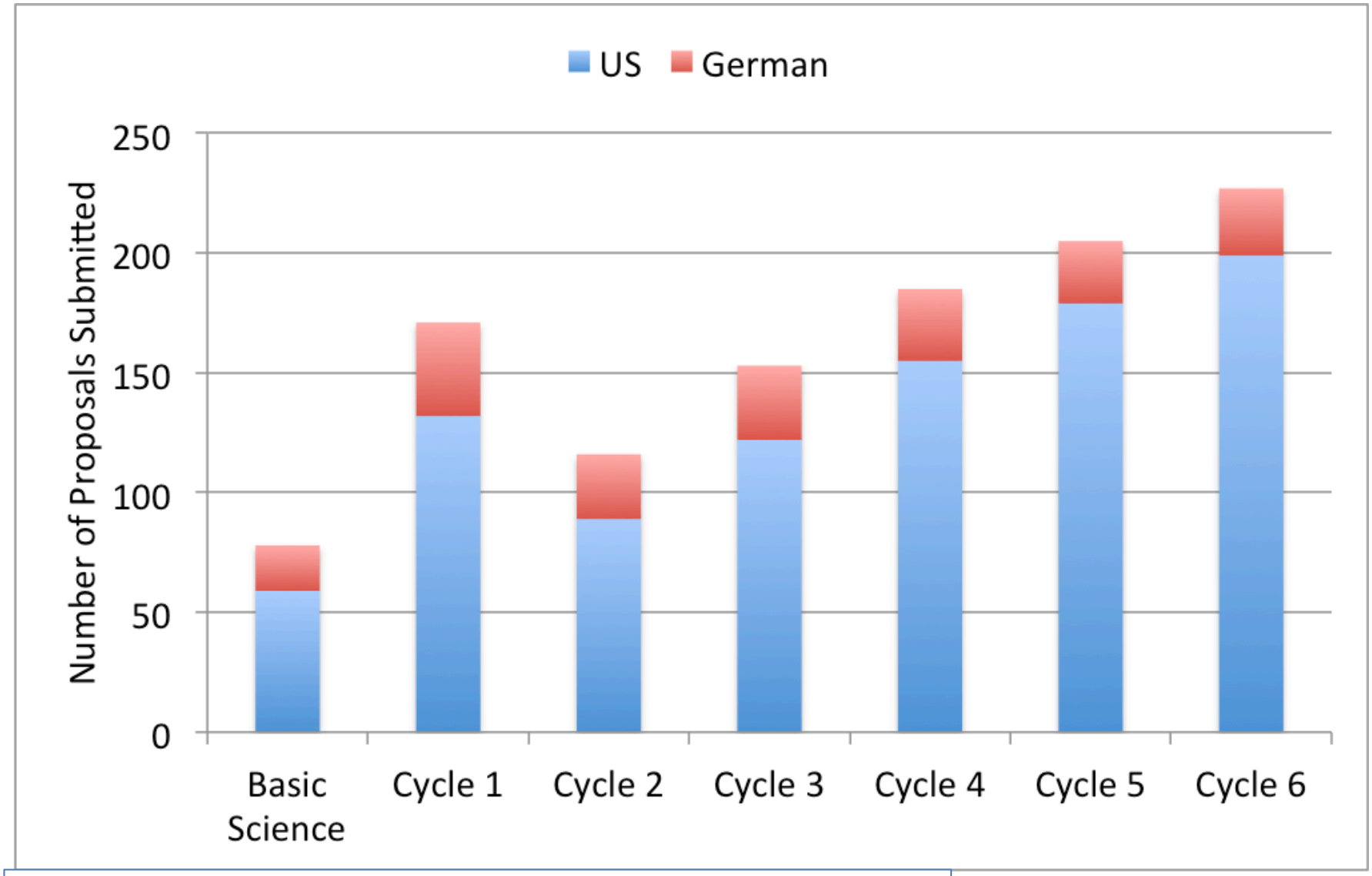
Oversubscription by Hours

- Hours Requested / Hours Offered



Number of Proposals Submitted

- Increased proposal pressure seen over multiple cycles



Due Dates: Basic Science: July 2010 Cycle 1: Jan 2012 Cycle 2: June 2013
Cycle 3: June 2014 Cycle 4: June 2015 Cycle 5: June 2016 Cycle 6: June 2017

Acceptance Statistics

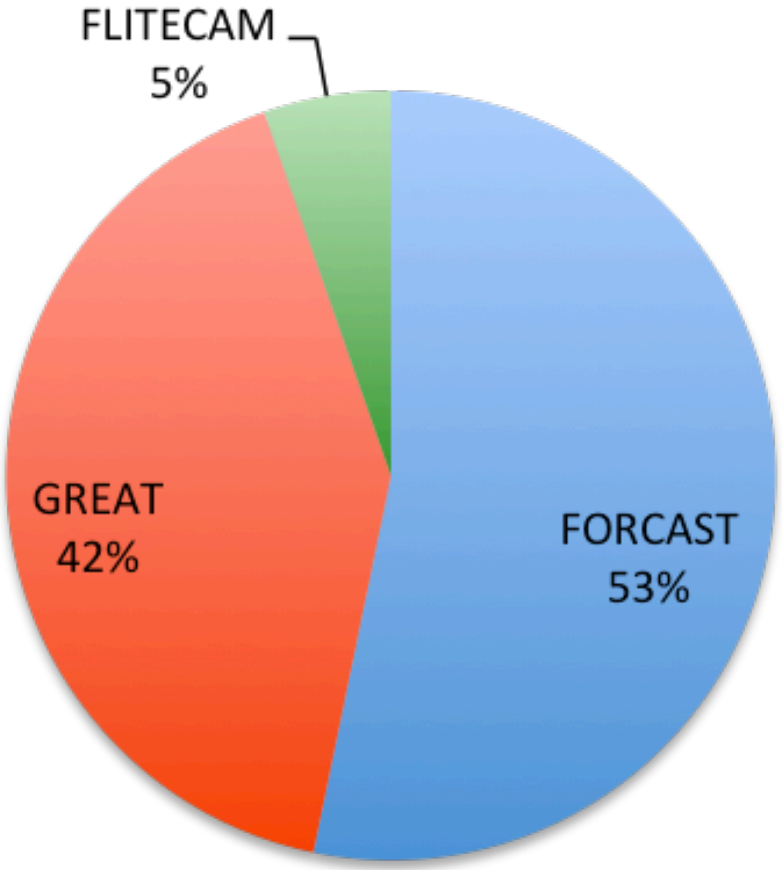
By Time Awarded per Cycle

- Instrument
  - FORCAST – Mid-IR (5-40 um) camera and low-resolution spectrometer
  - GREAT – High-resolution heterodyne spectrometer at THz frequencies
  - FLITECAM – Near-IR (1-5 um) camera and medium-resolution spectrometer
  - HIPO – Optical (0.3-1.1 um) high-speed photometer for occultations
  - EXES – Mid-IR (5-28 um) high-resolution spectrometer
  - FIFI-LS – Far-IR (42-210 um) integral-field spectrometer
  - FPI_PLUS – Optical (0.3-1.1 um) focal plane imager
  - HAWC_PLUS – Far-IR (50-250 um) camera and polarimeter

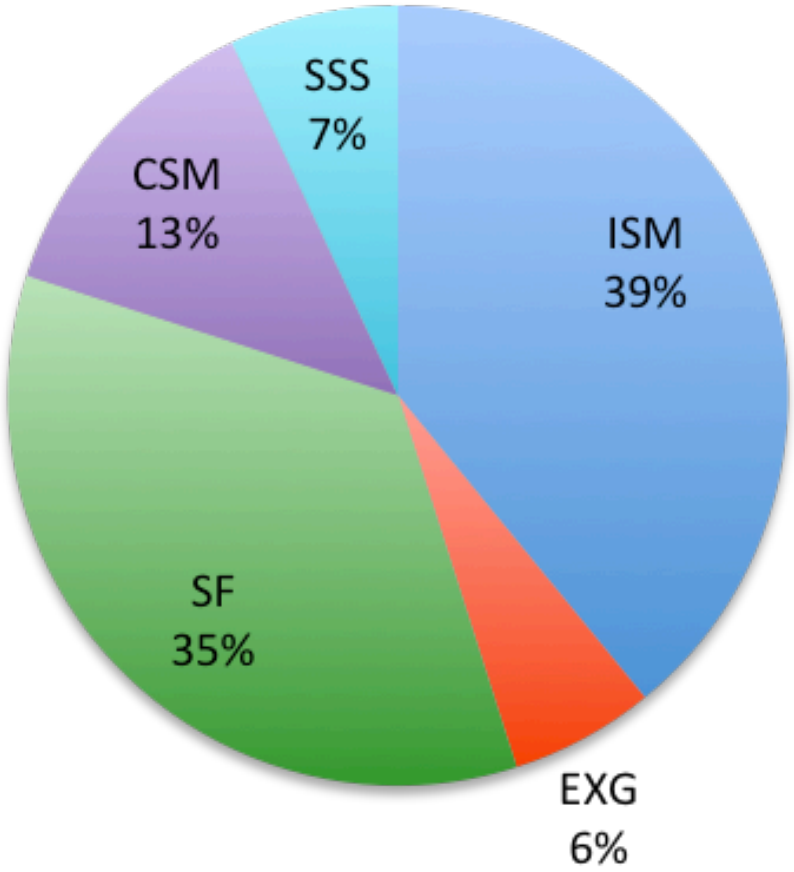
- Scientific Discipline
  - ISM – Interstellar Medium
  - EXG – Extragalactic
  - SF – Star Formation
  - CSM – Circumstellar Matter
  - SSS – Stars, or Solar System

Cycle 1 – GO Time Awarded

by Science Instrument



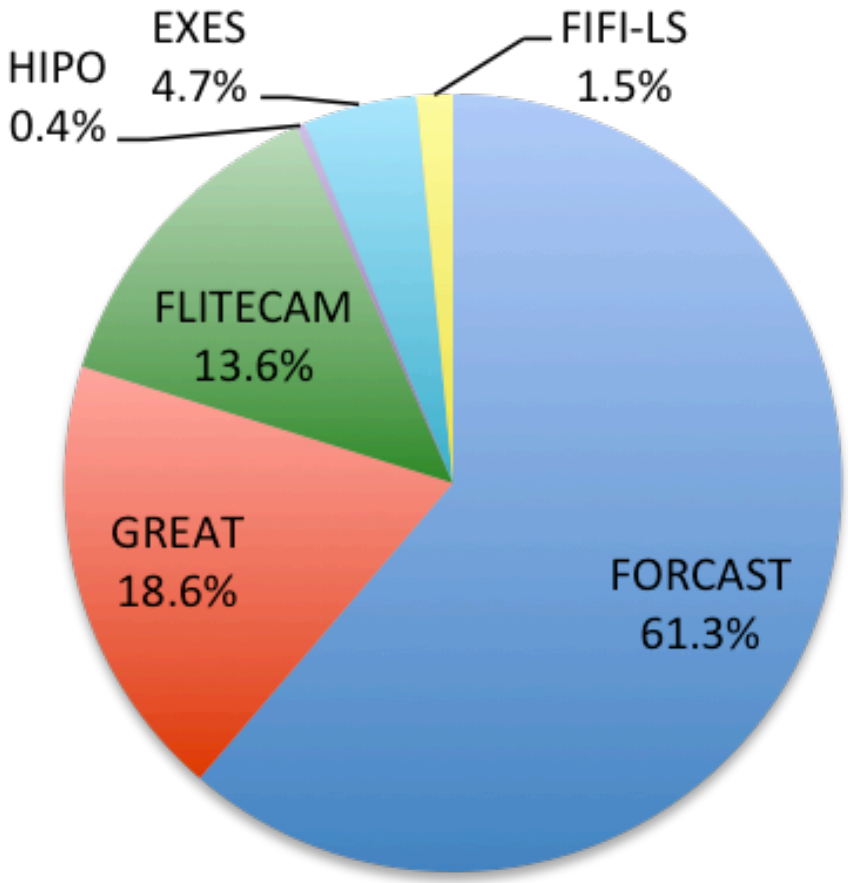
by Science Discipline



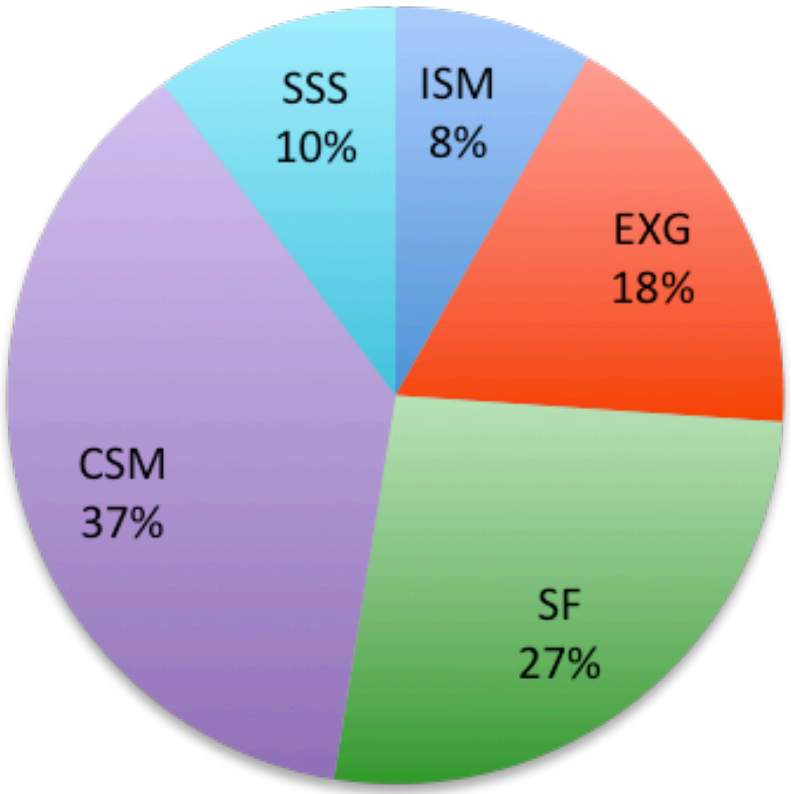
Sum= 180 hrs

Cycle 2 – GO Time Awarded

by Science Instrument



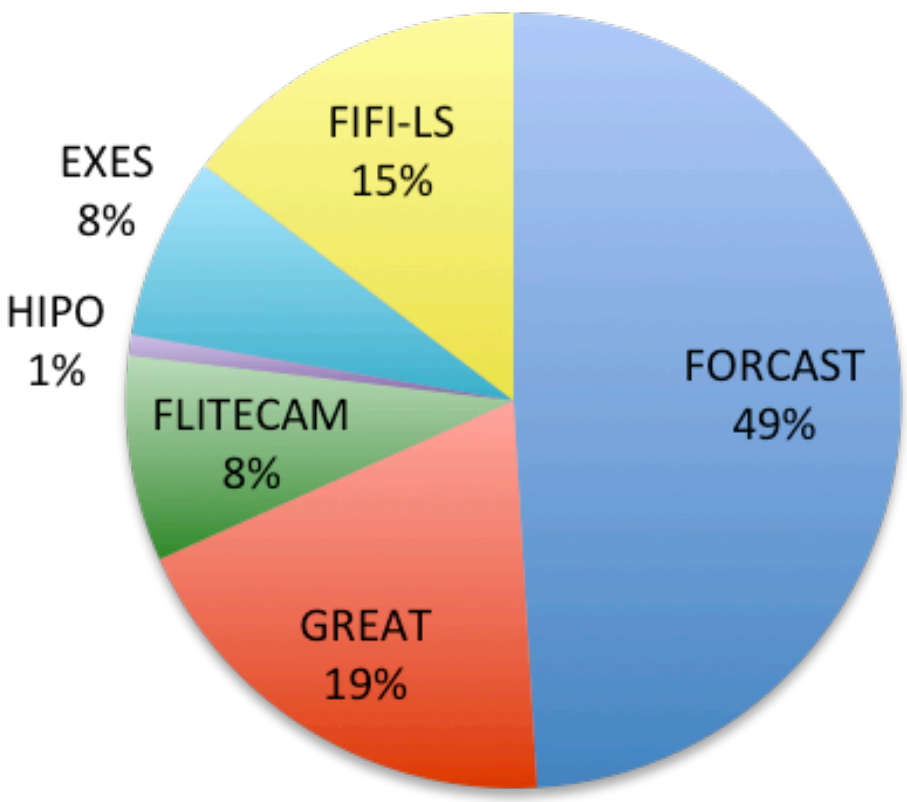
by Science Discipline



Sum= 166 hrs

Cycle 3 – GO Time Awarded

by Science Instrument



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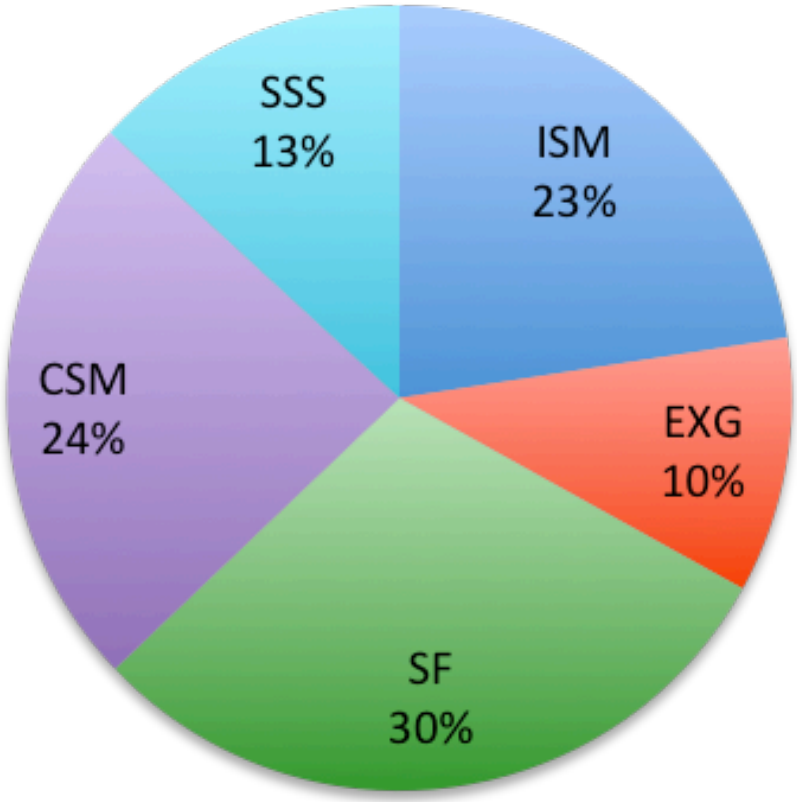
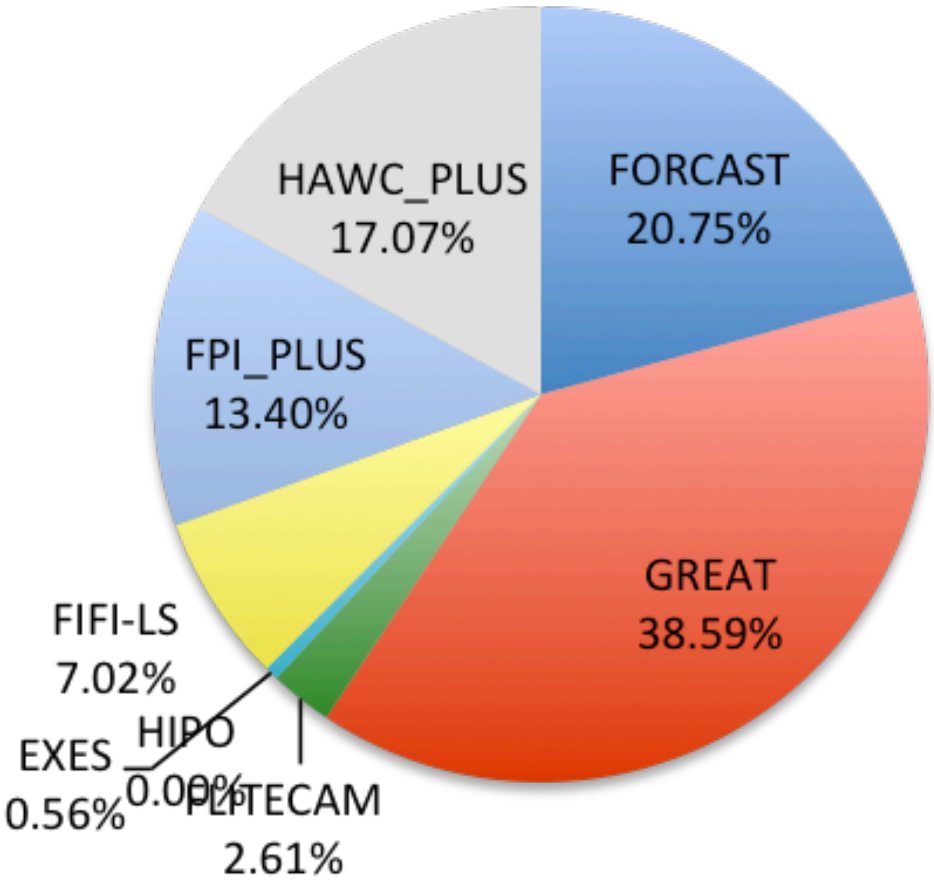


Sum= 478 hrs

Cycle 4 – GO Time Awarded

by Science Instrument



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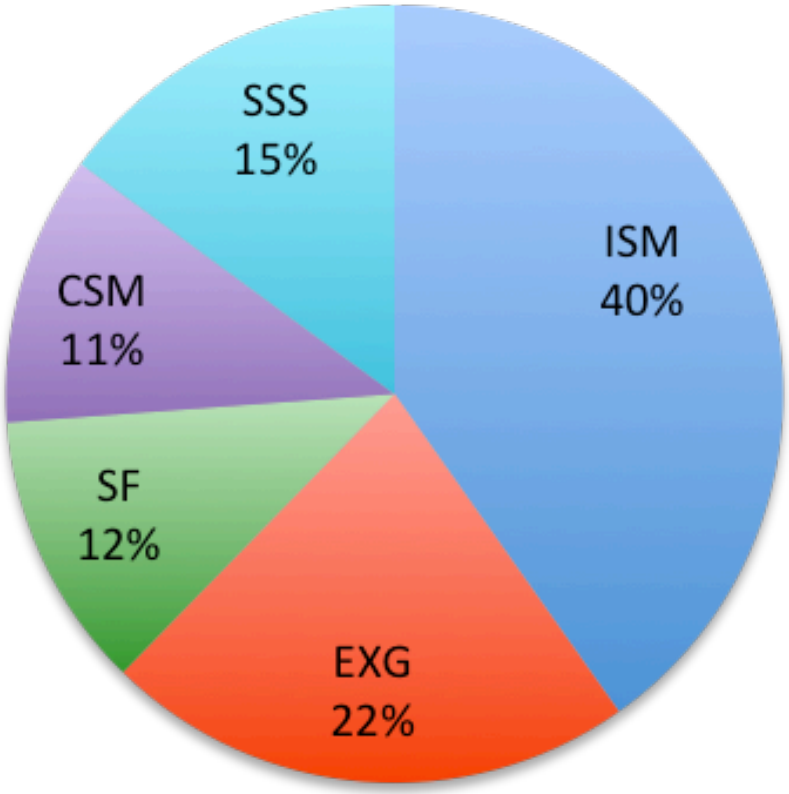
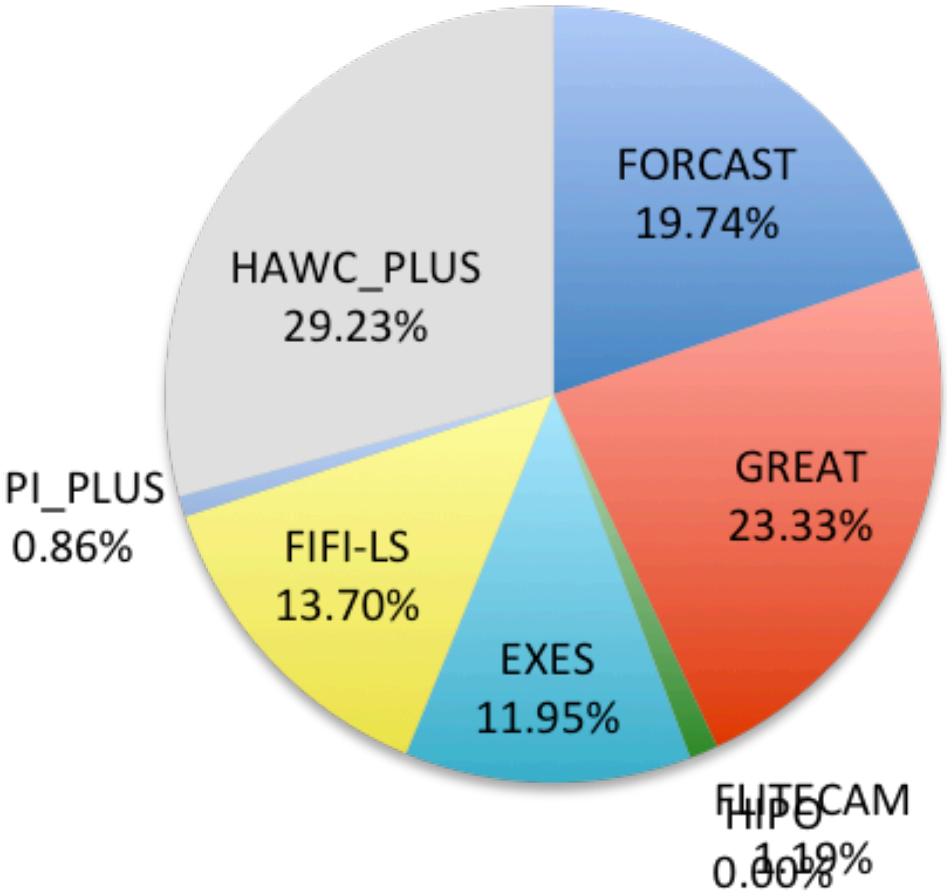


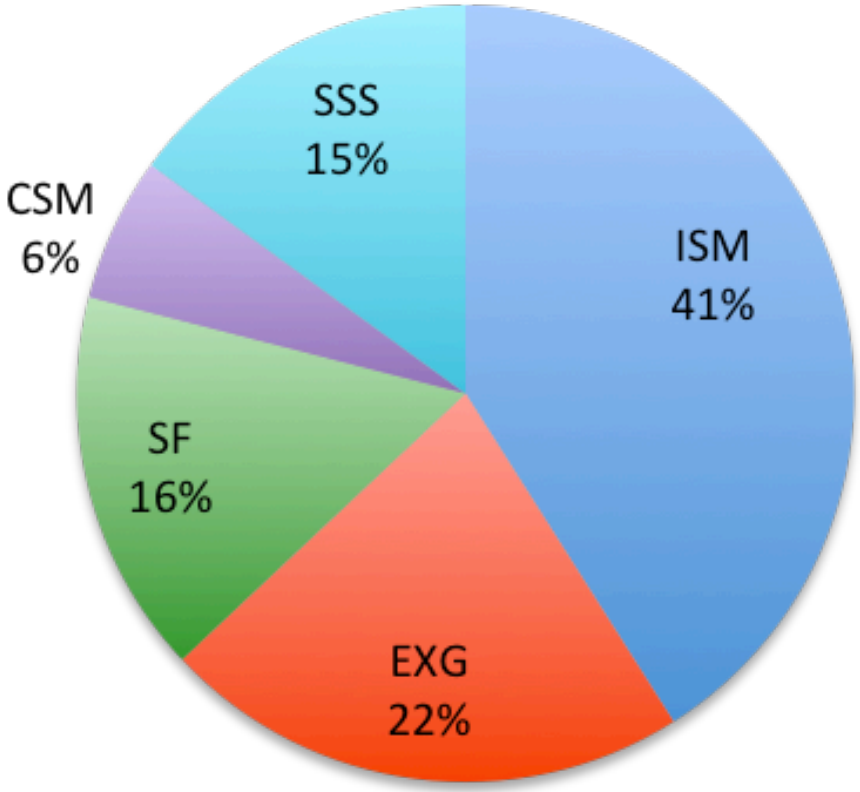
Sum= 616 hrs

Cycle 5 – GO Time Awarded[1]

by Science Instrument



by Science Discipline

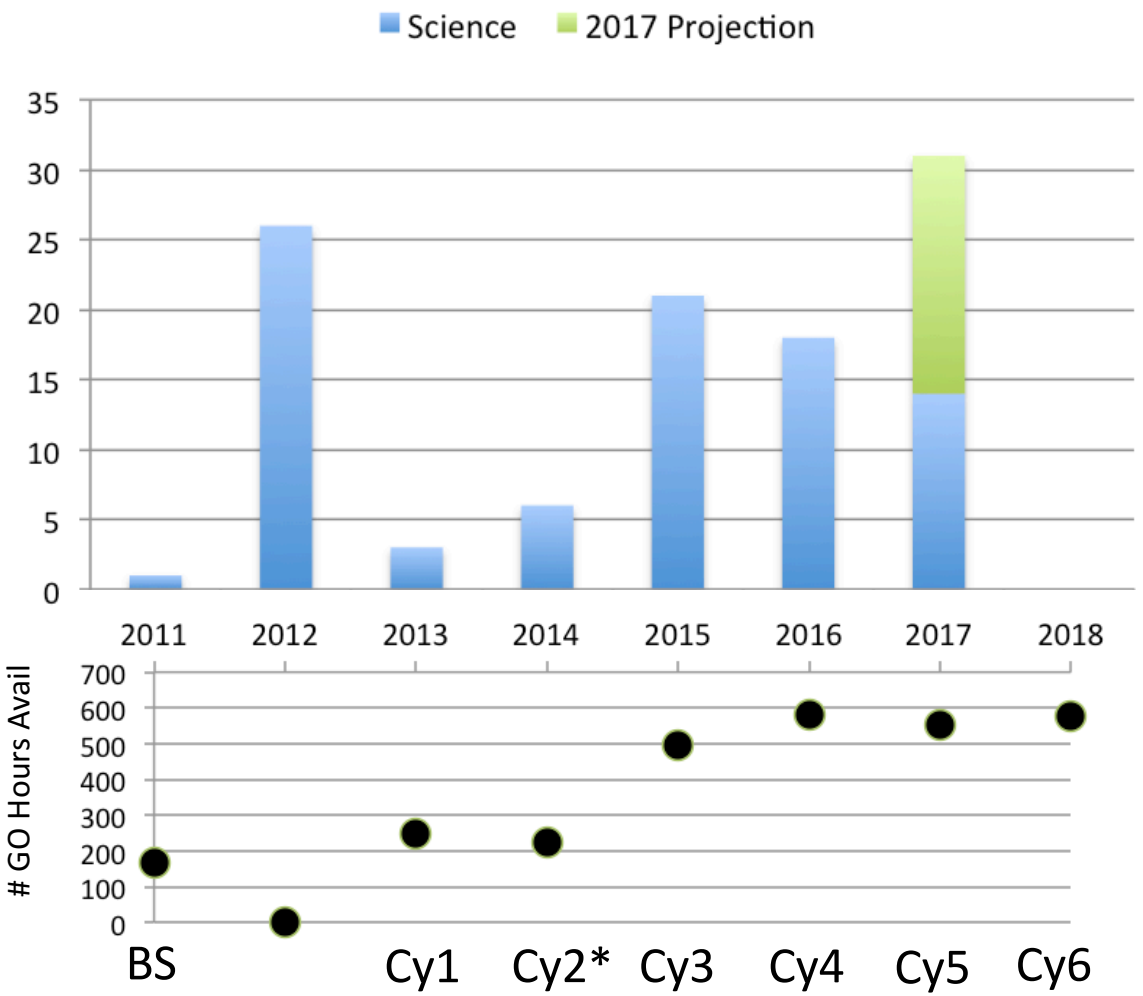


Sum= 671 hrs

[1]APAC April 2017 presentation showed Cycle 5 by number of accepted proposals and by requested time. This is the actual time awarded breakdown to show how the observatory is being scheduled.

SOFIA Science Publications per Calendar Year

- Number of peer-reviewed science publications as of July 1, 2017.
- Projection to end of '17 given current rate.
- Since Cycle 1 typical publication dates lag the data taken by ~2.5 years.
- >500 GO hrs (on average) starting in Cycle 3, we expect to see a lot more papers starting to show up now.



*Phase E began May 2014

Summary

- SOFIA began full operations in May 2014.
- SOFIA is currently in year 3 of its 5 year prime mission.
- Proposal pressure has been steadily increasing.
- Program sees new users proposing and winning time on the Observatory.
- Paper production due to increase due to the ~2.5 year lag from observations to publications
  - Program offered >500 hrs annually starting since 2015
  - Anticipating more publications from 2017 onward