DANISH NATIONAL SPACE CENTER

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SDAST Meeting #36

Danish National Space Center October 26th and 27th 2006

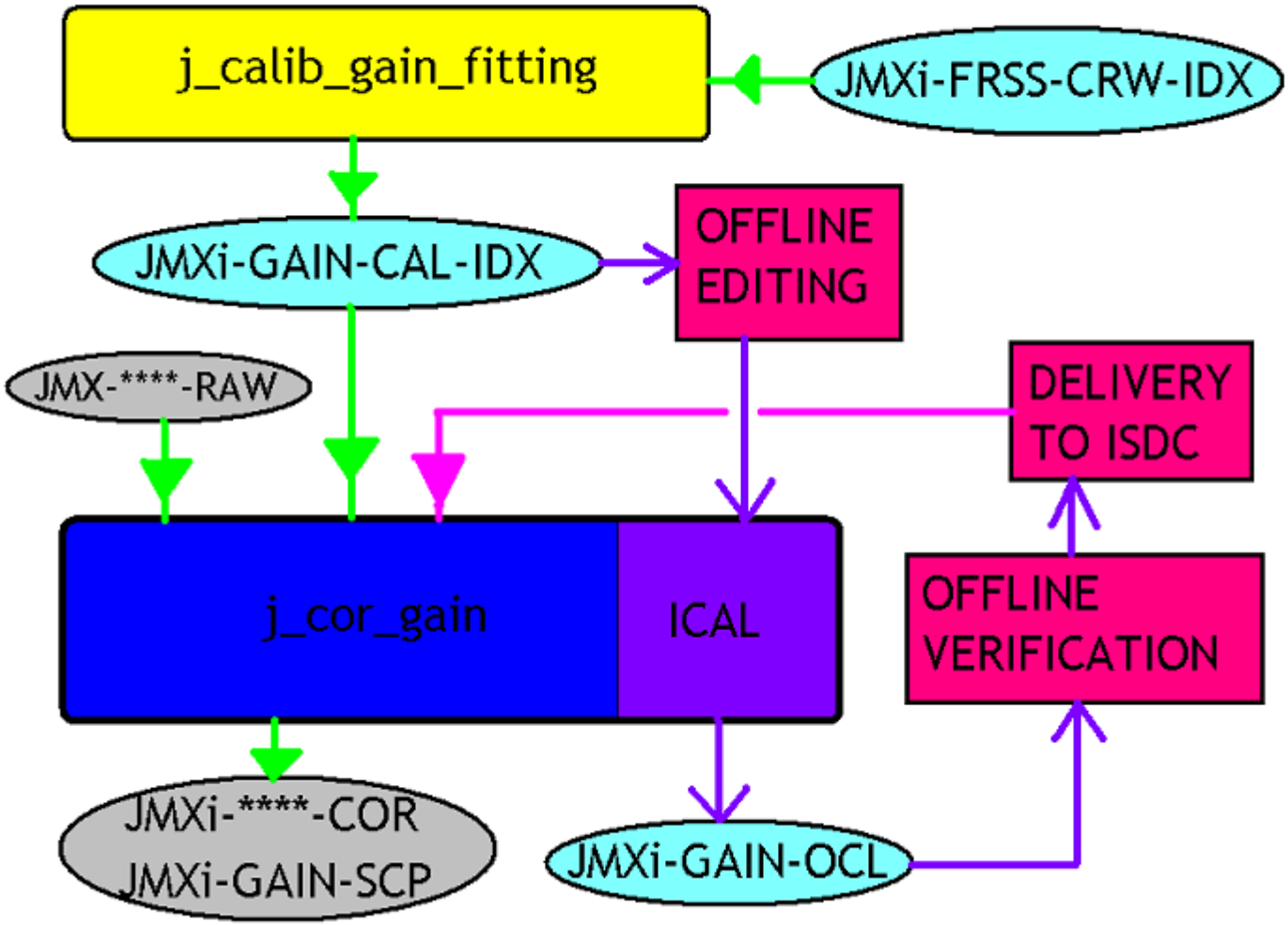
ID Number	Status	Responsible	Due Date	Description
AI27.7	OPEN	NJW	19 July 2007	Make spectral response matrix for REST events and non-imaging data modes
AI29_1	OPEN	SB	June 2006	To provide list of bad periods on webpage where JEM-X data in one or both unit may be suspect
AI30_5	OPEN	SB	June 2006	Add search engine to his instrument status webpage
AI34_1	OPEN	CBJ/NL/NJW	06/06/06	Determine azimuthal angle characteristics parameters (collimator, SPAG, vignetting etc). NL team leader.
AI35_2	OPEN	NJW	30/4/2006	Initiate procedures to up date IMOD files with detector map
AI35_3	OPEN	SP	31/5/2006	Verify (and urge programmers to ensure) that output of j_stc_properties (lightcurves) is expressed in flux and that the spectra have the correct ARFs taking into account current gain
AI35_5	ONGOING	NJW,CBJ?SB?	31/5/2006	Prove that the electronic efficiency will produce high quality ARF for Crab observation interpretation
AI35_6	ONGOING	CAO	31/9/2006	Update the Gain webpage with average gain factor (PHA/keV)
AI35_8	ONGOING	CAO	31/9/2006	Add a search engine to the JEM-X Instrument Forum to make it easier to find documents
AI35_10	OPEN	SB	30/06/2006	Check whether there have been changes in the spatial gain variation of the units that require updating the SPAG table
AI_200906_3	OPEN	NJW	29/09/2006	Deliver new ARFs to ISDC

Delivery: j_calib_gain_fitting

- Version 8.0 delivered 1/6/2006, apparently integrated with no problems
- New functionality (SCREW 1844): adds very weak calibration spectra together before attempting to fit them
- This needed on the Cd sources which have the shortest half-life
- Currently on JEM-X source 4 (Cd) actually uses this facility, and only during strong grey filtering.
- Since sets of calibration spectra handed to j_calib_gain_fitting 8 at a time by ISDC Revolution File Pipeline, it will be possible to sum up to 8 spectra for each source.
- A new lower fitting boundary for spectral data has been set to cut out interference from Sco X-1 when this is in FOV
- Still to be done (OSA 6.0+): operation with fewer than 4 anode segments

Delivery j_cor_gain

- Version 7.3 delivered to ISDC 29/09/2006, some minor bugs (with excessive log messaging, for example) still to be sorted out for OSA 6.0+
- Complete overhaul of program and restructuring added several nasty bugs!
- New functionality for input, JMXi-GAIN-OCL:
  - Accepts ISDC-generated gain history tables with raw calibration peak positions in ADC channels
  - Or IC gain history tables generated offline (edited ISDC tables) that include the average gain of the detector before SPAG adjustments.
  - Allows us to correct problems in the automatically generated tables e.g.:
    - Gain suppression on detector plate due to high background (REV 276)
    - Gain suppression at calibration points due to hotspots (?, REV 332)
    - Contamination of calibration spectra by strong sources. (REVs 410, 418, 419)
    - One-off oddities (REV 358)
  - Also allows us to officially recognize a correct gain hist,ory for revolutions where incorrect tables have been generated previously (REVs 422, 300)
  - Each JMXi-GAIN-OCL table covers one revolution.


j_calib_gain_fitting
JMXi-FRSS-CRW-IDX
JMXi-GAIN-CAL-IDX
OFFLINE EDITING
JMX-****-RAW
DELIVERY TO ISDC
j_cor_gain
ICAL
OFFLINE VERIFICATION
JMXi-****-COR
JMXi-GAIN-SCP
JMXi-GAIN-OCL

Delivery j_cor_gain (continued)

- New functionality for output: JMXi-GAIN-SCP
  - Contains raw gain calculated from each individual calibration source, even ones not being used (e.g. JEM-X2 source 4), at 256 sec intervals
  - Also contains smoothed gain averaged over the useable sources at 64 sec. intervals. This as best we can tell is the average gain of the detector before spatial gain corrections are applied.
  - JMXi-GAIN-SCP is produced for each SCW processed
- Events now assigned randomized energies in keV in new column ENERGY added to JMXi-****-COR
- Can handle cases where one or more anode segments are missing spectra for more than half a revolution, but not shorter periods
- Splitting into decay model time zones corrected and tested up to 9 zones (including a mandatory partial switch on). Rev 422 failed to fit 7 zones with j_cor_gain 6.4

Delivery j_cor_gain

- Still to do (OSA 6.0+):
  - Remove one or more sources from use if switched off for short periods
  - Cut out some event-level log messages that previously errored off
  - SCP output can be confused for first SCW of a revolution

Delivery j_cor_position

- Version 6.0 delivered 15/9/2006, integrated without apparent problems
- Events now assigned positions randomized in a square around the pixel centre that was previously their quantized position value
- Tidied up log messages
- Still to do (OSA 6.0+) :
  - More sensitive hotspot handling: selection over shorter periods of time though exclusion of events over entire SCW
  - More stringent hotspot flagging, to include entire anode strips in cases of very strong hotspots (REV 362).

Delivery j_dead_time_calc

- Version 4.1 delivered 14/9/2006, integrated with no apparent problems
- Only change is that program can handle cases where mixes ORHK data with CSSW HK. Recently, due to some change in procedure at MOC these rows of NULL data have become far more numerous.
- Program now blithely ignores these interruptions, but the real question is: should ORHK and CSSW HK really be mixed since they have their own separate data structures?

Should the start of each revolution have a BTI?

- There are several good reasons why the first SCW in a revolution should be treated cautiously:
  - The gain is changing very rapidly and probably not very evenly
  - Thus instrument sensitivity will be changing rapidly too.
  - Differences in gain change in the four calibration sources indicate that the SPAG corrections are changing rapidly too
  - Gain history at the beginning of a revolution may not be particularly well fitted/smoothed either due to the steepness of the curve, or the presence of a hook at the beginning (competition between fast, surface charging of plate and slower gain aging due to ion migration inside the plate)
  - Temperature of instrument is generally changing rapidly too.
- Conclusion: it's good to exclude these periods for the general user, but best if the more involved user can override the BTI

Gain history tables as IC files

- For JEM-X1 9 tables have been verified and delivered for revolutions 276, 332, 358, 410, 418, 419, 422, 465, 467
- For JEM-X2 3 tables have been verified and delivered for revolutions 300, 422 and 482. Only rev 482 actually needs this file since the delivery of improved j_cor_gain
- As mentioned above, the need for such files are various unanticipated problems that must be dealt with offline.
- However, if a general problem arises that j_cor_gain cannot deal with, the pipeline program will be upgraded. IC files are not a substitue for improving j_cor_gain.