

## Attendants

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Simon Shaw	ISDC	SS
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Lars Hansson	ESA, ESAC	LH
Peter Kretschmar	ESA, ESAC	PK
Erik Kuulkers	ESA, ESAC	EK
Rees Williams	ESA, ESAC	ORW
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## 1 Introduction & Agenda

LH introduced PK as new GS Coordinator.  
The Agenda was accepted without changes.

## 2 Actions

Co/08-03 Still open. MS: DB is not up-to-date in redundant unit.

Co/09-03 Closed, obsolete, worked afterwards.

Co/09-04 Closed, note has been sent by MS. Mistake at MOC.

## 3 Operations status

### 3.1 ISOC

LH presented changes to the system, especially

- Custom dither patterns
- Hex pattern with wandering COP since rev. 343
- JEM-X activation changed and new OMC S/W since rev. 343
- Improved system for more safety and flexibility
- New helpdesk software: Kayako

The AO-4 is coming up keeping ISOC very busy. The ISOC system is being updated, e.g., PGT will be changed so that users will select “one JEM-X” instead of a specific unit.

### **3.2 ESOC**

The instruments are working well. The latest incidence was a SEU in SPI with quick recovery. IREM is still problematic (crash # 28), to be discussed later this meeting. The platform is OK with one recent SEU.

The new control system is running after some trouble. Upgraded to TCP/IP protocol for Villafranca. Changing to DSS-27 from DSS-16 at Goldstone, which has been clarified with ISDC and will be used operationally from beginning of next year.

The MOC will be moving to the XMM control room next year and plan to move the PI workstations down to the control room as well. IBIS plans to replace two workstations. MOC hopes to have real-time participation from instrument teams for first Earth Observation.

Teams remains stable for time being but Federico Cordero will leave in July, which will be an issue for dealing with SPI.

An agreement has been reached with Formosat-3 to avoid interferences.

### **3.3 ISDC**

Operations are running smooth, telemetry has been archived up to revolution 375 and three more CDs have been received.

It is planned to change having duty scientist for one week in a row instead of three days to simplify scheduling and allow better follow up of sources or problems.

A new source was discovered last weekend leading to two ATels.

### **3.4 SPI**

A new version of the IASW has been uploaded, apparently resolving several previously existing problems.

### **3.5 IBIS**

The IASW patches for the redundant unit have been tested successfully. A report is to be sent next week.

### **3.6 JEM-X**

No major news. The activation procedure at the beginning of a revolution was shortened as reported by LH already. The use of the “Test Format” during Crab observations and one OMC Flat-Field calibration were successful, to be discussed further below. The transient hotspot observed irregularly is no major concern. Currently the team plans to stay with JEM-X1 also for the next AO.

### **3.7 OMC**

The instrument is working well, no problems to report.

## 4 Earth Observation

### 4.1 Scientific Justification

Main object is not the Earth but the Cosmic X-ray Background (CXB). At higher energies, most data are still from HEAO-1 — a chance for *Integral*. At low energies 80% of the “background” has been resolved into sources, while in the *Integral* 20-60 keV range, detected sources make up only 3%!

The Earth atmosphere will also reflect the CXB  $\Rightarrow$  CXB signal will be reduced by a factor  $\sim 2$ . The fact that the Earth will drift through the FOV reduces the effective signal (30 ks  $\rightarrow$  8 ks). In the current scenario a dip of 15-20 cps in the 20-50 keV band is expected. A single observation of 8 ks will give  $> 60\sigma$  at low energies, not quite  $3\sigma$  at 140–180 keV (calculated without Earth emission).

Point sources can be removed through imaging. Also previous observations of the region in question exist.

The Earth X-ray emission is mainly auroral emission with a soft spectrum, this emission is transient and could be removed by imaging. Above 100 keV a positive signal from Earth expected! At 30 keV the expected emission contribution from the atmosphere is  $\sim 3\%$ . A 511 keV signal of  $4 \times 10^{-4}$  phot/s/cm<sup>2</sup> is expected, too low to be detected within the available time. The atmospheric emission is a function of (rigidity,  $r/R$ , day/night). Modeling emission will increase errors by factor 3-5 above  $\sim 50$  keV.  $\Rightarrow$  single observation (8 ks) will yield useful results up to 50 keV.

A single observation will yield useful data in the 20–50 keV range, but repeated observations are required to study the higher energies.

SS did a quick calculation with the BATSE mass model, confirming EC’s estimates for Earth atmospheric emission.

### 4.2 Planning Earth Observation

EK presented the scheme of possible Earth Observations from the ISOC point of view.

The next SPI annealing is scheduled for revolutions 398–400, thus the earliest start possible is in revol. 401. The time taken out from observations of SN1006/Cen X-4 cannot be recovered in the current AO.

EK explained the basic scheme agreed between MOC and ISOC (see viewgraphs). In summary, for an observation in revolution  $N$  one currently needs to have in revolution  $N - 1$  a “pre-Earth” pointing at the expected position of the Earth for the observations and then must plan for moving to a safe position for the perigee passage and the staring pointing including the actual observation. MOC will take out the actual slewing, if all works to plan, so *Integral* remains targeted at the Earth position for 6h after perigee.

In total about 10h plus slews to/from astronomical targets are required, the latter could be somewhat optimized. Reacting to a question by EC, MOC stated later that the only other foreseeable shortening of the required overall time in future observations would be less extended post-observation phase saving possibly  $\sim 1$  h.

### 4.3 Integral Earth Observation Geometry

MS first laid out the geometry of the problem (see pres. by F. Dreger). Then he went on to describe in detail the expected sequence of events (see slides). The IMU will be calibrated in the previous revolution to ensure maximal stability. A drift of ~30 arcmin in two hours is expected.

Possible problem areas and planned measures are:

- The blinding of the startrackers leads to the use of a different control mode using the IMU's.
- The Broadcast Packet must be set correctly. The OTF will be manually commanded by MOC, other settings are to come in the POS received from ISOC.
- To overcome the Mission Planning constraints several fictitious slews have to be introduced which will not actually be executed.

In summary, no problem has been identified which would make the observations impossible. The planning and execution approaches have been identified.

JPR requested the position of the Earth center and the radius of the Earth in the Integral coordinate system (assuming no drift); this would help NRT analysis.

<b>Action 10–1 on R. Southworth</b> <i>See with Flight Dynamics if table as requested by JPR can be provided.</i>	<b>Due: 9 Jan 2006</b>
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The actual observation will appear like a long staring pointing to the ISDC system.

### 4.4 Instrument settings

The OMC plans to take 300×300 pixel images in FFCAL format. Different parameters for before Earth limb / during Earth blinding / afterwards. *This was rediscussed on Dec 21 with E. De Miguel and most probably a different approach with fewer, larger images be taken in order to have a chance of imaging the Earth limb.*

JEM-X wants to operate both instruments, within almost normal telemetry (5+5) packets. JEM-X 2 must be powered on in previous revolution at least. (⇒ OCR required). After some discussion a consensus was reached to switch JEM-X 2 on already during part of the SPI annealing in order to get some verification of its status. This is being implemented by ISOC.

IBIS will operate with standard settings, except for the request from JEM-X to obtain one TM packet.

<b>Action 10–2 on G. La Rosa</b> <i>Confirm that 1 TM packet for JEM-X can be taken from IBIS TM share</i>	<b>Due: 23 Dec 2005</b>
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SPI will operate with standard settings.

The AOCS mode remains, but the AOCS submode will change during the actual Earth Observation. According to information provided at the meeting the submode is not used by the instruments.

## 4.5 Conclusions

A first Earth Observation will be scheduled for revolution 401 (moving to position at end of revol. 400).

High solar activity, transient sources or other problems could impede this observation. For solar activity monitoring the SOHO predictions will be used as usual. A final decision on its execution will be taken around lunch time on 24 Jan 2006.

All instrument teams will have representatives at MOC for this first observation following the operations in real time and providing NRT analysis. At ISDC the NRT data will be made available to the teams without delay.

If the NRT analysis indicates a successful first observation, three further observations will be done in revolutions 404, 405 and 406. The deadline to determine this is Wednesday, 01 Feb 2006.

The ISDC will monitor possible transient sources in the FOV with special attention in the weeks leading up to and during the Earth Observations. For the actual observations the IBAS system will be deactivated.

No TOO observations can be scheduled in parallel with the Earth Observations. If a TOO comes up the choice is to delay it to afterwards or drop the Earth Observations.

## 5 SPI Annealing

ISOC needs go-ahead for SPI annealing in order to plan the corresponding revolutions. AP is waiting for feedback from payload support people, but proposes to go ahead in planning.

PK asked about possibility of predicting the SPI annealing time intervals. JPR explained that background rates and amount of recovery are hard to predict and thus cannot be easily pre-planned. Instrument is kept in range of 'good' values for all time and observations should *not* be planned specifically tied to annealings. Would be different if annealings were much less frequent, but the annealing frequency would only change by changing operation temperature.

## 6 Crab calibration

### 6.1 JEM-X

During the last Crab calibration observations with different gains were done which turned out to be very useful. Plan to do something similar, maybe with 3 or 4 such observations (30 ksec) at next opportunity.

The JEM-X team want to repeat observations in "Test Format". They need to discuss with ISDC how these data could be processed as well. ISOC should assess implementing this as a mode for planning, PK will write a SCREW.

The JEM-X team would like to be informed about upcoming engineering sessions (they are visible in the long-term plan). PK should inform JEM-X team on any upcoming sessions.

## 6.2 IBIS

GLR talked with A. Bazzano. A report is being prepared on off-axis response (due beginning of January) that will contain information on next Crab calibration.

## 6.3 SPI

The only requirement is one normal 5×5 dither pattern.

## 7 OMC FF Calibration

MM informed the meeting about the changes the OMC team would like to introduce for the Flat-Field calibration procedure:

1. New detailed procedure, very similar but with different parameters.
2. New pointing positions for OMC FF positions.
3. There should be at least 3 slightly offset pointings in one FF calibration exercise in order to remove background stars.

The first two should be easy to implement, the third needs further interaction with ISOC (PK) to spell out the details before a corresponding change request will be created.

MS points out that changing the sequence means an ODB update at MOC and ISOC (⇒ GS CR implied).

SS notes that currently ISGRI data from OMC FF calibrations cannot be used for spectral calibration because of different risetime settings than during normal observations. If possible this should be changed.

<b>Action 10–3 on E. Kuulkers</b>	<b>Due: End January 2006</b>
<i>Discuss with IBIS team possibility of having same risetime settings in OMC FFCal as in normal observations.</i>	

## 8 New DCR lay-out

As mentioned before, the *Integral* control room is moving. Instrument Teams should let MS know if they prefer being also in Control Room or stay. This change will be done after Earth Observation.

<b>Action 10–4 on Instrument Teams</b>	<b>Due: Mid January, before EO</b>
<i>Check-out of instrument station readiness.</i>	

## 9 Key Programmes

AP explained the background of Key Programmes which have been endorsed by the IUG. The basic idea is to define zones of special interest which will be observed for extended times. Proposers can apply for data rights of specific sources observed in these programmes.

For AO-5 a two-staged AO will be done, first asking for Key Programme ideas then for the usual proposals. For AO-4 there is no time for a dedicated pre-AO. As a pilot programme the Galactic Center region will be observed for 2 Ms.

LH explained the planned implementation at ISOC, PGT is being updated to handle such proposals. Wants to discuss handling of proposals associated with Key Programmes in January 2006 with ISDC.

## **10 IASW updates**

The SPI IASW was successfully updated.

For IREM there have been 28 SEU's since launch. MOC proposes to change the IREM software for an easier recovery (see pres. by M. Schmidt) and are currently for feedback from Wojtek Hajdas.

A test of this update on the satellite is necessary as the simulator is not sufficiently representative. No objections were raised against this test and update.

## **11 Documentation status**

No UM updates required currently for SPI, JEM-X or OMC. The current IBIS UM claims falsely that AOCS submode is used and there is an open question of context tables.

## 12 Anomaly Reports

MOC Anomaly Reports		
<i>Spacecraft</i>		
INT_SC-135	BCR2 Spurious Switch-off#3	SEU ⇒ closed
<i>IREM</i>		
INT_SC-132	Last IREM reset	kept open
<i>IBIS</i>		
INT_SC-130	Veto TC rejected	open
INT_SC-129	Veto VDM09 HV breakdown	nothing to be done ⇒ closed
INT_SC-126	Veto VDM08 HV breakdown	nothing to be done ⇒ closed
INT_SC-101	Veto toggling of the PMT 28 V set by IASW	open
<i>SPI</i>		
INT_SC-71	Task overrun problems	obsolete ⇒ closed
INT_SC-70	Wrong On-Request Report Operation	obsolete ⇒ closed
<i>JEM-X</i>		
INT_SC-131	JEM-X DFEE CRC Anomaly	nothing to be done ⇒ closed
ISDC Anomaly Reports		
<i>IBIS</i>		
IA-00022	gap in telemetry not signaled by a restart processing	closed
IA-00019	Drop of the PICsIT countrate during one pointing.	nothing to be done ⇒ closed
IA-00017	Time of first event (s1) not increasing	open
<i>SPI</i>		
IA-00016	count rate bursts in SPI camera ...	nothing to be done ⇒ closed
IA-00009	ACS_RATE out of order	obsolete ⇒ closed
IA-00008	Occasional time shifts of 250ms in SPI ACS_RATE data	obsolete ⇒ closed



## 13 GS CCB

There were only two open Ground Segment Change Requests:

**ISOC SCREW 456** File Name Changes from SOC to SAC

⇒ open, being implemented

**INTGSCCR-81** Use of DSS-27 Antenna for Integral

⇒ open, being implemented

Nobody sees any problems in these.

The interface problems ISOC encountered with Flight Dynamics w.r.t. delivery of eclipse files, may lead to a GS CCR, but this is still TBD.

Recently an overlap window gave problems. MOC must ensure that overlap remains within instrument window as the ISOC software will schedule a handover at any time within the overlap window ⇒ PSF and POS ICD may need update.

## 14 AOB

The 6<sup>th</sup> Integral Workshop foreseen for St. Petersburg will be moved to Moscow, because of a G8 meeting during this time in St. Petersburg. Further details are still being discussed.

The next GS Coordination Meeting may take place in summer, depending on topics requiring discussion. Copenhagen and Toulouse were brought up as possible locations.