

## Attendants

Antony J. Bird	Univ. Southampton	AJB
Roland Diehl	MPE Garching	RD
Carlo Ferrigno	ISDC	CF
Sergei Grebenev	IKI Moscow	SG
Wim Hermsen	SRON	WH
Peter Kretschmar	ESA, ESAC	PK
Daniel Lennon	ESA, ESAC	DL (at start of meeting)
Miguel Mas Hesse	INTA Madrid	MM
Mikhail Revnivitsev	IKI Moscow	MR
Jean-Pierre Roques	IRAP Toulouse	JPR
Norbert Schartel	ESA, ESAC	NS
Richard Southworth	ESA, ESOC	RS
Pietro Ubertini	INAF Roma	PU
Ed van den Heuvel	Univ. Amsterdam	EvdH
Peter von Ballmoos	IRAP Toulouse	PvB

## 1 Welcome, Agenda, Actions

EK introduced PvB as new chair. In July 2015 also MR and JV will end their term at IUG, new members will be V. Beckmann (APC, France) and A. Lutovinov (IKI, Russia). Several IUG members were excused for a variety of reasons.

There were no open actions from previous meetings. It was noted that no minutes from the meeting (#16) on the 2014 extension science case had been circulated yet.

## 2 Mission Status

DL explained the background of the ongoing effort to identify possible further savings. RD pointed out that in the last effort, the IUG had tried to keep the science mainly protected, going further would affect science.

A small panel of external experts has been involved in the study of further savings options. A draft report of this panel has been available since 3 February, but the panel was not yet ready to have this circulated. A brief summary of their findings was presented.

EK and DL commented that the draft report rather was in line with IUG recommendations. A general discussion ensued on the role of external experts vs IUG, the strategy for this extension effort, etc. Some members proposed a second meeting later this year.

PK gave a brief overview of past saving exercises (see [viewgraphs](#)) without detailed numbers. JPR warned that saving additional personnel at MOC would lose critical expertise.

## 3 Status report by Project Scientist

EK presented the mission status (see [viewgraphs](#)). The manoeuvres ensuring a long-term disposal were ongoing at the time of the meeting.

The AO-12 programme has gaps, not covered by accepted observations due to visibility constraints. Efforts are underway to fill these gaps, e.g., by more exposure on Russian proposals, Cyg X-1. EK invited further suggestions from IUG. Mentioned options included the underexposed region in the Galactic Plane, accreting ms pulsars, or the LMC. NS commented that the TAC should only accept feasible proposals, which also includes avoiding too many proposals with similar visibility intervals.

Special observations (GPS, Russian scans, customised patterns) take much more effort and lead to more frequent re-planning. Should one concentrate only on standard patterns (5x5, Hex) or possibly allow special patterns only for A grade?

The question of the specific data rights for Russian proposals was raised again by EK and EvdH, who emphasised that the current situation is not symmetric. MR responded that the decision to open data access had been taken unilaterally by the European side and was not supported by the Russian community. MR also requested to know the overhead resulting from the special treatment for Russian proposals. No immediate answer could be given, but these proposals do create extra work for ISOC and ISDC.

A possible roadmap for the long-term future of INTEGRAL was discussed as well as EK's summary of the expert findings. PU noted that if AO periods were to be increased, additional mechanisms (e.g., DDT) would need to be introduced to maintain flexibility in case of new developments.

## 4 Instrument & Calibration status, Science Ground Segment

### 4.1 OMC

MM briefly presented the OMC status which is generally very smooth (see [viewgraphs](#)). PL inquired if OMC had noted issues due to the Moon in the FOV, but none had been found. The startracker constraint will keep the Moon outside the OMC FOV while it might be in the wider IBIS FOV.

### 4.2 JEM-X

PK presented the JEM-X status (see [viewgraphs](#)) on behalf of S. Brandt (excused). The status is good with controlled evolution. No further anodes have been lost in the two years, even three for JEM-X 1. The onboard particle rejection mechanism has been updated in order to have a more even spectral response for the price of a slightly increased background.

### 4.3 SPI

JPR summarised the SPI status (see [viewgraphs](#)). In the 23<sup>rd</sup> annealing the annealing duration was decreased and a “significant” level of degradation was awaited, because of the accumulation of smaller problems seen during switch-on in previous annealings. The recovery of the energy resolution has been slightly worse for both a longer wait to start annealing and the reduced duration. The 24<sup>th</sup> annealing, again for the shorter 128 h duration was scheduled to start on 15<sup>th</sup> February.

The French budget for SPI operations decreased strongly in 2015. Operation support and performance monitoring will continue, but on-board software maintenance would no longer be possible.

#### 4.4 IBIS

PU informed about the ongoing ASI/INAF support (see [viewgraphs](#)). ASI is supporting INTEGRAL until end 2016 with a possible 3 years extension. The current budget is 0.5 MEuro for 2014–2016, in addition there are 10 FTE at INAF (corresponding to 800 kEuro).

PU also explained the cross-calibration status for ISGRI (see [viewgraphs](#)). The team needs to provide new ARFs for 2014.

PL reported on the ISGRI calibration status on behalf of F. Lebrun (see [viewgraphs](#)). Major progress has been made in the last months on the energy calibration by modelling the pulse-height correction as time-dependent instead of static. With these corrections ISGRI and SPI agree for the cyclotron line source 1A 0535+262.

The new energy calibration scheme should become part of the next major OSA version (date TBD) and updated calibration files should be delivered monthly.

#### 4.5 SPI Calibration

JPR reported on the SPI calibration results (see last pages in [viewgraphs](#)). Overall, the Crab spectrum is stable, but the latest revolutions show a different HE spectrum. It is not clear yet if this is real or instrumental.

#### 4.6 ISDC

CF reported on the ISDC status (see [viewgraphs](#)). Swiss funding for 2015–2016 has been approved. The currently very strong Swiss Franc may create issues with the ESA contract. Manpower is stable, operational hardware and software has been reorganised to ease maintenance and increase performance. CF went on presenting statistics on QL results, data distribution, software downloads etc. In the future ISDC will first release OSA 10.2 (adapt to new Mac OS/X versions) and then plan a larger release with new ISGRI energy calibration.

#### 4.7 Scientific results

EK listed some of the scientific highlights of the last year in his [presentation](#). RD announced new results on Cas A, also detecting the high-energy line. WH explained that an overview paper on the gamma-ray pulsar population was on the way; MR noted a survey paper on the high-energy sky at  $> 100$  keV with 1/3 of the sources being radio pulsars. PL reported that a new paper on the Crab polarisation had been submitted, finding a change in the polarisation angle.

#### 4.8 De-orbit status and lifetime limitations

RS explained the background and the implementation of the ongoing disposal manoeuvres (see [viewgraphs](#)). He continued with a detailed explanation of the lifetime limiting factors fuel and electrical power. For electrical power, the payload is responsible for about 2/3 of the usage and maybe this could be reduced somewhat, but as thermal balance also must be kept, room for adjustments is probably limited. The new orbital pattern and its effects were explained in detail.

**Action 17–1 on PK**

**Due: end Feb**

*Put up documents from disposal studies on Web.*

RS also gave an overview of the current Flight Control Team and their duties.

## 4.9 Hibernation

RS explained the technical reasons speaking against hibernation (see last slides in [previous presentation](#)).

JPR noted that a regular, frequent switch-off increases risk for the instruments and commented that SPI would die quickly under such conditions.

RD proposed that the instrument teams should provide report on negative effects of hibernation.

<b>Action 17–2 on JPR,RD,PU,SB,MM</b> <i>Provide technical reasons against hibernation</i>	<b>Due: by next meeting</b>
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<b>Action 17–3 on RS</b> <i>Collect Rosetta experiences on hibernation inflight</i>	<b>Due: by next meeting</b>
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## 5 Increase awareness of INTEGRAL in the community

EK presented again the ongoing activities to increase awareness (see [viewgraphs](#)). NS commented that the collaboration with ESO had not been very fruitful for XMM-Newton. An extended discussion ensued. One idea was to show more presence at conferences of other communities.

PU asked about the possibilities for joint observations with NuSTAR. EK has attempted this, but did not have a positive reply so far.

## 6 Italian INTEGRAL Workshop 2015

PU proposed another workshop in Rome for the time interval mid September to mid October. Generally this was positively received and the need to announce details soon emphasised. EK remarked that inviting specific people from other missions was successful in Annapolis. PvB asked the IUG members to propose keynote speakers.

## 7 ASTROGAM

PvB presented the proposed ASTROGAM mission (see [viewgraphs](#)).