ICC Development Team Workshop

Wednesday 25th April 2001

RAL SPIRE-ICS-MOM-000801

Mission Statement
The primary role of the ICC is to make possible the processing of the instrument data into scientifically useful products. It does this by providing the necessary software and expertise to allow the definition of astronomical observations and engineering tests and the processing of data taken from their measurement into usable products

The ICC is also responsible for the monitoring and maintenance of the instrument scientific performance throughout the mission

ICC development tasks:
(i) Provision of information and/or software to allow definition of observations
(ii)

Specific Operations Centre tasks are:
(iii)performance of the formal testing of beta versions of the data-processing software and its delivery to the HSC;
(iv)distribution (making available) of beta versions of data-processing software to ICC members.

Specific DAPSAS Centre tasks are:
(v) production, and delivery to the ICC Operations Centre, of instrument data-processing software;
(vi)revision, enhancement and updating of data processing software, especially during flight operations;
(vii)Scientific validation of the new releases of data -processing software
(viii)
(ix)quality control and calibration of SPIRE data;
(x) preparation and planning of PV and routine phase observations;
(xi) reduction of data taken in special observing modes (e.g., serendipity).
(xii)

The ICC will develop data processing software in java - a form compatible with installation in the HSC

The DAPSAS centres will generate new beta versions of the data processing software as algorithms are improved. These versions will be available only in the ICC, for ICC use only - no beta versions will be delivered to ESA. At regular intervals (or agreed delivery times) we will endeavour to turn these into official version at agreed delivery times by formally testing the beta version. Official version of IA will be delivered to HSC

Coordiation group to plan evolution of data processing software, based on advice from (SDAG)

Data Processing
IA is configurable to allow only certain aspects of IA to be available to general users - ICC users need a processing 'toolkit'

Extraction -> Initial Data Product is extracted from database and processed as little as possible. This means that the first n steps of IA have been done. It forms the input to the rest of IA. This IDP may include steps 1 & 2 below. It is important that the extraction can deal with different needs of processing - i.e. extracting multiple observations (including different observing modes) as one set of data.

Photometer

1. Extraction - time series of detector samples associated with telescope and instrument parameters -
2. Flag bad data
3. Store data (to local store)
4. Visualisation of raw data (interactive)
5. Electrical Cross-talk removal
6. 0th order deglitching
7. mode dependant deglitching
8. demodulation

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9. Sensitivity correction - needs change in sensitivity to be calculable from calibration measurements
10. Deglitch1 - compare each value from chop cycle with average value over all chop cycles at a given position
11. Average chop cycles to get a single value per position
12. Flat field
13. Subtract straylight

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14. For each jiggle position average the signal and remove outliers (median filtering) - assumes no drift between repeating jiggle positions - if there is drift we need to project the jiggle positions on to the sky and average some other way
15. Average values at different nod positions
16. If POF1 or POF2 add all jiggle positions values (1 or 7)

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17. Flux calibration
18. Colour correction
19. => focal plane view

For POF3 from step 16
construct map
flux calibrate

- ⇨ view map in different projections
- ⇨ output in standard form

Infrastructure

Spectrometer

1. Extraction - group all data by 'scan'.
2. Flag bad data

3. Store data (to local store)
4. Visualisation of raw data (interactive)
5. Electrical cross-talk removal
6. 0th order deglitching
7. Convert position counter to position (look-up table)
8. Generate list of signal v position (two methods - interpolate position to time of detector sample or interpolate signal to time of position sample), includes adding missing data (e.g. missing position info)
9. Convert position to OPD for each detector
10. Sensitivity correction - needs change in sensitivity to be calculable from calibration measurements
11. Correct for time dependant variation in flux (e.g. from telescope and/or calibrator)
12. Correction for position-dependant variation in flux
13. Correction for pointing drifts
14. Store and visualisation
15. Re-grid, if necessary
16. Drift correction across multiple scans
17. 1st order deglitching (removing outliers)
18. Phase correct, apodise and transform individual scans
19. Look for duff spectra (visualisation or automatic?)
20. Removal of time-dependant spectral response (including frequency response of detector)
21. => a spectrum per pixel per pointing
22. Remove instrument signature (difference between telescope-calibrator)
23. flat-fielding
24. convert to relevant units (e.g. Jy)
25. average for a single pixel position on sky

--------- for mapping mode only ---------

26. produce map/spectrum data cube
27. select and display map over spectral range!!

Need to decide how far IA goes before exporting to another data processing package to carry out the later steps.

Actions:

Seb: to collect together all URDs and update compliance matrix
Marc: to collect together all Sumary leveluse cases aand update compliance matrix
Ken: to collect together all Wps and create a compliance matrix w
Ken: to create livelink folders for ICC documentation (URDs, Use Cases, WPs)
Sunil: to create an ICC email distribution List

Next Meeting 18th May ICSTM