MAST Users Group Meeting

Nov 18-19 2013

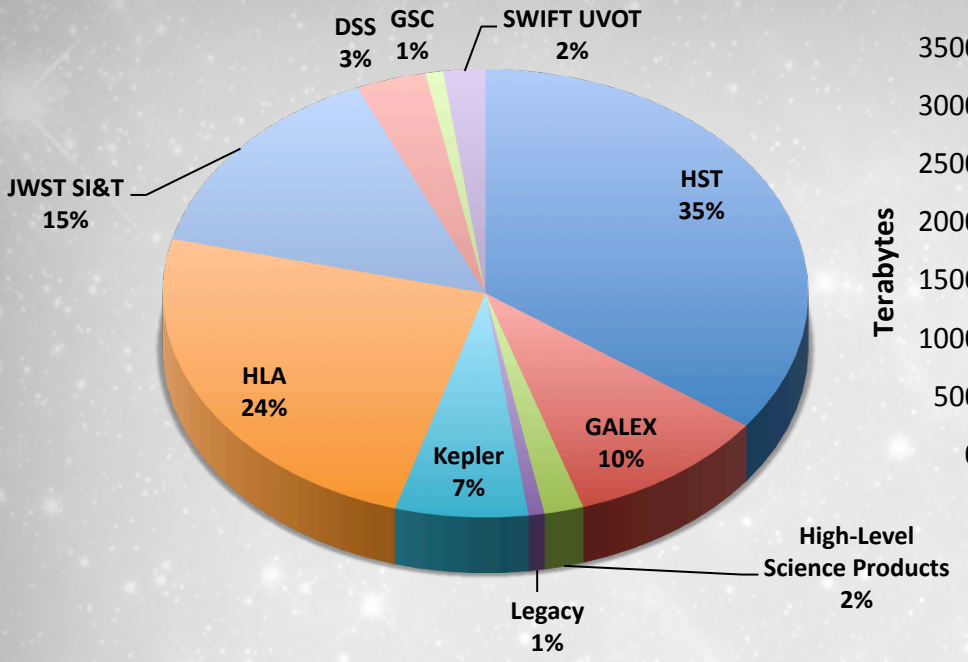
Introduction and Highlights

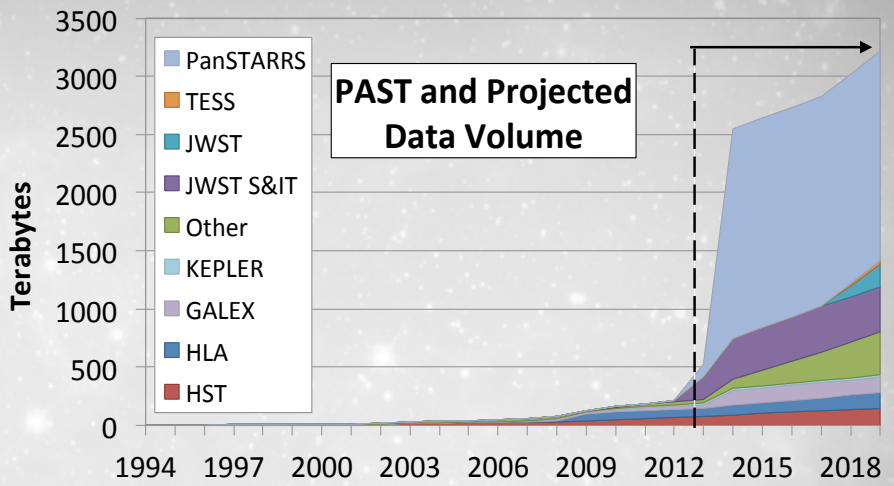
Rick White

Karen Levay

MAST
Users
Group
Meeting
Nov
18-19
2013

MAST Data & Growth





278 TB - Holdings Size as of Nov 1 2013

3 TB – Average Ingest Rate per month

19 TB – Average data distribution rate per month

1,500,000 - Average # searches per month

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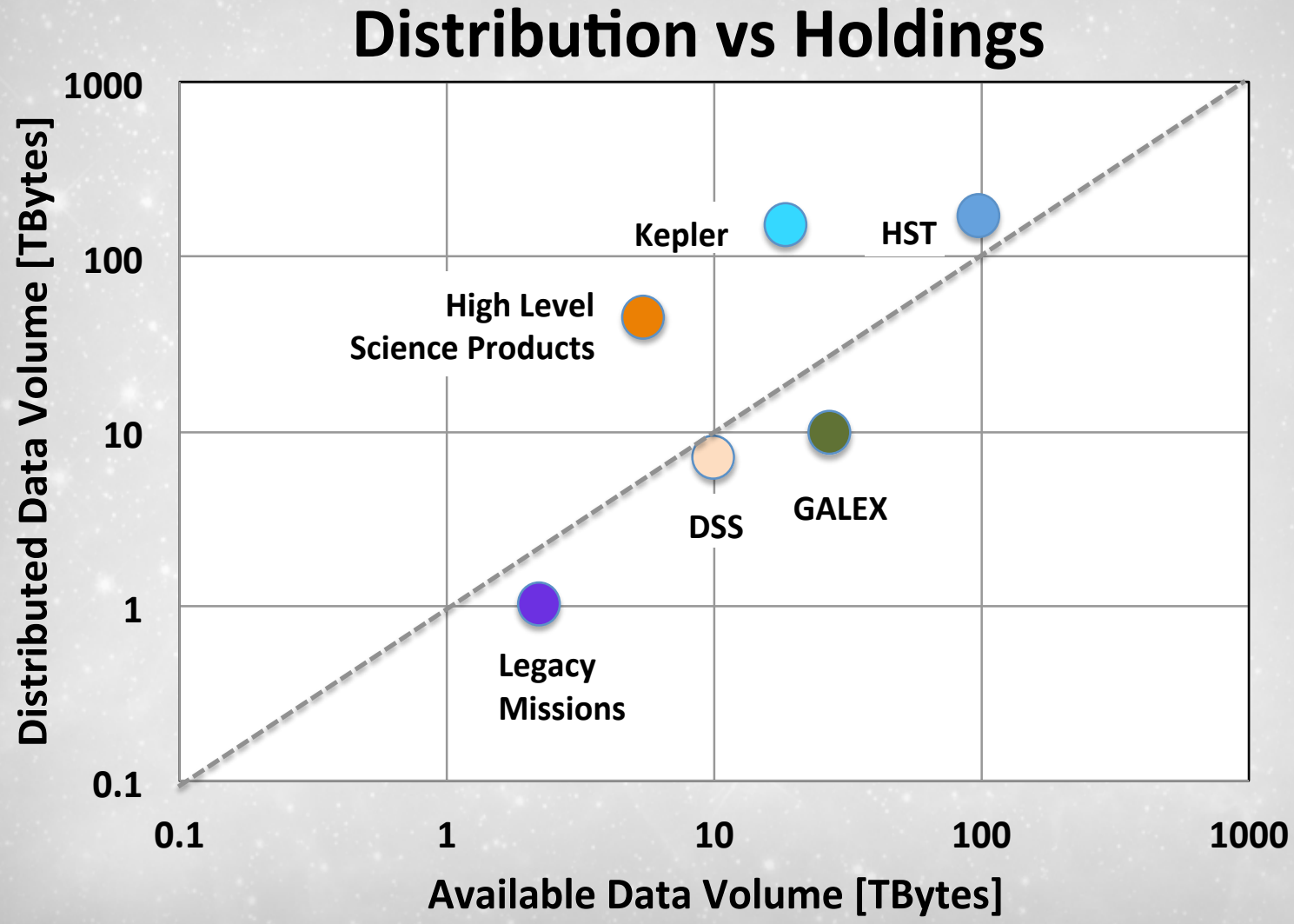
Distribution vs Holdings



Holdings as of Nov 1 2013
Distribution 2011 –2013

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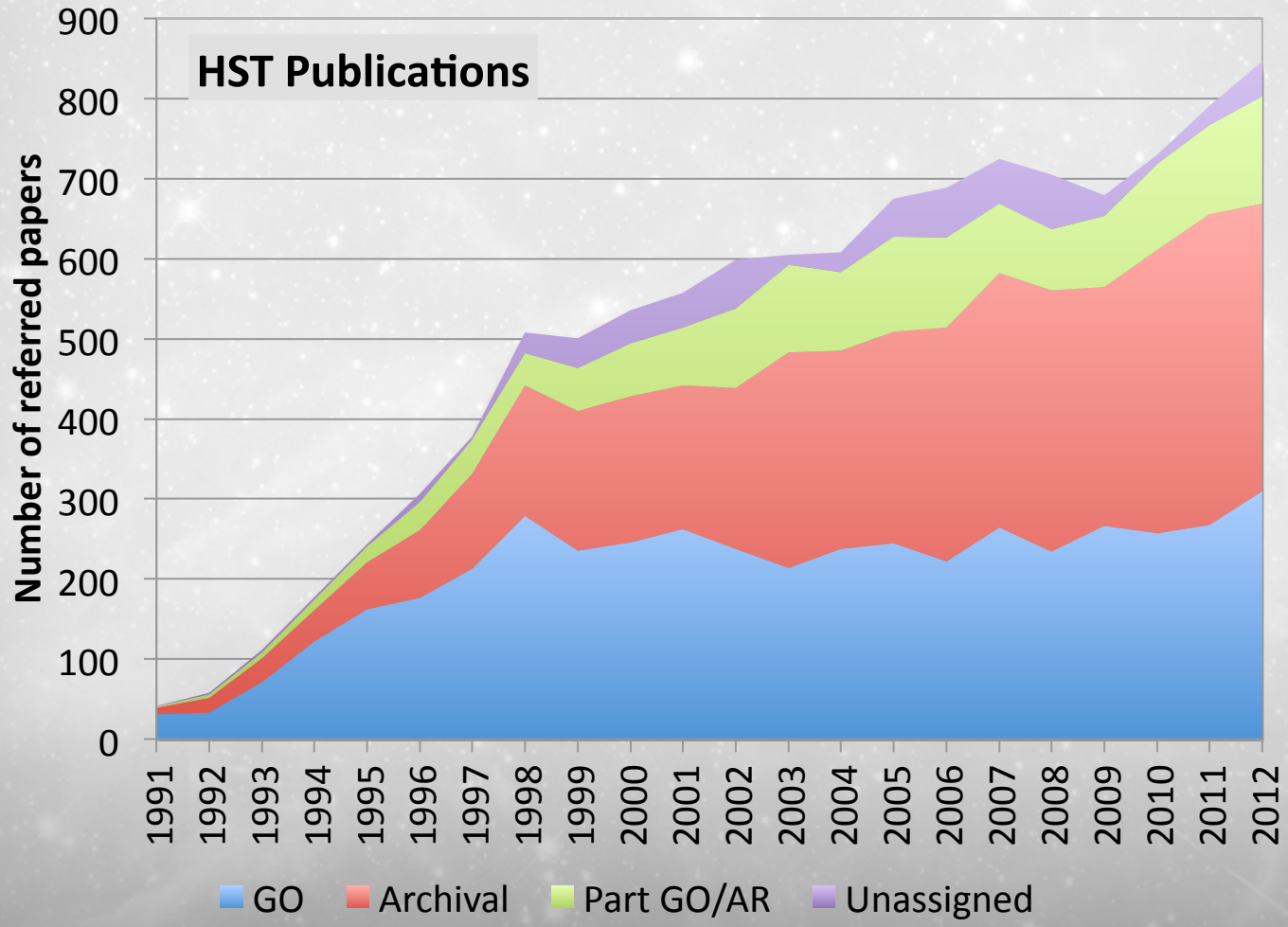
Publications

MAST continues to identify papers using data for most of the MAST missions. HST archival papers continue to be more than half of the annual total.



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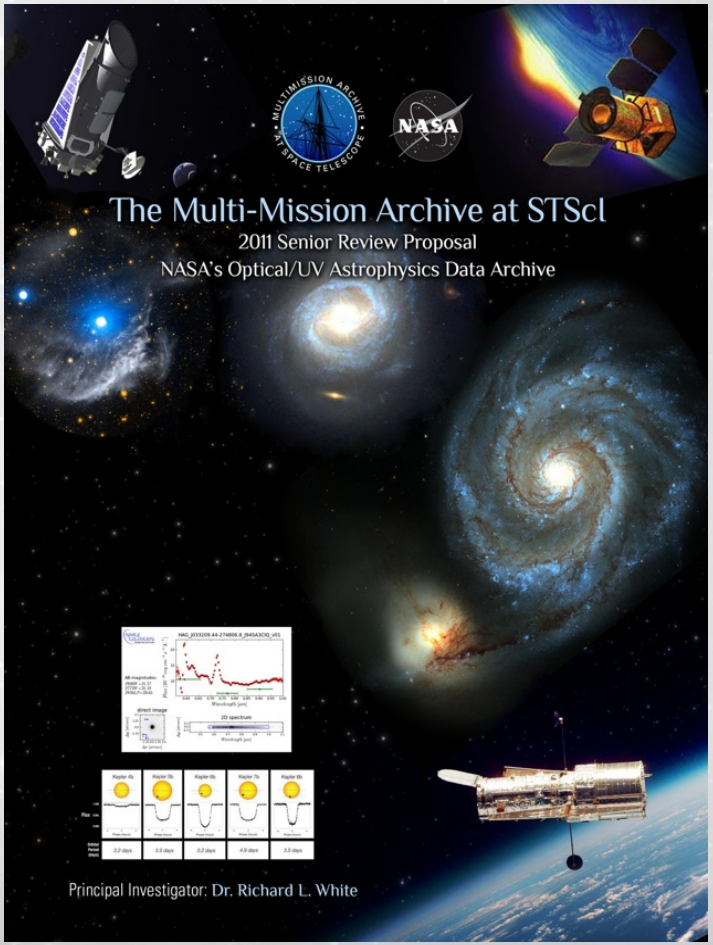
Archive Funding Sources

- Missions
  - HST
  - JWST
  - Kepler
- MAST
- VAO (<2 FTEs)



MAST Proposal for 2011 NASA Data Archive Centers Senior Review

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Archive & MAST Staff

- Archive Team Leads: Carl Johnson, Rick White, Gretchen Greene, Alessandra Aloisi
- Data Systems Branch – Mark Kyprianou
  - 20 members
  - Development and testing of HST/JWST/Kepler processing pipelines, archive, distribution processes
- Data Processing Archive Services Branch – Faith Abney
  - 11 members
  - Operations for HST/JWST/Kepler pipelines and distribution
- Archive Sciences Branch – Karen Levay
  - 18 members
  - "MAST" archiving and distribution; Interface development for all Missions/Datasets; Bibliography support; VO work; HLSP Support
- Hubble Legacy Archive – Lee Quick coordinator
  - Members from various areas in STScI (MAST, DSB, INS, Mission Office)
  - ~ 10 people at various levels of effort
  - HLA pipeline, catalog & interface development

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Staff Changes

- Departures
  - Steve Handy
  - Myron Smith (retirement)
  - Niall Gaffney
  - Francesco Pierfederici
- Arrivals
  - Scott Fleming – Archive Scientist
  - Sahar Allam – Archive Scientist
  - Lou Strolger – HLA
  - Jacob Matuskey – S/W
- Transfer
  - Anastasia Alexov (ASB -> DSB)
  - Alessandra Aloisi – New Deputy Division Head – primary focus on Archive and Science Software work

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Highlights with details later

- Hubble Legacy Archive and Hubble Source Catalog (*White/Whitmore*)
- Kepler status and variability statistics project (*Fleming/Fraquelli*)
- GALEX photon-list (*Fleming/Shiao/Thompson*)
- Data Discovery Portal (*Rogers*)
- Outcome from Spectral Legacy Working Group (*Aloisi*)
- High-Level Science Products – new guidelines and current projects (*Koekemoer/Fleming*)

Related to MUG recommendation: Improving HST astrometry

Related to MUG recommendation: Improving tools & products for spectra

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Topics Covered in Supplementary Slides

- HST Upgrade Project Status (Condor/OWL, new calibration file system, processed data cache)
- HST Instruments/Operations Highlights
- JWST Data Management Systems
- JWST Data Flow Diagram
- JWST Functional Architecture

Ask if you'd like to see any of this material discussed.

WFC3 Persistence

- MAST still maintains cache of WFC3 persistence corrected flats in a separate cache.
- MAST communicated the MUG recommendation that the WFC3 persistence corrections be incorporated into the standard pipeline.
- The instrument team was reluctant to include this correction in the standard pipeline as they feel the correction not finalized, but will reconsider the issue in 2014 time frame. Incorporation of the persistence correction may be more possible once the archive is in the online-cache mode and updates can be included when the data are reprocessed.

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Common Archive Observation Model

- Common Archive Observation Model
  - Meta-data population for most MAST missions now complete in current version of CAOM
    - (HST and HLA, GALEX, IUE, FUSE, EUVE, BEFS, TUES, WUPPE, HUT, SWIFT, KEPLER)
  - This is version being used by the Data Discovery Portal.
  - CAOM 2 is nearing completion and the meta data will be moved in the next couple of months.
  - Continuing active collaboration with CADC. ESAC, ESO and IPAC also considering adoption of CAOM.
  - Population of new/reprocessed HST data will be part of the HST processing pipeline

Related to MUG recommendation: Cultivate CAOM use by other archives

Communicating to Users

- Two blog entries in AstroBetter (programmatic access and High-Level Science Products)
- Regular updates on Facebook and Twitter
- RSS feed "What's New"
- STScI Newsletter
- Survey suggestion for more Archive Newsletters – but evidence is that they are not read.

High Level Science Products

- Talk later about updated guidelines with discussion about HLSP in general (*Koekemoer/Fleming*)
- New datasets include:
  - Frontier Fields
  - Hubble Heritage: Comet ISON, Horsehead
  - ACS Globular Cluster Survey additions
  - Hubble eXtreme Deep Field (XDF)
  - Brightest of Reionizing Galaxies (BoRG) additions
  - Orion Nebula Cluster Treasury Program
  - UDF12
  - Many CANDELS/CLASH/PHAT updates (next slide)
- > 10 teams have had initial contact about providing HLSP

Related to MUG recommendation: Establish metadata requirements for HLSP

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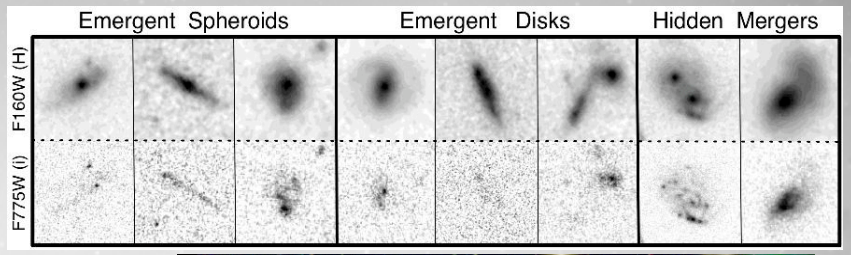
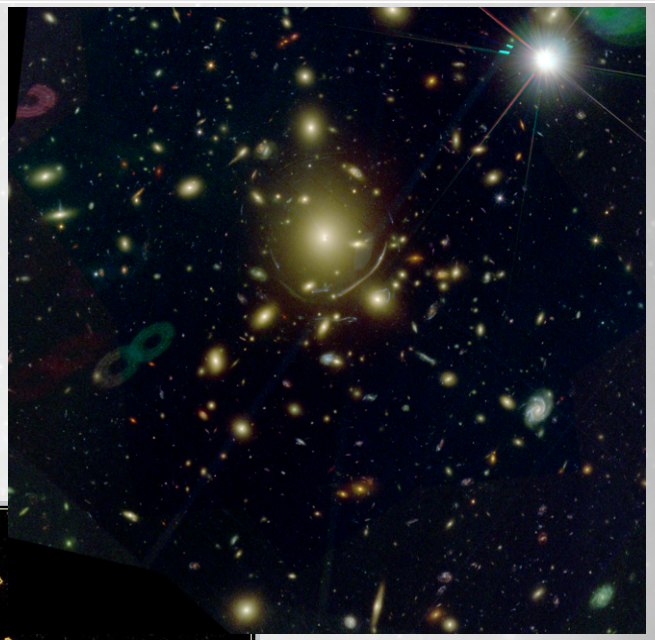
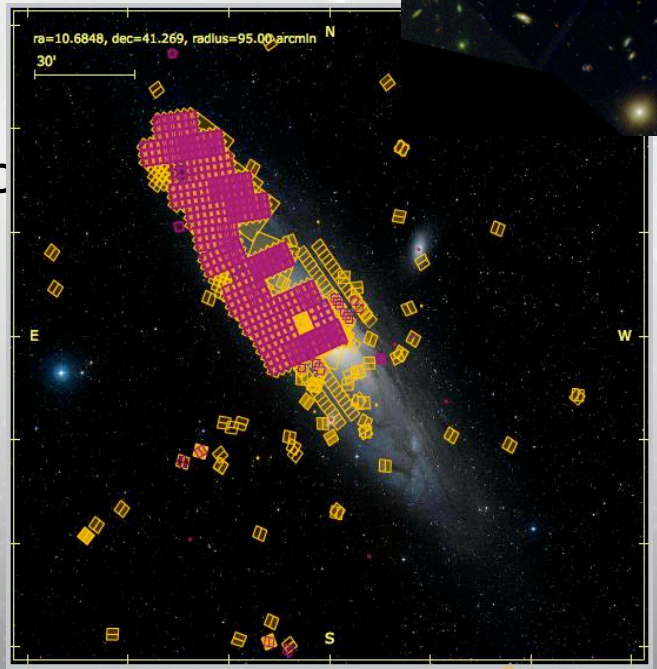
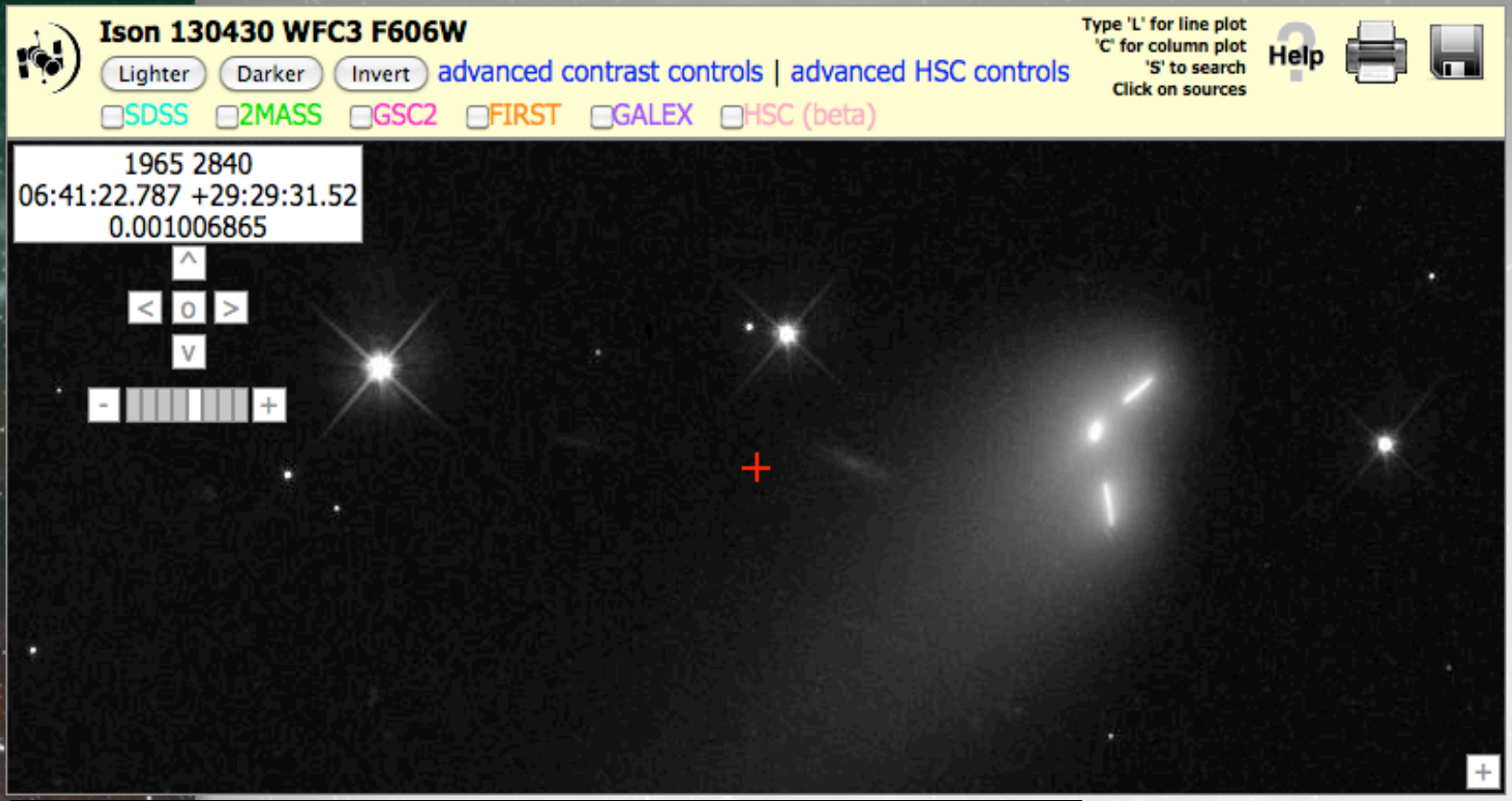
Multi-Cycle Treasury Programs

- CANDELS (Faber/Ferguson)
  - 2.6 TB of data
  - > 40 TB distributed to > 1400 IP addresses
- CLASH (Postman)
  - 343.6 of data
  - > 2.6 TB distributed to > 1100 IP addresses
- PHAT (Dalcanton)
  - >1 TB of data
  - > 5 TB distributed to >540 IP addresses



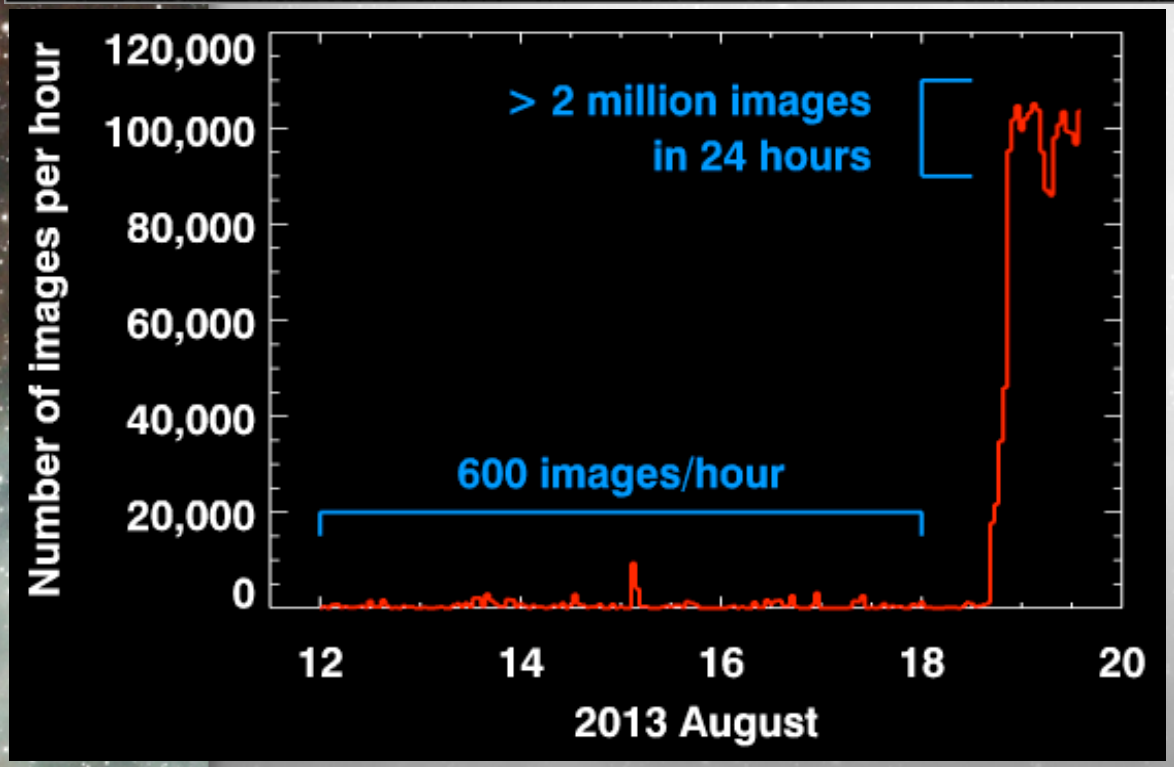






MAST Gone Viral!

Comet C/2012 S1 (ISON)



What happened?

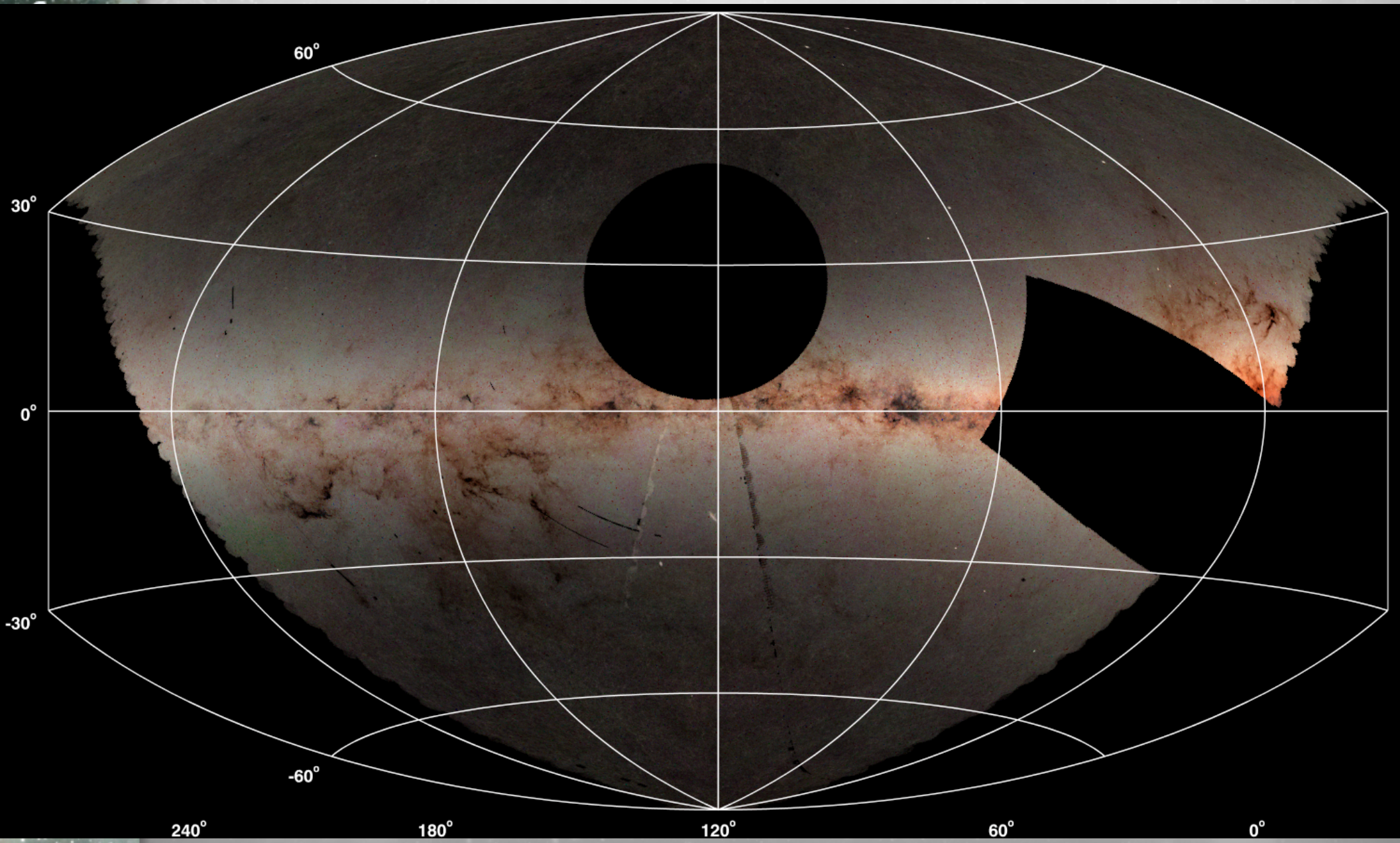
- Blog post: comet is a spaceship!
- Image is sum of 3 blurred exposures of the moving comet

Exposure #1 Exposure #2 Exposure #3

Pan-STARRS

- STScI will host the public archive for PS1
  - 100 TB database
  - 2 PB images
- This is a science project, not funded by MAST
  - But MAST will benefit from data + experience (already planning PS1 use to improve HST astrometry)
  - Will use MAST tools but new hardware
- Current schedule: opens April 2015

Pan-STARRS 3PI g/r/y mean colors
4.57×10^8 objects



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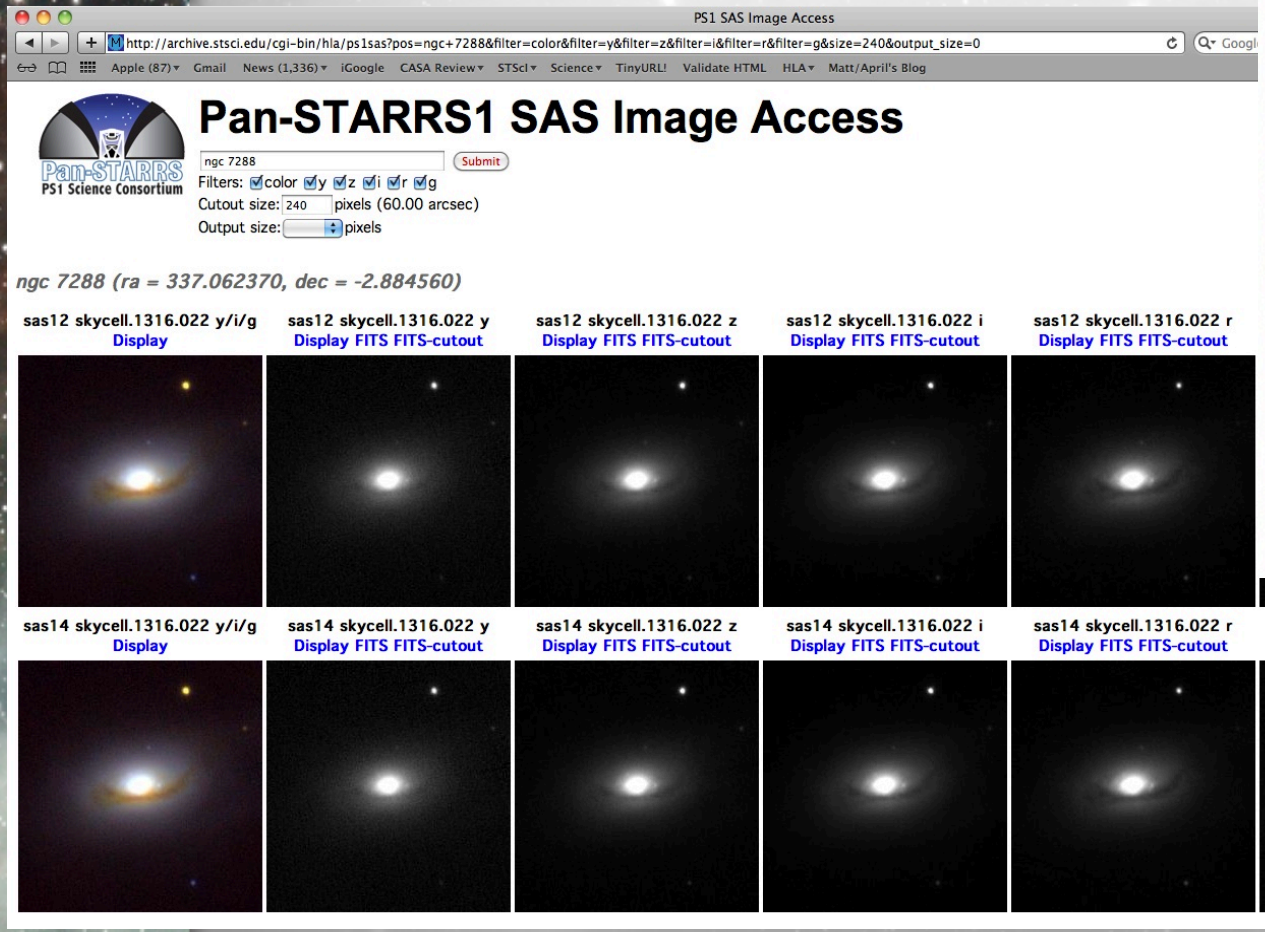
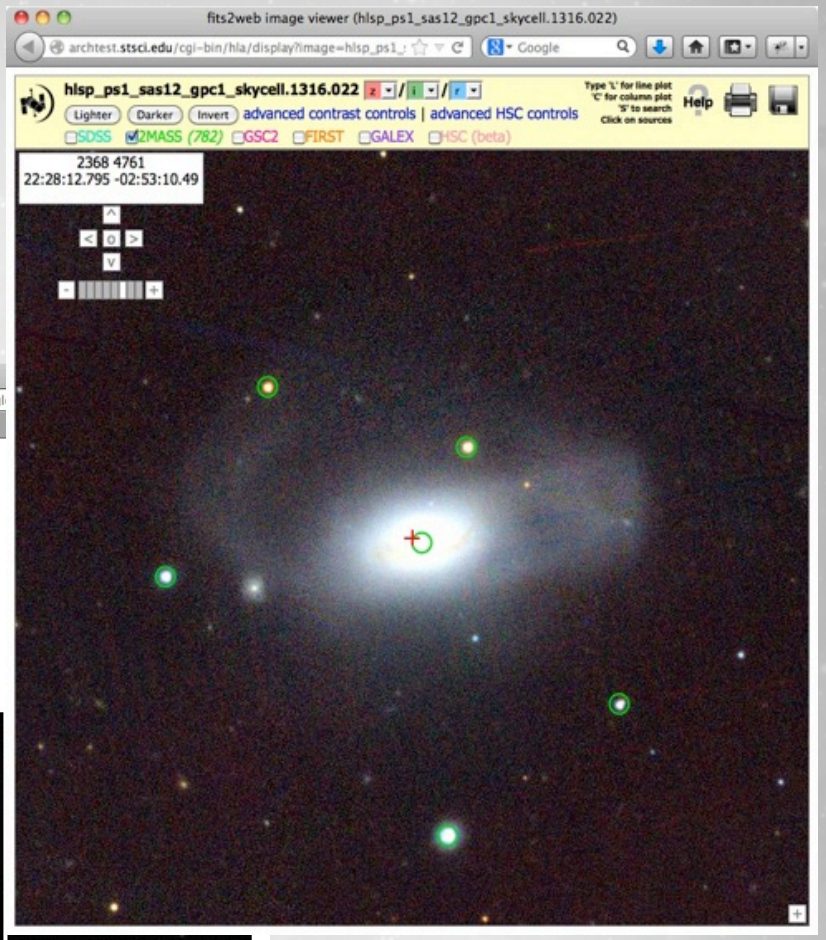
Sample PS1 image using HLA tools





Future

- SWIFT UVOT updates monthly
- XMM OM data same as at HEASARC for the products we are serving.
- Literature links are on-going. The data gathered from this project will be used in some future projects (see *Aloisi*)
- Investigating the JHU SciDrive (VO Space)
- Big Data – LSST representative on JWST SDR Review Board
- Pan-STARRS

Related to MUG recommendation: SWIFT and XMM data should be the same as at HEASARC

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MUG meeting changes

- Fewer/shorter presentations
- Longer meeting
- Including some responses to MUG recommendations and suggestions in talks

Related to MUG recommendations: Improving the MUG meeting

Extra slides

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Supplementary Material

- HST Upgrade Project Status
- HST Instruments/Operations Highlights
- JWST Data Management System (DMS)
- JWST Data Flow Diagram
- JWST Functional Architecture

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HST Upgrade Project Status

- Project goals – modernize, improve flexibility.
  - Replace reference file system (replace CDB with CRDS)
  - Replace old OPUS pipeline infrastructure with Condor/OWL
  - Replace OTFR with online cache that is updated as needed
- Goal to complete upgrade project and be operational Spring 2014
  - Improved implementation of reference files to be implemented into parallel operations in Dec 2013
  - Replacing OPUS with Condor/OWL workflow manager – Initial implementation in Ops for CRDS. - Dec 2013
  - HST instrument pipelines will be in Condor along with most of the support/ancillary pipelines.
  - Upgrade of Storage Broker – now flexible and able to handle different types of mount points e.g. online cache – completed September 2013
  - Full online cache population and reprocessing/repopulation in development. Static instruments will also be in cache. Timing is still TBD, but by Spring 2013
  - Operational workflow will include CAOM population and preview creation

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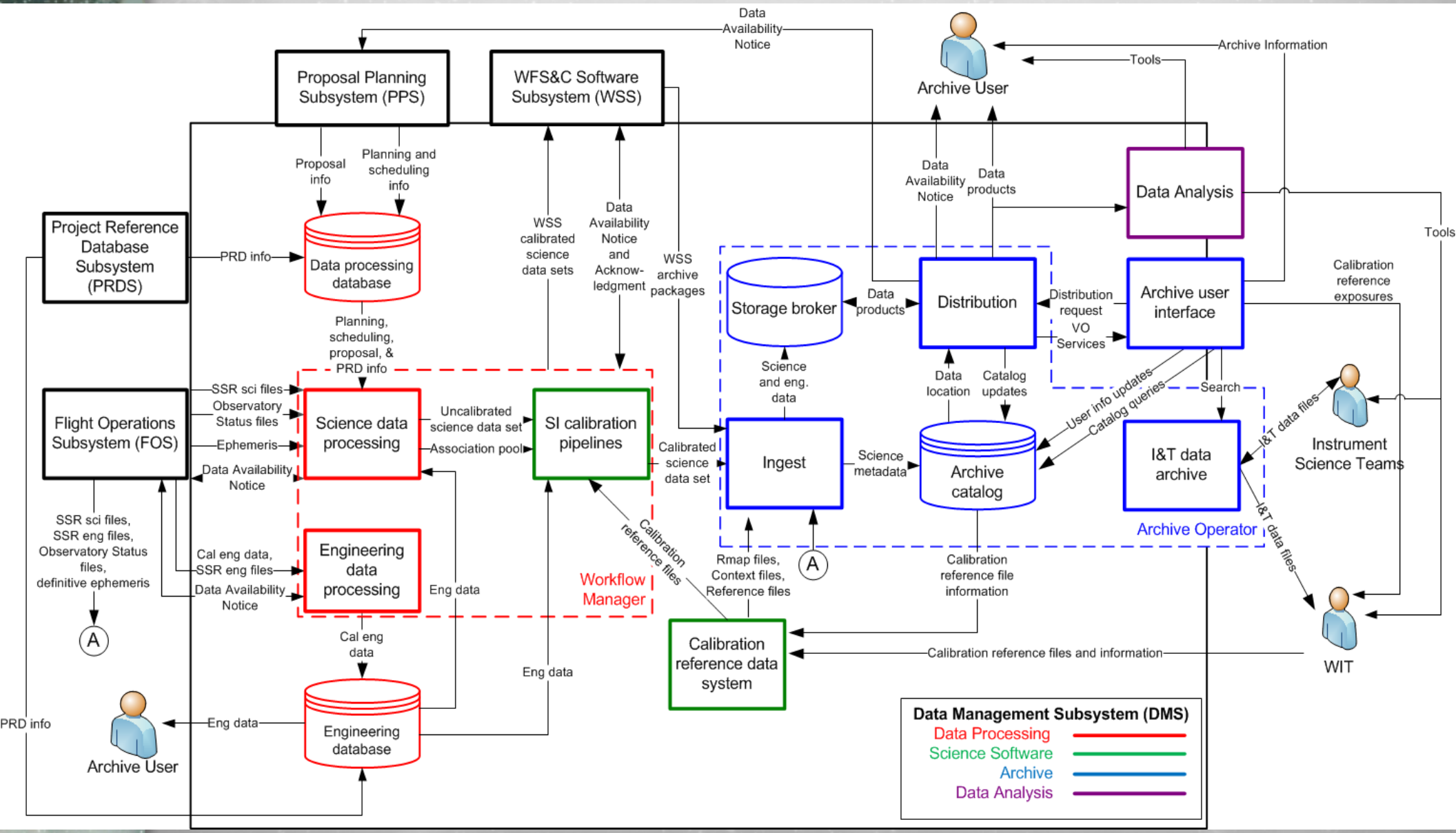
HST Instruments / Operations Highlights

- Astrodrizzle and CALWFC3 updates – Dec 2012 and Jan 2013
- March 2013 – All WFC3 data reprocessed – March 2013
- April 2013 – All ACS data reprocessed – April 2013
- New calibration routines, COS updates – April 2013
- More COS updates – May 2013
- COS reprocessing started – June 2013. Recreating CCI/CSUM files so processing data manually in chronological order with team inspection every few weeks.
- FOC and GHRS header-data fixed and re-ingested – Oct 2013

JWST Data Management Systems (DMS)

- Design and development work underway.
- Third System Design Review (SDR) later this week. Second DMS build was Oct 1.
- Calibration and pipeline development underway. Definition of data products and associations started recently. Database design underway, starting with file tracking.
- HST upgrade project taking advantage of JWST design decisions and HST provides operational experience for JWST.

JWST Data Flow Diagram



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JWST Functional Architecture