SOFIA Users Group Meeting:
SOFIA Data Cycle System Status

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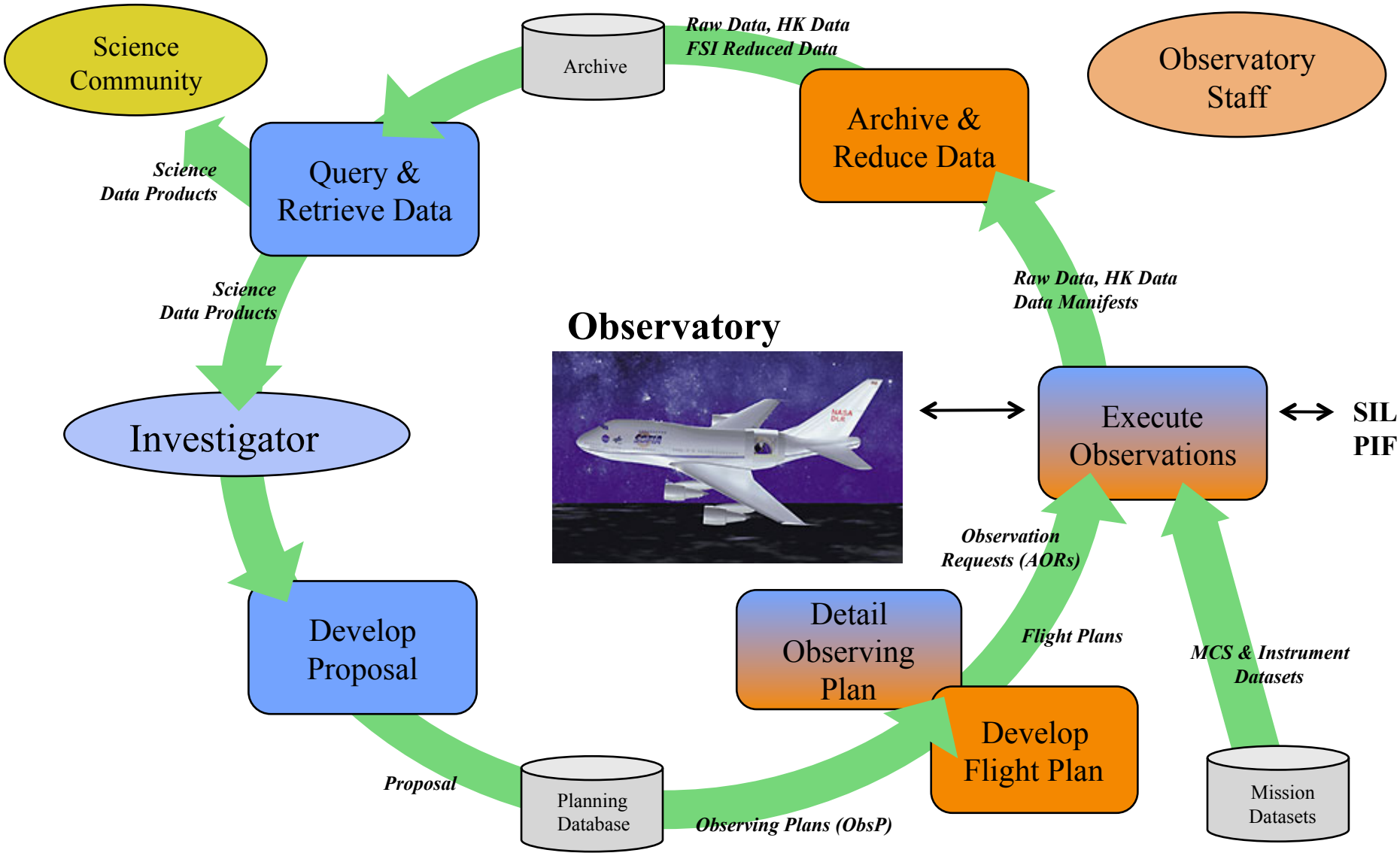
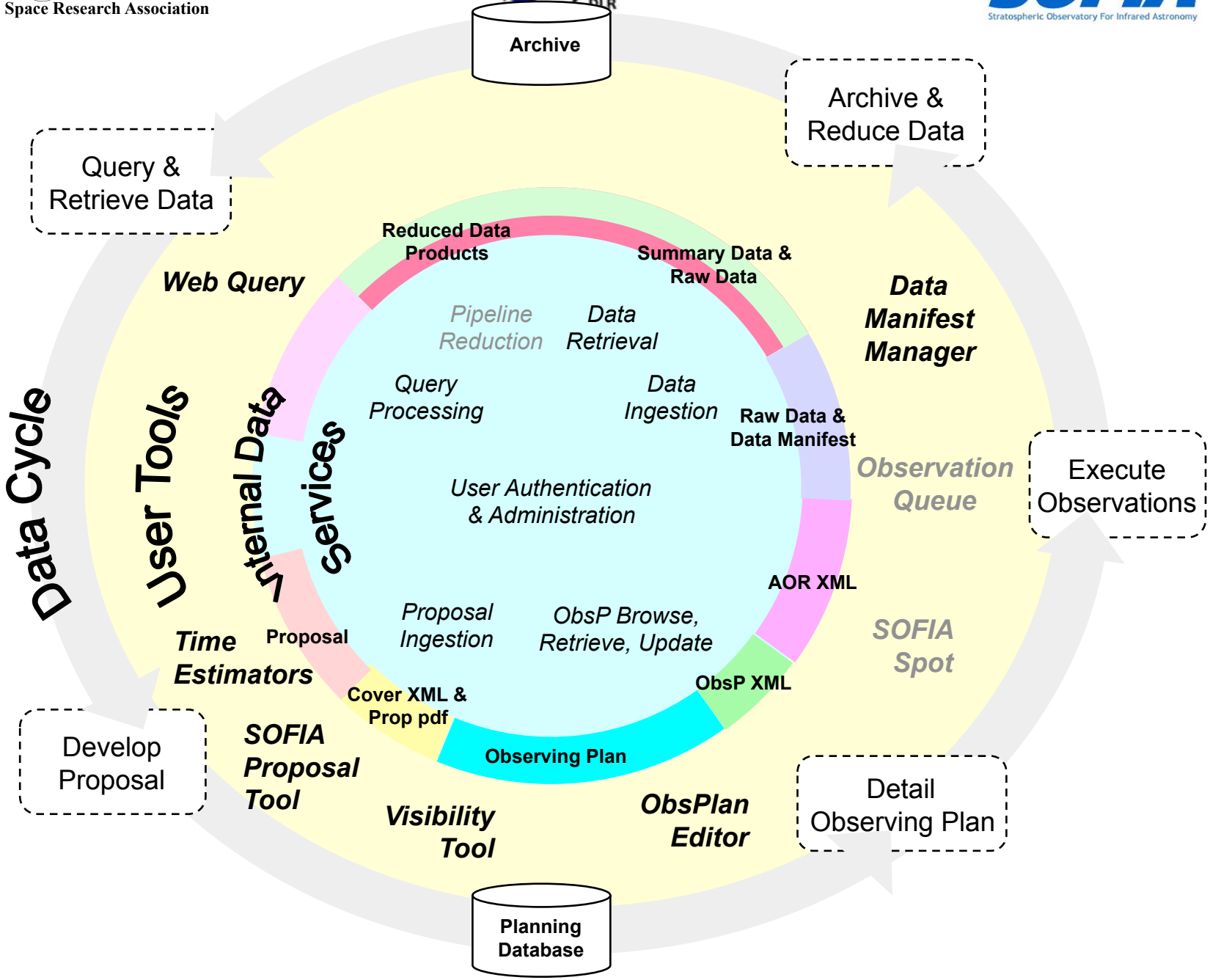
SOFIA Science & Mission Operations Data Cycle




Archive
Archive & Reduce Data
Query & Retrieve Data
Reduced Data Products
Summary Data & Raw Data
Web Query
Data Manifest Manager
Pipeline Reduction
Data Retrieval
Query Processing
Data Ingestion
Raw Data & Data Manifest
Data Cycle
User Tools
Internal Data
services
Observation Queue
Execute Observations
User Authentication & Administration
AOR XML
Proposal Ingestion
ObsP Browse, Retrieve, Update
Time Estimators
Proposal
SOFIA Spot
ObsP XML
Cover XML & Prop pdf
Develop Proposal
SOFIA Proposal Tool
Observing Plan
Visibility Tool
ObsPlan Editor
Detail Observing Plan
Planning Database

DCS User Roles and Access Priveleges

- **Public --** Includes archive and proposal search, tool download, and user registration.
- **General Investigator (GI)** – user registration required (default role). Includes Proposal development and Observation Planning capabilities, as well as access to proprietary data.
- **Science & Mission Ops (SMO)** – user registration and SMO management approval. Includes all administrative tools and interfaces, with some restrictions on view/edit privileges.
- **Telescope Allocation Committee (TAC) --** registration required, must be assigned by DCS or TAC administrator. Includes access to Proposal Summaries and Details with some edit privileges.

DCS Tools

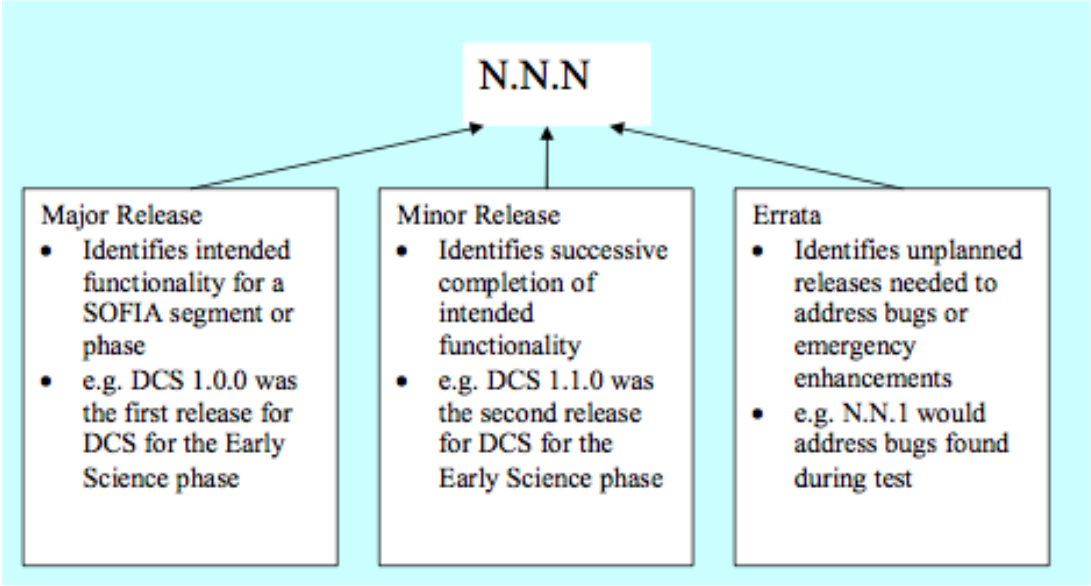
- User Support
  - User Registration (Public)
  - User Profile Management (Registered Users)
- Proposal Development
  - SOFIA Proposal Tool (SPT) (Public)
  - SOFIA Instrument Time Estimator (SITE) (Public)
  - Estimate Atmospheric Transmission (ATRAN) (Public)
  - Proposal Access (GI, SMO, and TAC; Public with limited display)
- Observation Planning (alpha)
  - Visibility Tool (Public)
  - SOFIA Spot (Public) *Under Development*
  - Observing Plan Access (GI & SMO)
  - Generate Observing Plan (SMO-only)
- Data Archiving & Retrieval (*.ark, *.fits, *.wav, …)
  - Data Ingestion (SMO-only)
  - Data Search and retrieval (Public/GI)

DCS Phasing and Functionality

- **DCS for Early Science (v1, 2009) -- *COMPLETE***
  - Proposal development and submission
  - some observation planning support
  - raw data archiving
  - archive search and retrieval
- **DCS for Segment 3 (v2, 2012) – *In Work***
  - Full phase II observation planning support (including *SOFIA Spot*)
  - AOR command expansion tool
  - Pipeline support (FLITECAM/FORCAST)
- **DCS for RSSO (v3, 2015)**
  - On-AC AOR execution support (Obs Queue)

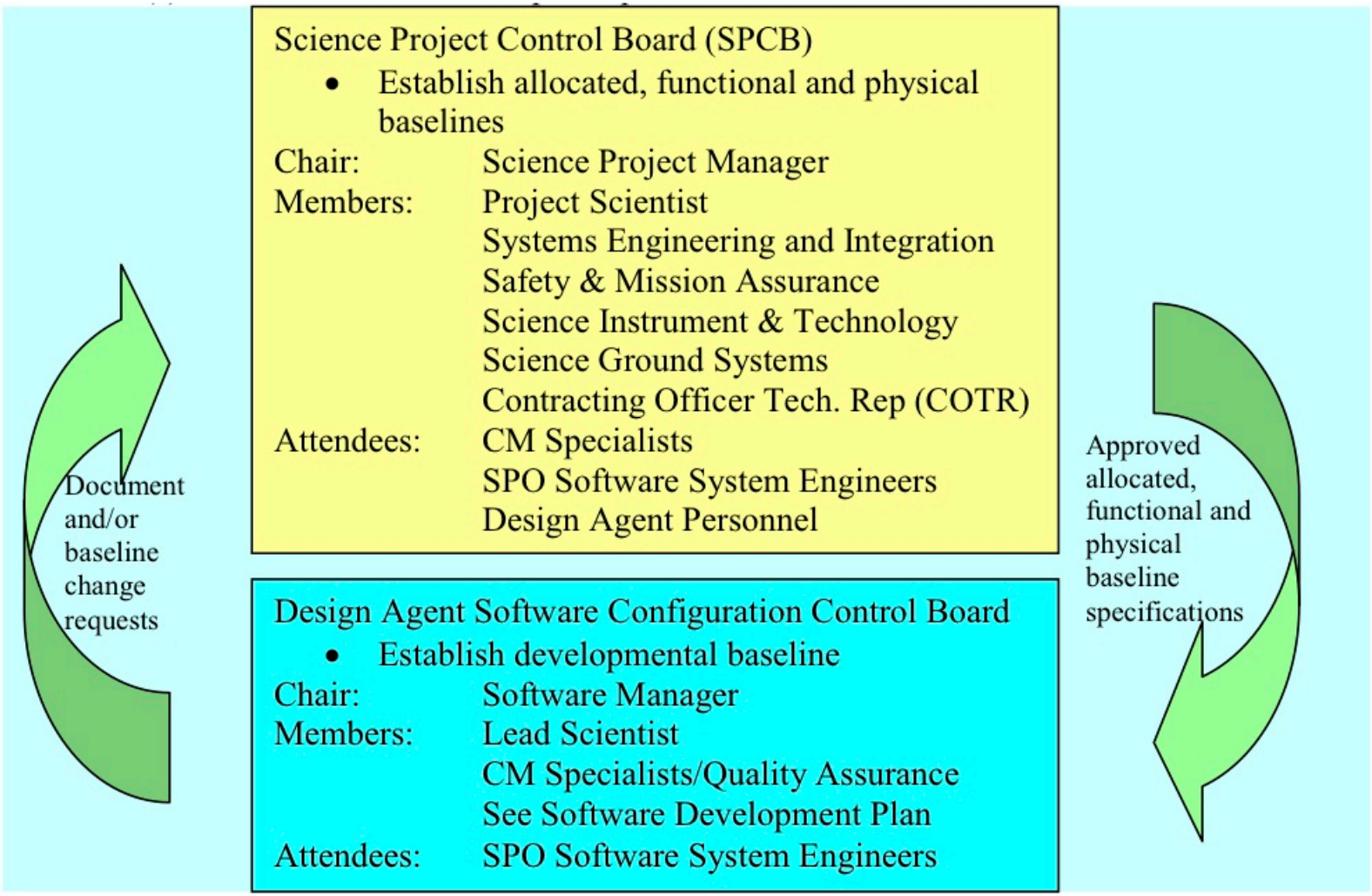
DCS Change Control (1)

- DCS development and maintenance adheres to USRA Software QA and Configuration Management Plans and NASA Software Management Plan
  - developed using IEEE Std 828-1998 (Software Configuration Management Plans) -- which has been adapted to support ISO 9001 requirements.

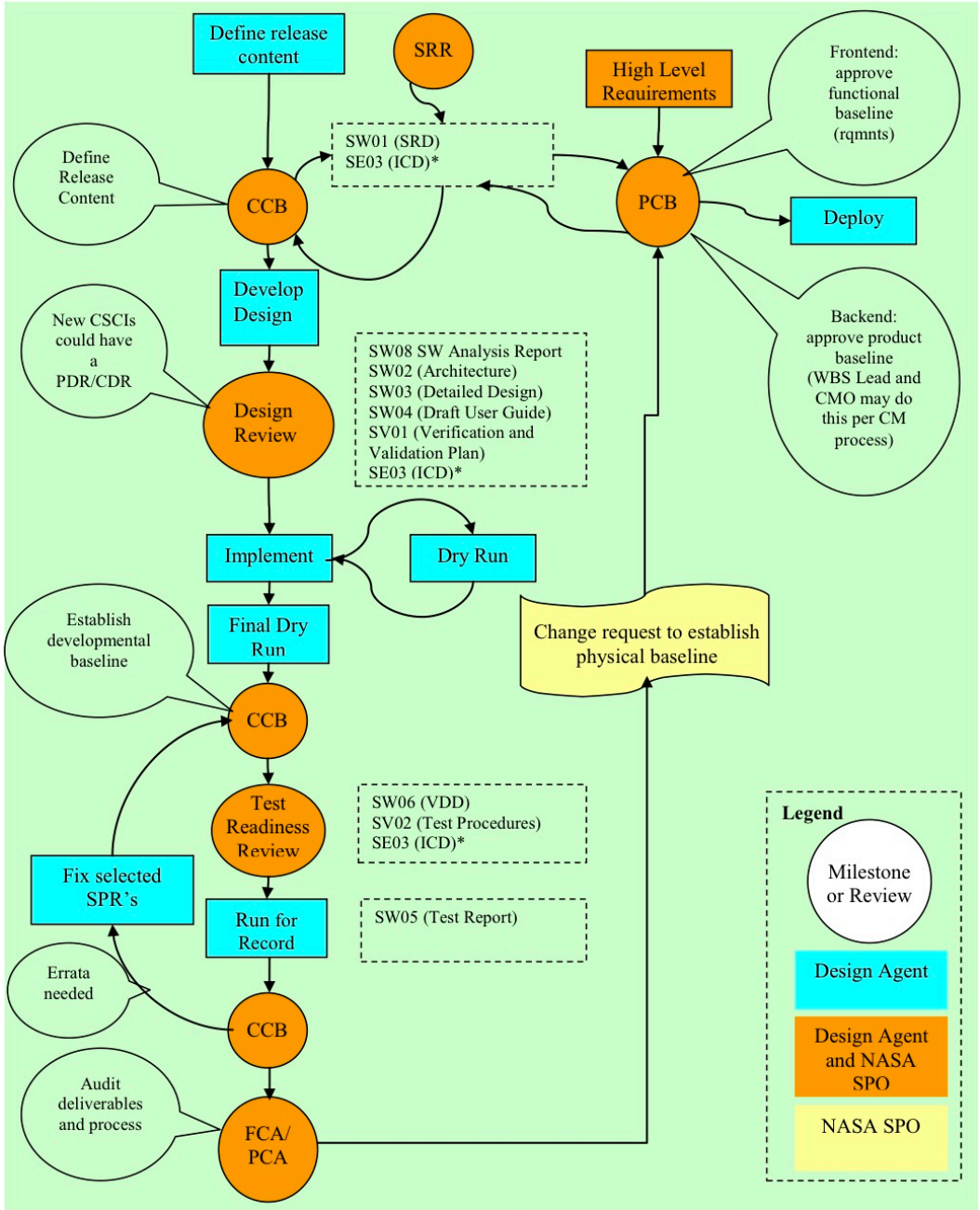


Release/Versioning Nomenclature

DCS Change Control (2)



DCS Change Control (3)



DCS Utilization During Basic Science (2010 – 2011)

- Proposal Submission:
  - 165 submission/resubmission transactions; 60 proposals received.
  - System loads light, well within testing benchmarks (see following slide)
  - 15 issues documented – 13 SPRs (Bugs) identified – 12 fixed before Cycle 1 CfP.
- Observation Planning:
  - Proposed observations from submitted proposals used in flight planning (after some edits)
- Archiving:
  - All SI, TAIPS, MADS, and other ancillary data from each flight was ingested into archive after data transfer to ARC:
    - Current ingest throughput (not including transfer from DAOF): ~50 MB/sec
  - Summary data for over 45300 science observation files available in archive. Associated data files available for download (with access controls), including Level 2 and 3 data products.
    - FORCAST: ~6500 files
    - GREAT: ~39000 files
  - Archive Volume (Basic Science Only):
    - SI Data: 16.5 GB
    - TAIPS Data: >643 GB
    - Ancillary Data (primarily mission audio): >226 GB

Overall DCS performance was nominal. Basic Science was an excellent shake-down: numerous issues reported and fixed for Cycle 1.

DCS Utilization for Cycle 1 Proposal Submission

- Proposal Submission:
  - US: 583 submission/resubmissions; 133 proposals received.
  - DE: 90 submission/resubmissions; 38 proposals received.
  - System loads well within testing benchmarks (see below)
- Issues:
  - 7 issues documented
    - 3 addressed during submission period (via errata releases)
  - triage of remaining 4 issues in-work.

Window	Max Submissions Basic Science	Max Submissions Cycle 1	Testing Benchmark
24 hours	90	360	> 1000
1 hour	10	42	--
15 min	6	21	150
2 min	2	5	120

Significant Cycle 1 Proposal Preparation Issues

- SPT installers not visible under some versions of IE/Windows
  - No fix: had to point users to different browsers.
- Emission line sensitivity issue in SITE
  - Fixed in v2.0.5 before bulk of US proposals were submitted.
- Issues with valid NAIF-IDs
  - Fixed for specific users immediately; validation scheme in SPT updated as part of v2.0.6 (in time for German submissions)
- **Non-ASCII characters in Abstract field**
  - Addressed in v2.0.6 (in time for German submissions)

Issue: Non-ASCII Characters in Proposal Abstract (1)

- APT code base requires all entries to be ASCII (noted on website and in SPT help pages). Not a problem for typed input, but…
- Real proposers often cut/paste from other applications, introducing non-ASCII characters into the tool without their knowledge.
- *Some* characters can cause breakage either in SPT (e.g. unreadable files) or at the SSC.
- At least 14% of SPT users encountered this problem.
- *No proposals lost*.
- Issue addressed in SPT by validating text on save/upload and issuing detailed error to user; and by issuing detailed error on file:open.
  - *Implemented in time for German submissions; during which **only one** non-ASCII character issue was reported.*

Issue: Non-ASCII Characters in Proposal Abstract (2)

- Note that APT has the same problem. From the APT FAQ*:*
  - "If you find that your edited .prop file will not re-import into APT (with no information as to why), try this experiment: Export the .prop file and try to re-import it into APT will no edits at all. If this does not work you may well have non ascii characters in the text of the original APT file. These characters don't cause APT grief unless it is trying to import a .prop file. If you can't find the non ascii characters please ask us for help. (60003)"
- But we are still unsure as to why this was a much bigger problem for Cycle 1 than Basic Science, and have not ruled out the possibility that it was exacerbated by upgrades we made in preparation for Cycle 1.

Intro to SOFIA-Spot (SSpot)

- During Phase 2 observation planning, GIs will use ***SOFIA-Spot*** to specify an observing strategy and detail their AORs.
- Based on Spot tool developed for Spitzer by IPAC.
- Features:
  - Detailed AOR editor with constraints and validation
  - Support for multiple AOTs as defined by SI teams.
  - AOR visualization with SI FOVs on image background, including SOFIA specific constraints (e.g. chopper)
  - Interface with existing archives (2MASS, IRAS, MSX, etc…)
  - Integrated with DCS planning database and proposal system

Beta version now available internally to USRA SMO staff for review and comment. Planning beta release to select outside users soon.

Cycle 1 AOTs Supported

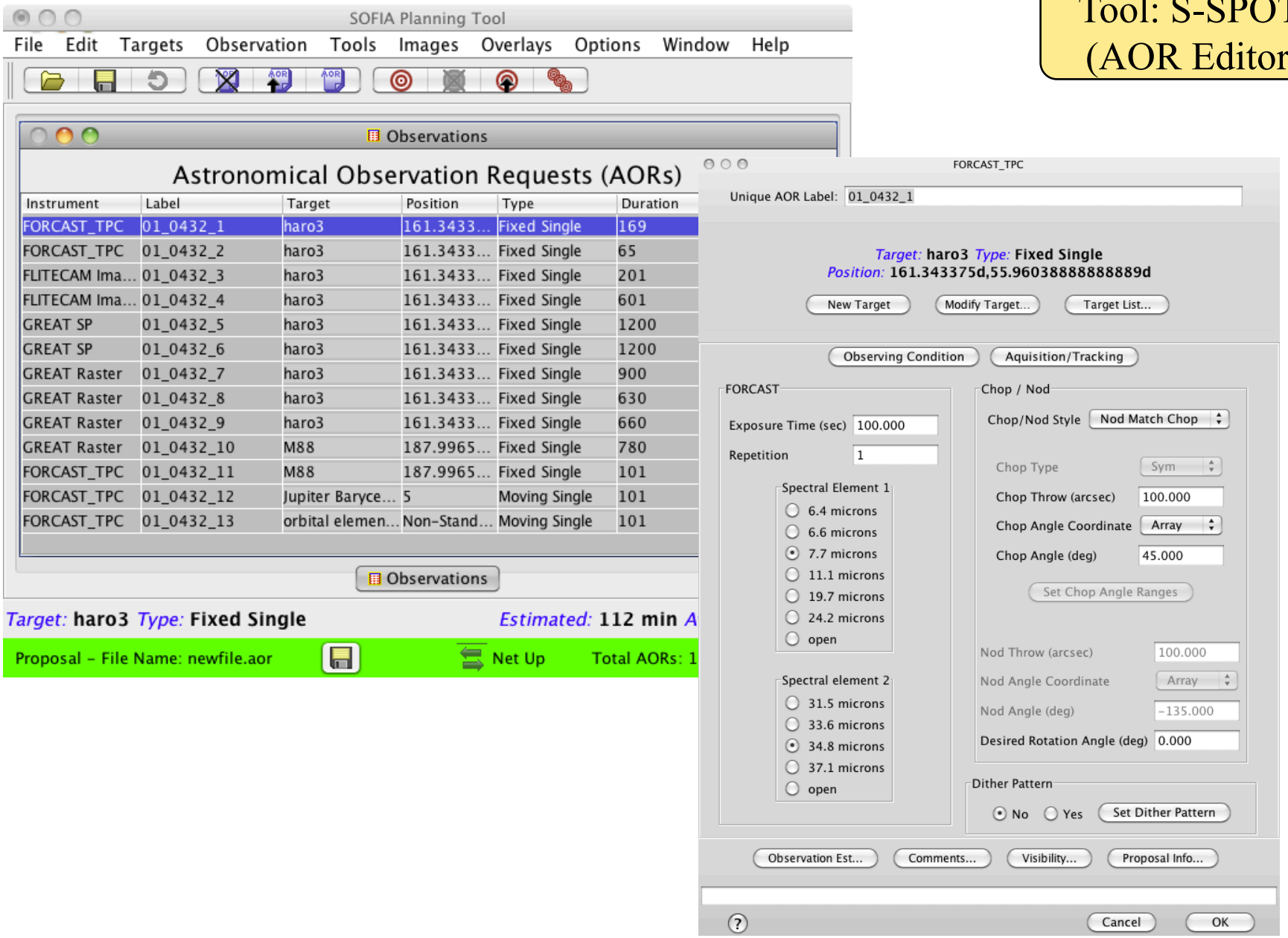
- AOTs to be offered in SSpot for Cycle 1:
  - FORCAST Imaging
  - FORCAST Grisms
  - GREAT Low
  - GREAT Medium (Shared Risk)
  - FLITECAM Imaging
  - FLITECAM Grisms (Shared Risk)
- Milestones:
  - **Oct 2011**: Cycle 1 Call for Proposals
  - **April 2012**: Cycle 1 Phase 2 Planning Start
  - **July 2012**: Cycle 1 Start of Observations

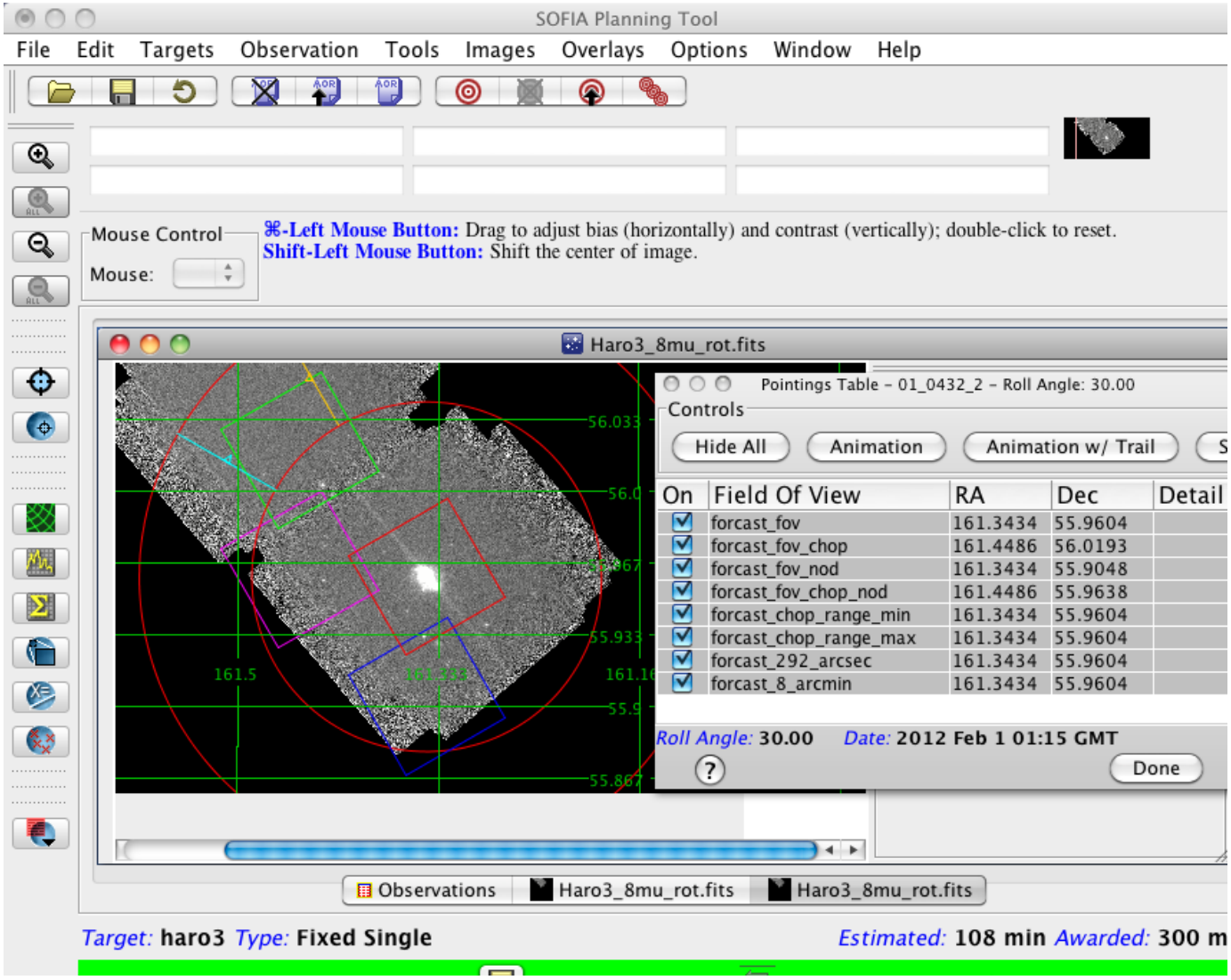
Functionality Comparison: Spot, HSpot, SSpot

Function/Capability	Spot	HSpot	SSpot
Edit/Save AORs	Y	Y	Y
Visualization	Y	Y	Y
Image Server Support	Y	Y	Y
Observing Time Estimation	Y	Y	Y*
Phase 1 Support	Y	Y	N**
Visibility Estimation	Y	Y	N**
Sensitivity Estimation	N	Y	N**
Spectral Line Support	N	Y	N

* Including overheads.
** Functionality provided as separate tools: SPT, VT, SITE

Tool: S-SPOT (AOR Editor)




SOFIA Planning Tool
File Edit Targets Observation Tools Images Overlays Options Window Help
Mouse Control
Mouse:
⌘-Left Mouse Button: Drag to adjust bias (horizontally) and contrast (vertically); double-click to reset.
Shift-Left Mouse Button: Shift the center of image.
Haro3_8mu_rot.fits
Pointings Table - 01_0432_2 - Roll Angle: 30.00
Controls
Hide All
Animation
Animation w/ Trail
On | Field Of View | RA | Dec | Detail
forcast_fov | 161.3434 | 55.9604
forcast_fov_chop | 161.4486 | 56.0193
forcast_fov_nod | 161.3434 | 55.9048
forcast_fov_chop_nod | 161.4486 | 55.9638
forcast_chop_range_min | 161.3434 | 55.9604
forcast_chop_range_max | 161.3434 | 55.9604
forcast_292_arcsec | 161.3434 | 55.9604
forcast_8_arcmin | 161.3434 | 55.9604
Roll Angle: 30.00 Date: 2012 Feb 1 01:15 GMT
Done
56.033
56.0
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161.5
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Observations
Haro3_8mu_rot.fits
Haro3_8mu_rot.fits
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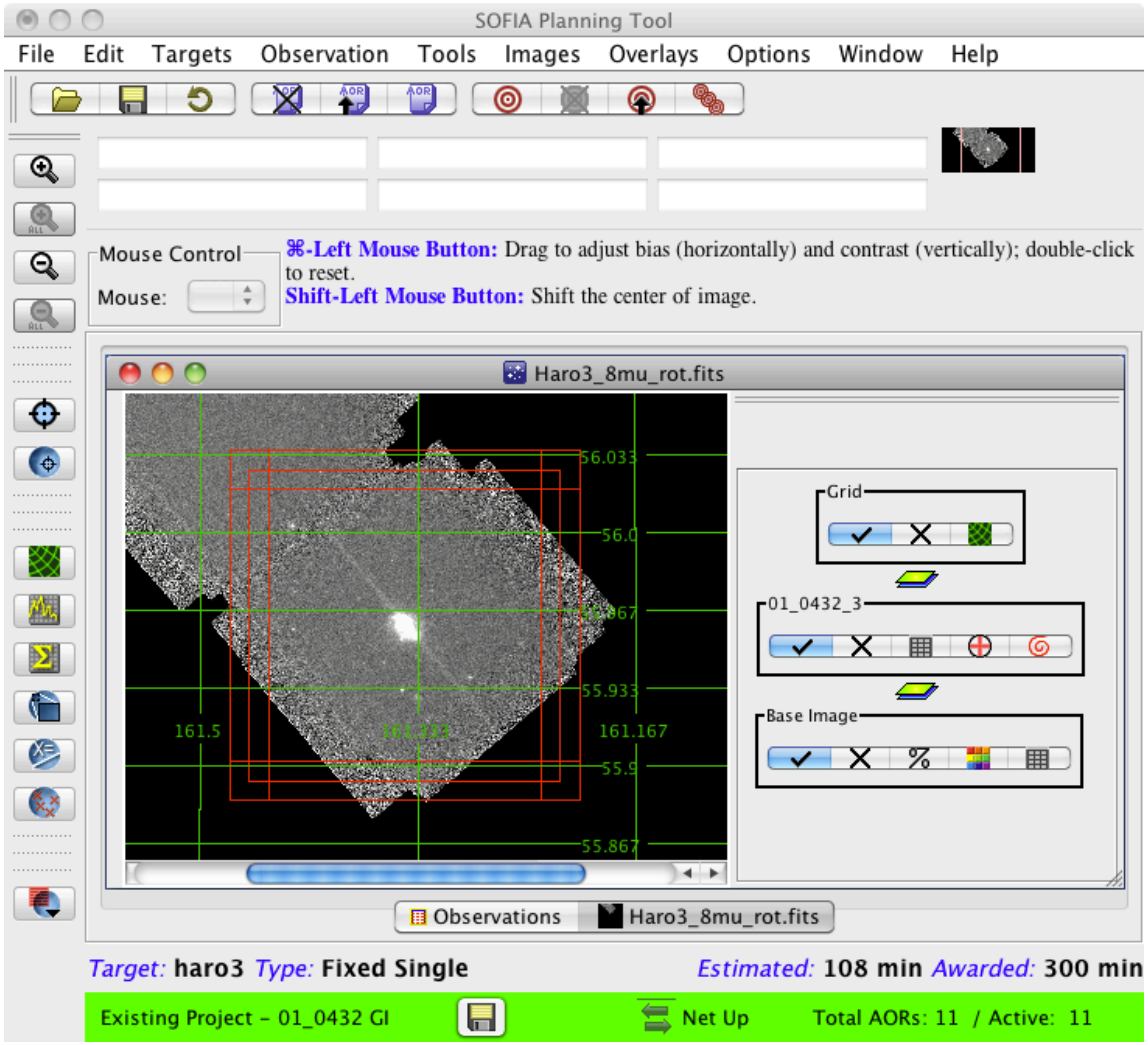
Estimated: 108 min Awarded: 300 m


SOFIA Planning Tool
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Mouse:
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Shift-Left Mouse Button: Shift the center of image.
Haro3_8mu_rot.fits
56.033
56.0
55.933
55.9
55.867
161.5
161.167
Grid
01_0432_3
Base Image
Observations
Haro3_8mu_rot.fits
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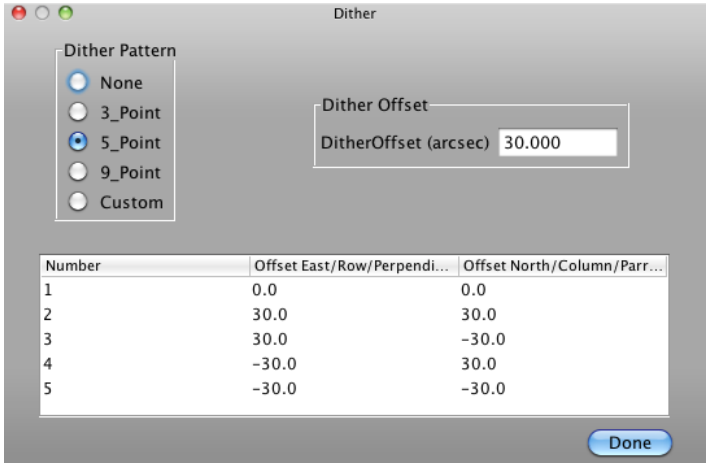
Estimated: 108 min Awarded: 300 min
Existing Project - 01_0432 GI
Net Up
Total AORs: 11 / Active: 11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Dither Pattern
None
3_Point
5_Point
9_Point
Custom
Dither Offset
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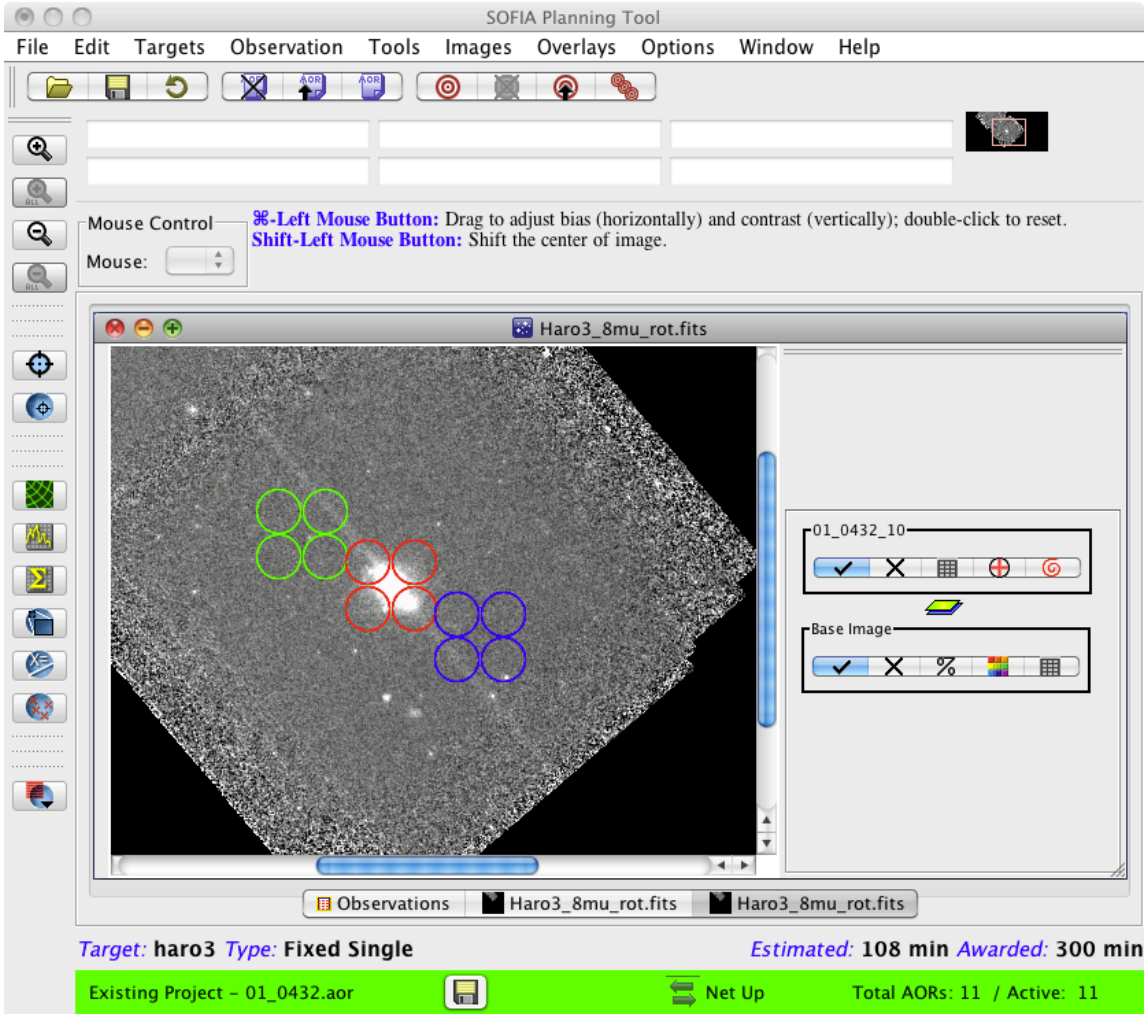
Number
Offset East/Row/Perpendi...
Offset North/Column/Parr...
1 0.0 0.0
2 30.0 30.0
3 30.0 -30.0
4 -30.0 30.0
5 -30.0 -30.0
Done


SOFIA Planning Tool
File Edit Targets Observation Tools Images Overlays Options Window Help
Mouse Control
Mouse:
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Haro3_8mu_rot.fits
01_0432_10
Base Image
Observations
Haro3_8mu_rot.fits
Haro3_8mu_rot.fits
Target: haro3 Type: Fixed Single
Estimated: 108 min Awarded: 300 min
Existing Project - 01_0432.aor
Net Up
Total AORs: 11 / Active: 11