Danish Space Research Institute
Juliane Maries Vej 30
DK-2100 Copenhagen

JEM-X SDAST Meeting 19: June 7th–8th 2001

Carol Anne Oxborrow, DSRI

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Participants

Peter Kretschmar peter.kretschmar@obs.unige.ch
Stefan Larsson stefan@astro.su.se
Sami Maisala smaisala@astro.helsinki.fi
Niels Jørgen Westergaard njw@dsri.dk
Søren Brandt sb@dsri.dk
Nils Lund nl@dsri.dk
Allan Hornstrup allan@dsri.dk
Carol Anne Oxborrow oxborrow@dsri.dk

1 NL: Instrument status

INTEGRAL project status:

SPI is delivered, calibrated and integrated on satellite in Alenia

OMC was integrated on satellite about a month ago

SVT-D and end-to-end test next week

Satellite to be moved to ESTEC in July

Vibration tests in Aug.–Sept. with JEM-X and IBIS structural models only

JEM-X delivery expected in September and October

IBIS deliver in October

Payload calibration Dec.–Jan. for 15 days according to Alenia

Thermal Vacuum test Feb. 2002 - unfortunately potential conflict with Rosetta FM testing

Launch 'no earlier than September 2002'

TAC has finished going through AO1 proposals and their recommendations await signature of ESA Science Director

July 3rd–4th NL attends ground segment review with Brian Taylor

JEM-X Instrument status:

FM1 experienced destructive discharge during performance verification in March, due to soldering problem with flat-pack capacitors

All capacitors replaced (about 130 in all) somewhat quicker than expected

FM1 being rebuilt with MSP saved for FM2: will undergo performance verification after assembly in Helsinki next week

FM DC-DC converter problem will be resolved by removing redundant inhibitor

Work on FM2 progressing well. Electronics underway and MSP already verified in Helsinki

EM will be used for SVT-D next week

Structural models sent to Alenia for vibration tests

SB: Slides of saw-tooth output countrates due to flip-flop behaviour of greyfilter/mode switching algorithm because it is based on levels of buffer filling, not on current rate of processed event production.

2 PK: ISDC Status and News

- SVT-D next Thursday plus 1 day of following week to iron out bugs
- GSIT-2 in October tests ISDC-MOC interface w/o concern for telemetry content. SVTs deal with telemetry content
- IFAR (Final Acceptance Review) in March 2002
- End June, complete JEM-X ISSW V2 component redeliveries
- First V1/V2 integration in July with second integration in September
- Beginning of October for SA system tests
- IPAR2 already passed with a good grade
- Consortium meeting at end of June to include SA pipeline demonstration
- Early Dec. QLA pipeline integration
- Absoluted deadline for instrument integration is the thermal-vacuum test

3 ALL: JEM-X ISSW integration status

Redeliveries are expected to be complete by end of June. Some remarks on individual components:

- PK: j_calib_gain_fitting must be sure not to stall if handed garbage calibration spectra, but also must not save garbage gain parameters to output since this can throw off results for an entire revolution
- SM: V2 needs smarter selection critera for j_bkg_∗∗∗_sel executables
- NJW: all j_ima_∗∗∗ executables redelivered though they still lack some functionality

- PK: has redelivered most of j_bin_∗∗∗_spectra but the j_bin_∗∗∗_lc will still need alot of work
- PK: In figures and ADD, levels BIN_S and BIN_T should come after levels SPE and LCR
  AI 19.1: On NJW to Make/fill template for -ANOD-MOD/-DETE-MOD anode mapping. Due: 07/01 AI 19.1
- NL: Wants something that will check whether certain anodes are burnt out. Should this be checked in j_verify? Where will anode model be stored -ANOD-MOD or -DETE-MOD? Must be an updateable part of JMXi-IMOD-GRP via j_ical
  AI 19.2: On CAO to Meet with IT to determine what j_verify should do. Due: 08/01 AI 19.2
- SPR should be filed for problem with clock_reset_DUMMY.fits file that appeared with RP2.2 distribution.
  AI 19.3: On CAO to File SPR for clock_reset_DUMMY.fits problem. Due: 07/01 AI 19.3

4 Off agenda: How to treat REST events?

- Decided to bin only complete restricted images
- Will NOT bin to user-defined time binning
- User-defined binning involves abitrary assignment of events to bins smaller than the integration time: imaginary event times.
  AI 19.4: On PK to Verify units of IMAGE_LENGTH in -REST-SRW are 10^{-9}. Due: 07/01 AI 19.4

5 NJW, SL: Source list interfaces

- NJW: j_ima_src_find output: RA_OBJ, DEC_OBJ, E_MIN (256 vector bins), E_MAX (256 vector bins), FLUX (256 bins) - spectrum of found object.
- E_MIN and E_MAX come from original shadowgram binning requested by user to make image on which object was found
- SL: Source data extraction components have input: COSX_JMX, COSY_JMX COSZ_JMX which are detector co-ordinates
- NJW's output is SL's only input.
- We need a generic tool to find detector co-ordinates from RA/DEC/attitude information.
  AI 19.5: On PK to Talk with Stephane about generic detector coord. tool. Due: 07/01 AI 19.5

6 NJW: Instrument Calibration

- Required ground documents: Data storage and formats; logbooks for each of DSRI, Ferrar and ESTEC calibration sessions
- Inflight documents: Schedule; Data and Results (log data)
- Documents for JEM-X/INTEGRAl intercalibration: Schedule; Data and result (log data)
- Our data will be archived at ISDC, but ISDC will not be involved in calibration data analysis
  AI 19.6: On NJW to Check column names in -CRW same as diagnostic dump. Due: 07/01 AI 19.6
- Ferrara campaign will be beginning September if all goes well

7 NL: Rapid source-finding algorithm

- Concerned mainly with GRBs and IBAS
- Most GRBs at edge of FOV so must worry about how collimator shadows strongly off-axis sources
- NL makes list of sky pixels visible at every detector pixel (about 36,000,000 entries)
- Then correlate illuminated sky pixels with shadowgram and back projection of sky
- At middle frequencies position resolution limited by pixel size
- At high energies position resolution worsens due to long penetration lengths
- At very low energies position resolution worsened by electronic noise
- to find GRBs must discard all high energy events and back project to sky position with spectral weights depending on off-axis angle
  AI 19.7: On NL to Explore running NL's GRB finder with Jurek's event triggering system. Due:
  AI 19.7 08/01

8 PK: ISDC V3 and Pipeline Scripts

- No V3 schedule yet - will probably be put together in July
- Everything needed for launch must be in place by end of this year
- V3 will have same scripts and executables are QLA/SA but with tools to extend functionality
- Decided to keep scripts simple and understandable to increase flexibility, therefore must minimise dependencies
- Final outputs can be fed directly into standard tools, XSPEC, XRONOS etc.
- Currently ISDC discussing 'standard event files' useable by FTOOLS and central to OSA
- Only limited GUI support for parameter entry and OG setup
- TBD support for displaying images, spectra, lightcurves etc. — this will be discussed in July
- 'Standard event file' format is opposed to split data file format used by ISDC — i.e. it involves one file for each SW containing X,Y,OBT for every event
- This would lead to alot of repetition and NULL entries for many events so ISDC does not use this format
- Observers however, prefer their data in this format
  AI 19.8 **AI 19.8:** On CAO to Find error codes for PK's high level scripts. Due: 07/01
- Scripts are set up so that they can be run from command line just like executables
  AI 19.9 **AI 19.9:** On ALL to Read, understand, comment/correct Peter's scripts. Due: 07/01

9 SM: Performance monitoring

- Use GUI developed by OSM
- Needs input file of parameters to be listed/displayed
AI 19.10 **AI 19.10:** On PK to Verify whether OSM writes log files or OEM lists. Due: 07/01
- j_prp_performance (or j_prp_derived?)may repead stuff from DEAD level, but output can be monitored by OSM
AI 19.11: On CAO to Talk with IT about derived HK parameters to be monitored. Due: 07/01 AI 19.11
- j_prp_derived to be written by SB?
- I/O: JMXi-CSSW-RAW → JMXi-CSSW-DER?
AI 19.12: On SM to Make tool to create time-filtered performance parameter table. Due: 09/01 AI 19.12

10 SM: Automatic Background Handling

- Works SCW by SCW with 3 bkg databases: spatial, spectral and scaling criteria
AI 19.13: On CAO to Send Sami list of IBH tools from meeting 18. Due: ASAP AI 19.13
- Instrument background selection criteria:
  - Spatial: Orbit (radiation level, sun angle)
  - Spectral: spatial distribution (orbit); radiation level
  - Scaling: Radiation level, sun angle, orbit
- Orbit selection procedure: Orbit split into 8 sectors so select sector then select shortest distance in the sector
AI 19.14: On PK to Ask ISDC how to find orbital phase. Due: 07/01 AI 19.14
- Diffuse background selection: Pointing plus shorted distance between available models. Interpolate between models
AI 19.15: On SM to Read DAL3AUX for sun angle and roll angle conventions. Due: 07/01 AI 19.15
- PK: too late to research background database - time is critical
AI 19.16: On NJW to Provide SM with function to calculate roll angle. Due: 07/01 AI 19.16
- PK: neighbouring models should not be interpolated but translated
AI 19.17: On NJW to Provide diffuse background sky maps to make diffuse bkg. shadowgrams. Due: 07/01 AI 19.17
- Southampton is supposed to be making background simulations but NJW hasn't heard from them in a long time
AI 19.18: On NJW to Ask Southampton what happened to background simulations. Due: 07/01 AI 19.18

  AI 19.19: On NJW to Give Sami AutoCadd file for bkg simulations. Due: 06/01 AI 19.19

11 CAO: Interactive calibration

j_ical_collimator	• Position corrections • Based on collimator shadowgram • Carl already has some code • Not a severe problem now • Spatial Resolution • Tag dead pixels • Find hot spots
j_ical_energy	• Using stray Xe lines • Use latest E2E data to find best ones • User could choose which lines to use • Tag dodgy pixels
j_ical_dead	• Find dead time as function of hardware trigger rate • Fairly crude - only every 8 secs. • Event readin is major hold up • Could later do something fancier. As a function of event rate too?

12 CAO: ADD and DDD

- ADD: Keep data structures list updated
- ADD: Keep input parameter names list updated
- DDD: List Unit conventions in data structures to check for consistency across data structures and usage across entire ISSW
- DDD: Error code assignment system explained
- DDD: Master List of Error Codes should be added to DDD section
- What information do we need in User Manual? SDAST to think about this.
AI 19.20 **AI 19.20:** On ALL to Think about contents of UM. Due: 09/01
- Other suggestions for DD section are welcomed
AI 19.21 **AI 19.21:** On CAO to Circulate a UM template. Due: 10/01

13 ALL: Mini Data Centre at DSRI

- PK: ISDC lines limited to 3Mbyte/sec. ISDC can support download of a few targets by a few observers, but NOT bulk downloading all Core data for the day by several observers
- NL suggests a mirror site at CERN (but what do they owe us?)
- SL suggests mirror site at unige but that has same download limitations
- Data could be distributed on DVD, especially for public TOO
- All core data and public data can be downloaded to DSRI as mirror site but NOT guest observer data, so could never be a real mirror

- ISOC wants to have a mirror archive but no machines have been bought for this
- DSRI's first goal is to have data centre with all Core JEM-X data first. Next priority is data from other instruments for targets that concern our observers
- Requirements for Core data: 500 Gigabytes memory per year for all core data
- It's up to DSRI to decide what we can do within limits of disk space, machine speeds and data rights
- ISDC support software is supposed to be totally portable and easy to install—so any GO can theoretically process all their data at their own institute, though no obligation for them to use these tools
- At DSRI we will have:
  - ALL the software
  - ALL Core data
  - ALL the JEM-X data we're allowed to have
  - Some data from other instruments that interests us
- People who want more than just their GO data will have to go to ISDC and be patient
- JEM-X is 10% of total INTEGRAL data output
- PK: SDAST should forsee in-flight problems requiring access to private data for which we can make a procedure for getting hold of some well-defined data files that will be needed to recalibrate instrument for this problem
  AI 19.22: On CAO to At consortium meeting request download of all payload calibration data. Due: 06/01 AI 19.22

14 Old Action Items

- Most old AI's had their due dates extended a month
- AI 18.4 edited so that SM should make IBH document and new AI on CAO to send him her list of tools for this document
- NL added to AI18.15 and AI18.16, to get input from hardware team
- New AI on SL to send list of IBH tools he needs from Sami to perform photon tagging
  AI 19.23: On SL to Send SM description of IBH tools needed for photon tagging. Due: 06/01 AI 19.23

15 Action Items

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