NASA Herschel Science Center Users Panel Report for the WebEx meeting on March 6, 2015:

To: Phil Appleton, NHSC Project Scientist & Task Lead,
George Helou, Director of the NASA Herschel Science Center (NHSC)

From: Margaret Meixner, Chair of the NHSC Users Panel (NUP), on behalf of the NUP

In attendance online:

NUP:
Joe Hora
Margaret Meixner
Andy Harris
Paul Harvey
Eiichi Egami

NHSC:
Philip Appleton
Roberta Paladini
Bernhard Schulz
David Shupe
Pat Morris
Yi Mei
Schuyler Van Dyk
George Helou
Lisa Storrie-Lombardi

Executive Summary:

The NUP remains impressed with the dedicated support of the NHSC staff in the post-operations and archive development of Herschel. During the 2 hour telecon NUP commented upon and questioned the NHSC report (attached) which has a very nice summary of this status of Herschel and its archive. The NHSC certainly makes effective and efficient use of their staff during the natural down sizing during post-operations. The NHSC staff should be proud of the Herschel archive they have helped create.

Funding Status & staffing

Funding for the NASA Herschel Science Center is ramping down in post-operations. Although the current funding levels is adequate to finish the work, there is little room for last minute problems. The NHSC has had several staffing changes that have resulted in heavier loads on the remaining staff. Nevertheless, the strategy to embed NHSC team members in the ICCs has kept the NHSC involved in the final releases of HIPE and the definition of the archive. All Herschel Community funding has been released and the funding for the observing programs is expiring by 2016.

NUP questions in this area:

Q: Are you getting the reports from investigators?
A: Yes, we send advanced reminders to the organizations. If we do not get a report, we may find a published paper on the program from the literature.

Q: Are you worried that expiration of funds will affect publication rates?
A: Not really, the funding given provides enough momentum for the project that the program is usually published.

Q: Is the NHSC supporting publication costs for people whose contracts are long expired?
A: Because of our decreasing budget this has become more difficult. However, we had only 3 or 4 requests to cover publication charges last year. We will continue on a best effort basis.

User support:

The NHSC will no longer do face-to-face workshops and is focusing attention on finalizing documentation and on line support. There was some discussion of on-line videos describing how to do data processing. Analytics of videos on the HIPE Academy YouTube channel shows the average viewing time is 6 minutes, even for hour-long workshop videos. NHSC asked the NUP if shorter, more professional videos would be better? NUP thought that if someone was really wanting to learn how to use HIPE, they would need to invest more than 6 minutes of time.

Q: Will online HIPE information and videos be updated to reflect the final form of HIPE?
A: Video productions are very costly in terms of staff time. Now that HIPE development is slowing, most videos will stand the test of time. As we move to a lower staffing level in the coming year, the NHSC may consider some revisions, or make notes of potential updates to videos in a header.

PACS

PACS images in the archive will have two types, JScanam and Unimap.
Q: What is the difference between the two and why have two?
A: The two versions of the map have enabled the NHSC and PACS ICC to establish confidence in the final products. The flux calibration is good to 5% in both and this will not be updated or revised. A user may prefer one version of the map over another. The JScanam images look flatter. The noise level in the JSCanam and Unimap maps is comparable. However, in the blue band, the noise is slightly more correlated ('orange peel') in the JScanam map than in Unimap (white noise, or 'salt and pepper'). Nevertheless the level of correlation in the JScanam maps does not represent a concern for scientific analysis.

Comment: The Herschel archive users may need guidance on choosing the appropriate version of the maps for their projects.

Q: What type of PACS spectroscopy products will be made available in the archive? Will it be as complete as for HIFI or SPIRE-FTS?

A: The spectroscopy of PACS in the archives will be the processed data cubes using the best calibration available. There will be no line lists as for HIFI and SPIRE-FTS . They are just trying to consolidate the data products. Most of the PACS spectroscopy data was taken in Chop-Nod mode and in HIPE 12 and 13 the products are of science quality.

Unchopped mode (~15% of data) are affected by short and long-term transients. IPAC developed a script, made available in HIPE13, to do a more effective processing of these data. However, there are not enough resources to move this script into the SPG to do a bulk reprocessing. So users would be advised to reprocess their PACS unchopped mode data using the script. NHSC is working on documentation to provide guidance on this.

HIFI

HIFI will have expert reduced products, line lists and maps in the archive. A very nice set of data.

Q: How are things going with the ripple removal?
A: A method has been devised to remove the electrical standing waves (ESWs) from Bands 6,7 data, which make up a large portion of HIFI obs in the HSA. An analytical approach to modeling the behavior of the complete instrument from end to end is part of a PhD thesis but does not constrain well enough the large number of variables to accurately remove the ESWs from real data. The empirical approach (begun in parallel) uses families of spline fits to the non-sinusoidal ripples derived from all off-source spectra, and being applied to all Band 6,7 data in HIPE 13. Some follow-up to deal with cases with broad and low-contrast lines and very blended spectra escaping our metrics will occur in HIPE 14. Ripples in the other bands 1-5 are still well approximated by sine waves, treatable interactively and possibly lights-out by HIPE 14/15.

Q: What will be the products of the expert analysis?
A: Improvement of spectral scans: 50% to date have been manually reflagged for artifacts related to LO spurs, saturations, isolated weird noise, etc. The quality is vastly improved over the standard pipeline output relying on automatic flagging. That 50% will appear in the HSA with HIPE 13 products. The remaining 50% are well underway, and a next step will be to apply corrections for ripple and other drift. Most spectral scans will be available as Expert Products directly from pipeline output in the HSA. Some will have to be delivered similar to User Provided Data Products. Maps will also be done but only as many as can be done in a prioritized list (mainly affected by the recent staff downsizing).

HIFI line lists with chemical assignments are possible to generate interactively, with an input guess line list (templated by source type). This interpretive feature is in the "nice to have" category to the HIFI ICC at this stage, and would be available in the HSA in some searchable form with observations for which they have been derived. The search capabilities are not well developed due to limited resources in the Herschel archive group as well.

Q: For the HIFI figure, what do the contours show?
A: Greyscale is CH+ line integrated, K km s^{-1}; continuum in black contours. Methanol in color contours with blue-shifted component in blue and red-shifted component in red.

Q: When will these improved data products be searchable in the Herschel Science Archive (HSA) ? Are these data products being documented?
A: First batch is arriving in Summer 2015, with reprocessing of the archive for HIPE 13 products. The full effort will take until near the close-out of the HIFI ICC in Spring 2016.

SPIRE

SPIRE mapping quality improved, both enlarging the areal coverage of the map and minimizing the stripes with a de-striper, and a new deglitching scheme based on spatial redundancy rather than timeline analysis. This map improvement is a big advancement. SPIRE FTS has a new linearization algorithm that improved ~20% of the observations that were scheduled after a cooler change. Meixner notes this amazing improvement really saved an observation and enabled the first extragalactic detection of CO in an evolved star outflow. There was only one question on SPIRE because many NUP members thought SPIRE data was in really good shape.

Q: What is the purpose of the SPIRE line list?
A: A line detection program for what lines and wavelengths are detected in an object, including S/N , but no fluxes are extracted. These lists will be used as a searchable data base for the users of the archive.

Archive

NHSC has computed footprints for all Herschel observations, which will greatly improve the accuracy of searches in IRSA's Herschel Data Query service when it is released in a few weeks. The Herschel Science Archive has recently enabled an advanced level interface that allows searches by line, wavelength or instrument mode. At IRSA, they have provided an interactive interface for users using Firefly. This enables users to preview Herschel data products. The NHSC contribution to development of this IRSA interface will end their work at the end of Fiscal year 2015, but other elements of IPAC will continue to maintain and extend Firefly for multi mission purposes.