JEM-X SDAST Meeting #38

Copenhagen 28-29. November, 2007.

Participants:
ISDC: Stéphane Paltani
           Simona Soldi
ESAC: Peter Kretschmar
DNSC: Søren Brandt
           Jérôme Chenevez
           Carol Anne Oxborrow
           Carl Budtz-Jørgensen
           Niels Lund
           Niels Jørgen Westergaard

Welcome address (NJW)

JEM-X Status Report (SB):

Mission Extended Operations Review overview.
IUG is now the only direct science board for INTEGRAL.
JEM-X status:

- Gain is continually increasing to be counteracted by repeated downstepping of HV on an annual basis from now on.
- Temperature dependence of gain has increase from 1 % per deg to 3% per deg in the mission life.
- Spatial gain map is to be updated – also with regular intervals (annually?).

The number of hardware triggers per second has increased by a factor of 2 since beginning of mission. This has resulted in a deadtime increase from 12% to 18%.

When the rate of rejected particle events exceeded a limit of 10000 per 8 s the data are marked as bad. This limit has been increased to 15000 per 8 s in the ISDC operations but for offline analysis an IC updated is required.

Action: (SP, 2007-12-20) Take hand of this situation

http://www.spacecenter.dk/~sb/JEMX/HK.htm

ISDC news (SP):

Major event was the release of OSA7 with a much better energy calibration for ISGRI allowing the official energy limit to be 18 keV in stead of 23 keV. For JEM-X OSA7 has given better imaging and mosaicking.

Nothing planned for a new release of an OSA version. OSA7 is being used in the barn for the operations. (j_ima_iros makes a division by zero in Solaris quite regularly. There is an SPR for this problem.)

People: Daniel Rychcik has left ISDC, but there is no major problem (yet) because there are other people that know about the computer systems. Jake Wendt is leaving but will be replaced. Mark Gaber is leaving. The funding from the Swiss Confederation funds has decreased so ISDC has to do with less money. Arash Bodaghee is leaving and the maintenance of the reference catalog must be taken care of by somebody else. Marc Audard is doing research work not directly related to INTEGRAL data together with a couple of younger people. Ingo Kreykenbohm is leaving. Tübingen is considering a replacement. Volker Beckmann is back and has replaced Nami Movlawi as leader of the operations.

Gaia is taking more and more momentum in ISDC. XEUS has been selected by ESA and will attract work from ISDC, among those will be Stéphane Paltani, whose participation in INTEGRAL will decrease in about six months time. His responsibilities vis-à-vis JEM-X will most likely be taken over by Simona Soldi.

The CTA Cerenkov array also removes work from INTEGRAL.

News from ESAC, ISOC (PK):

Action for JEM-X team: Review AO documentation when obtained from PK

ESAC becomes EPSAC.

JEM-X team representation at ISDC (JC):

The visits of JEM-X team members at ISDC should rather be organized around a particular topic such as software, operations or calibration. The aim is three to five visits a year.

The discussions concluded that visits with a specified discussion or work topic will be much more useful than visits every so and so many weeks. The travel budget for JEM-X work has not been decided yet, but there will most probably be room for the mentioned number of trips.

j_ima_iros developments (NL):

Major problems with current OSA7 version:
- Systematic errors for source fluxes, particularly strong azimuthal variations for JEMX2
- Source position fluctuations for JEMX1.

The flux determinations of j_ima_iros depend on the accuracy of the position determination. There are systematic effects that are not radial.

New FLAG values in JMXi-SRCL-RES data structure.

Action: (SB, NL 2007-12-12) Investigate the outliers from the flux figures – what is the cause?

Action (NL, PK 2008-01-15): Organize testing j_ima_iros-7.1 at ESAC.

Action: (NJW 2007-12-24) Make SCREWs for j_ima_iros-7.1 among those: Change j_ima_iros to report the applied gain as well as the electronic efficiency factor.

Type of default images from j_ima_iros (JC, NL):

Now by default we don't get the three images for search finding in JMXi_SKY.-IMA. It should be possible to run mosaic_spec directly on the resulting index table.
If the user asks for N energy bands then N images will be given but N+3 energy bands will be reported in JMXi-SRCL-RES.
After a discussion the agreement was that we change nothing.

Action: (JC, NJW 2008-01-15) This must be documented in the ADD and in the Analysis User Manual.

Plans for JEM-X work (SS):

Finish PhD by April 2008 and then start ~50% on JEM-X.

j_ima_cross status (NJW):

j_ima_cross runs fine together with e.g. j_ima_src_locator but the following points need to be looked into:
- The source finding efficiency with respect to j_ima_iros
- The vignetting function including a collimator tilt
- The quality of the electronic efficiency correction

IC data updates (NJW):

- IMOD has been updated with parameters for j_ima_iros
- BPL must be updated with radial source position correction coefficients

Xe line analysis and gain aging (CAO):

By using reference channels, we can keep the Xe line summed over each revolution with 29 to 30 keV for both instruments.
The Xe line resolution has deteriorated from 9% to about 14% for JEM-X1 over the course of the mission, and from 9% to 12% for JEM-X2.
Individual calibration spectra show interesting changes in peak widths which are not always bad, and this presumably reflects the worsening and improvements in energy resolution happening all over the detector plate.
IC gain history files have been delivered to ISDC to handle especially difficult revolutions. For JEMX1 these are revolutions 276, 332, 336, 358, 410, 417, 418, 419, 420, 422, 464, 465, 467. For JEM-X2 these are revolutions 300, 365, 422, 482, 541, 605.

Improvements to the energy calibration will include:
- New SPAG table for JEM-X1.
- New reference channels for JEM-X1.
- Tool to add HK data into automatically generated gain history tables.
- Temperature-dependent gain smoothing model.
- Automatic patching of very sparse gain history tables.

Common cookbook for ISGRI and JEM-X? (JC):
A case study of IGR J17467-2811 revealed that the understanding of the data analysis is sometimes lacking.
The cross correlation factor between instruments may not be a free parameter when using statistically poor data.

We need to promote the use of JEM-X data in order to remove the rumor that JEM-X data is useless. How can we do that?
- Can we add a chapter in the Analysis User Manual?
- Can we write a section in the ISDC newsletter?
- Publish example cases?
- Create a Web site (under ISDC??) with essentially Analysis User Manual plus example cases?
SP: The best thing is to publish papers with JEM-X data since this may (will ?) trigger more papers with and increased use of JEM-X data.

Focus of the software development (ALL):
Main blocks j_ima_iros, j_ima_cross, j_src_properties.
NL: j_ima_iros is almost at its final development and will be left there soon.
j_src_properties uses the PIF as in j_ima_iros and is (will be) mostly useful for lightcurve extraction.
Recommendation from the meeting: It is mportant to produce a new spectral/lc extracting tool (such as j_src_properties) that make reliable spectra/lc of sources in the presence of a strong source. j_ima_cross development should continue.

ARF generating tool (NJW):
In the light of the growing understanding of the gain dependence of the spectral response the interpretation of data requires an ARF (Ancillary Response Function) for each source and for each time-interval. It might be useful to have a tool that can produce such an ARF outside the OSA software. It is already prepared in j_src_properties.
There is a caveat: The electronic rejection operates in a different way on the observed number of counts than e.g. the absorption in the detector window. This must be considered and evaluated.

Science presentation 1: Ophiochus Cluster (SP):

JEM-X and ISGRI imaging of an extended source and spectral extraction with hardness ratios.

Science presentation 2: Long X-ray Bursts (JC):

JEM-X and ISGRI light curves of long bursts and spectra.

Crab calibration and instrument cross calibration (SB, CBJ, NJW):

Action: **(CBJ, SB, NJW 2007-01-07) Prepare calibration report for the meeting in January 2008.**

SPAG, position correction etc. (SB):

Derived pixel size is somewhat correlated with the countrate in the pixels as measured in a very large dataset (100 revolutions).

We can make an exercise taking out pixels that from the combined shadowgram appear to be in bad shape.

Action: **(SB, CAO 2008-01-31) Produce the necessary number of SPAG tables in order to update the IMOD.**

Documention status:

SVR is to be updated with new software such as spectral extraction and j_ima_cross when these are more or less ready.

ADD (JC):

Action: **(NJW 2007-12-16) A section on j_lib_pif (aka jmx_lib_pif).**

Action: **(SS 2007-12-12) Write an SPR to take out the BKG level from the GUI.**

Next meeting: Sometime just after mid-February 2008.