SUBJECT: HCSS 1.2.4 RC1 DP-SPIRE Acceptance Test Report

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1. Introduction:

1.1 Purpose of document:

The purpose of this document is to report on the execution of the SPIRE pipeline scripts and tools as provided in the SPIRE version of the HCSS 1.2.4 RC1 software release.

1.2 Documents:

1.2.1 Applicable Documents

Document Name	Document Number	Version Number
SPIRE Data Processing Pipeline Module Requirements	**SPIRE-ICS-DOC-002998**	**2.1**
SPIRE Pipeline Description Document	**SPIRE-RAL-DOC-002437**	**2.1**
Herschel Products Definitions Document	**HERSCHEL-HSC-DOC-0959**	**0.95**

2. Test Set-up:

The tests were run on a Linux box, using the following configuration.

- Fedora 10
- 8 GB of RAM
- Java(TM) SE Runtime Environment (build fedora-21.b16.fc10-x86_64)

The install of HCSS used for the acceptance testing was the 1.2.4 RC1 user release of the HCSS. During installation, the Advanced installation was selected to allow access to the additional SPIRE tools, such as obsExporter, that are not installed using the default installation.

Additional software used during the acceptance testing included:

- Firefox 3.5.5
- Adobe Acrobat 9.0
- ds9

3. Executed Acceptance Tests:

3.1 - Test 1 : Access products using HSA Browser

Starting Conditions:
- A set of pipeline products available in the HSA
- Tester has been set up as an Authorised User of HSA

Scenario(s) tested:
- Accessing products

Procedure Summary:
Part1
- Log on over web to HSA as Authorised User
- Select products in HSA
- Retrieve data from HSA into local pool

Part2
- Start HIPE
- Browse HSA files
- Import Products into local pool

Test executed by: Brian O'Halloran
Date of Test: 2009-11-06.

Scenario(s) tested:
- Accessing products

Results:
Part1
- The actor logged onto the HSA via HCSS as an authorised user.
- The HSA was searched for SPIRE products, and several photometer observations were available.

Part2
- The user selected the photometer jiggle map observation 1342183474 for download. The product was successfully downloaded via the FTP retrieval GUI. However, exporting the data directly in to HIPE failed.

Conclusions: SPIRE products were available for browsing, and were successfully downloaded from the HSA – PASSED.

3.2 - Test 2: Access products and run first stage of pipeline via a database

Starting conditions:
- A remote database

Scenario(s) tested: Access a remote database and run the Level 0 to Level 0.5 pipeline.

Procedure:
- Start obsExporter
- Select available remote database
- Enter the Observation ID to be processed
- Run pipeline to convert from Level 0 to Level 0.5
- Browse Products in a Session using DatasetInspector
- Check SPIRE products for compliance with their specification
- Repeat using HTTP pool and run the first stage of the pipeline.

Test executed by : Brian O'Halloran
Date of Test: 2009-11-06.

Starting conditions:
- Access to a remote database at RAL (ops_1@chesterfield)

Results:
- obsExporter was successfully started, and the connection was made to the ops_1@chesterfield database at RAL successfully.
- Several photometer observations were retrieved via obsExporter, namely 1342183486 (POF5), and 1342186114 (POF5).
- Accessed the same datasets via HTTP pool, and retrieved the Level 0 datasets. These were processed by the POF5 successfully to Level 1.
- Products were successfully browsed using DatasetInspector.
- SPIRE products were checked for compliance against their specification.
- Total time for required for access & processing the datasets ~ 10 minutes.

Conclusions: The actor was successfully able to access a dataset on a remote database, download and initially process the dataset to Level 0.5, as specified. The test can be thus considered to have been PASSED.

3.3 - Test 3: Browse and Access Products from Local Pool

Starting conditions:
- A local pool

Scenario(s) tested:
- Browse and Access Products

Procedure:
- Start HIPE
- Select available Local Pool
- Start Product Browser
- Extract Products into HIPE session
- Browse available Tasks for Spectroscopy and Photometry
- Browse available Tasks for a specific Product
- Inspect the History of a Product
- Browse Products in a Session using DatasetInspector
- Check SPIRE products for compliance with their specification

Test executed by: Brian O'Halloran
Date: 2009-11-06

Test Results:

1) HIPE was started and the Local Pool 'myTestPool5', containing the saved products from Test 2 (obsid: 1342186114).
2) The product browser was started, and the products were successfully extracted into the the HIPE session.
3) Task browser was opened and available tasks were inspected successfully.

Conclusions: The actor was successfully able to browse and access products from a local pool, as specified. The test can this be considered to have been PASSED.

3.4 - Test 4: Run Pipeline

Starting conditions:
- A local pool

Scenario(s) tested:
- Run Pipeline(s)

Procedure:
- HIPE started
- Select pool
- Start automatic pipeline application connected to pool
- Operator monitor this process

Test executed by: Brian O'Halloran
Date: 2009-11-09

Test Results:

As part of the acceptance testing process, I executed a number of photometer pipelines (POF2, POF3, POF5 and PARALLEL) and a spectroscopy pipeline (SOF1).

3.4.1 Pools access:
Several pools were set up containing photometer observations downloaded via obsExporter and via HTTP Pool. PASS.

3.4.2 POF 2 pipeline (obsID: 1342183474 – flight data for NGC 5315):

Pipeline was executed using the standard pipeline script for POF2 (POF2_pipeline.py,v 1.61).

New set of calibration files generated successfully using cal_import before pipeline processing was attempted. HIPE successfully used this new set of calibration files for all POF and SOF pipelines.

Level 0 to Level 0.5 processing – processing proceeded as expected, with the products produced following the SPIRE products definitions document.

Level 0.5 to Level 1 processing – Processing was performed using the standard parameters for the respective modules. Processing to Level 1 performed as expected, with the PPP and APPP products following the SPIRE products definitions document.

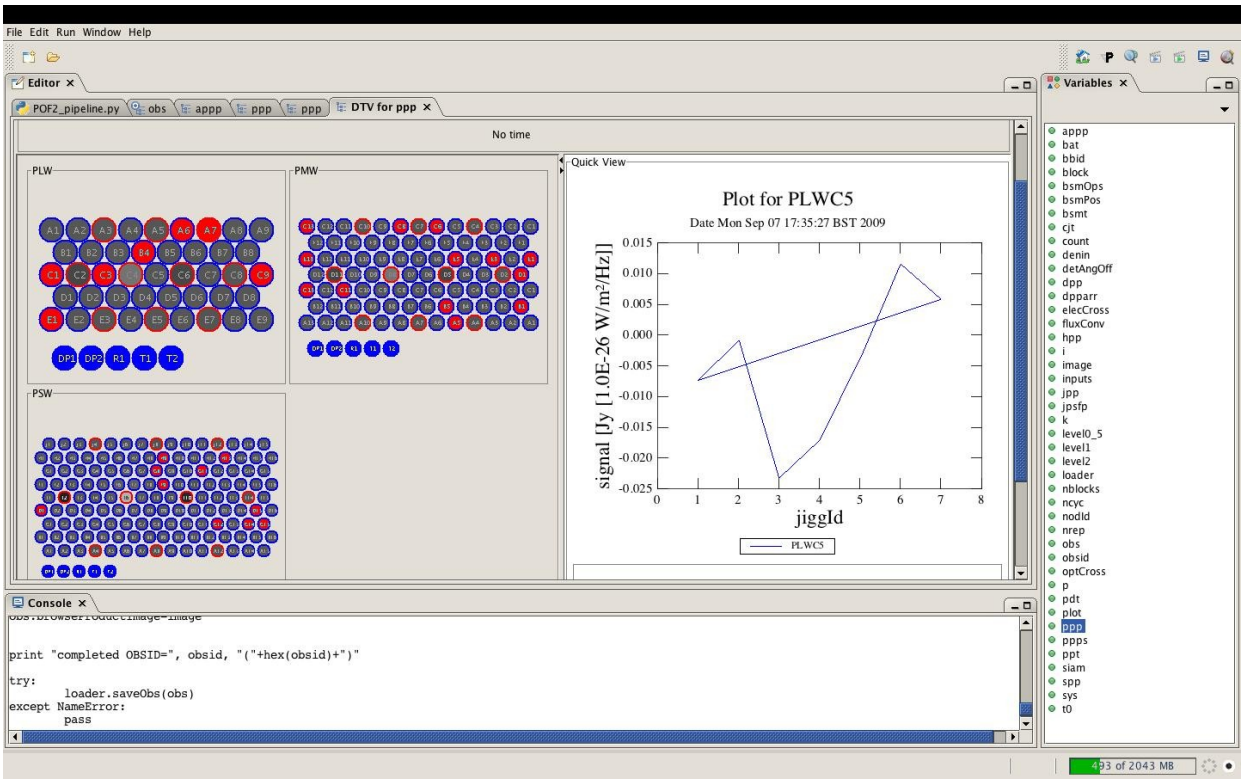

Fig 1. POF2 pipeline with flight data ObsID 1342183474 – output of the PPP product

Level 1 to Level 2 processing – the POF2 pipeline successfully processed the data to Level 2. Looking at the JPP product, some issues arise. There are no values for RA, DEC and their associated errors, there are no fluxes for the PMW and PSW arrays, the PLW flux has no units and the errors are NaNs.

Total run time for the POF 2 pipeline – 10 minutes.

Conclusions: The pipeline script successfully processed the data until Level 1. However, there stills seems to be significant issues with the Level 2 products – the developer needs to fix this.

3.4.3 POF 3 pipeline (obsID: 1342183488 – flight data for Arp 220):

Pipeline was executed using the standard pipeline script for POF3 (POF3_pipeline.py,v 1.59).

Level 0 to Level 0.5 processing – processing proceeded as expected, with the products produced following the SPIRE products definitions document.

Level 0 to Level 0.5 processing – Processing proceeded as expected, with the products produced following the SPIRE products definitions document.

Level 0.5 to Level 1 processing – Processing was performed using the standard parameters for the respective modules. Processing proceeded as expected, with the products produced following the SPIRE products definitions document.

Level 1 to Level 2 processing – Processing was performed using the standard parameters for the respective modules. Processing proceeded as expected, with the products produced following the SPIRE products definitions document.

Level 2 map products were successfully exported to FITS files.

Fig 2. Work Bench perspective of the PLW Map for the POF3 observation 1342183488.

Total run time for the POF 3 pipeline – 10 minutes.

Conclusions: The pipeline was successfully propagated, with the output products following the expected specifications. The POF3 pipeline processing test can be considered to have PASSED.

3.4.4 POF 5 pipeline (obsID: 1342183475 – large map for NGC 5315):

Pipeline was executed using the standard pipeline script for POF5 (POF5_pipeline.py,v 1.62.2.1).

Level 0 to Level 0.5 processing – processing proceeded as expected, with the products produced following the SPIRE products definitions document.

Level 0.5 to Level 1 processing – Processing was performed using the standard parameters for the respective modules. Inspection of products produced following the completion of the POF5 Level 1 processing were confirmed to be following the SPIRE products definitions document.

Level 1 to Level 2 processing – Processing proceeded as expected, with the products produced following the SPIRE products definitions document.

Level 2 map products were successfully exported to FITS files.

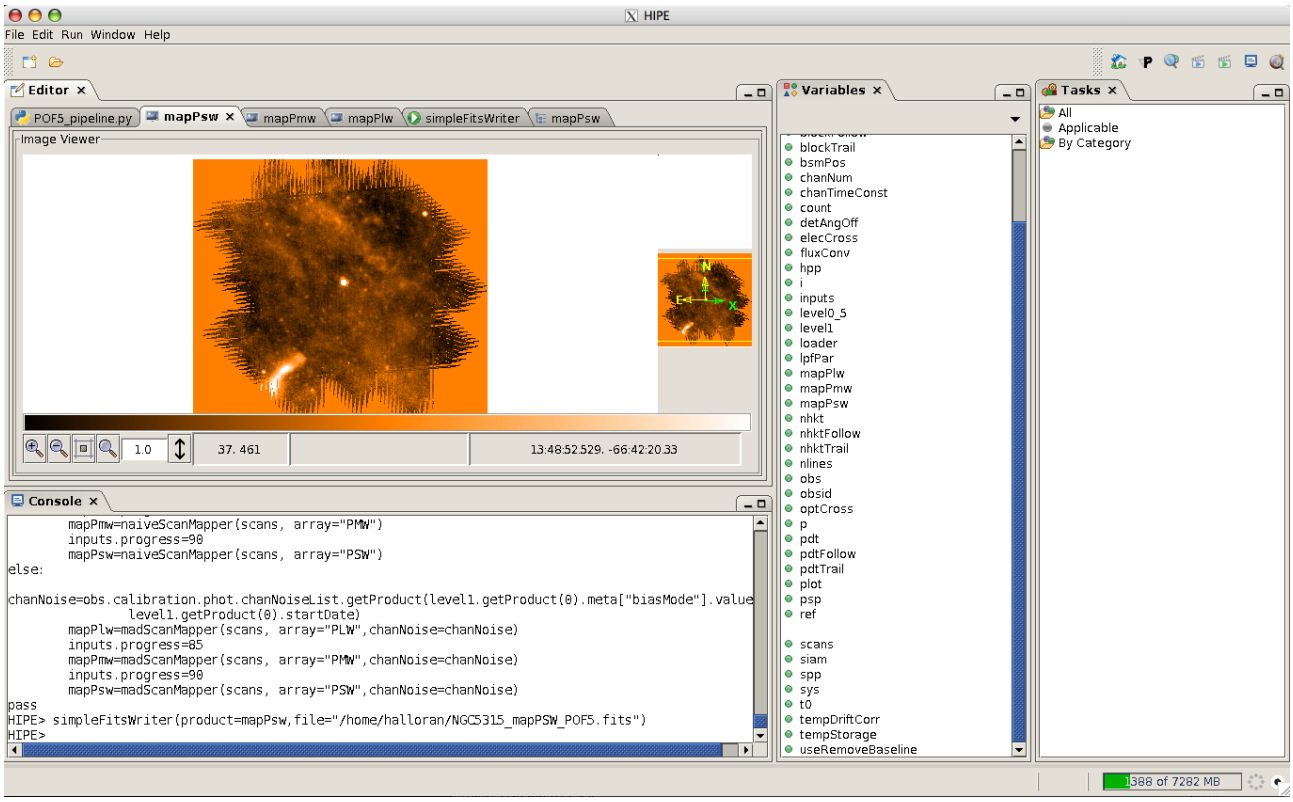

Fig 3. Work bench perspective of the PO5 observation 1342183475, after Level 2 processing.

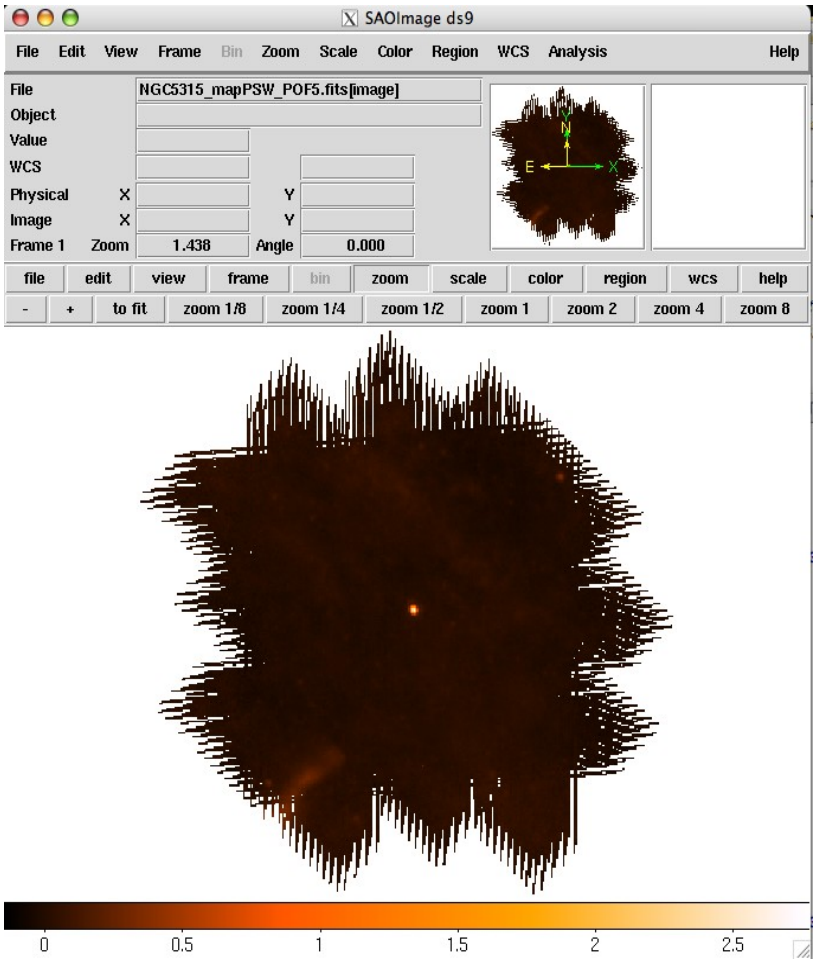

Fig 4. ds9 view of the exported PO5 observation 1342184475.

Total run time for the POF 5 pipeline – 15 minutes

Conclusions: The pipeline was successfully propagated, with the output products following the expected specifications. The POF5 pipeline test can therefore be considered as PASSED.

3.4.5 PARALLEL mode pipeline (obsID: 1342184474 – large scan map of SgrB2):

Pipeline was executed using the standard pipeline script for PARALLEL mode (which, in essence, is the POF5 pipeline script. (PARALLEL_pipeline.py,v 1.14.2.1)).

Level 0 to Level 0.5 processing – processing proceeded as expected, with the products produced following the SPIRE products definitions document.

Level 0.5 to Level 1 processing – Processing was performed using the standard parameters for the respective modules. Inspection of products produced following the completion of the PARALLEL Level 1 processing were confirmed to be following the SPIRE products definitions document.

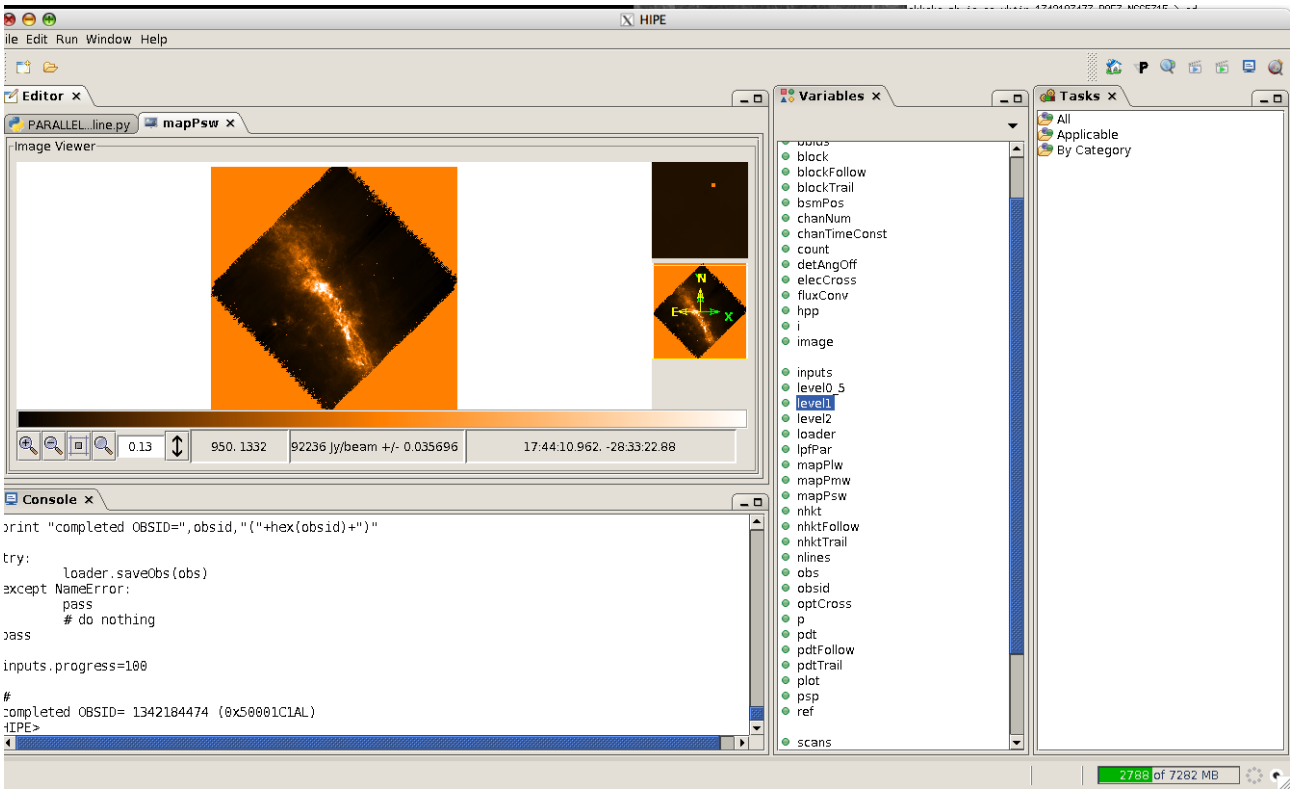

Fig 5. Work bench perspective for the PARALLEL observation 1342184474, after Level 2 processing.

Level 1 to Level 2 processing – Processing proceeded as expected, with the products produced following the SPIRE products definitions document.

Map products were successfully exported from HIPE in FITS format, and were loaded without a problem in to d9.

Level 2 map products were successfully exported to FITS files.

Total run time for the PARALLEL mode pipeline – 15 minutes.

Conclusions: The pipeline was successfully propagated, with the output products following the expected specifications. The PARALLEL mode pipeline processing test is therefore considered as PASSED.

3.4.6 SOF1 pipeline (obsID: 1342184122):

Obtained 1342184122 (a SOF1 observation of IC 342) via obsExporter.

Pipeline was executed using the standard pipeline script for SOF1 (SOF1_pipeline.py,v 1.40). Additionally, the tester used a modified demo script provided by Peter Davis-Imhof.

The demo script provided the tester the opportunity to very easily inspect the intermediate data products, such as the corrected and uncorrected interferograms by interactively plotting the Level 1 products as they were produced. The products were additionally accessible via the Variables pane for each level of processing for inspection.

The SPG SOF1 script worked as expected for v1.2.4, producing Level1 products in the form of a spectrum and an interferogram. The demo script likewise produced the expected final products, though the demo script guided the user in much greater detail and interactivity as to how the final products are arrived at.

Spectral pipeline products were successfully exported to FITS files and to a local store - see below for examples of output from intermediate products along the pipeline.

Total run time for the SOF1 pipeline – 20 minutes.

Conclusions: The pipeline was successfully propagated, with the output products following the expected specifications. The SOF1 pipeline test is therefore considered as PASSED.

3.5 - Test 5: Process Products

Starting conditions:
HIPE started
Products extracted into HIPE session
Calibration Products available from private pool

Scenario(s) tested:
Process Products

Procedure:
Stepwise execution of the pipeline standard processing steps
Visualization of temporary results
Modify input parameter for a pipeline step
Command line support by command completion mechanism
Compare results (Display and Plot)
Plug in of private Jython and Java Tasks without restarting HIPE
Reloading of Jython and Java Tasks without restarting HIPE
Execute private or modified Jython/Java Task
Browse History of Products

Test executed by: Brian O'Halloran
Date: 2009-11-09

Test Results:

To test the processing of products, we used the demo script and datasets for use with SPIRE spectroscopy pipeline, provided by Peter-Davis-Imhof.

Below are some examples from output from the intermediate products produced:

Plotting the input of Time Domain Phase Correction and the output of the task:

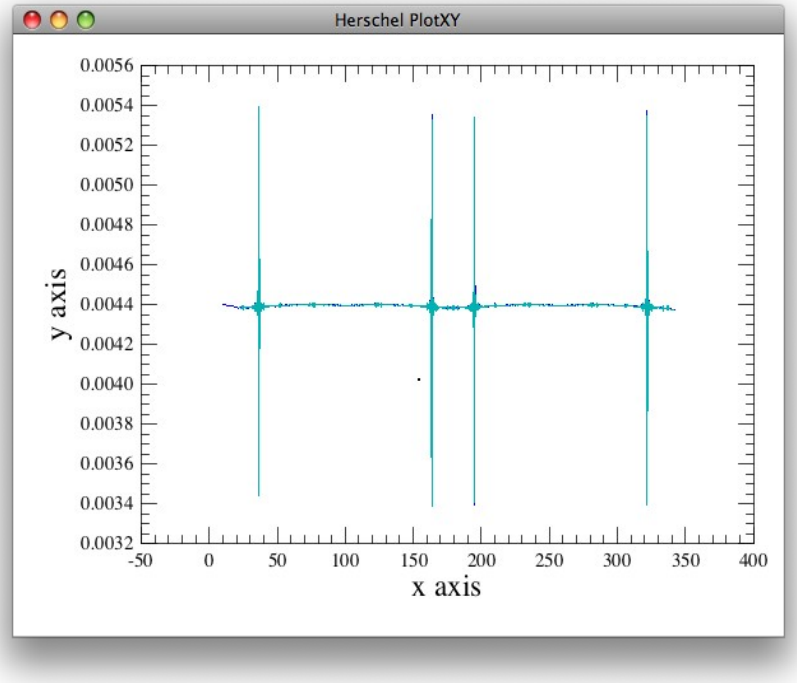

Fig 6: Output from the Time Domain Phase Correction

Plot the detector timeline and the mechanism timeline: these two are combined to form the interferogram:

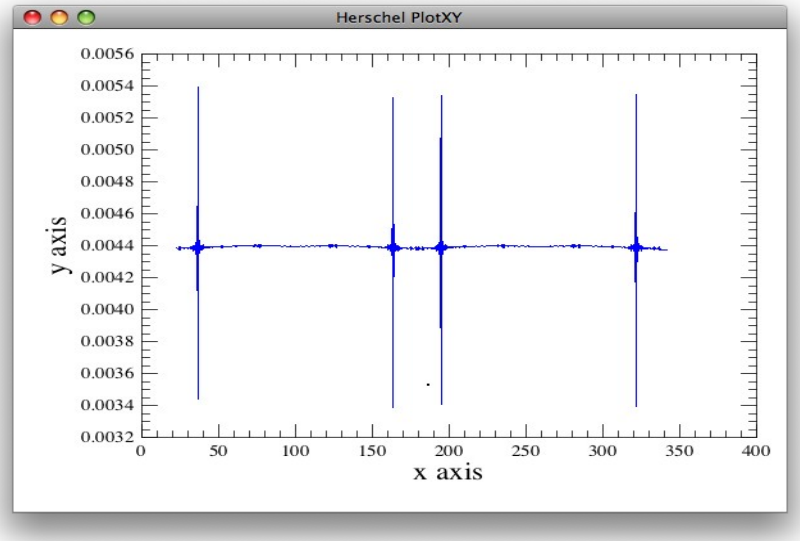

Fig 7: Detector timeline

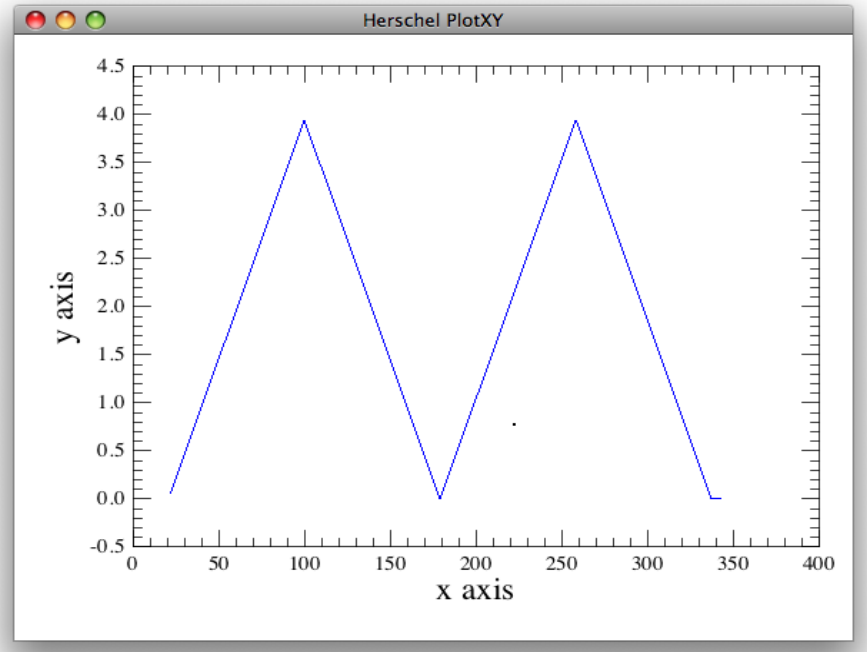

Fig 8: Mechanism timeline

Corrected forward and reverse scans:

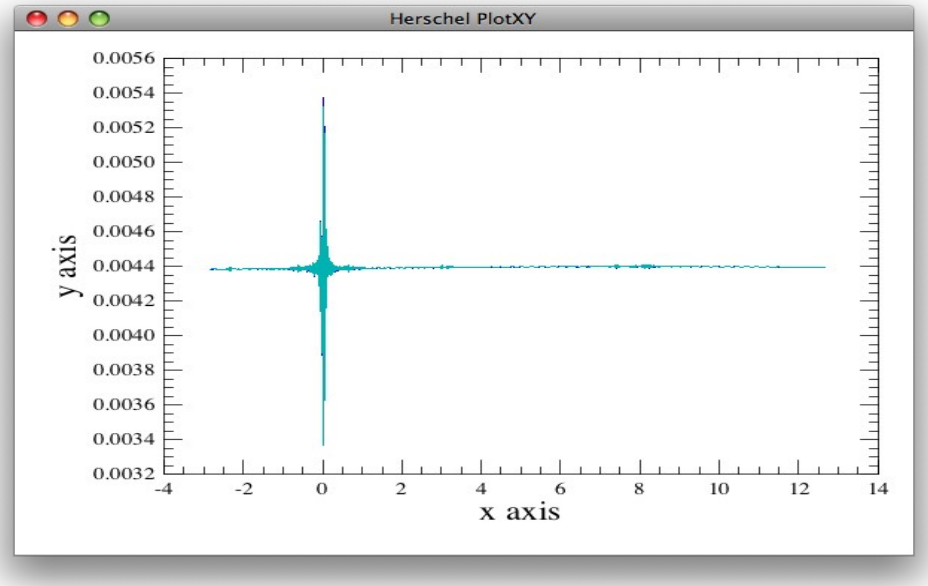

Fig 9: Corrected forward and reverse scans

Examining the spectrum without phase correction - real and imaginary parts:

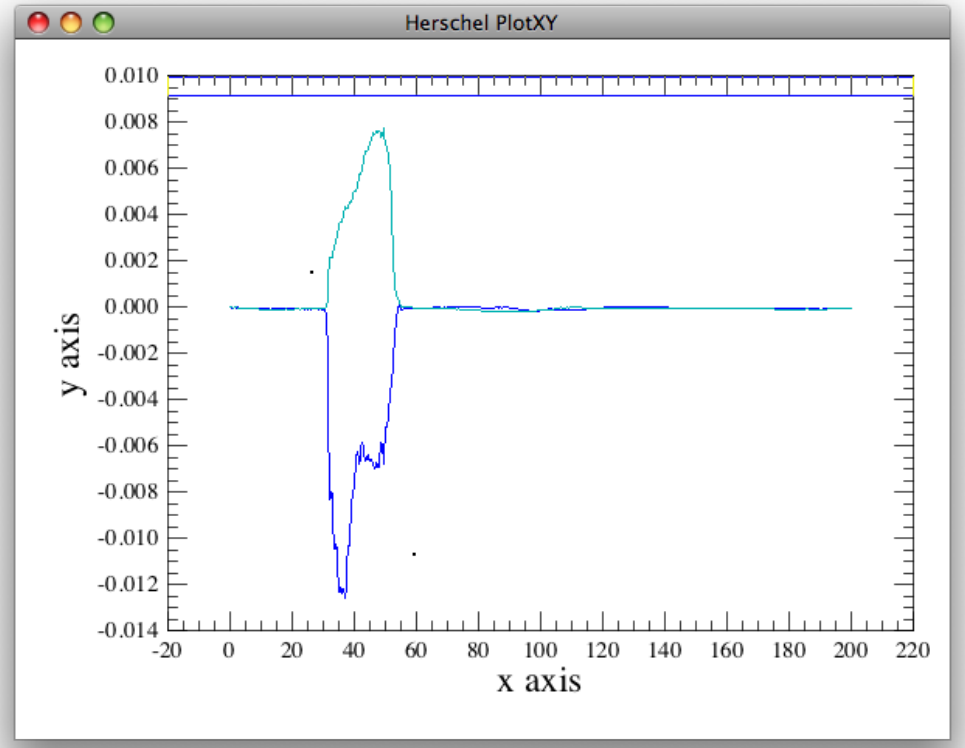

Fig 10: Spectrum without phase correction

Plotting the resulting corrected interferogram post phase correction:

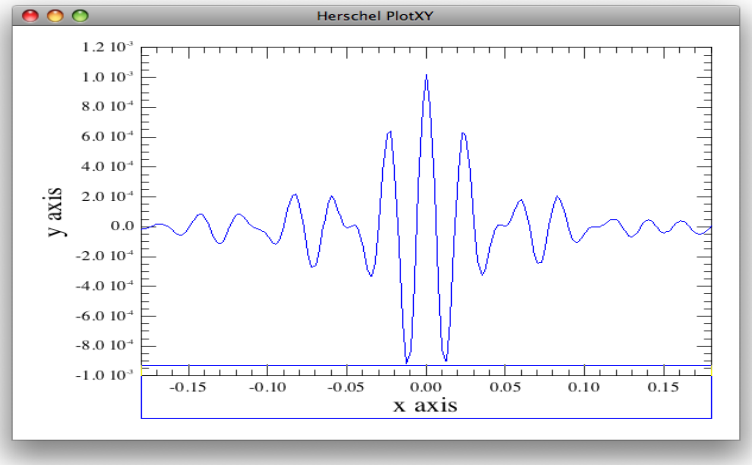

Fig 11: Corrected interferogram post phase correction

The final spectrum - plot of the SSW centre pixel:

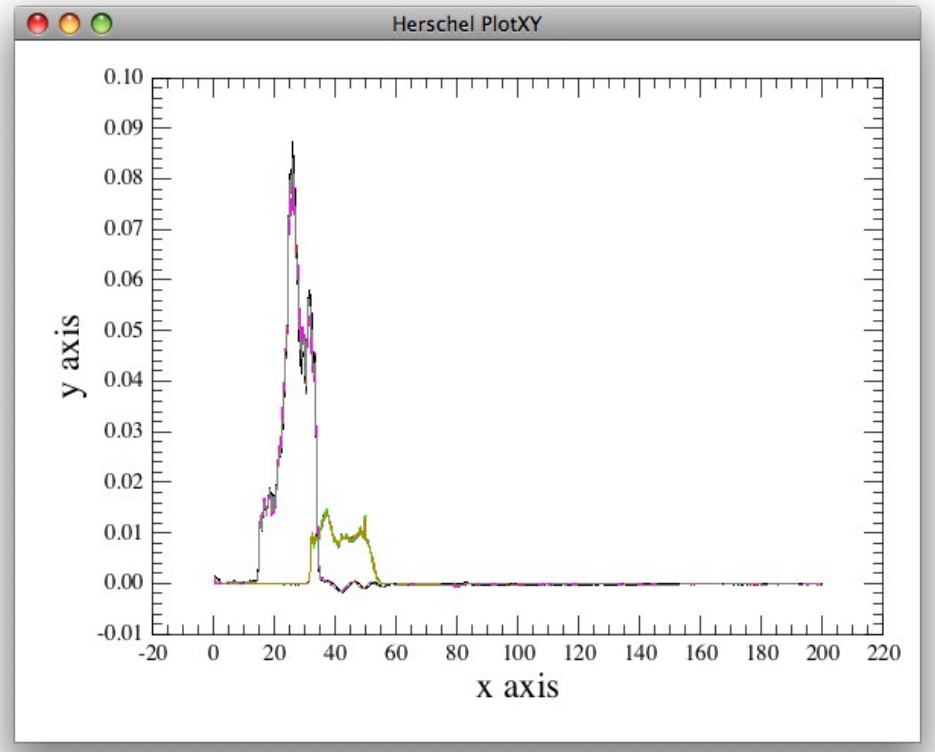

Fig 12: Plot of the SSW centre pixel

Conclusions: We were able to stepwise execute the pipeline standard processing steps for the SOF1 pipeline. We successfully performed visualization of temporary results.

Modify input parameter for a pipeline step – we successfully altered the phase correction performed, by altering the input parameters (polyDegree, pcfSize) required.

Results were plotted successfully.

History of Products was successfully accessed and browsed.

This test is therefore considered as PASSED.

3.6 - Test 6: Import and Export of Data Products

Starting conditions:
- A local pool

Scenario(s) tested:
- Browse and Access Products

Procedure:
- Start HIPE
- Select available Local Pool
- Start Product Browser
- Extract SPIRE Products into HIPE session
- Browse available Tasks for Spectroscopy and Photometry
- Inspect the History of a Product
- Browse Products in a Session using DatasetInspector
- Export processed SPIRE product(s) from HIPE to local pool

Test executed by: Brian O'Halloran
Date: 2009-11-09

Test Results:

This test in essence forms a subset of Tests 4 and 5 – we performed this test by selecting the local pools 1342184122 for spectroscopy and 1342183475 for photometry.

We extracted the SPIRE products for both into HIPE successfully, and were able to access and browse the available tasks.

On running the pipeline, we browsed the products, inspected the history and finally exported them into a local pool.

The import and export of data products test is therefore considered as PASSED.

3.7 - Test 7: Access Documentation

Starting conditions:
- HIPE started
- Products extracted into HIPE session

Scenario(s) tested:
- Access Documentation

Procedure:
- Access User Manual
- Print a Chapter of a User Manual
- Click on a Product to get view/possible pipeline applications/product description
- Get pipeline scripts (code) related to a certain Product
- Get synopsis of a certain Task

Test executed by: Brian O'Halloran
Date: 2009-11-09

Test Results:

I started HIPE and clicked on the Documentation icon- the jetty service was started successfully and created a tab within Firefox 3.5.5 listing the documentation bundled within the 1.2.4 RC1 build.

I accessed the SPIRE UM without any problems (HTML, Javadoc and PDF versions) and successfully printed Chapter 7.

For the denodding module used in the POF2 pipeline, I was able to successfully access the SPIRE URM entry to inspect the synopsis of the task.

Finally, I was able to inspect the code for the POF2 pipeline used to create the Averaged PPP product produced by the denodding task by exploding the dp-spire_src jar file in the src directory – this is only possible if the tester uses the Advanced Installation option when first installing HIPE.

Conclusions: The access of documentation test can be considered as PASSED.

3.8 - Test 8: Workspace handling

Starting conditions:
- HIPE started
- Products present within HIPE

Scenario(s) tested:
- Workspace handling

Procedure:
- Save Workspace (command history, parameter settings, Products,...)
- Restore crash: Restore last saved Workspace

Test executed by: Brian O'Halloran
Date: 2009-11-09

Test Results:

Individual window were adjusted in the following ways.

Window resizing – windows were maximized and minimised. Clicking and dragging borders of each of the windows allowed for expansion in any direction of any of the views.

Right clicking on the view tab provides a pull-down menu that allows some default window resizing and also tab placement and direction of written label

Windows can be moved inside the HIPE workspace by clicking on the window itself and dragging to another part of the work bench.

The user completely undocked a window view by holding the right mouse button down while on the window tab.

Moving Between Windows in a View. Windows can be moved inside a view using the arrow buttons to the top right of the view. The left and right arrows toggle through the windows available in a view, while the down arrow allows window selection from a list.

This was done for both the Work bench and the Full Work Bench perspectives.

To perform the saving of a workspace, we performed a POF2 pipeline script up as far as the generation of the Level 2 products.

Conclusions: The user was able to successfully manipulate the various work environments within the HCSS. Therefore we consider this to have PASSED.

4. *SPIRE SxRs applicable to the 1.2.4 release:*

The following have been checked within 1.2.4 RC1, and the fixes have applied, so have passed the AT:

SPIRE-2084 FIXED Source position in Level 2 maps from POF3 is different from maps from POF5
SPIRE-2029 FIXED DemodulateTask uses deprecated mask
SPIRE-2061 FIXED NaiveScanMapper task is much much slower!
SPIRE-1309 FIXED Wrong propagation of comp. metadata values from ObsContext to SPIRE products

The SxRs below have previously been patched into the HCSS 1.2.x builds, and have been tested as part of uplink/operations/mission planning prior to this AT test successfully and we thus can consider them as having passed the Acceptance test:

SPIRE-1978 FIXED Spectrometer Bright Source Settings are Not Implemented
SPIRE-1841 FIXED Table remain locked
SPIRE-2118 FIXED CalGCO observations should work with moving targets
SPIRE-2028 FIXED NHKT.SCANS counter was not reset before Observation 0x50001AE7
SPIRE-2077 FIXED Release of SPIRE Large Map AOT for Fast scan speed and nominal detector settings
SPIRE-2078 FIXED Release of SPIRE PACS Parallel AOT for slow and fast scan speed and nominal detector settings (SPIRE part)
SPIRE-1453 FIXED Onboard monitoring system stops triggering after the first action for an anomaly
SPIRE-622 FIXED Update to allow definition of SAFE Mode

SPIRE-1944 is awaiting a patch of the documentation build and subsequent patching to the 1.2 builds – this will appear in the next release candidate, according to the HSC.

Conclusions: All the applicable SxRs have passed AT. We await resolution for SPIRE-1944.