WISE Science Data System Source Photometry (WPHOT) Subsystem Design Peer Review: Introduction

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Review Panel

- John Krist (JPL)
- Mike Skrutskie (U. Virginia, WISE Science Team)
- Adam Stanford (LLNL, WISE Science Team)
- Jason Surace (IPAC/SSC - Document review only)
- Bill Wheaton (IPAC/SSC)

Charge to Panel

The peer review panel is asked to comment on the following specific questions:

- Does the design of the Source Photometry (WPHOT) subsystem address the requirements on the system?
- Are the WPHOT algorithms suitable and appropriate to carry out the system functions?
- Is the design robust to circumstances that will be encountered with the WISE data?

In addition, comments are welcome on other aspects of the design. However, we will limit discussion of other subsystems and WPHOT implementation issues.

WISE Will Release Three Primary Science Data Products

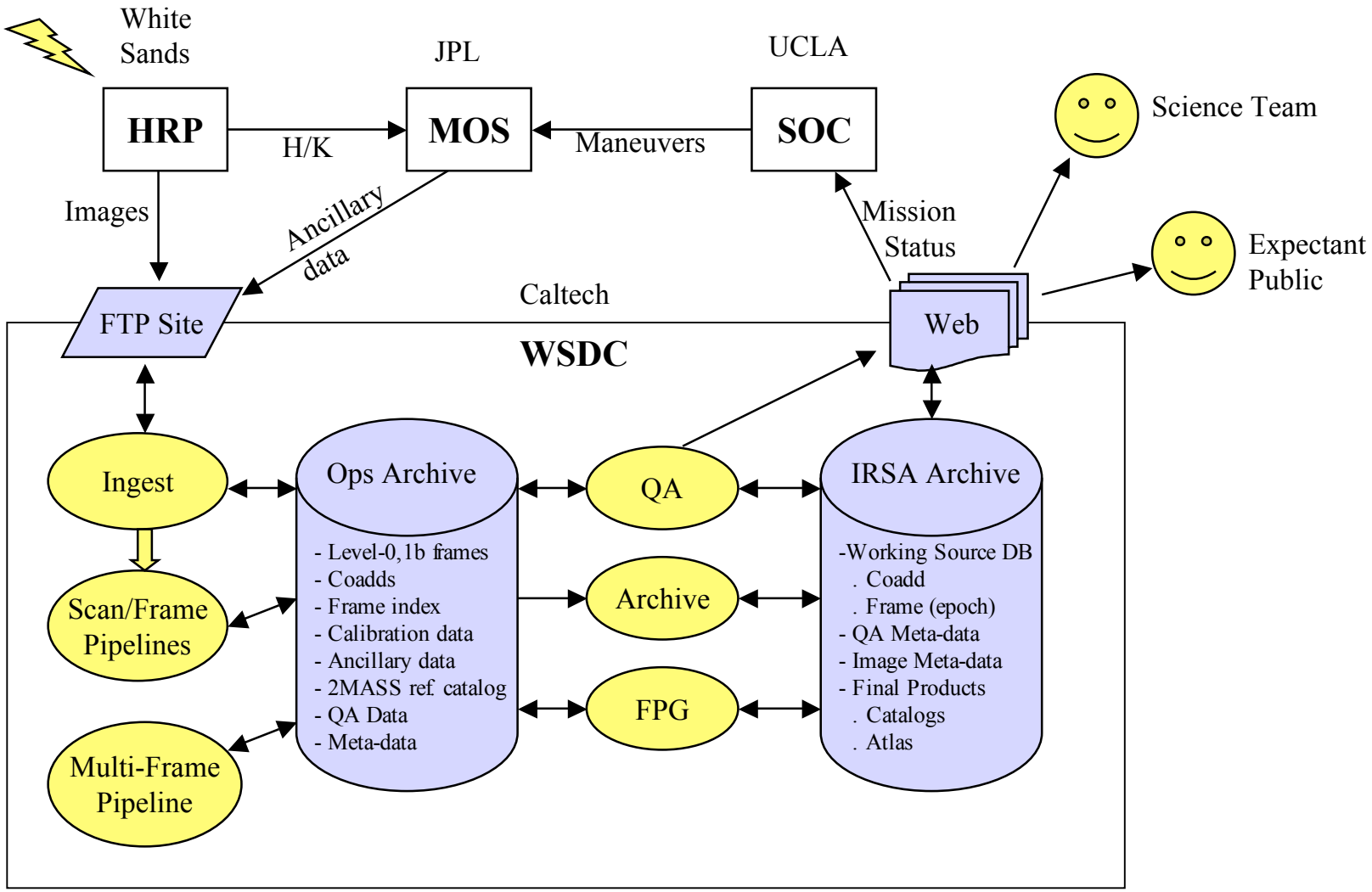
- ***Image Atlas*** - Calibrated images covering the sky in the four WISE bands. Photometric and astrometric calibration to be tied to the WISE Source Catalog.
  - ~3.0e5 1.375”/pix FITS format images (number depends on footprint adopted)
  - Combination of all available exposures covering each field
  - Depth-of-coverage maps for each image
  - Combined image metadata
- ***Source Catalog*** - Accurate positions and fluxes in four WISE bands
  - ~3e8 objects detected on combined images
  - Detection and measurement quality flags
- Explanatory Supplement
  - Mission and data product descriptions
  - User’s guide (*e.g.* data formats, access modes)
  - Cautionary notes describing limitations of data and known idiosyncrasies

Data Product Requirements

WISE Source Catalog Requirements		
Reliability	>99.9%	SNR>20; unconfused
Completeness	>95%	SNR>20; unconfused
Photometric Accuracy	<7%/band	SNR>100; unconfused
Photometric Sensitivity	3.3μm: 0.12mJy 4.7μm: 0.16mJy 12μm: 0.65mJy 23μm: 2.6mJy	SNR=5
Astrometric Accuracy	0.5” RMS wrt 2MASS PSC	

WISE Image Atlas Requirements	
Coverage	Constructed by combining all available images in each band
Band Registration	Four bands resampled to common pixel grid and scale
Calibration	Tied to Source Catalog
Format	Standard FITS

WISE Science Data System (WSDS) Executes Functions of the WSDC



WPHOT in Context

- WSDS originally baselined to perform only aperture photometry
  - Profile-fitting photometry was descoped for cost savings
  - Catalog would report aperture curve-of-growth corrected photometry
- Profile-fit photometry re-instated into baseline in October 2007
- Baseline still does not include any provision for special characterization of non-point sources
  - All sources to be characterized as if they were point-like
  - Retain aperture photometry to provide some measure of integrated flux
  - Possibly provide a “not point source” flag in Source Catalog