

Status Report of Herschel Data Processing/HIPE

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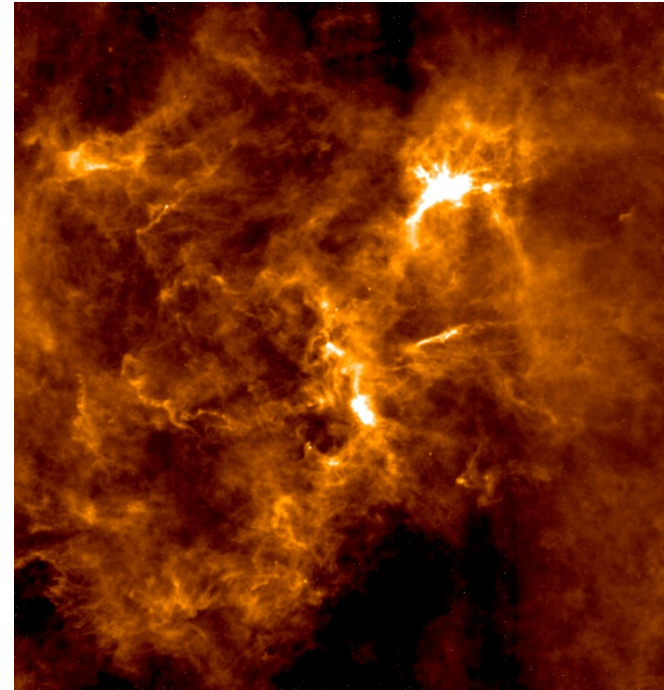
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Outline

- Data Processing Overview
- Highlights of HCSS 8
- Data Processing Status
- Project development statistics
- Additional points
- Your reactions?



Standard SPIRE photometry pipeline
product of Serpens observed by Herschel

Gould Belt survey, PI: P. André

Data Processing Overview

- **HCSS 7.0 was released 24th of May 2011**
 - **HCSS 7.1 was released 27th of July 2011**
 - **HCSS 7.2 was released 19th of August 2011**
 - **HCSS 7.3 was released 13th of September 2011**

The reduction in patch releases indicates the growing maturity of HCSS. As side-benefit resources which were needed for testing could be redeployed for other tasks (e.g. quality control of data products)

- **Following the decision to reduce the HCSS release cycle to two versions per year, HCSS 8 was branched-off 18th of October 2011 and released 9th of December 2011**
 - **The code-freeze for HCSS 8.1 is 26th January 2011. This version will be used for bulk reprocessing**

General Remarks about HCSS 8

- Nearly 2000 software tickets were implemented
- 30 persons contributed to testing of HIPE and pipeline products “a total of < 228 md”
 - Global coordination of astronomers’ acceptance testing (lead by B. Merin) was improved
 - HIFI and NHSC stepped up their efforts. Thanks!
 - 92 tickets were raised (40 less compared to HCSS 7)
 - Test reports can be found at <http://herschel.esac.esa.int/twiki/bin/view/Hcss/AstronomerAcceptanceTesting8>
- No “HCSS 8 newbie” test session took place. Will be reconsidered for future test campaigns

Selection of Highlights of HCSS 8 for Pipeline system, HIPE, Documentation and User Tools

- **Reduction of crashes and freezes**
- **User friendliness (task-variable association and tooltips)**
- **Upgrade of Jython (HIPE's interpreter) from 2.1 to 2.5.2**
- **Shielding installer against corruption due to network problems**
- **Support for DS9 to display and process Herschel images**
- **More protection against problematic plug-ins. You can now disable all plug-ins without having to start HIPE**
- **All SED models for asteroid observations have been added to the ESAC database**
- **Revamp of organisation of HIPE Owner's Guide**

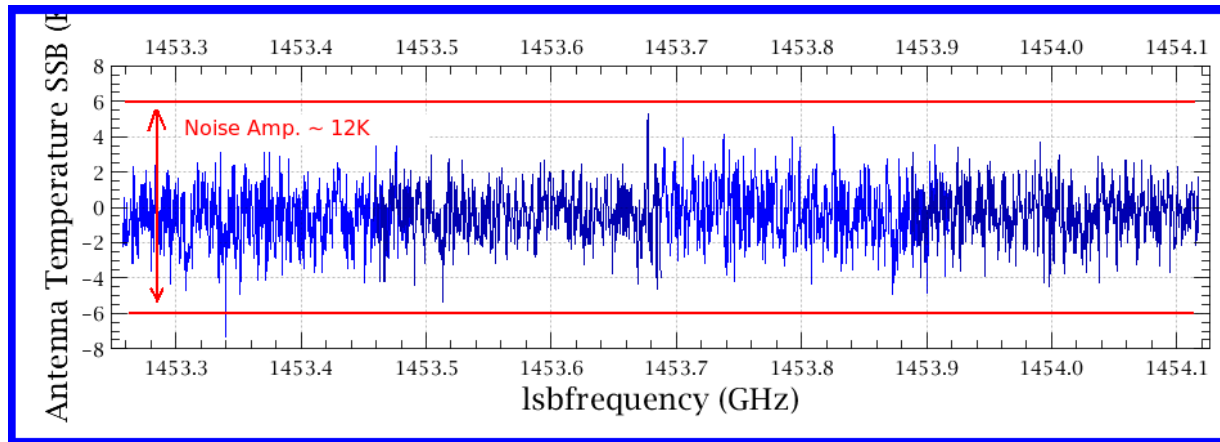
Bonus Effort: App to access Herschel Quick Look Products for Android and iPhone



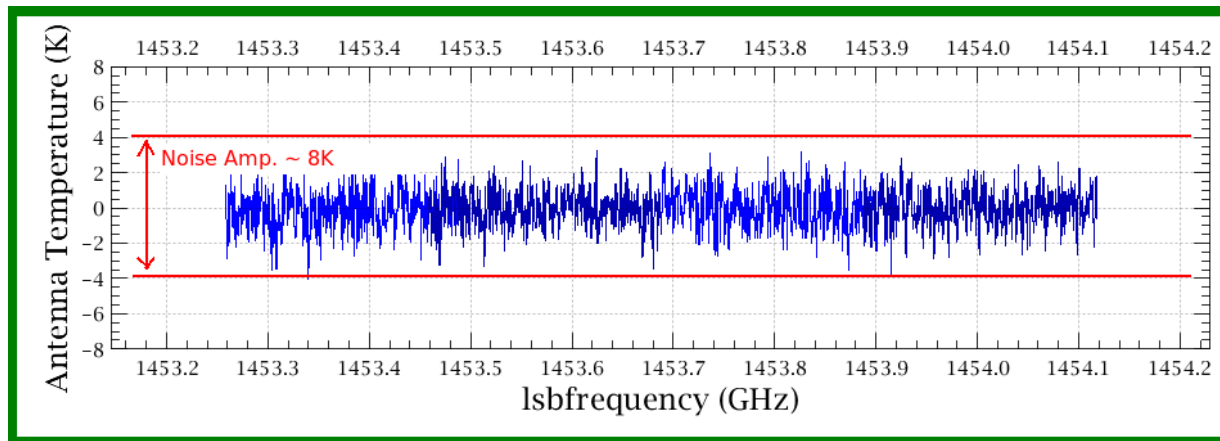
Selection of Highlights of HIFI Improvements

- **40% noise reduction and improved baseline quality for level 1 products of all observations performed in bands 6 and 7**
- **For strong continuum sources an optional pipeline step can reduce or eliminate standing waves**
- **Updated browse images for point mode observations**
- **The HIFI User's Manual changed name to HIFI Data Reduction Guide, chapters were rearranged into more logical order**
- **Addition of several chapters (introduction, chapter, quick start guide, DBS Point Mode cookbook, “How to flag and remove flags from your data” and Unit Conversion**

Highlights of HIFI Improvements for HCSS 8



HCSS 7



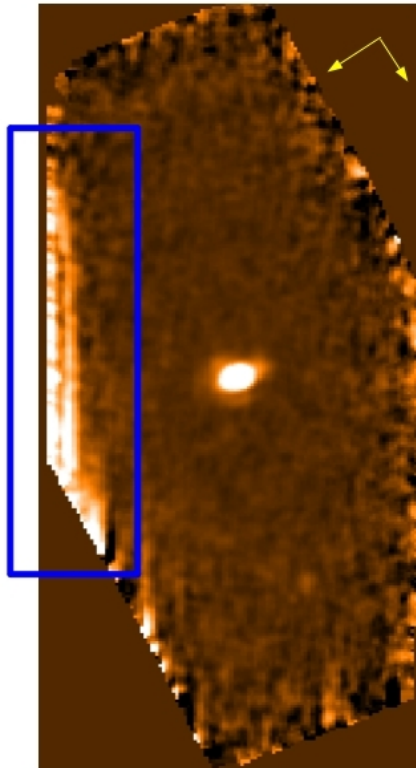
HCSS 8

Transient correction for miniscan map (photometer pipeline)

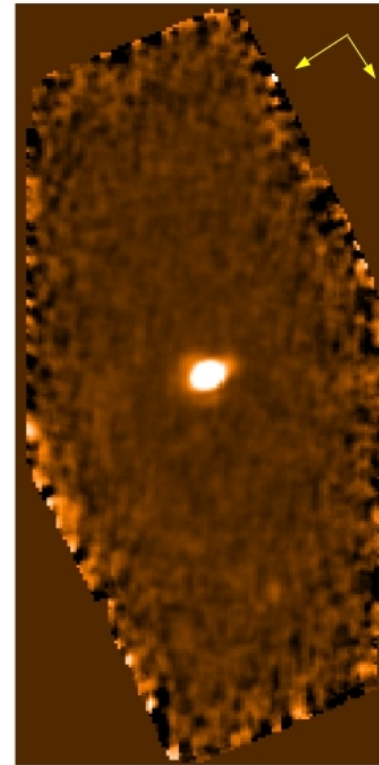
Selection of Highlights of PACS Improvements

- **Interactive reduction scripts for all spectrometer observing modes**
- **Flatfielding for spectrometer interactive reduction scripts**
- **Background normalisation method for chop/nod observations leads to improved flux calibration**
- **New level 2.5 product is available combining photProject scan and cross-scan maps (Photometer pipeline)**
- **Error propagation for Level 2 PACS rebinned cubes product & error bars for significance tests of line detections (Spectrometer pipeline)**
- **Browse products and browse image products (Spectrometer pipeline)**

Highlights of PACS Improvements for HCSS 8



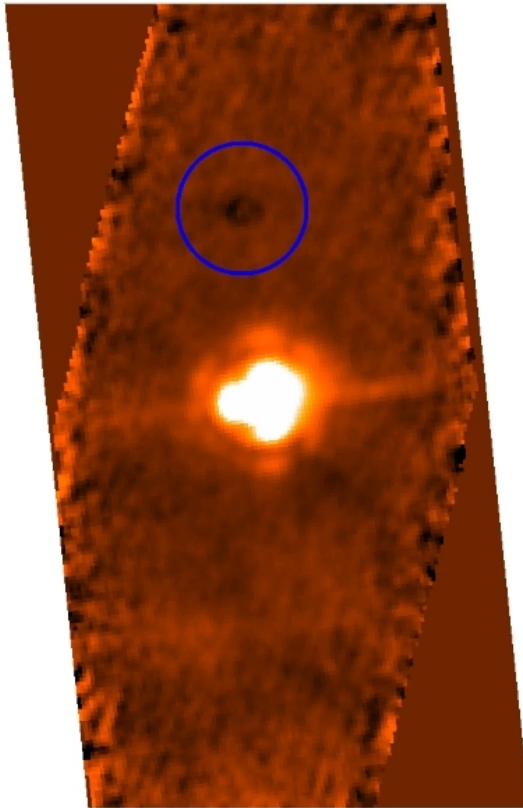
Level 2
@hcss 7.0



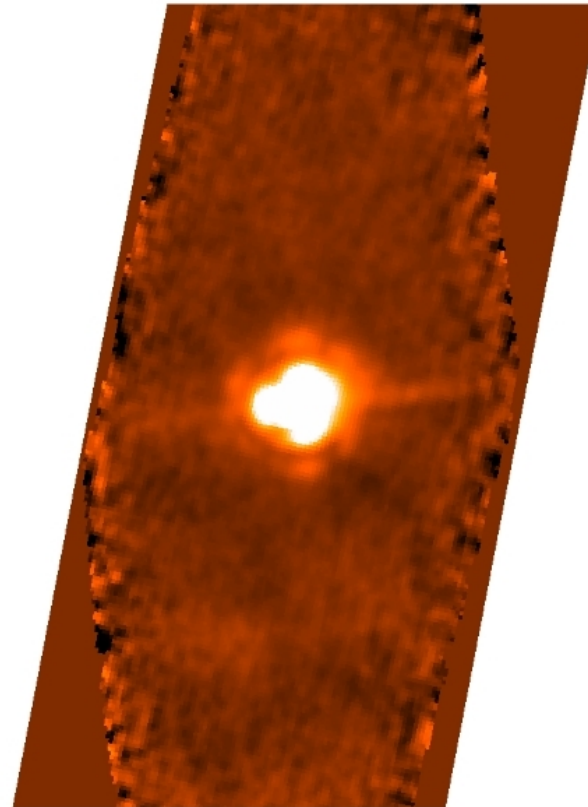
Level 2
@hcss 8.0

Transient correction for miniscan map (photometer pipeline)

Highlights of PACS Improvements for HCSS 8



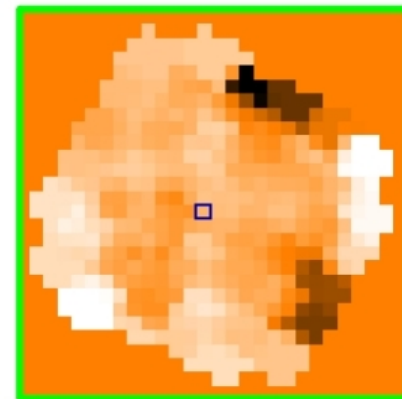
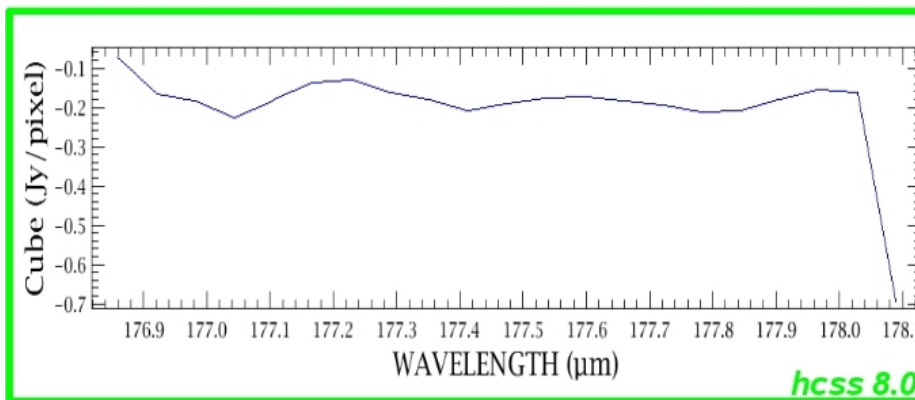
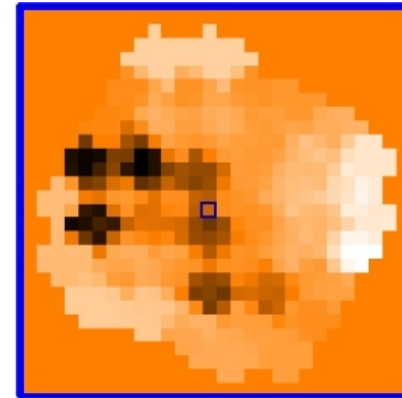
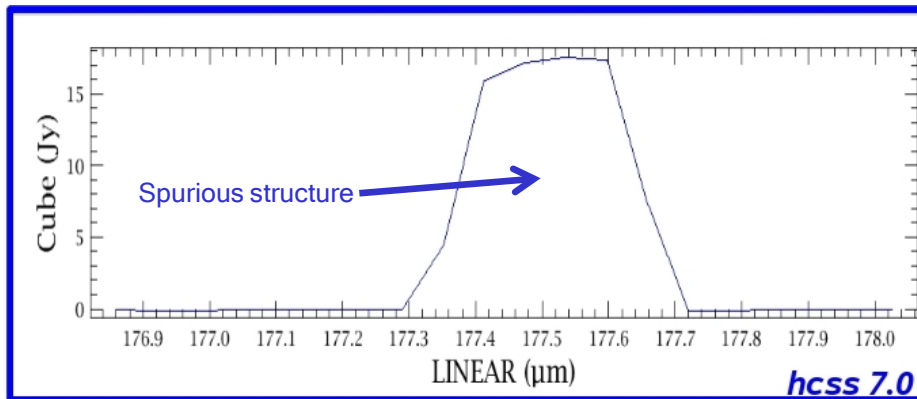
hcss 7.0



hcss 8.0

Cross-talk correction for red channel (photometer pipeline)

Highlights of PACS Improvements for HCSS 8

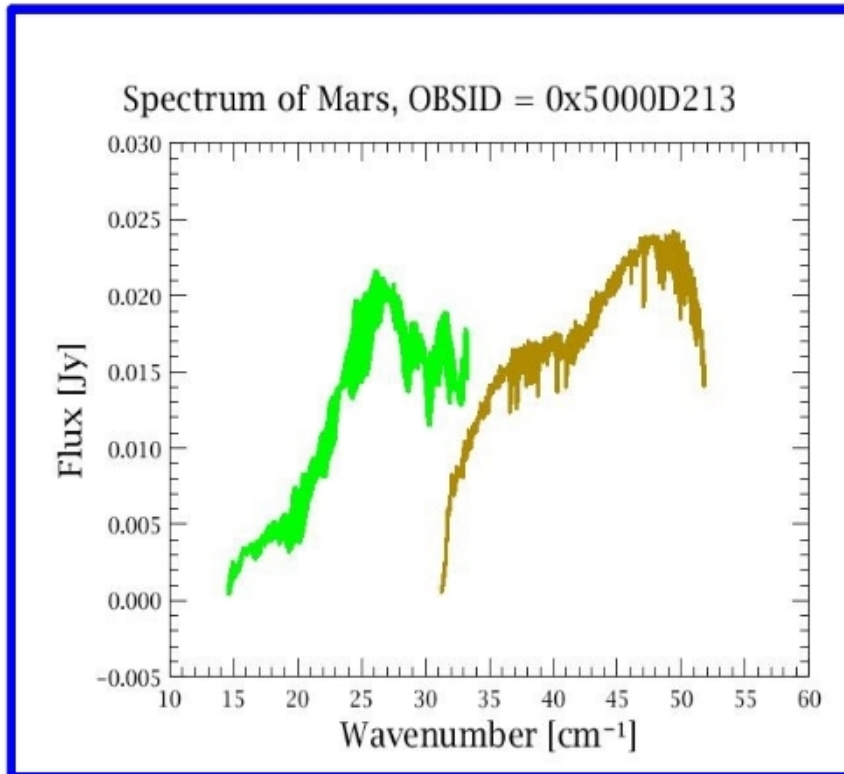


Spurious structures removed as observation is now processed by upgraded unchopped mode pipeline

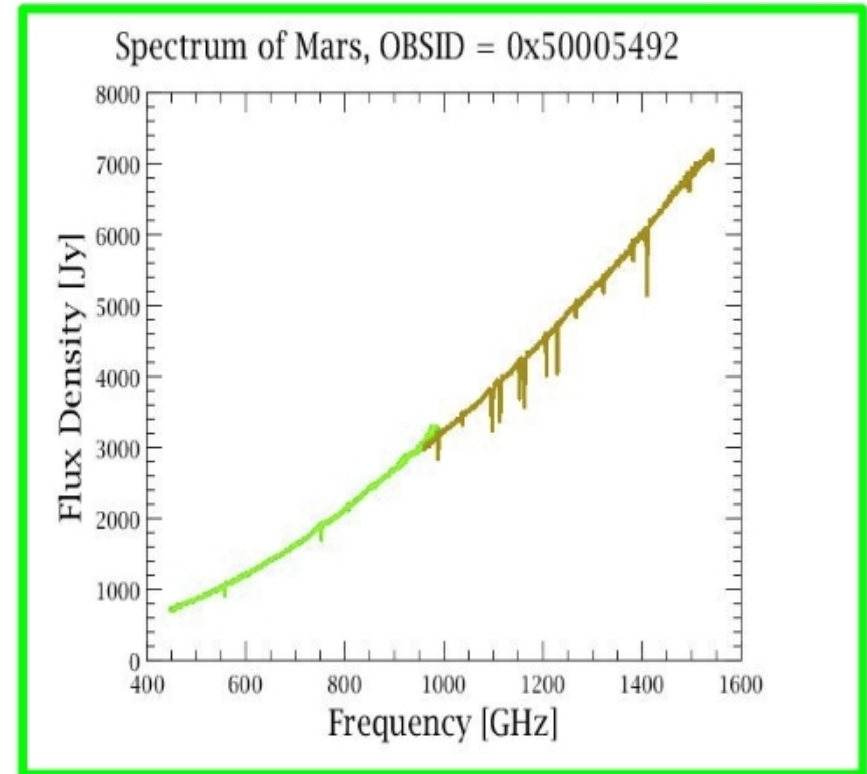
Selection of Highlights of SPIRE Improvements

- **Pipeline processing of bright source mode observations with the SPIRE Spectrometer**
- **ScaIPhotChanRelGain calibration product to improve extended emission calibration for photometry**
- **Improvement of ScaISpecTeleRsrF to reduce the noise level in the RSRF**
- **Inclusion of Photometer (e.g. destriper, moving object correction) and Spectrometer scripts (e.g. background subtraction, line fitting)**
- **Provision of quick start guides to give you an overview of the SPIRE processing, what's available, and quick link jumps into the documentation**
- **Revision of the SPIRE Data Reduction Guide for both Photometer and Spectrometer Chapters.**

Highlights of SPIRE Improvements for HCSS 8



hcss 7.0



hcss 8.0

Spectrometer pipeline product of bright mode observation of Mars

HIFI Data Processing Status for HCSS 8.0

AOT	Observing Mode	L2 Product comparable to IA?	QC Avail (Flags/Docs)	HSA Browse Product	HIPE scripts Usable	Planned/needed improvements
Single Point	DBS	Yes	Yes	Yes	Yes	QC Area: spur flagging
Single Point	Freq./Pos Switch	Yes	Yes	Yes	Yes	QC Area: spur flagging
Single Point	Load Chop	Yes	Yes	Yes	Yes	QC Area: spur flagging
Spectral Scan	DBS	Yes	Yes	No	Yes	QC Area: spur flagging Browse Product
Spectral Scan	Freq./Pos Switch	Yes	Yes	No	Yes	QC Area: spur flagging Browse Product
Spectral Scan	Load Chop	Yes	Yes	No	Yes	QC Area: spur flagging Browse Product
Mapping	DBS Cross/Raster	Yes	Yes	No	Yes	QC Area: spur flagging Browse Product
Mapping	OTF Freq./Pos Switch	Yes	Yes	No	Yes	QC Area: spur flagging Browse Product
Mapping	OTF Load Chop	Yes	Yes	No	Yes	QC Area: spur flagging Browse Product

green : OK (for current state of the mission) orange: limited shortcomings red: not available/not useful

PACS Data Processing Status for HCSS 8.0

AOT	Observing Mode	L2 Product comparable to IA?	QC Avail (Flags/Docs)	HSA Browse Product	HIPE scripts Usable	Planned/needed improvements
Photometer	Scan Map	Yes L2.5 available	Yes	Yes	Yes	Calibration access for L2.5 products QC Flags: threshold avail. for : % of Sat. pixels QC Flags: threshold needed for: % of Deglitched/Usable pixels
Photometer	Point Source (not recommended observing mode)	Yes	Yes	Yes	Yes	Calibration access for L2.5 products QC Flags: threshold avail. for : % of Sat. pixels QC Flags: threshold needed for: % of Deglitched/Usable pixels
Photometer	Parallel	Yes L2.5 available	Yes	Yes	Yes	Calibration access for L2.5 products QC Flags: threshold avail. for : % of Sat. pixels QC Flags: threshold needed for: % of Deglitched/Usable pixels
Line Spec	Pointed Mapping	No	Yes (no thresholds) (DecMec flag available)	Yes	Yes	RSRF, reliability of broad features, flat-fielding broadband correction for flux loss due to pointing, QC Flags: threshold needed for: % of Saturated/Deglitched/Usable pixels
Range Spec	Pointed Mapping	No	Yes (no thresholds) (DecMec flag available)	Yes	Yes	RSRF, reliability of broad features, flat-fielding broadband correction for flux loss due to pointing QC Flags: threshold needed for: % of Saturated/Deglitched/Usable pixels
Unchopped	Pointed Mapping	No	Yes (no thresholds) (Decmec flag available)	Yes	Yes	RSRF, reliability of broad features, flat-fielding broadband correction for flux loss due to pointing QC Flags: threshold needed for: % of Saturated/Deglitched/Usable pixels

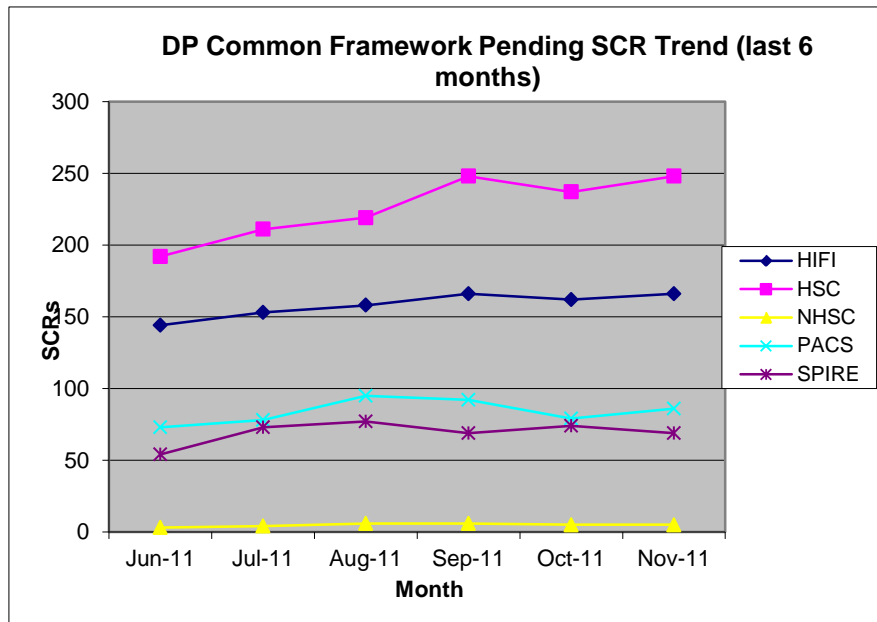
SPIRE Data Processing Status for HCSS 8.0

AOT	Observing Mode	L2 Product comparable to IA?	QC Avail (Flags/Docs)	HSA Browse Product	HIPE scripts Usable	Planned/needed improvements
Photometer	Point Source (POF2)	Yes	Yes	Yes	Yes	Calibration of extended sources (baseline removal) QC flag thresholds under revision
Photometer	Large Map (POF5)	Yes L2.5 available	Yes	Yes	Yes	Calibration of extended sources (baseline removal) QC flag thresholds under revision Need scientific validation of L2.5
Photometer	Parallel (POF9)	Yes L2.5 available	Yes	Yes	Yes	Calibration of extended sources (baseline removal) QC flag thresholds under revision Need scientific validation of L2.5
Photometer	Small Map (POF10)	Yes	Yes	Yes	Yes	Calibration of extended sources (baseline removal) QC flag thresholds under revision
Spectrometer	SOF1	Yes	Yes	Yes	Yes	QC flag thresholds under revision
Spectrometer	SOF2	Yes	Yes	Yes	Yes	QC flag thresholds under revision

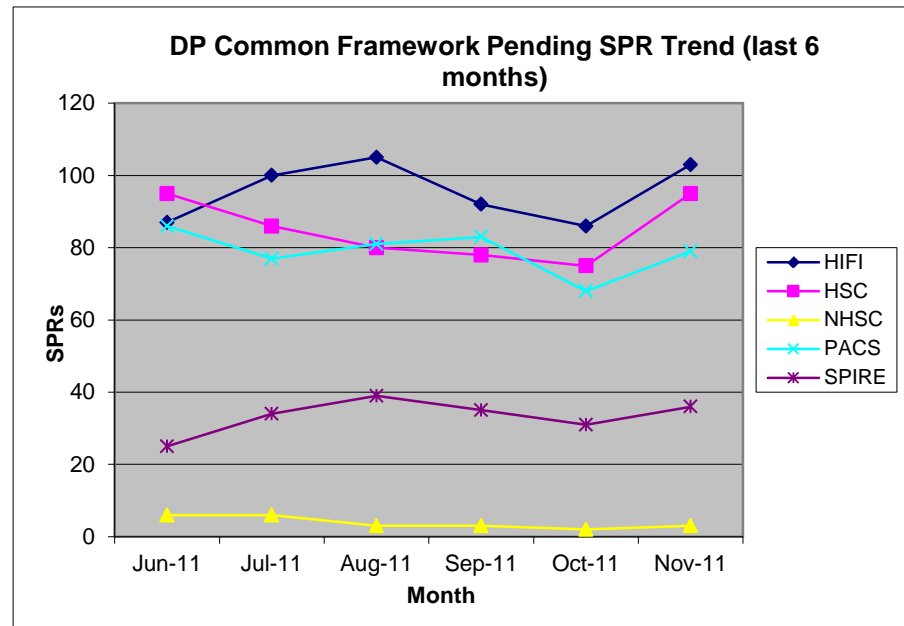
green : OK (for current state of the mission) orange: limited shortcomings red: not available/not useful

Project development statistics

Trend of s/w tickets for pipeline system, HIPE, documentation and user tools



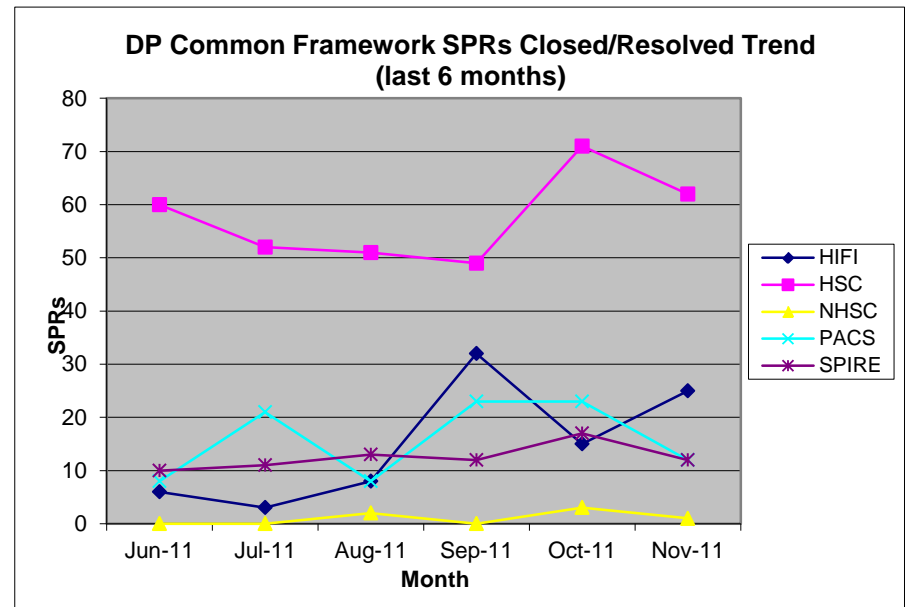
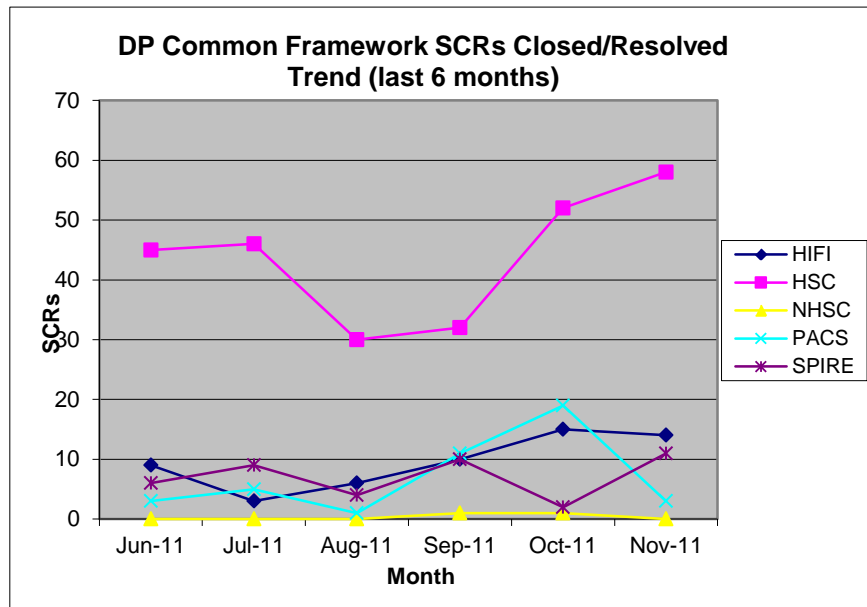
stable number of change requests



Overall stable number of problem reports; November increase following DPAT

Project development statistics:

Closure rate of s/w tickets for pipeline system, HIPE, documentation and user tools



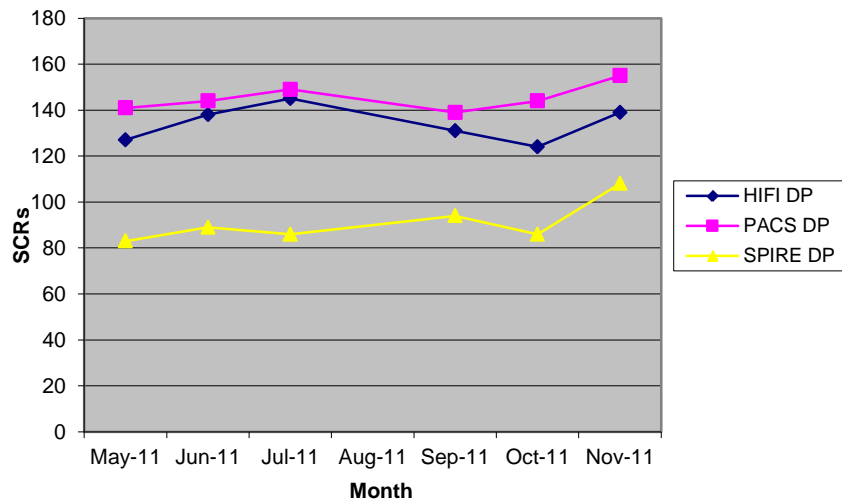
Change Requests

Nearly 200 s/w tickets are implemented each month

Problem Reports

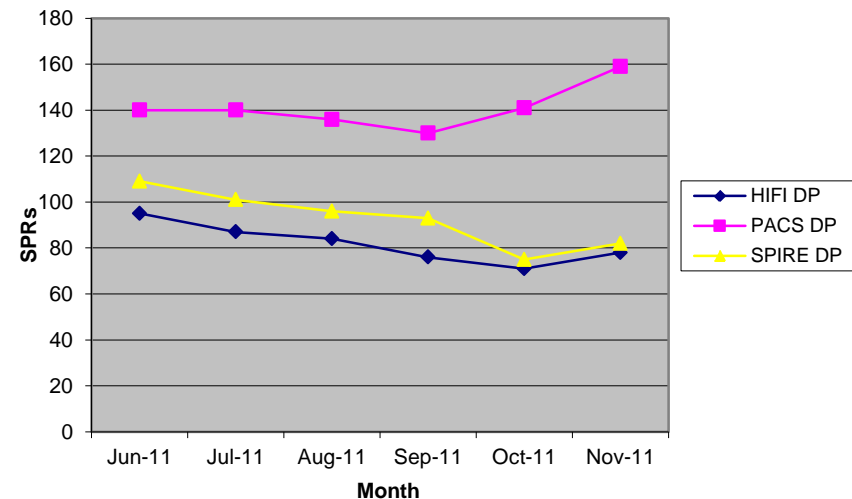
Project development statistics: Trend of instrument DP s/w tickets

Pending SCR Trend Chart (last 6 months)



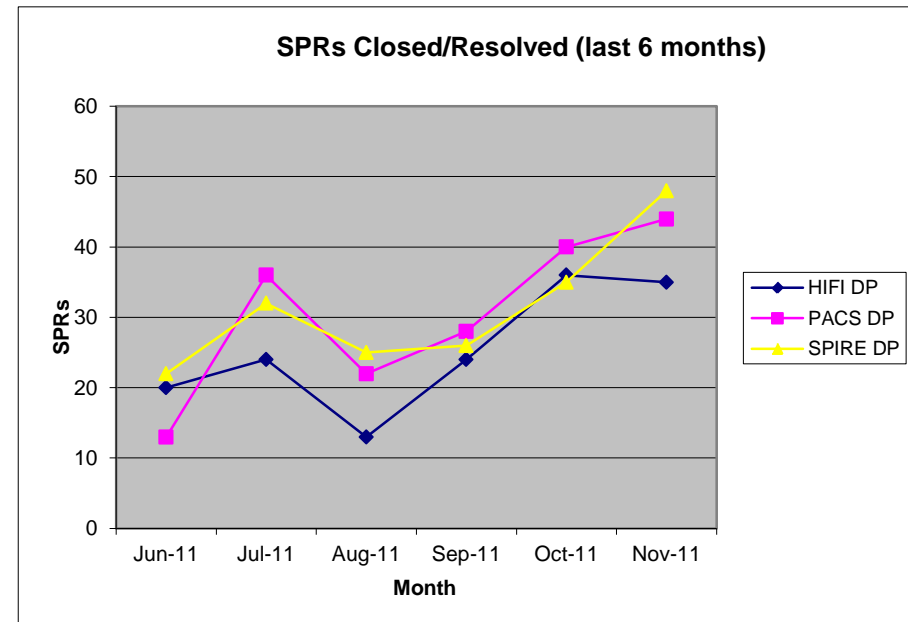
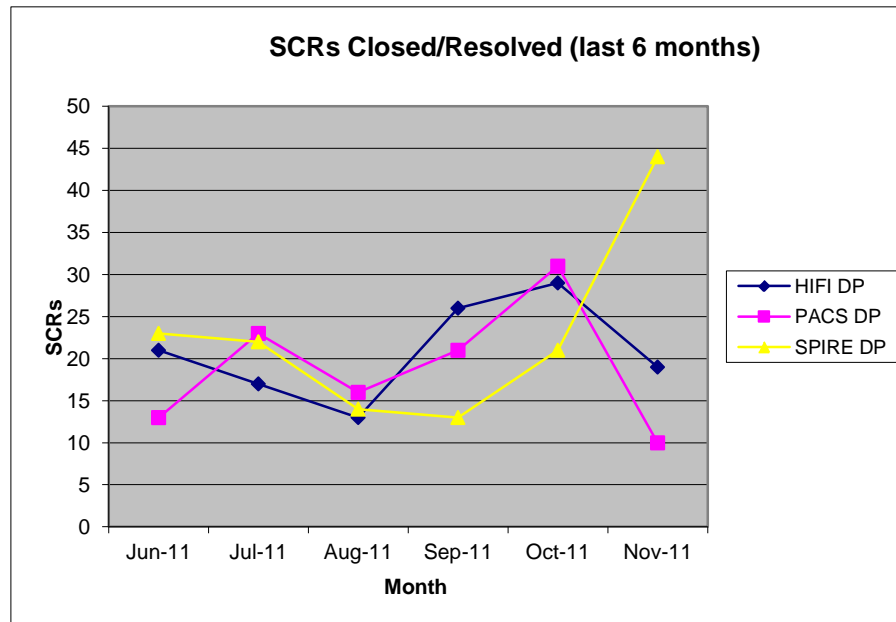
number of software change requests overall stable, November increase following DPAT

Pending SPR Trend Chart (last 6 months)



number of software problem reports decreasing for HIFI and SPIRE; number of PACS SPRs remains high

Project development statistics: Closure rate of instrument DP s/w tickets



Change Requests

Problem Reports

Nearly 150 s/w tickets are implemented each month

Agreed DPMG monitored high-level Goals

- 1. Improvement of calibration and data reduction pipelines**
- 2. Improvement of user friendliness**
- 3. Reduction/optimisation of memory requirements by user pipelines**
- 4. Identification of packages that can be declared as “under maintenance”**
- 5. Combination of data from the different Herschel instruments**
- 6. Ease access to calibration data**

Proposed Additions to DPMG monitored high-level Goals

- 1. Improvements to documentation framework**
 - a. Search functionality**
 - b. Option to add comments by users**
 - c. Incremental documentation builds**
- 2. Maintainability of HIPE with reduced manpower during post-ops**
 - a. Code reviews**
 - b. Addressing code quality issues**

Miscellaneous

- **HIPE Forum 2011** took place in June 2011. Nearly 100 persons participated. For the first time HCSS users outside of the Herschel Science Ground Segment participated. I think this was a good change, and hope for even more users participating in the HIPE forum 2012.



Looking forward to your reactions and questions

