What's New in HIPE 13
General Topics

Bernhard Schulz (NHSC/IPAC)

on behalf of the HCSS Development Team

Pointing

- For SPIRE new pointing reconstruction applied by default.
- Gyro-based attitude reconstruction
- Combines the star tracker attitude measurements with the output from the Inertial Reference Unit.
- Greater weight to gyroscope output.
- Reduces the high-frequency components of the Absolute Measurement Error (AME).
- Pointing product update:
    - New fields
    - New keywords
- Special event handling
    - STR switch-overs
    - Reset of the Spacecraft Velocity Vector (SVV)

- All these changes are documented in the S/C and observatory Twiki and in the "What's new in HIPE" page.
- The impact on SPIRE observations is rather small. Some FTS observations may be affected.

Absolute Pointing Accuracy

Point Source Mode:

- Absolute pointing accuracy improves a bit for all periods except for the last one when all corrections were in place.

from PACS observations

Table 1: Summary of absolute pointing accuracy results. Point-source mode.

OD range	Raw accuracy APE[†] (arcsec)	simple-processed APE[†] (arcsec)	gyro-based APE[†] (arcsec)	number of observations
32–320	1.9–2.2	1.4	1.4	356
321–761	2.4[a]	1.6	1.2	280
762–865	1.45	1.3	1.2	169
866–1010	1.1	–	N/A	–
1011–1452 (EoH)	0.9	–	1.2	182

[a]extreme outliers at ≥ 8 arcsec possible

Scan Map Mode:

- Measured for two periods.
- A moderate improvement of the APE+ is observed in both cases.
- A slight reduction of the PSF width is also observed in the gyro-based ground processing.
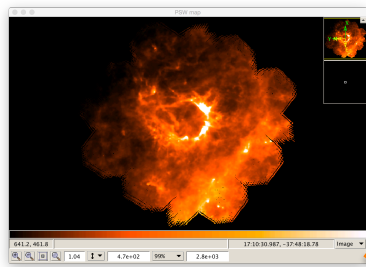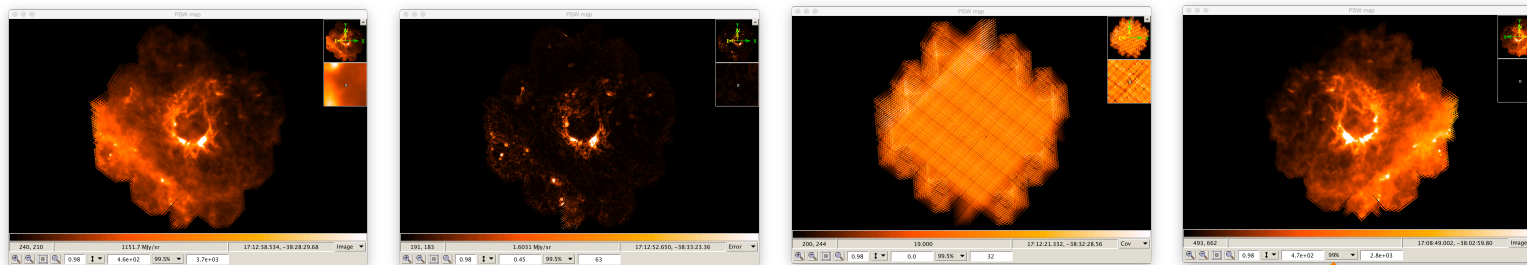
Table 3: Results from pointing scan map observations.

OD range	Type (G/S)	$\langle \Delta Y \rangle$ (arcsec)	$\langle \Delta Z \rangle$ (arcsec)	APE[†] (arcsec)	σ_{PSF} (arcsec)
607–748	G	0.42	0.18	1.31	2.33
607–748	S	0.57	0.35	1.58	2.40
1076–1266	G	0.46	1.06	1.12	2.35
1076–1266	S	0.54	1.22	1.28	2.37

From presentation:
M. Sánchez-Portal, 8-May-2015

Image Display

- some new method names
- new flip options
- reworked annotations in display
- bug fixes


```
HIPE>
HIPE> d = Display(obsid_1342183678.level2.refs["extdPSW"].product)
HIPE> d.showError()
HIPE> d.setCutLevelsPercentage(99.5)
HIPE> d.showCoverage()
HIPE> d.setCutLevelsPercentage(99.5)
HIPE> d.showImage()
HIPE> d.setCutLevelsPercentage(99.0)
HIPE> d.flipXAxis()
HIPE> d.flipXYAxis()
```

More Help on Display

Print list of all methods:

```
HIPE> print dir(d.__class__)
['ABORT', 'ALLBITS', 'ERROR', 'FRAMEBITS', 'HEIGHT', 'PROPERTIES', 'SOMEBITS', 'WIDTH',
'__class__', '__copy__', '__deepcopy__', '__delattr__', '__doc__', '__eq__',
'__getattribute__', '__hash__', '__init__', '__ne__', '__new__', '__reduce__',
'__reduce_ex__', '__repr__', '__setattr__', '__str__', '__unicode__', 'addAnnotation',
'addAnnotationWorldCoordinates', 'addAnnularSkyPhotometryProduct', 'addArcSecs',
'addArcSecsAnnotation', 'addAxis', 'addCircle', 'addCircleAnnotation', 'addCompass', ...
```

Log-In Panel and On-Line Status
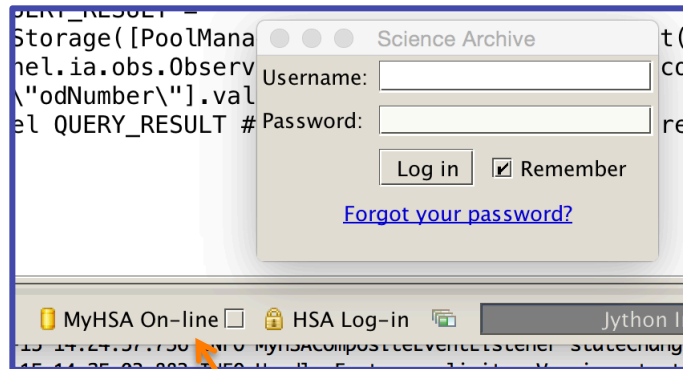
- Comes up if not logged in or by double-click on "HSA Log-in" in HIPE status bar.
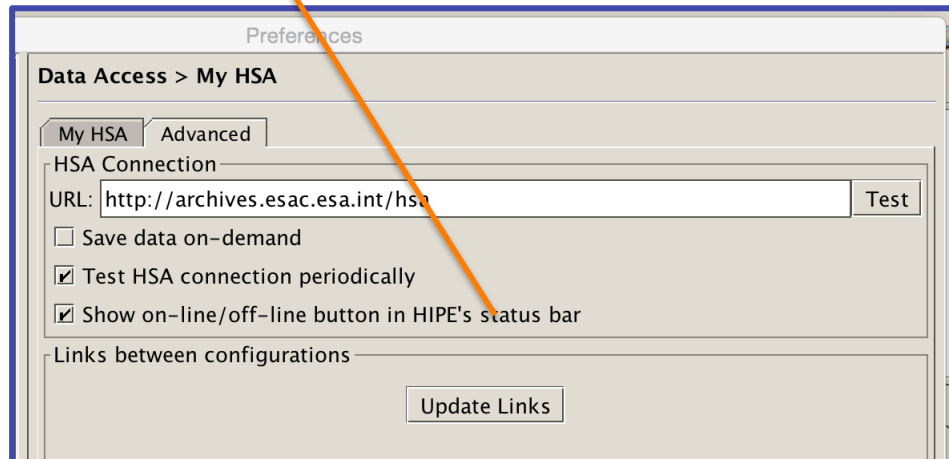
- MyHSA On-Line indicator/switch appears in HIPE status bar if enabled in "Preferences" menu → Advanced panel.

- Controls whether queries to "hsa" or "myhsa" go also online and check HSA at ESAC.

Other Notable Changes

- HIPE now opens ALMA files and identifies ALMA cubes as spectral cubes, displayed in the Spectrum Explorer.

- A rescue mode has been added to HIPE for cases where intensive scripts or memory thrashing issues make the GUI unresponsive.
  - Timeouts can be configured in "Preferences".

- New auxiliary product OperationalDaySummaryProduct that helps filtering and handling data per Operational Day (OD).

Many More New Features

- This was only a selection of new features.
- Have a look at the What's New page of HIPE:
  - http://herschel.esac.esa.int/twiki/bin/view/Public/HipeWhatsNew13x#Highlights
- Links to more useful information can be found on the NHSC SPIRE documentation page at:
  - https://nhscsci.ipac.caltech.edu/sc/index.php/Spire/Documentation

List of New Items I

- New gyro-based pointing reconstruction algorithm.
  - Improved astrometry.
  - STR switch-overs, i.e. changes from the usually prime star-tracker (STR1) to the backup unit (STR2).
  - Reset of the Spacecraft Velocity Vector (SVV) that is used by the STR to compute the aberration correction of the coordinates of guide stars.
- HIPE now opens ALMA files and identifies ALMA cubes as spectral cubes, displayed in the Spectrum Explorer.
- A rescue mode has been added to HIPE for cases where intensive scripts or memory thrashing issues make the GUI unresponsive.

- New auxiliary product OperationalDaySummaryProduct that helps filtering and handling data per Operational Day (OD).
- Batch mode command line parameters.
- Transitions
- Outline
- Editors & Viewers
- Status bar
- File handling
- Java version in Help
- Login panel simplified
- Mapping: temporary files created in separate subdirectory

List of New Items II

- Display:
  - some new method names
  - new flip options
  - reworked annotations in display
  - fixes
- Spectra
  - Display: nicer axes with less digits in coordinates
  - Analysis: multiFit task accepts limits for model parameters
  - Data Cubes
  - Disable selection tools when other cube data than flux is shown
  - Improvements in computeVelocityM and extractRegionSpectrum.

- Products and datasets
  - New OD Summary product
  - New columns and metadata in pointing product

- PAL Product Access layer
  - Task GUIS generate full list of commands
  - convertUnits improvements
- Quality Control various improvements
- Data IO
  - new spgVersion parameter in getObservation()
  - Reading of ALMA/CASA data cubes
  - improvements in asciiTableReader
  - automatcally add extension to output files when exporting data
- VO
  - VOPLot substituted by Topcat
  - Topcat will return table, not product
- Documentation
  - New chapter about units