



MAST Multimission Archive at Space Telescope

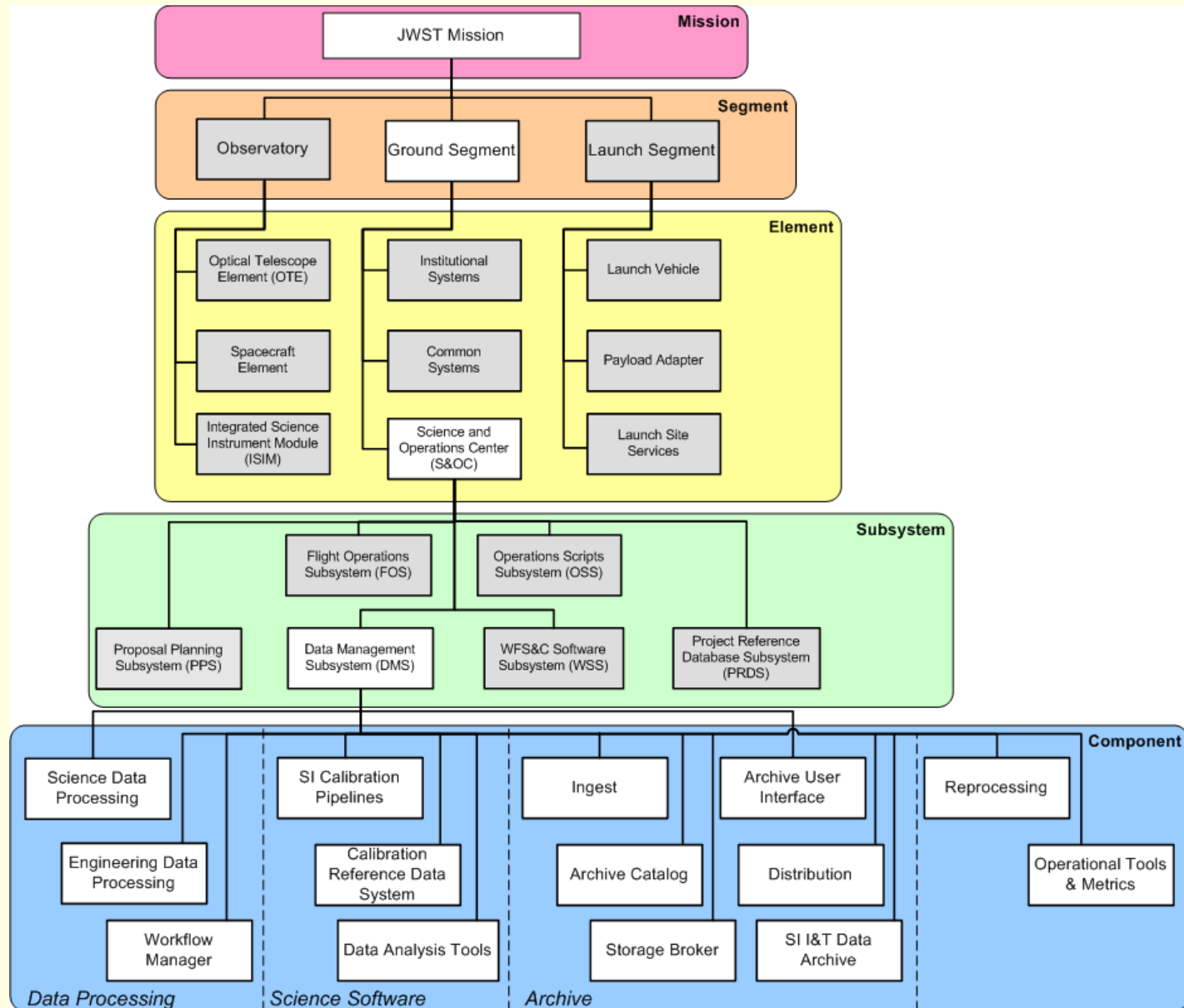
MAST Users Group – September 23, 2011

JWST DATA MANAGEMENT SYSTEMS

Gretchen Greene



JWST Hierarchical Overview



DMS is one subsystem within the JWST Science Operations Center (SOC)



JWST DMS Basics

- Reformat and process science *and* engineering telemetry data
- Perform calibrations of science instrument data and generate a set of standard products
- Build and manage a data archive which stores and retrieves data products
- Provides science users access to the JWST data
- Deliver tools and services to the public astronomical community to support data analysis



JWST vs. HST DMS...

Many Similarities, systems reuse (DADS, MAST), and lessons learned, however there are...

- Key Basic Differences:

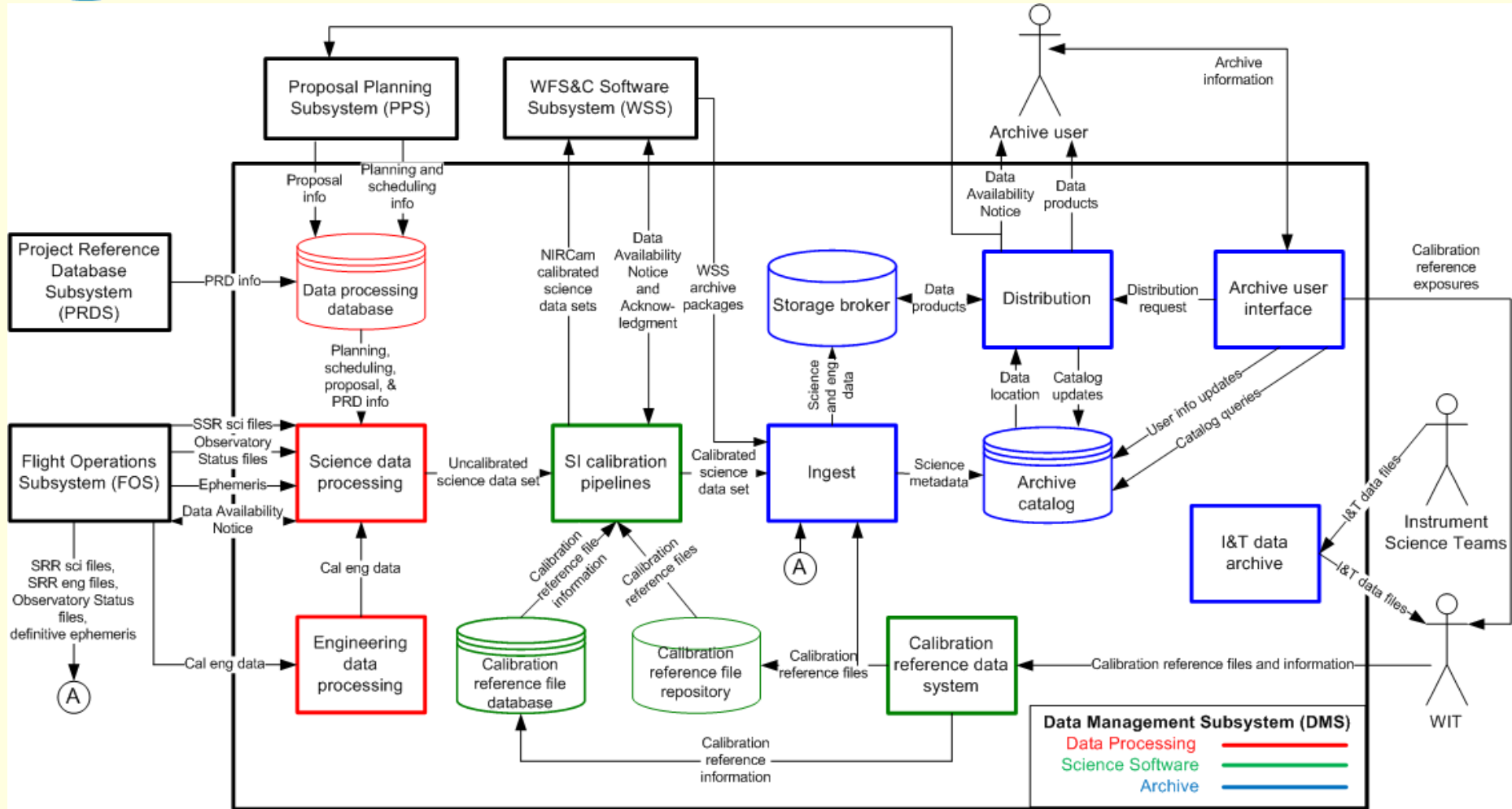
- Order of magnitude increase in computational and I/O DMS throughputs
- Flight Operations System interfaces to DMS will support direct transfer at STScI of DSN telemetry data and require priority data processing for Wavefront Sensing and Control

- Functional Decisions:

- Trade Study for Workflow Management system resulted in down-selected CONDOR system, will replace OPUS
- Dynamic reprocessing of data products
- Online Data Products from the outset
- Higher Level data product generation assumed fundamental
- Service based architecture to support multi-mission DMS

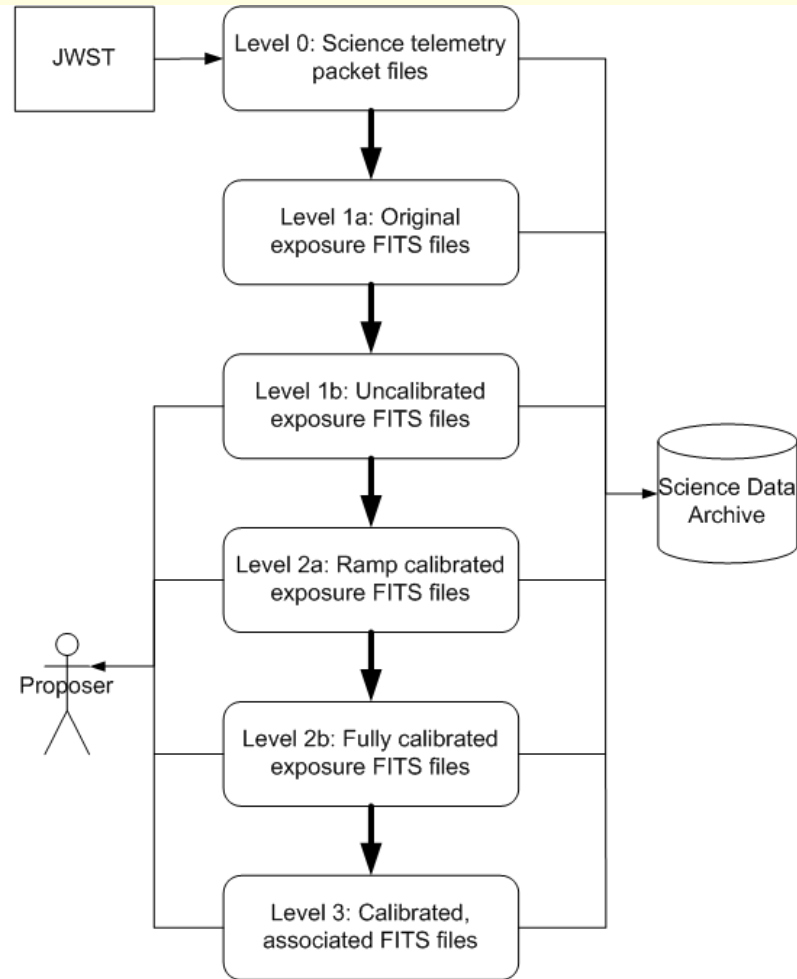


DMS Dataflow





DMS Estimated Archived Data Volumes



Data	Per Yr (TB)	5.5 yr Mission (TB)	10 yr Mission (TB)
Recorded engineering	0.3	1.6	3.0
Level-0	20.9	115.0	209.0
Level-1a	20.9	115.0	209.0
Level-1b	20.9	115.0	209.0
Level-2a (compressed 2:1)	1.0	5.6	10.2
Level-2b (compressed 2:1)	1.0	5.6	10.2
Level-3 (compressed 2:1)	1.0	5.6	10.2
WSS Archive package (compressed 2:1)	0.05	0.25	0.5
Total	66.1	363.7	661.1



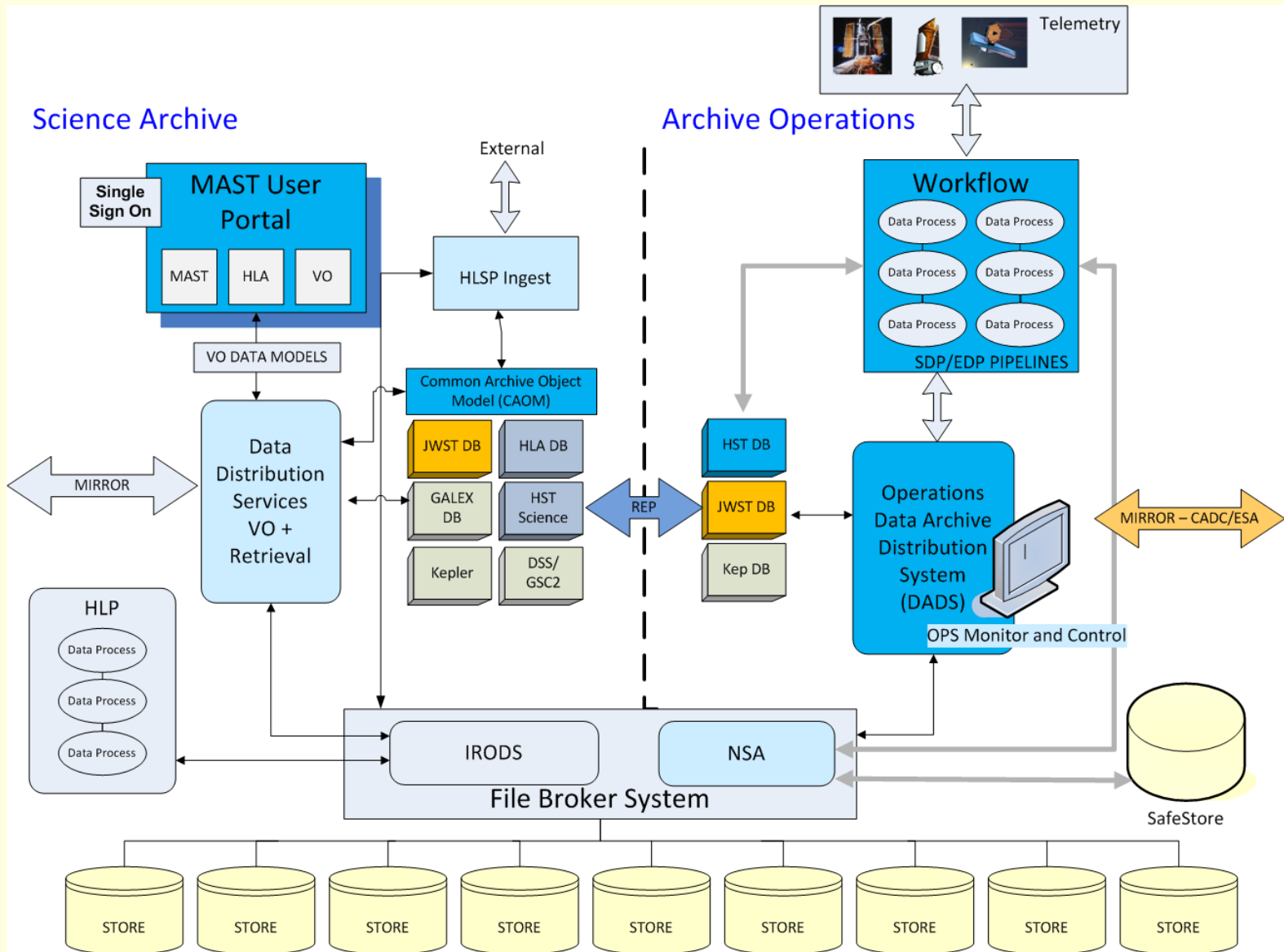
JWST SOC DMS

Requirements and Design Phases

- Completed formal Systems Requirements Review (Dec '10) => 650 requirements
- Currently in year 1 of design and development
 - Systems Design Review 1 – Dec '11
 - Leveraging capabilities in MS SQL
 - DMS architecture, Data Processing, Archive, and Science Software design teams (~ 15 FTE)
- Designing for Launch Readiness Data of 2018 with 95% level of current STScI DMS capability

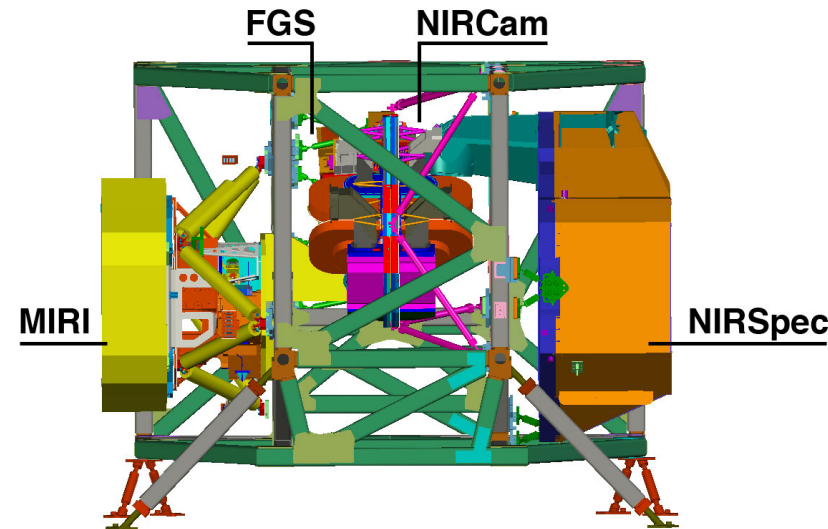


STScI Multi-mission Archive JWST



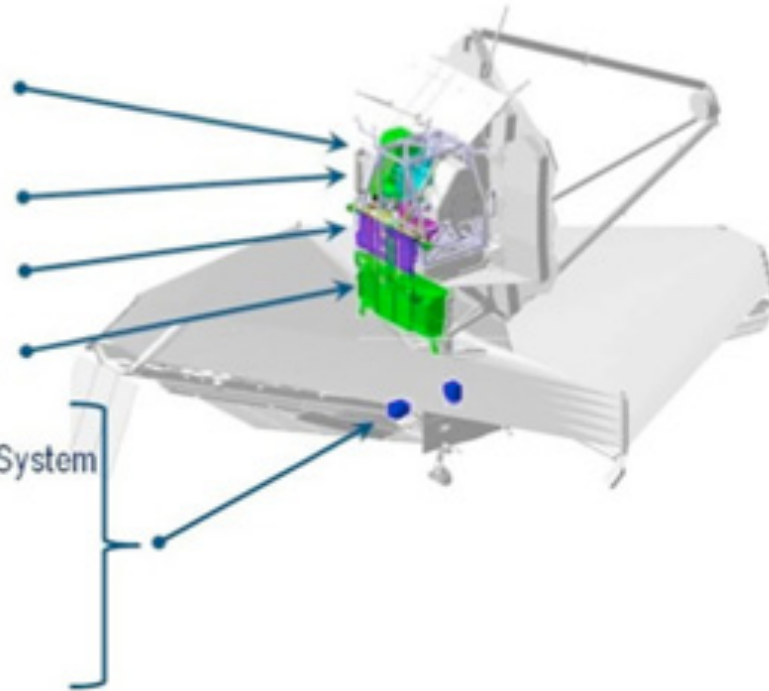


JWST Mission entering Integrated Science Instrument Module (ISIM) Ground Testing Phase



The ISIM system consists of:

- Four science instruments
- Nine instrument support systems:
 - Optical metering structure system
 - Electrical Harness System
 - Harness Radiator System
 - ISIM electronics compartment (IEC)
 - Cryogenic Thermal Control System
 - ISIM Command and Data Handling System (ICDH)
 - ISIM Remote Services Unit (IRSU)
 - Flight Software System
 - Operations Scripts System





JWST SID Archive

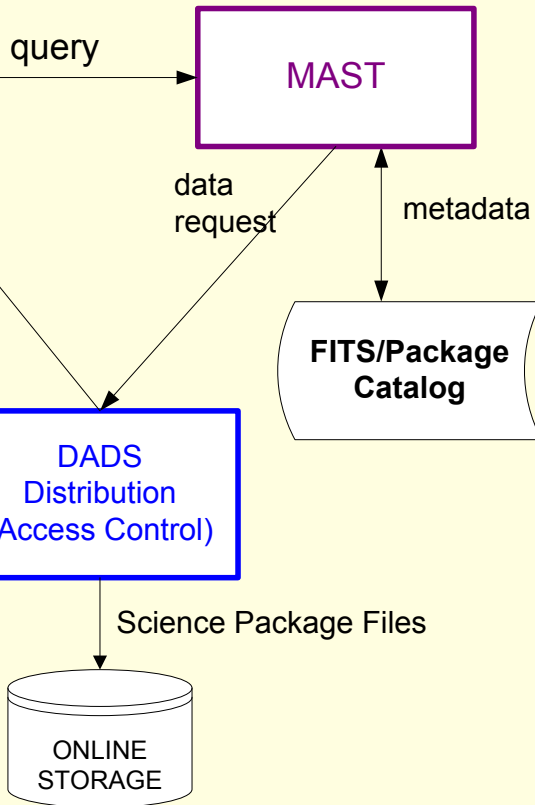
- **S**cience instrument
- **I**ntegration and test
- **D**ata

- **SID functionality**
 - Receive data from I&T teams (FILES and/or PACKAGES)
 - Ingest I&T data
 - Build/update archive catalog
 - Store I&T data (locally and offsite)
 - Enable I&T archive searches
 - Deliver I&T data to authorized users



MAST, DADS and the SID Archive

JWST SID
Archive User



The screenshot shows the JWST MAST website. The header includes navigation links for MAST, STScI, Tools, Mission Search, Tutorial, and Site Search. A sidebar on the left contains a FAQ section with links for Search & Retrieval, Documentation, Instruments, and Related Sites. The main content area features a detailed description of the James Web Space Telescope (JWST) and a list of its instruments: Mid-infrared instrument (MIRI), Near-Infrared camera (NirCam), Near-Infrared Spectrograph (NirSpec), and Tunable Filter Imager (FGS-TFI). A right-hand sidebar displays a NEWS section with dates and mission information, and a Missions section listing various astronomical missions like Hubble, GALEX, and others. At the bottom of the page, there is a 3D rendering of the JWST spacecraft.

MAST JWST Mission <http://archive.stsci.edu/jwst>



MAST, DADS and the SID Archive

- Constraining search on keyword values based on augmented set of FITS keywords
- Keywords are “mined” from the SID archive catalog into a searchable indexed set

MAST

MAST STScI Tools Mission Search Tutorial Site Search

JWST Home About JWST Status SID Cookbook SID Search

Archive Status **SID Search** (Help) Field Descriptions

Standard Form File Upload Form

Search Reset Clear Form

Retrieval Type Test Title Test Number

Package File NRS_A_41_0_TotalNoise_

DATE-OBS INSTRUME Z_JOBNUM Z_CATEG Detector

Readout

User-specified field 1 Field Descriptions

N Frame
package ID
Use SCA ID
N Frame
N Group
Use NAXIS1
NAXIS2
Filename

Field Descriptions Retrieval Type

User-specified field 2 Field Descriptions

Retrieval Type

User-specified field 4 Field Descriptions

Retrieval Type

User-specified field 6 Field Descriptions

Retrieval Type

Output Format: HTML_Table

Show Query Make Rows Distinct

Maximum Records: 1001

Records per Page: 50

Search Reset Clear Form

Mission Search / Missions / Contacts / STScI / MAST

SID2 Search Results

Display numeric columns graphically using VOPlot

number of rows returned = 2

Submit marked data for retrieval

Mark all Unmark all Mark public Unmark public Mark proprietary Unmark proprietary

Mark	Retrieval Type	Data Set Name	File Name	Test
<input type="checkbox"/> @	FILE	NIRSPEC_I_T-NRS_A_41_0_TOTALNOISE_02_28-NRSDS06050	nrsds06050s2_noise.fits	NRS_A_41_0_T
<input type="checkbox"/> @	FILE	NIRSPEC_I_T-NRS_A_41_0_TOTALNOISE_02_28-NRSDS06050	nrsds06050s1_noise.fits	NRS_A_41_0_T

Submit marked data for retrieval

Mark all Unmark all Mark public Unmark public Mark proprietary Unmark proprietary

Fixed Keywords

Selectable Keywords