Implementing “Portals to the Universe” Report
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Herschel Space Observatory and
The NASA Herschel Science Center at IPAC

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Three instruments: imaging at \{70, 100, 160\}, \{250, 350 and 500\} µm; spectroscopy: grating [55-210]µm, FTS [194-672]µm, Heterodyne [157-625]µm; bolometers, Ge photoconductors, SIS mixers; \textbf{3.5m primary at ambient T}

ESA mission with significant NASA contributions, May 2009 – February 2013 [+/-months] cold
Herschel Mission Parameters

- **Userbase**
  - International; most investigator teams are international

- **Program Model**
  - Observatory with Guaranteed Time and competed Open Time
  - ESA “Corner Stone Mission” ($>1B) with significant NASA contributions
  - NASA Herschel Science Center (NHSC) supports US community

- **Proposals/cycle (2 Regular Open Time cycles)**
  - Submissions run 500 to 600 total, with >200 with US-based PI (~x3.5 over-subscription)

- **Users/cycle**
  - US-based co-Investigators >500/cycle on >100 proposals

- **Funding Model**
  - NASA funds US data analysis based on ESA time allocation

- **Default Proprietary Data Period**
  - 6 months now, 1 year at start of mission
Best Practices: International Collaboration

- Approach to projects led elsewhere needs to be designed carefully
  - NHSC Charter remains firstly to support US community
  - But ultimately success of THE mission helps everyone
  - Need to express “dual allegiance” well and early to lead/other centers

- NHSC became integral part of the larger team, worked for Herschel success, though focused on US community participation
  - Working closely with US community reveals needs and gaps for all users
  - Anything developed by NHSC is available to all users of Herschel
  - Trust follows from good teaming: E.g. NHSC scientists contributed half the technical reviews of proposals

- Mantra of “learn by helping” was seen by all as win-win
  - NHSC helps with tasks that generate insight into instruments, software, workings of system; NHSC staff spent time with Instrument Teams and ESA Science Center as members of the team
  - That insight proved essential to effective user support
Best Practices: User Support Targeting

- User Support has different emphases at different mission phases

- Need to target messages, medium, mode of support to each phase
  - Start early to make sure potential users understand how to use it
  - Provide same tools for the whole spectrum of users, GTO - GO – Archival
  - Talk to non-GTO early: they will have different takes and needs
  - Aim support at non-specialists: the whole community is potentially interested, if properly engaged, and will enrich the science

- Herschel payoff was high access for US community (48.5% of time)
  - NHSC User Support model was ahead of EU effort, especially pre-Launch, because more resources were available for it
  - NHSC worked with HSC to deploy model in EU, e.g. Data Analysis Workshops

- User surveys using mail-in questionnaires, informal data gathering
Best Practices: User Support Evolution

◆ Example #1: As US-based Herschel users grew in number, the model of hosting teams to support their data analysis became unworkable
  ❖ Success rate of US PI and co-I teams was 2-3x anticipated rates for “Key Projects,” OT1, OT2

◆ NHSC response:
  ❖ Organize hands-on data reduction workshops, 20-40 participants each
  ❖ Take those sessions onto the web with webinar technology
  ❖ Schedule remote help sessions, and provide self-paced web-tutorials

◆ Example #2: Hardware requirements for reducing large data sets exceeded by far anticipated sizing, to well beyond what most investigator teams could afford to buy

◆ NHSC Response:
  ❖ Set up dedicated well-sized hardware to be reserved & used remotely
  ❖ A “virtual machine” (private, secure, tailored environment) is deployed for each team for days to weeks, then destroyed
**Best Practices: Build on Other Missions**

- **From Spitzer:**
  - Observation Planning Tool Spot became H-Spot (now also SOFIA-Spot)
  - Team structure within NHSC: Combined scientists + engineers
  - User interactions: Start Panel early, diversify it, listen hard in other forums!
  - Data Analysis Funding scheme and policies: RSA, formulas, priority levels for uncertain cryo-mission duration

- **ISO**
  - Collaboration model: “learn by helping”
  - Resident US Astronomer at Herschel Science Center
  - Background estimator, other tools adapted for Spitzer, then for Herschel

- **IPAC environment, team member progression to new projects help**
  - New missions still need to work hard at not re-inventing the wheel
Successful research using archival data sets is dependent on the resident expertise and corporate memory that resides at the science centers.”

From Portals to the Universe: The NASA Astronomy Science Centers (NRC Report, 2007)