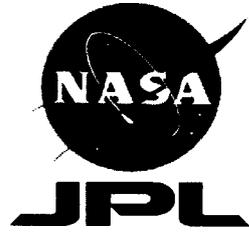




Advanced Methodology for Capturing Product Metadata

Kalyani Rengarajan
Mark Abajian, Navid Dehghani, Jeff Jones, Quentin Sun and
Quoc Vu

*Interferometry Science Center,
California Institute of Technology*



Topics



- Introduction - Interferometry Science Center
- Introduction - SIM instrument Testbed
- Challenges
- Prototype Objectives
- Metadata Catalog System Architecture
- Advanced Methodology to Handle Changes
- Current Status/Future Plans

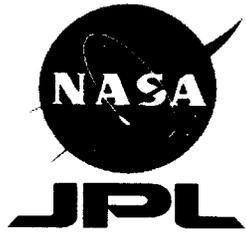


Introduction

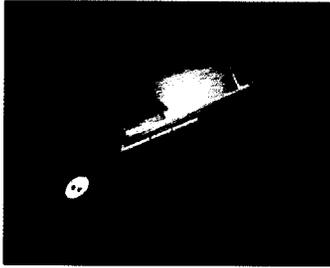
Interferometry Science Center



- ISC is a multi-mission facility to support science for the Origins Interferometry projects
- Jointly operated by Caltech and JPL <http://isc.caltech.edu>
- **Charter**
 - **Multi-Mission (Core):**
 - Data handling facilities for analysis, archiving, and for archive access.
 - Development of a core multimission science operations system (SOS) architecture for application to ISC-supported missions
 - User community interfaces and interactions
 - Development of data formats to allow for data comparisons and analysis across Navigator Program projects.
 - **Mission-Specific:**
 - Issuing call for proposals for observing time
 - Oversight and management of the selection of guest investigators
 - Developing project-unique software for science operations and analysis
 - Developing the schedule of observations for a project
 - Processing of raw data into level-one (and higher) data products as defined by the projects
 - Instrument simulation and planning tools
- **Supported Projects**
 - Keck Interferometer (KI), Space Interferometry Mission (SIM), Large Binocular Telescope Interferometer (LBTI), Terrestrial Planet Finder (TPF) Mission, Keck Single Dish Archive



SIM Instrument Testbed

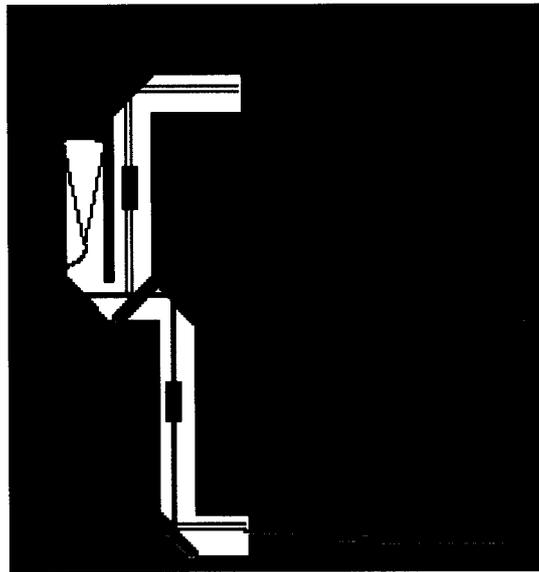


SIM Goal: Determine the positions and distances of stars, and probe near-by stars for Earth-size planets. The accuracy required is several hundred times more than any previous mission. For details, refer to <http://sim.jpl.nasa.gov>

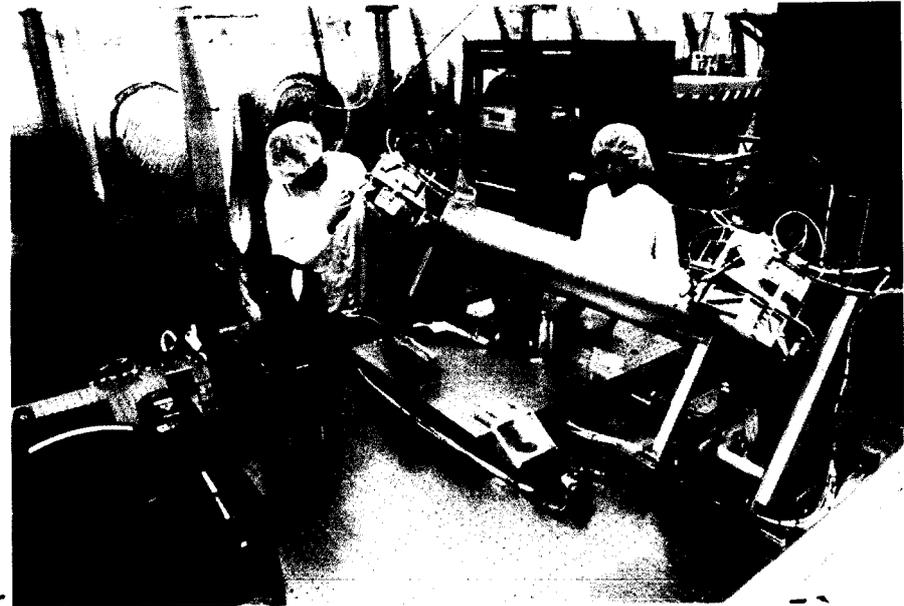
- First-in-space optical interferometer
- Astrometric precision requirement at a few micro-arcsecond level
- Requires fringe measurement accuracy at the picometer level.
- micro-arcsecond Metrology Testbed to measure the difference between starlight path within the instrument and the internal metrology measurement of that path
- This talk covers a prototype to capture the metadata of the experiments



MAM Pictures

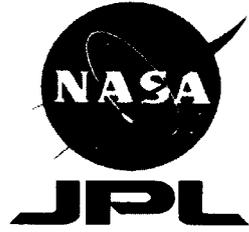


Schematic of MAM interferometer and pseudostar



MAM inverse interferometer pseudostar (IIPS) in final assembly

From "SIM technology development overview—light at the end of the tunnel " by Robert A. Laskin (SPIE 2002)



Challenges



- Getting the attention of the users, busy with technology milestones
 - To identify metadata
 - To use the prototype and give timely feedback
- Identifying what metadata is needed
 - The instrument components used, their state, data location, analysis results, data retrieval
- Keeping up ever changing configuration (instrument technology first of its kind)
 - Changes to the configuration mean changes to the metadata
- Running in the experiment environment
 - Postgres database, Linux
 - Our development environment – MySQL (now Oracle), Solaris
- Resource constraints



Prototype Objectives



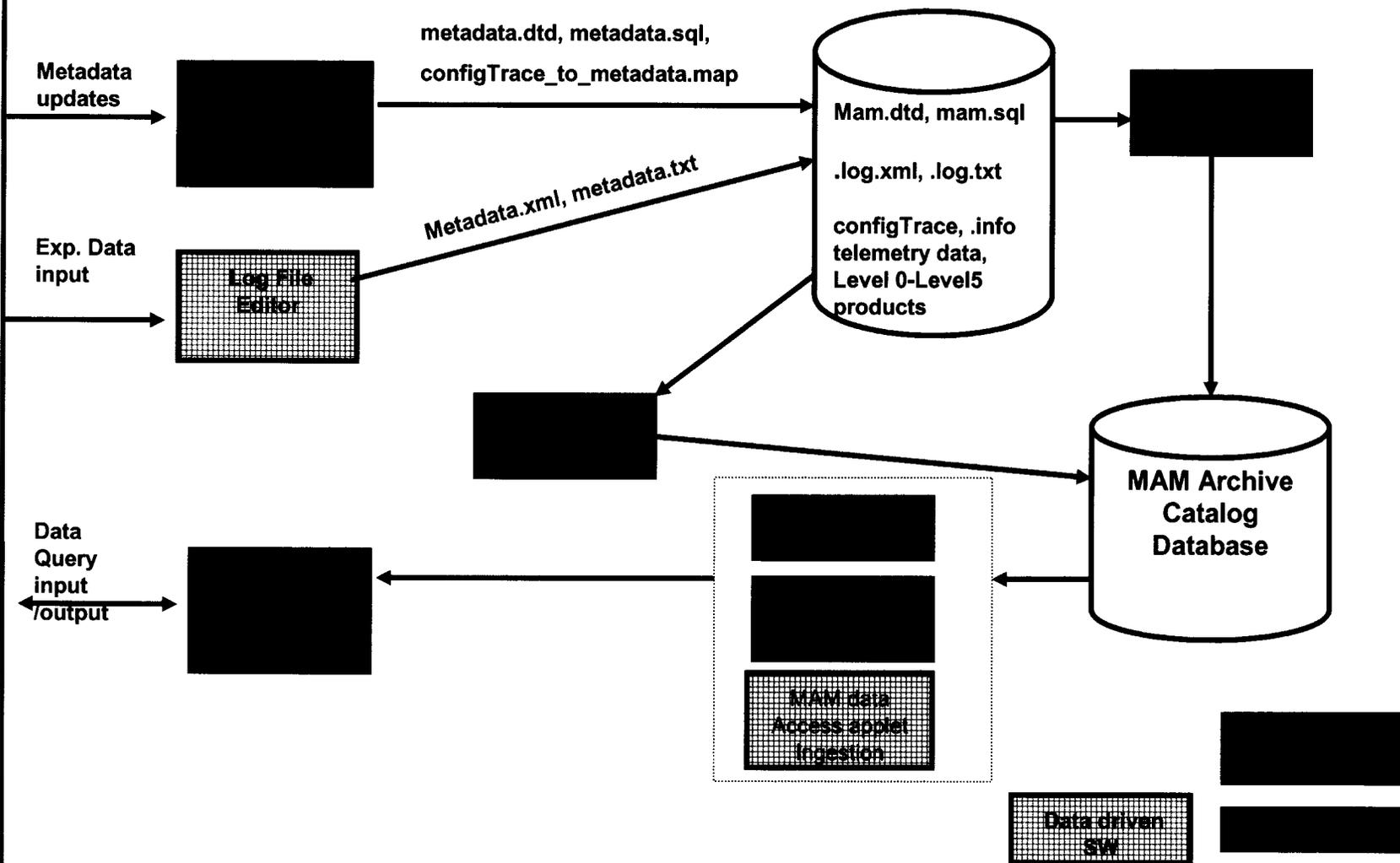
- Capture and save the experiment metadata - GUI
- Provide utilities to access the data
- Adapt to flexible metadata definition and changes
- Minimize the impact of metadata changes to the software
- Make the software components reusable
 - Metadata definition
 - Metadata capture, store, retrieval



Metadata Catalog System Architecture

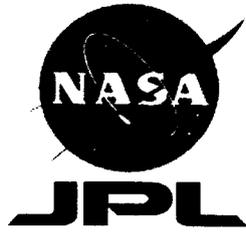


Interferometry Science Center





- Metadata specification from Excel converted to XML, DTD and SQL
- Data-driven application software
 - Metadata capture GUI based on the XML DTD
 - Data query tool based on data definition
- Metadata transfer to user and database using XML file



Current Status/Future Plans



Current Status

- End-to-end prototype developed
- Experimental use by the MAM team
- Resources needed to implement the changes and support further usage

Future plans (resources permitting!)

- Incorporate user recommendations
- Get user commitment
- Automate database schema updates
- Eliminate Excel and replace by data-driven metadata update tool