IMPLEMENTING PORTALS OF THE UNIVERSE: LESSONS LEARNED

Operational Processes

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Topics Overview

- Science Input at All Levels
- Operations Concept Development
- Defined Observing Modes
- Observers Share the Workload
- Integration of Teams
- Science & Mission Operations
- Pipeline Processing & User Tools
- The Archive is not an Afterthought

Science Input at All Levels

Scientists should be real members of all design, development and operations teams.

- PI Science Team or Science Center, Instrument Team & Project Science Staff
- Task Lead + Task Scientist have joint responsibility for deliverables
- Most efficient method to design and deliver hardware/software that has maximum scientific utility

Operations Concept Development

Operations concepts should be developed in tandem with the instruments and the mission.

- For multiple instrument missions, minimizes divergence of expected operating modes
- Enhances interactions of ops/design team with instruments early
- Observing modes (next slide) developed as part of this process

Defined Observing Modes

Observing modes can be designed to support > 99% of science cases. Handle unique and new science programs in engineering modes.

- Leads to well defined calibration program, fewer modes to calibration and no orphans
- Scientists are extremely creative at utilizing available modes to reach their science goals
- Add new observing modes as mission evolves

Observers Share the Workload

High-fidelity observation planning tools allow users to do real work in preparing their observations for execution.

- Need to find the balance between
  - performance estimators
  - high fidelity resource planning tools
  - proposal/scheduling process phases
- Science and scheduling expertise is required to handle the ~20% of observations that can't be fully specified with tools.

Integration of Teams

Instrument and Science Center teams need to be integrated at the earliest possible opportunity.

- Happens naturally for PI mission
- Science Center staff should be part of instrument development teams
  - Minimum - as liaisons
  - Optimum – full members of teams

Science & Mission Operations

NASA missions exhibit multiple successful science+mission operations models. Good communication and team building is the key.

- Co-location makes this easier.
- Distributed operations can be very successful.
  - Start the integrated planning early and continue to address integration issues as the mission evolves.

Pipeline Processing & User Tools

Community expects Science Centers to provide at least level 1 pipeline processed data products. Additional processing tools are very valuable.

- Build pipelines and processing tools to be as flexible and extensible as possible.
- Minimize reinventing the wheel but recognize that missions are unique and will require some unique processing tools

The Archive is not an Afterthought

The mission archive and final data products should never be forgotten in science and mission operations design and development.

- Archive is primary science interface to the mission.
- Substantially more work to retrofit your archive and data products after the fact than to do it right in the first place.