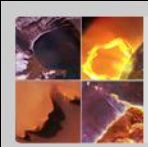




Astrophysics

Workshop Purpose
Paul Hertz

April 25, 2012



The Importance of Astronomy Science Centers

NASA Astronomy Science Centers provide functions for the community:

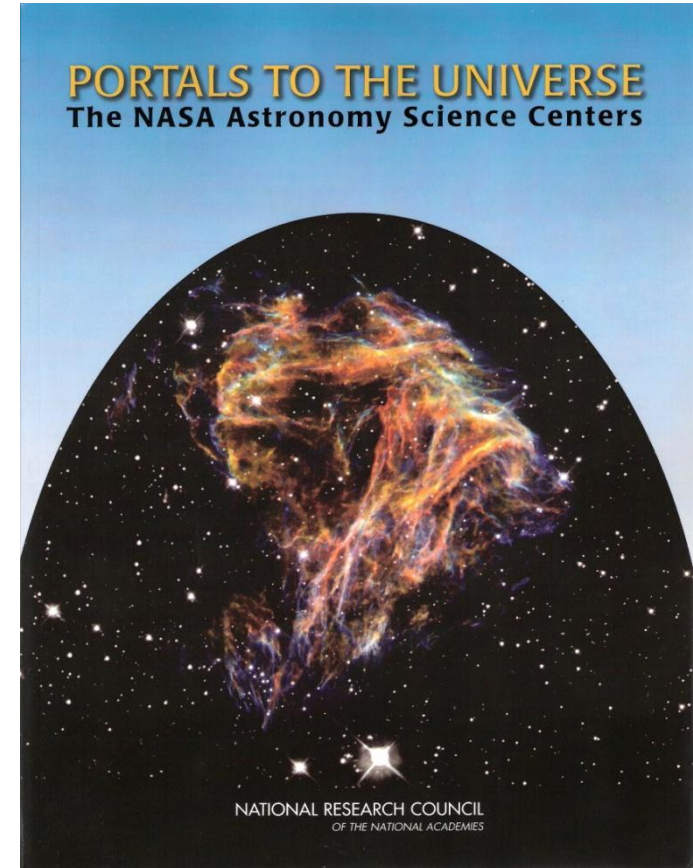
- proposal ingestion & data return (the basic GOF functions),
- archival data curation and access (the basic SARC functions), and
- repository of mission expertise

We're here to compare best practices of a range of such centers. The archive functions are particularly important because

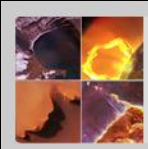
- The interaction of the science community with major NASA astrophysics missions is through a science center
- Observers submit proposals through a science center
- Observers receive their data in archive-ready condition through a science center
- Non-observers (archive users) receive their data through a science center
- Some missions such as surveys (e.g. Fermi) do not even have observers in the sense that pointed observatories do (e.g. Hubble)
- The fraction of astrophysics research that makes use of archival data is growing
- A significant fraction of the NASA astrophysics community received funding for analysis of mission data (ADAP is 20% of NASA's astrophysics grants programs)
- The pace of new missions being launched is slowing making archival data even more important

Portals to the Universe

1. Conduct a comparative review of current astronomy science centers in terms of the kinds of roles and services that they provide; their size (e.g., budget, staff), the extent to which they utilize centralized or distributed approaches to their architecture, the roles and status of their staff, the nature of their host or governing institution governance structure, how they were established by NASA (e.g., sole source versus competition).
2. Identify best practices and lessons learned from experience to date with NASA astronomy science centers.
3. Assess the questions of whether there are optimum sizes or approaches for science centers, whether there are rational break points in levels of service for centers, and what may be significant advantages or disadvantages for different scales of service.



NRC Study (2007)



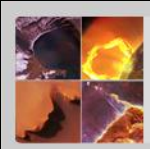
NRC Findings and Recommendations

- **Finding:** The CXC, STScI, HEASARC, and IPAC have sufficient scientific and programmatic expertise to manage NASA's current science center responsibilities after the active phases of all current and planned space-based astronomy missions have been completed.
 - **Recommendation 1.** NASA should establish a large new center only when the following criteria are met: (1) the existing centers lack the capacity to support a major new scientific initiative and (2) there is an imminent need to develop a new infrastructure to support a broad base of users.
 - **NASA Response 1:** NASA concurs with this recommendation.

New missions assigned to existing Centers, e.g. Fermi to GSFC/HEASARC, JWST to STScI/MAST.

New Center created (SOFIA SMO) to support a broad base of users in a different area of astronomy exploration – airborne astronomy.

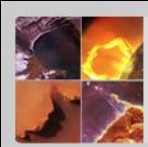
New Center created (NExSci) to support a broad base of users in a different area of astronomy exploration – exoplanets.



NRC Findings and Recommendations

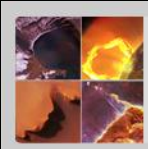
- **Finding:** The ability of CXC, STScI, HEASARC, and IPAC to provide the appropriate level of support to the scientific community depends critically on the extent to which they can attract, retain, and effectively deploy individuals with the mix of research and engineering skills necessary to maintain continuity of service.
- **Finding:** Embedding GOFs in existing science centers, such as the HEASARC, provides for efficient user support, especially when the scope of a space mission does not require establishing a separate center.
- **Recommendation 2.** NASA should adopt a set of best practices as guiding principles to ensure the effectiveness of existing flagship and archival NASA astronomy science centers and to select the operational functions of any future centers.
 - **NASA Response 2:** This workshop will help define current best practices.

Best practices suggested in the Portals Report follow.



Examples of Portals Report Best Practices

- Mission Operations
 - Have close interactions among scientists, engineers and programmers.
 - Have research scientists who actively participate in mission ops & policy decisions.
- Science Operations
 - Support robust, accessible, well-documented software.
 - Use common, rather than instrument-specific, software across missions when possible.
 - Maintain adequate online supporting materials and a help desk with adequate staffing and rapid turnaround.
- Data and Archiving
 - Provide rapid (<24 hr) response to requests for data that have been calibrated and archived.
 - Support common analysis software and protocols that can be used by all the science centers.
- Education and Public Outreach
 - Involve staff scientists and investigators in EPO activities.
 - Coordinate EPO efforts of smaller missions with EPO systems of large NASA astronomy science centers.



NRC Findings and Recommendations

- **Recommendation 3.** NASA should ensure that NASA astronomy science centers cooperate among themselves and with other agencies to develop strategies and plans for: developing common protocols and formats for proposal entry; developing a universal infrastructure for data formats and metadata, archiving, and retrieval and analysis tools; and providing curriculum materials and professional development programs for K-12 teachers.
 - **NASA Response 3:**
 - Many missions use derivatives of APT, SPOT, or RPS for proposal entry.
 - NASA is now collaborating with the NSF on the Virtual Astronomical Observatory. All NASA archives are participating.
 - All NASA archives now have funded E/PO programs.



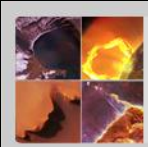
Workshop Charter

In 2007, the National Research Council completed a thorough comparative review of NASA astronomy centers, assessing the roles and services that they provide to the community. The conclusions from that review are summarized in the NRC publication “Portals to the Universe”. These include recommendations that NASA should adopt a set of best practices as guiding principles to ensure the effectiveness of existing astronomy science centers, and that NASA should ensure that science centers should cooperate among themselves and with other agencies to develop strategies and plans.

The purpose of this workshop is to provide a forum to understand the current processes used by various astrophysics science centers and identify the current best practices candidates in a report to the Astrophysics Division.

The participants in this workshop will include representatives from the Chandra X-ray Center, the Spitzer Science Center, the Infrared Processing and Analysis Center, the NASA Exoplanet Science Institute, Space Telescope Science Institute, Goddard Space Flight Center (SWIFT mission), NASA-Ames (Kepler), and the SOFIA Science Center.

Each center will be asked to report on their process for each of the following areas and what they consider works well or not and why.



Workshop Charter (cont)

Proposal process

- Schedules and coordination with other observatories (ground and space)

- Submission tools and proposal format

- Evaluation processes

- Grant administration and budget processes

Community interaction

- User committee

- Newsletters and Technical Reports

User support

- Documentation needs prior to proposal submission

- User query support/helpdesk

- Direct support during observations

- Post-observation support for data reduction and analysis

- User committee

Operational processes

- Observation planning and scheduling

- Instrument calibration

Archival support

- Data Storage

- Long-term data curation

In addition, each participant will be asked to identify issues they may have with Astrophysics science policy issues and suggestions for improvements. In particular,

- Duplication policies

- Data Access restrictions

- Complaint processes



Workshop Charter (cont)

The workshop will be held at the Space Telescope Science Institute, Baltimore, in Spring 2012. It will last 1 day. It is anticipated that 2-4 representatives from each science center will attend the workshop in person, and the meeting will be webcast in a manner to allow interactive participation by scientists at remote locations. Remote attendees will be asked to register in advance of the workshop.

The meeting format will comprise a series of 30-45 minute presentations by a representative from each science center, followed by a 30 minutes period for further discussion. A final session will be scheduled for developing the final products of the workshop:

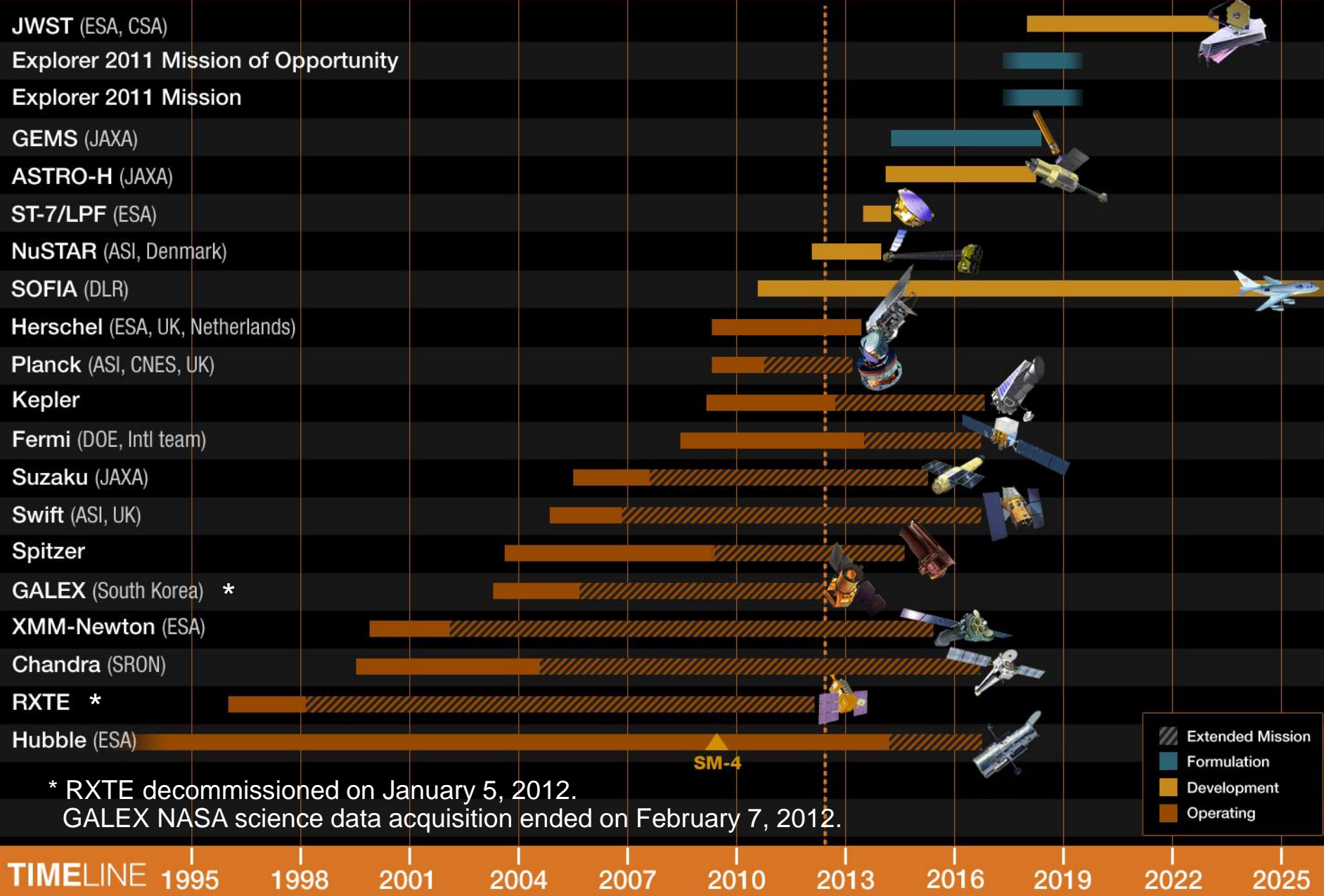
1. A document giving feedback on NASA policies that are constraining operation and may require modification. 3 topics were mentioned: proprietary time; processes for awarding DD time (which probably falls under the proposal process discussion); and guaranteed time for science centers.
2. A best practices document, to be used as a guide for establishing future science operation centers. The NRC Portal report gives high level guidance; this document will focus more on implementation. Contrasts between large and small missions should be drawn, where appropriate. There may also be differences stemming from operational modes: surveys vs GO-dominated missions; collaborative missions with other agencies vs NASA-only missions; multi-user vs PI-led missions.

At the end of the workshop, an oral outbrief will be presented to the Astrophysics Division and a written presentation provided to the Astrophysics Division within one month after the workshop.

The presentations, report to the Astrophysics Division, and the webcast will be archived at STScI and made available to the broader community, with links established at the appropriate NASA SMD web pages.

Astrophysics Missions timeline

Last updated: April 24, 2012



* RXTE decommissioned on January 5, 2012.
 GALEX NASA science data acquisition ended on February 7, 2012.

- Extended Mission
- Formulation
- Development
- Operating

TIMELINE 1995 1998 2001 2004 2007 2010 2013 2016 2019 2022 2025