Herschel HPDP and associated HUI interface needs
ICS team – 16/06/2015 – 15:00 CEST – Room C031
Minutes of meeting

Present: APM, KE, TL, IV, EV, MSP (part time), DT, MR (remote), LC (remote), CJ (remote)

See also viewgraphs used during the meeting at:

http://herschel.esac.esa.int/twiki/bin/view/Public/HPDPDefinitionPage

1. Review current plans for HPDP deliveries from the ICCs, in particular what is the exact content of each HPDP delivery

We went through the different HPDP plans per instrument.

HIFI:
- Spectral Scans and spectral map HPDP: baseline-corrected versions of the equivalent SPG level2.5 products
- Isolated OFF position spectra, in the same format as for the ON-target data
- Uncertainty tables: these are table datasets of the error budget breakdown estimated for a given obsid
- Line lists: one bit table dataset for all obsids, as well as individual tables per obsid. Will come with static plots, as well as interactive html ones
- Optional: un-averaged level 2 data (Point mode only)

SPIRE-P:
- Point source catalogue: unlike the other obsid-linked products, these are indexed per source ID, and will contain, among other things, a column with the list of obsids that were used to extract the source flux. There will be up to 3 large .csv files for each wavelength
- HiRes maps: they will probably be put somewhere in the level 2 or level 2.5, i.e. not necessarily as HPDP (but could go into the tarball for the *Legacy Product*)

SPIRE-S:
- Correction for semi-extended sources (SECT), only on those targets not properly calibrated with the point source calibration – makes only sense for the central pixel
- Correction for point sources affected by extended background emission – makes only sense for the central pixel
- Repair some anomalous observations were the pipeline was failing so far – Trevor has a dedicated code for that
- All three above items should be tackled before the beginning of next year to have access to the instrument experts from the ICC
- Line lists: will also come with scripts/recipes on how to extract certain filtered information from the list.

PACS-P:
- Point source catalogue: same as for SPIRE-P. There will be up to 3 large .csv files for each wavelength
- Improved level3: Luca needs to run a feasibility study to see the real benefits for such an effort and decide on whether this should happen. Entering into the balance is also the computational needs, typically to combine large number of coverage. This should not substitute the SPG level 3.
- Level 2.5 combinations of fields that don't currently fulfill the condition to be eligible for such merging: this deals e.g. with fields that have a small sky overlap, or cases where more than 2 fields are concerned (e.g. LMC or some ATLAS fields). These could be merged using Unimap (JScanam TBC as it may be limited to just 2 fields at a time).

PACS-S:
There were quite a lot of potential alternative processing and repaired products discussed here. The assumption is that despite the existence of scripts provided to create those, in a HIPE-free world this would not be an easy option. It's obvious that not all of them will be possible to perform, esp. since the vast majority cannot be done with ICC manpower and so ends up on the HSC PACS representatives. KE came up with the following items:
- Point-source-correction: two scenarios here: the point source is centred or not in the central spaxel
- Spectra of high source flux level
- Line lists: KE reports that the PACS ICC is not interested in this, they don't see the interest. We will follow up with KE's master student. There exists code to do this at the PACS ICC. Another alternative is to look into the detectLines task from HIFI – test on a prototype PACS spectrum show promising result, although the PACS data need quite some massaging before.
- Un-chopped data: provide baseline subtracted data, together with the subtracted continuum
- Long-range spectroscopy flat-fielding if not covered by SPG in 14
- Repair of data currently unprocessed since tagged as failed
- Different wavelength gridding: re-run SPG with different wavelength grid parameter for more rigorous noise computation
- Red leak spectral range: run dedicated pipeline (CalBlock+RSRF) to deal with this part of the spectrum

Whether or not all or part of the above can be handled has to be discussed separately and should not impact the following points concerning the HUI requirements to query and access those products.

It was also acknowledged that the case of semi-extended source correction won't be covered since it needs assumption about the source morphology.

Third parties HPDP:

We did not really discuss this in details, but concerning those products post-processed in the framework of traineeship or postdoc, they should rather fall in the category of UPDP, not HPDP.

2. <u>HPDP and the HUI</u>

We went through the current interface offered for the UPDP:
- Download as a bulk (once a query has been made) with possibility to select sub-categories such as Data, Catalogues, Images, etc
- Download for a given list of selected obsids: in this case, the products linked to this obsids are being served. We note that in case several UPDPs are linked to an obsid, all of them are served by default

We started to discuss the various use cases applying to the contemplated HPDPs ad how and whether the current UPDP approach could be re-used. It is clear that we need more granularity in the selection, already from the main search panel window. Eva started mocking-up how this could look like for different sorts of HPDP but we did not have the time to converge on that.

Some items that were discussed:
- For products that are basically improvements or alternative versions of SPG products, the same approach as for UPDP is considered fine. The one difference however is that several HPDP may be linked to a given obsid and it was acknowledged that being able to select only some of those would be desirable.
- For lines lists, it should be possible to deal with them in a similar fashion as for the above case – both as a bulk but also on an obsid-filtered basis.
- For point source catalogues, the situation is totally different because we can't link to obsids so directly. Obviously one can download the whole catalogue(s). However one clear use case is that of a user willing to know which point sources have been detected in a given field or ra/dec area. While the ra/dec filtering of the HUI would provide the fields, the structure of the PSC's would not allow to identify which source IDs apply here as the HSA cannot dive into the catalogue itself and extract the rows for the applicable source IDs. An idea would be to create a reverse-engineered table of obsids vs source IDs, that would allow to serve all source IDs rows applying to a given obsids. Ivan volunteered to help looking into a prototype of this. This would also require to store the catalogues in individual row files for each source ID.

We need to continue on that and it was agreed that **the next step will be an action on each of us to come up with a list of use case and wish lists for the HPDP they are aware of. Deadline is by the second half of September, when we will probably have our next meeting.**

As a starting point Eva already made the suggestion of how the HPDP dedicated panel could look like, with more ad hoc selection boxes and hard-coded buttons. I'm showing here a simple-minded mock-up of what it could look like, for further discussion.

Open questions to be addressed in a subsequent meeting:
- If new postcards have been produced, would they replace those displayed in the HUI query result?
- How to make sure we explain well what has been done to the data in order to improve them – we need to be able to back-track what happened to the data, esp. when some subjective action may have been performed

3. Legacy products:

The idea here was to discuss how **legacy products** could, in contrast with the current **stand-alone browse products**, serve more than one kind of data processing. Tanya e.g. raised the issue of having only extended-emission calibration products served in the stand-alone browse products of SPIRE-P, while many users would actually need the point-source calibrated data. Currently the solution is to download the level 2 data, but legacy products serving a tarball with e.g. those various level 2 products could be another solution.

Another example would be for HIFI to serve, together with the level 2.5 products (as of SPG, or as of an HPDP) the uncertainty tables.

We could not discuss this at all so this will be an item for our follow-up meeting.

4. Somewhat related but not HPDP: so-called Ancillary legacy products

This was not discussed due to lack of time. See appendix for what PACS provided as wish list concerning this particular item.

Appendix: ancillary products suggested by PACS

- PACS spectrometer flux calibration reference files (includes model SEDs for the exact times of the PACS spectrometer flux calibration observations)
  - ftp://ftp.ster.kuleuven.be/dist/pacs/calsources/
- PACS library of modeled PSFs
  - http://pacs.ster.kuleuven.be/pubtool/PSF/
- The ascii dump of the ILT, IST and in-orbit Versant databases (instrument models, uplink calibration files, cus scripts as run, tcl scripts, etc)
- On-board software image history (inc. image)
- Contents of herfts02.esac.esa.int
- The html no-edit dump of the twiki
- The no-edit html or pdf dump of the JIRA tickets
- The no-edit html or pdf dump of the helpdesk tickets
- Dump of daily PACS trend plots
  - http://pacs.ster.kuleuven.be/pacstrend/index.php
- Daily PACS memory dump and events dump
  - http://pacs.ster.kuleuven.be/pacstrend/dumpevents/
- HTML dump of Mission planning summaries
  - http://herschel.esac.esa.int/twiki/bin/view/HSC/HSCMissionPlanningCOP
  - http://herschel.esac.esa.int/twiki/bin/view/HSC/HSCMissionPlanningPV
  - http://herschel.esac.esa.int/twiki/bin/view/HSC/HSCMissionPlanningSDP
  - http://herschel.esac.esa.int/twiki/bin/view/HSC/HSCMissionPlanningRP

Besides the static information, there is also some on-the-fly plotting we might want to preserve (another option is to archive the fits files from which these are generated:

- PACS trend plots
  - http://pacs.ster.kuleuven.be/pacstrend/LongTerm/index.html
  - http://pacs.ster.kuleuven.be/pacstrend/LongTerm/calBlocksTrend.html