

# HERSCHEL USERS GROUP

## MINUTES OF EIGHTH MEETING ESAC, 22-23 MAY 2014

**Members attending:** P. Hartogh, L. Hunt, C. Kramer, M. Meixner, A. Noriega-Crespo, D. Rigopoulou (chair), G. Stacey, A. Weiss

**HSC Staff attending:** J. Bakker, G. Pilbratt, P. Garcia-Lario, A. Marston, B. Merin, E. Verdugo

### **SUMMARY**

The 8<sup>th</sup> Herschel Users Group (HUG) took place in late May 2014 at ESAC and was the second meeting to take place in the Herschel ‘‘post operations’’ phase of the mission. The focus of the meeting was on the Herschel Science Archive (HSA), its functionalities and ease of access and, the current and future archival products. During the 6<sup>th</sup> and 7<sup>th</sup> HUG meetings the group made a series of recommendations related to functionalities of the HSA and product formats. The HUG welcomes the implementation of a number of its recommendations but recognises that there is room for improvements.

As with previous meetings much of the discussion was devoted to two key issues: the format and availability of ‘standalone’ products in the HSA and improving on some of the functionalities and user-friendliness of the HSA. The HUG fully supports the efforts of the Herschel Project Scientist (PS), the Herschel Science Centre (HSC) and the Instrument Control Centre (ICC) teams to ensure that the final products that will populate the HSA are of the highest possible standards and that the tools that will become available will meet the needs of astronomers for years to come.

**The main recommendations from the meeting are as follows, the order is roughly the one followed as per the meeting’s agenda.**

### **1. Herschel Science Archive Products**

The HUG is pleased with the addition of ‘standalone’ HIFI, SPIRE-P, SPIRE-S and PACS-P browse products in the archive and would like to see the addition of standalone PACS-S browse products as soon as possible.

It is worth stressing that these products do not constitute a substitute for the standard pipeline generated (SPG) products but, serve those users that wish to have a ‘quick’ look at the Herschel products outside perhaps of the Herschel environment (e.g. HIPE). **In order to make the ‘standalone’ files a product that is easily manipulated by widely used software the HUG further recommends that the ‘standalone browse products’ should contain only a small number (3) of extensions.** In what follows the standalone browse products will be referred to as standalone products.

In addition the HUG makes the following recommendations for each instrument-specific product:

### **1.1 For HIFI:**

- 1.1.1 It would be highly desirable to make products (Level 2) also available in formats other than the standard HIPE format (e.g. CLASS readable FITS format).
- 1.1.2 It would be helpful to make both co-added and fully calibrated without coadding data available in order to have more flexibility in post-processing – this is the standard delivery format of heterodyne data from ground-based facilities.
- 1.1.3 For level -2 products provide spectra co-added for same position frequency and backend.

### **1.2 For PACS-P:**

- 1.2.1 It would be highly desirable for the `standalone' products to have only three extensions: the science data, the error map and the coverage map.

### **1.3 For PACS-S:**

- 1.3.1 In addition to the standard pipeline products available, a standalone product should be made available. This should be a data cube in FITS format containing spectral data from each of the 25 spaxels. If scans of more than one line were carried out then a FITS file should exist and correspond to each line scan, wavelength range scan or SED-range spectral segment (for instance scans containing spectra of the second order should have their own fits file). All repeats in an AOR should be coadded.
- 1.3.2 For each PACS line scan, wavelength range or blue/red SED range there should be an associated ASCII spectral file and possibly a link to the ``postcard gallery”.

### **1.4 For SPIRE-P:**

- 1.4.1 It would be highly desirable for the `standalone' products to have only three extensions: the science data, error map and coverage map.

### **1.5 General suggestions:**

- 1.5.1 Information about what has been observed for a given source is not readily available (e.g., HIFI, PACS spectral ranges, filters for PACS photometry, etc.); it would be extremely advantageous to make such information easily accessible.
- 1.6.3 Finally, it would be extremely useful for the users to have the ability to query the archive by name (or coordinates) and create a cut-out image (postage stamps) of a small area around the queried position. The HUG understands that this functionality is under consideration and maybe provided in future releases.

## **2. Data Processing/HIPE**

The HUG welcomes the new functionalities already implemented in HIPE 12 and commends the DP and the calibration groups for all the improvements that have been implemented.

The recent specialised on-line workshop on Spectroscopy (in April 2014) was well attended. The HUG would like to stress the importance of such workshops in

disseminating all latest knowledge to the community and encourages the HSC to continue with organising both 'newcomer' and 'advanced' user meetings in the foreseeable future.

### **3. Instrument Calibration**

The HUG notes with satisfaction the considerable progress towards improving the quality of instrument calibrations. A lot of calibration-related activities have now reached a 'mature' stage with very little or no room for improvement (e.g. stellar & planetary models for calibration). The HUG commends the Calibration group for all their hard work which resulted in absolute flux calibration to better than 10%. Cross-calibration between the three Herschel instruments could be improved and the HUG encourages the team to look further into this issue.

The forthcoming version of HIPE (v.13) will include a number of improvements related to PACS map-making tools (Jscanam and UNIMAP both available) as well as PACS-S tools. The HUG stresses that inclusion of tools that help improve the quality of PACS spectra should be priority for HIPE13.

PACS-P extended emission is also better understood and comparison with Spitzer data – taking into account non-linearity- has improved. Flux corrections for PACS-P calibrators (of the order 2%) to take into account variations with evaporator & mirror temperature, are being developed. Progress also has been made on the analysis of the Focal Plane Geometry (~1% change from on-ground measurements) that can impact PSF and encircled energy functions. The HUG is pleased with the efforts towards improving PACS-P calibration of extended emission and encourages the teams to incorporate the findings into the calibration tree scheme/pipeline as soon as possible.

### **4. Instruments -- Priorities**

#### **4.1 HIFI**

The HUG notices the many improvements in calibration and data analysis. The HUG notes in particular the continued measurements of the sideband ratio in all bands and the investigations and the work on accurate beam parameters (which is nearing completion). In addition, the HEB wave correction will now be part of HIPE 13.

#### **4.2 PACS Imaging**

The comparison of the various mappers resulted in MADMAP being replaced by JScanam in HIPE13 upon completion of final testing. Future improvements will include UNIMAP. Cross-like artefacts associated with bright sources in PACS-P maps (scan/x-scan) can be mitigated in many instances with pointing updates.

#### **4.3 PACS Spectroscopy**

The HUG notes the many improvements in PACS-S products that are planned with HIPE 13. These include improvements in the spectral shape, a new script for extracting fluxes in extended and semi-extended sources and flux correction based on pointing drift fitting for bright sources. In addition keywords in the FITS headers are improved for ease in archival

searches. The HUG stresses that improving PACS-S spectroscopy products must be top priority within the PACS ICC team so that PACS-S 'standalone' products become available to the community as soon as possible.

#### **4.4 SPIRE Photometry**

A lot of work has been invested in testing repeatability of SPIRE-P maps using different mappers. The results of the various tests show excellent agreement down to 2% levels. Cooler burp removal has been successful. Among the remaining issues is that of reducing absolute flux errors.

#### **4.5 SPIRE FTS Spectroscopy**

The extended wavelength coverage has been a useful addition to SPIRE-S products. A new non-linearity correction will be implemented. Improvements on the obscontext structure is likely to be beneficial in future searches.

### **5. Community Support and Communication with Users**

The HUG continues to be impressed by the high level of support provided to the Herschel Community. The recent on-line Workshop on Spectroscopy was a great addition to the series of more focused workshops offered by the HSC. The HUG would like to encourage the HSC to continue to offer both the standard introductory data reduction workshops (aimed at novice users) as well as the more focused workshops. Both activities are of great importance to the Herschel Community as they provide a Forum for Users to interact with instrument experts and report on their experiences.

### **6. User Support for Instrument Calibration and Data Processing**

The group continues with their activities in disseminating both specialised and general expertise regarding the Herschel instruments and data reduction tools via face-to-face meetings and webinars. The HUG is fully supportive of these activities and encourages the DP to continue with updates and introduce regular reminders of such updates through the HelpDesk e-News.

## **1. INTRODUCTION**

The Herschel Users' Group (HUG) held its eighth meeting at ESAC on 22-23rd May 2014. The format of the 8<sup>th</sup> meeting was similar to that adopted in previous meetings with the main group leaders for the HSA, community support, instrument calibration, data processing and Users' Group (DPUG) submitting their reports ahead of the HUG meeting. During the meeting there was extensive discussion based on the presentations. A lot of the discussion was devoted to the HSA, the format of the available products and its 'user-friendliness', future features and improvements. In addition, the HUG reviewed advances in instrument calibrations and issues related to improvements in data reduction and data exploitation.

Copies of the presentations from the Project Scientist, the Mission Manager and leads of the HSC groups can be found on the HUG web pages <http://herschel.esac.esa.int/HUG.shtml>

## **2. THE HERSCHEL LEGACY**

The 'data collecting' phase of the Herschel mission ended over a year ago. However, it is envisaged that the Herschel Legacy will last for decades to come. Hence it is important to ensure that the Herschel products that are/will be made available through the HSA withstand the test of time and serve the astronomical community for the years to come.

Throughout its mission Herschel covered about 10% of sky through 23,400 hours of HOTAC allocated observations. Only 3% of the scheduled observations failed (mostly due to instrument hang-ups) with the majority of them repeated at some point in the mission. All the observations can be found in the HSA including non-standard calibrations. So far, about 40% of Herschel data have been published. In May 2014 Herschel papers numbered more than 1000.

In May 2014, the (last?) Herschel Ground Segment meeting took place in Paris. The focus of the meeting was the Herschel Legacy and how to best prepare for beyond 2017 when the Herschel mission officially ends. Although 2017 is the official end of the mission (and its funding) the Legacy of Herschel should and will continue for many years to come. The HUG fully endorses the plans of the HSC for delivering a long lasting Herschel Legacy by ensuring the products will be able to withstand the test of time by being portable on any software platform in the future. Although the HUG recognises the immense potential and value of HIPE it stresses that the Herschel Legacy products must be HIPE-independent to survive beyond the end of post-operations.

The HSC has been actively encouraging PIs of KPGT and KPOT to make their User-Processed Data Products (UPDPs) available to the community. At present the data (from those Programs that have released their products) reside in repositories but the plan is for them to be ingested in the HSA. The HUG would like to stress the importance of making UPDPs available to the Community and would encourage the HSC to remind all PIs to submit their products in a timely manner.

Prior to the meeting the HUG reviewed action items from previous recommendations and was satisfied that a number of those suggestions had been implemented.

## **3. HERSCHEL SCIENCE ARCHIVE (HSA)**

The HUG wishes to thank the HSA group and the HSC for swiftly implementing a number of the recommendations made following the 6<sup>th</sup> and 7<sup>th</sup> HUG meetings. In particular the HUG was pleased to see that the 'standalone' products are available to the community through the HSA. The HUG recognises the tireless efforts of the HSA group in constantly improving the archive and its functionalities. The HUG wishes to make a small number of additional recommendations aiming at making the HSA products available to as wide an astronomical community as possible.

### **Standalone products**

As has been stated before, the rationale behind 'standalone' products is to make Herschel data accessible to non-expert Herschel users. As such the structure of the file should be kept as simple as possible within the philosophy of the Herschel mission. The currently available SPIRE-P and PACS-P 'standalone' products are identical to the SPG products. The HUG notes however, that since 'standalone' products are intended for quick look purposes they do not need all the extra dimensions of the SPG products. A simplified version of 'standalone' products with just 3 extensions would be adequate. Detailed descriptions of additional suggestions for the standalone products follow below.

In addition the HUG stresses that PACS-S products must be come available as soon as possible, after the release of HIPE13 and following the corresponding bulk reprocessing.

### **Ingestion Rates**

Besides SPG products the HSA is ready to host also user-provided products (from all KPGT and KPOT programs) as per the original agreements with the teams. Additionally, it may contain products from OT large programs if the PIs are willing to make their end products available and HSC manpower and resources permit. It has been brought to the HUG's attention that the ingestion rates of UPDPs in the archive (that is from when the data are released from the PI of OTKP to the point when they are available in the HSA) are rather long. While the HUG appreciates that the Community Support Group group is under considerable work load it notes that it would be beneficial to have UPDPs available in the HSA on shorter timescales. At some point UPDPs will become obsolete- as new improved versions of HIPE become available-so to maximise their value UPDPs should be made available sooner.

### **Homogenisation of products for all three instruments**

It would be highly desirable to have the final (Legacy) products from the three instruments as uniform as possible. For instance, the observational context of the files should follow the same structure; the units (especially for PACS-P and SPIRE-P) should be the same.

### **Additional features**

Perhaps a facility that would allow users to choose the units in which they would like the products would be very helpful.

## **3.1 Suggestions for HIFI Products**

HIFI data in the archive is delivered in HIPE format only. For users who wish to analyse their data using a different software package (one that they are more familiar with) it may be beneficial to offer archival data in a different format (e.g. CLASS readable FITS format or general FITS compatible formats). A number of HIFI users are familiar with CLASS/GILDAS products so it would be beneficial to ensure that HIFI products are CLASS compatible (or perhaps CASA compatible)

Basic level (0.5) product: it would be helpful to make available fully calibrated spectra without any co-adding. This will allow the user to select individual spectra of their preference and work with them. This is also the standard delivery format of heterodyne data from ground-based facilities.

Level-2 products: provide co-added spectra for same position, frequency and backend.

Data Cubes: should be provided in case of mapping (in FITS format only). The current level 2.5 products deliver 4 cubes (H-USB, H-LSV, V-USB, V-LSB) with H and V polarization being in different data cubes. It would be desirable to have a tool available that, taking into account the known alignment deviations between H and V, coadds the data by convolving them onto a new, even grid. The resulting cube may be slightly smoothed but will contain the format that most users would find useful.

The HUG would like to commend the HIFI ICC for undertaking the analysis of a spectral scans and spectral maps as Highly Processed Data Products (HPDPs).

### **3.2 Suggestions for PACS Products**

#### **3.2.1 PACS-P**

Following earlier HUG recommendations the 2.5 Level Product is now available as a standalone product, alongside the tarball. The current product however, maintains the multiple extension format of the SPG and is potentially confusing for the novice user. The HUG therefore suggests that the FITS file of the PACS-P standalone product should only have 3 extensions: the science data, the error map and the coverage map all with uniform units.

At present the multi-extension standalone PACS-P products contain many fits tables related to the HIPE structure that are meaningless and confusing to a new user who is not necessarily familiar with the HIPE nomenclature and structure. In addition, these multi-extension products (as they appear currently in the archive) cannot be viewed by some standard astronomical visualization tools (such as the ATNF Karma visualization package). The HUG recommends that the extra extensions should be removed for the standalone products.

#### **3.2.2 PACS-S**

No PACS-S standalone products are currently available through the HSA. Under the current schedule PACS-S standalone products will become available after approximately 9 months (HIPE 13.0 and ensuing bulk reprocessing).

In addition to the standard tarball the following products should be made available in the HSA:

A data cube in FITS format containing the spectral data from each of the 25 spaxels. For each line scan, wavelength range scan, or SED-range spectral segment, there should be a separate FITS file. All repeats in an AOR should be co-added. For each data cube there should be an associated postcard jpg, showing the 5x5 spaxel image obtained at the central wavelength of the scan.

An ASCII format file containing the spectrum extracted from the central spaxels on a point source assumption. This file should have three columns: the wavelength in microns; the flux in Jy; and the uncertainty on the flux. (The user will have to convert these  $F(\nu)$  fluxes to  $F(\lambda)$  fluxes if they wish to measure integrated line fluxes).

For each PACS line scan, wavelength range scan or blue or red SED range scan, there should be a postcard image of the spectrum and an associated ASCII spectral file. All repeats in an AOR to be co added. There could be FITS format versions of these point

source spectra too, but the ASCII format versions should be the top priority.

### **3.3 Suggestions for SPIRE products**

#### **3.3.1 SPIRE-P**

As in the case of PACS-P, the current SPIRE-P standalone product maintains the multiple extension format of the SPG and is potentially confusing for the novice user. The HUG therefore suggests that the FITS file of the SPIRE-P standalone product should only have 3 extensions: the science data, the error map and the coverage map all with uniform units.

For the current standalone products the same comments apply as listed for PACS-P (The data contains many fits tables related to the HIPE structure which are meaningless and confusing if viewed by standard astronomical visualization tools).

The appropriate, most recently measured beam size, together with the assumptions used for measuring it (color, source size, etc.) should be given in the header of the FITS file.

#### **General**

Where possible links should be made between the standalone products that were described and the postcard gallery. The units in PACS-P and SPIRE-P products should become uniform.

## **4. DATA PROCESSING**

The HUG has been impressed with the overall activity in the area of Data Processing both in terms of improvements in data reduction software but also outreach activities such as meetings designed both for advanced but also less experienced users.

The current version of HIPE (v.12) includes a number of additions and improvements such as improved keywords in FITS files (for all SPG products), correction of electric standing waves for HIFI, super resolution maps for SPIRE-P and level 3 mosaics as well as JScanam for PACS-P. The next version of HIPE (v.13) will be made available towards the end of 2014 (TBC) and a number of additional improvements are already planned for implementation.

In fall 2013 the PACS-ICC together with the HSC/NHSC carried out a detailed comparison of the various mappers available for reducing PACS-P products. As a result of the study J-Scanam is now planned to replace MADMAP as the mapper for PACS in HIPE 13.0 with UNIMAP also available in the same version of HIPE (for point source and extended source analysis). It is anticipated that a number of mappers will still remain available (and supported by HIPE) in the foreseeable future as long as developers continue to maintain them. The HUG commends the PACS teams for all their hard work on the issue of the mappers and stresses the importance of relaying the information to the community through the instrument specific webpages.

HIPE13.0 will also include tools for better deglitching of SPIRE-P products (multi-pass pipeline) while full wavelength spectra for SPIRE-S are currently planned for HCSS14. For



HIFI the new version of HIPE13.0 will include corrections for electric standing waves for Bands 6 and 7. As we are nearing the end of HIPE development, preparations are already underway to accommodate a smooth transition phase that will see the three ICCs ceasing their activities. HSCC14.0 will be the last version of the pipeline for HIFI while HSCC14.2 will be SPIRE's last version. Finally HSCC15 will be the last version for PACS. Funding is currently in place to maintain HIPE until the end of 2017. ESA is exploring a number of options (virtual machines etc.) to ensure that the HIPE machinery outlives the end of the funding period. While maintaining HIPE for as long as possible is the ideal outcome the very real possibility that HIPE will one day cease to support the Herschel Legacy products is a very probable scenario, hence, it is necessary to ensure that Legacy products can successfully outlive HIPE and be able to cope with other software platforms.

## **5. INSTRUMENT CALIBRATION**

The HUG was very impressed by the considerable progress made on several aspects of calibration of the three instruments. Tony Marston gave a brief presentation during the meeting highlighting the advances made. A number of calibration related issues are now considered as completed. A detailed account of the improvements in calibration –related issues as well as outstanding items still are discussed in detail.

On the cross-calibration, it is encouraging that the latest analysis show that line fluxes in 190-200 micron wavelength region for PACS and HIFI are consistent.

## **INSTRUMENT SPECIFIC ISSUES AND CALIBRATIONS**

### **5.1 HIFI:**

The HUG recognises the effort that has been invested in addressing issues related to aspects of calibrating the instrument and improving the quality of the data. Significant progress has been achieved in several areas:

Careful analysis of the observed beam patterns using more sophisticated modelling has led to readjusted beam efficiencies. This work is coming to a conclusion. Updated beam efficiencies will soon be announced. Some large changes are to be expected. For expert users, detailed beam information will be put online onto the Hifi Calibration Web. The HUG stresses the importance of making all HIFI users aware of these changes.

A database of electrical wave templates has been created which allows improving the reduction of HIFI spectra taken in the HEB bands. The HEB wave correction in HCSS 13 is being tested.

Pre-launch gas cell data and data taken during flight, especially data from the frequency surveys on moderately line-rich sources, are used to deriving sideband gain ratios and their variation with LO frequency and other instrumental parameters. Higgins et al. (2014, Exp. Astronomy, 37,433) and a Technical Note by Teyssier & Higgins of 21/05/2013 describe the difficulties in measuring the gain ratios. The overall HIFI line intensity calibration accuracy is largely determined by the accuracy of the sideband ratio. This work is important for observers when trying to improve the calibration accuracy to better than 10%.

## **5.2 PACS-P**

The pipeline for PACS-P now includes JScanam and this resulted in increased performance and speed. JScanam is the main mapper in the latest version of the pipeline (HIPE12.0) while rigorous testing is underway to determine the best mapper for PACS-P. It is anticipated that both JScanam and UNIMAP will be available in the immediate future until a firm winner mapper emerges. New corrections based on gyro pointing drift information will be implemented in HIPE 13.0. Work is also underway to improve the recovery of flux for extended emission sources. Improvements on flux calibration have lead to an overall photometric accuracy of 1% to 2% subject to model used.

The jitter reduction is looking promising based on tests that are currently underway.

## **5.3 PACS-S**

Improvements have continued to take place in this instrument mode. Updates on the keywords of the headers of the PACS-S fits files means that they are now more suitable for advanced searches in the Herschel archive. A new empirical model describing telescope emissivity will be implemented which will improve SED shape dramatically (to 10% SED wide). In addition absolute flux calibration is now reported to be about 4%. An additional important feature will allow corrections for (semi-) extended PACS –S sources. The inclusion of information on full jitter correction will improve PACS-S flux corrections. An area that perhaps requires additional work is that of unchopped spectroscopy. Although this mode has not been widely used modelling of the transients and proper calibration of the response drifts will result in significant improvements. It is anticipated that the majority of the work underway will result in improvements that will be implemented in HIPE 13.0.

## **5.4 SPIRE –P**

The work on various source extraction algorithms for SPIRE-P (related to the construction of SPIRE source catalogs) has had a positive impact on various aspects of the SPIRE-P software and analysis tools. Improvements on removal of cooler burps have been noted and the use of Planck zero-point corrections has resulted in improvements in extended maps. Additional/future improvements in SPIRE-P data include updates in flux background offsets for SPIRE maps based on newly HFI released data.

## **5.6 SPIRE-S**

The extension of the wavelength edge of SPIRE-SSW and SLW has been a useful addition. In the near future a new correction for nonlinearity effects will be implemented. Improvements in the obs context of the SPIRE-S fits files allow for more advanced searches within the Herschel archive.

## **6. COMMUNITY SUPPORT AND COMMUNICATIONS WITH USERS**

All aspects of community support continue to operate smoothly. The number of registrations of new users remains almost flat

however, the number of HIPE user release downloads remains constant (peaks after every new HIPE release).

The FAQ facility that has been set up continues to be updated with information from tickets (FAQ). Helpdesk ticket closures are closely monitored and reviewed every 2-3 months to make sure that no major issues have been overlooked.

Communications with all KPGT/KPOT PIs have been concluded (wrap up telecons) and now every effort is made to encourage PIs to deliver the final products of their programs to the HSC as per the original agreement. At present most user-contributed data reside in ftp repositories but eventually the data will all be ingested in the HSA. The HUG notes the importance of such user-provided data products (UPDPs) and the impact they may have in further scientific endeavours by the extended astronomical community and therefore, would like to urge the HSC to ensure that the PIs release their data as soon as possible.

In addition to the user-provided data, it is foreseen that the HSA will also contain HPDPs. These are user-provided data products that have been provided either by the ICCs directly or that have been scientifically validated by instrument experts. It is anticipated that some fraction of UPDPs will become HPDPs. The HIFI team have undertaken the reduction of some challenging HIFI datasets and will make them available as HPDPs. The HUG commends the team for their commitment and wishes to encourage other instrument teams to consider whether there is gain in generating additional HPDP datasets.

Finally, the Herschel publication tool shows what OBSIDs are linked to what publications, by providing the relevant part of the observing log. Alternatively, by clicking on the BibCode a similar listing of observations is obtained from the HSA with their "postcards", enabling direct downloading of the associated "standalone browse products".

## **7. HUG SURVEY**

In April, 2014, the HUG conducted a Users' survey to assess the community's experience with the Herschel Science Archive. The questionnaire was constructed in consultation with the PI and the HSC, and was circulated to those members of the Herschel community users who had given permission for such inquiries during registration. 96 users, or roughly 4% of the number of registered users in the HSC database. Overall, the response to the HSA was very positive, in particular for the newly (at that time) introduced standalone products. Many of the responses to the questionnaire reflect the HUG suggestions given previously. Detailed results of the questionnaire are presented in a separate document, and have been posted to the HSC website:

[http://herschel.esac.esa.int/Docs/HerschelUG/HUGQuestionnaire2014Report\\_v4.pdf](http://herschel.esac.esa.int/Docs/HerschelUG/HUGQuestionnaire2014Report_v4.pdf)

## **8. HUG MATTERS**

The date for the next HUG meeting was provisionally set for Spring 2015, exact date TBC.

## **9. ACKNOWLEDGMENTS AND THANKS**

The HUG wishes to thank Göran Pilbratt, and the HSC staff for hosting a highly productive and informative meeting.

## **10. AGENDA OF THE MEETING**

Thursday 22nd May

08:30 Bus departs AA Hotel in Madrid  
09:15h-10:15h HUG Closed Session  
10:15h-11:00h Updates on the Herschel Legacy from PS  
11:00h-11:30h Coffee break  
11:30h-13:00h Update/report from the Archive Group  
status of the standalone products &  
Discussion (Verdugo)  
13:00h-14:00h Lunch  
  
14:00h-15:00h DP Group Updates (Bakker)  
15:00h-16:00h Herschel Calibration Updates & Discussion (Marston)  
16:00h-16:30h Coffee break  
16:30h-17:30h DP Users Group Updates & Discussion (Merin)  
17:30h-19:00h HUG Closed session  
19:00 h Bus departs ESAC  
20:00 h Dinner

Friday 23rd May

08:30h Bus departs AA Hotel in Madrid  
09:15h-10:00h HUG Closed Session  
10:00h-11:00h Herschel Community Legacy & Software (?)  
11:00h- 11:30h Coffee break  
11:30h- 12:30h Results of the HUG Survey and presentation to the HSC  
12:30 h Concluding remarks and end of meeting  
13:00h Lunch  
14:00h departure to airport