

Infrastructure for SIRTf Science Processing

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The Space Infrared Telescope Facility (SIRTf) will perform an extended series of science observations at wavelengths ranging from 20 to 160 microns for five years or more. The California Institute of Technology has been selected as the home for the SIRTf Science Center (SSC). The SSC is responsible for evaluating and selecting observation proposals, providing technical support to the science community, performing mission planning and science observation scheduling activities, instrument calibration during operations and instrument health monitoring, production of and access to archival quality data products, and management of science research grants. The science payload consists of three instruments delivered by instrument Principal Investigators located at University of Arizona, Cornell, and Harvard Smithsonian Astrophysical Observatory. The SSC is responsible for design, development, and operation of the Science Operations System (SOS) which will support the functions assigned to the SSC by NASA.

The SSC produce the standard science products by providing data reduction infrastructure services including:

- Data from the Flight, or Mission, Operations Center to the SSC.
- Scheduling of processing requests based upon type of data received. The request can result from data being delivered from the Mission Operations Center, from the requirement for follow-on processing once a product is created, from scheduled data reprocessing or from individual requests.
- Accepting work requests and dispatching job orders in a distributed system.
- Accepting a job from a dispatcher and executing it. This service organizes the required inputs, calls the appropriate data reduction services in sequence, archives final products, and queues any follow-on work.

The infrastructure is designed to handle both event-driven and batch requests. There is a significant reprocessing step which is nominally handled as a batch request while data arriving from the Mission Operations Center results in an event-driven request.

Processing in this system is distributed while data management is centralized via a data management system.

This paper will describe the development process, the top-level infrastructure architecture, the current implementation, and most importantly the lessons learned from the development of the SSC data reduction infrastructure. Additionally, more importantly, this paper the evolution of the infrastructure based on evolving community use cases and emerging information system technology. Of particular interest will be the description of the downlink processing as a cooperating, interoperable component of SSC Science Operations System.

Keywords: science data processing infrastructure, database management system, distributed processing.