STScI Science Operations Center: Activities and Plans

Karoline Gilbert and the STScI WFIRST Team

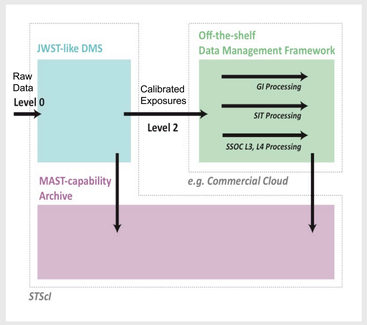
The WFIRST Mission at STScI

With sensitivity and resolution comparable the Hubble Space Telescope, and a field of view 100 times larger, the Wide Field Instrument (WFI) on WFIRST will be a powerful survey instrument. The science operations for the WFIRST Mission will be distributed between Goddard Space Flight Center, the Space Telescope Science Institute (STScI), and the Infrared Processing and Analysis Center (IPAC). The STScI Science Operations Center (SSOC) will schedule and archive all WFIRST observations, will calibrate and produce pipeline-reduced data products for the WFI, and will support survey teams and the astronomical community in planning WFI observations and analyzing WFI data. During the formulation phase, WFIRST team members at STScI have developed operations concepts for scheduling, data management, and the archive; have performed technical studies investigating the impact of WFIRST design choices on data quality and analysis; and have built simulation tools to aid the community in exploring WFIRST's capabilities.

WFIRST Operations at STScI

STScI is developing detailed concepts for WFIRST operations including

- Scheduling of all WFIRST observations (WFI and Coronagraph)
- Archiving of all WFIRST observations (WFI and Coronagraph)
- Planning tools for WFI observation specifications
- Support of the High Latitude and SN Surveys
- A data management system integrating data processing and the archive:
  - Data processing based on existing JWST pipeline and Science Team components
  - A novel cloud-based data management framework for high-level data processing, providing a common environment accessible to all users (STScI operations, Survey Teams, General Observers (GOs), and archival investigators)
  - Archive with MAST-like capability and interfaces



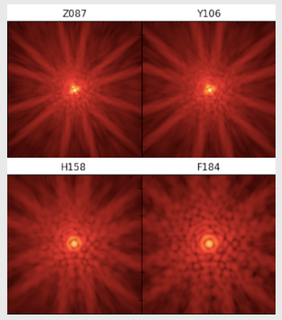
Other STScI WFIRST Formulation Activities include:

- Co-chairing working groups: Photometric Calibration, Data Management, Archive, WFI simulations, IFC, Deep fields, Scheduling and the High Latitude Survey, Astrometry, Guest Investigator, Filters
- Technical studies exploring a range of WFIRST operational capabilities, e.g.,:
  - Exploring the limits of traditional grism reductions and prototyping automated grism reduction algorithms
  - Creating and comparing IFC simulation tools

WFI Simulation Tools

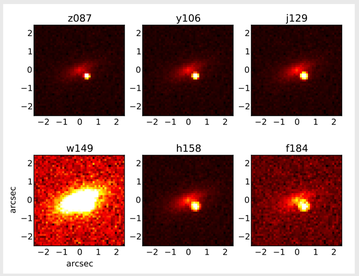
STScI has built upon a suite of tools developed for the JWST mission to enable the astronomical community to investigate the scientific capabilities of WFIRST. STScI will continue to expand the functionality and fidelity of these tools to enable robust survey and GO planning both before and during WFIRST operations.

WebbPSF: Point Spread Functions



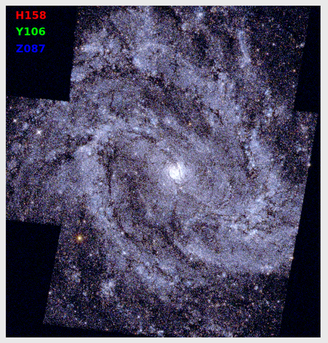
The WFIRST implementation of WebbPSF calculates high-fidelity point-spread function (PSF) models, providing PSFs for use in other tools and for precursor science planning.

Pandeia: Exposure Time Calculator



Pandeia calculates data cubes (x, y, lambda) for astronomical sources and small scenes, which are processed through instrument models to generate simulated data, enabling accurate signal-to-noise ratio and exposure time calculations for WFIRST observations.

STIPS: Simulated WFI Images



The WFIRST implementation of STIPS enables simulation of complex astronomical scenes over the field of view of one WFI detector. Above is a three color mosaic of M83 created with STIPS by the WINGS WFIRST Science Investigation Team *(PI Ben Williams, image credit: Rubab Khan).*

Community Engagement and Public Outreach

View the talks in the archive at https://webcast.stsci.edu

STScI is partnering with GSFC to engage the public with the WFIRST Mission, participating in events like SXSW and creating multi-media outreach products.

WFIRST-themed MinutePhysics video in English and Spanish

View a 3D model of WFIRST on your phone

For more information about WFIRST at STScI, visit us at the STScI booth. Or visit us on-line, where you'll find general information, detailed descriptions of the simulation tools described above, as well as technical reports and engagement materials: **https://www.stsci.edu/wfirst**

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