

ESOC, 11–12 June 2019

Minutes last updated on September 30, 2019

## Attendants

Sören Brandt	DTU Space	SB
Volker Beckmann	CNRS / IN2P3	VB
Guillaume Bélanger	ESA, ESAC	GB ( <i>secretary</i> )
Roland Diehl	MPE Garching	RD
Jochen Greiner	MPE Garching	JG ( <i>invited</i> )
Albert Domingo	INTA Madrid	AD
Matthias Ehle	ESA, ESAC	ME ( <i>Mission Manager</i> )
Carlo Ferrigno	ISDC	CF
Diego Götz	CEA	DG
Sergei Grebenev	IKI Moscow	SG
<b>Lorraine Hanlon</b>	UCD	<b>LH (<i>chair</i>)</b>
Marcus Kirsch	ESA, ESOC	MK ( <i>co-host</i> )
Erik Kuulkers	ESA, ESTEC	EK ( <i>Project Scientist</i> )
Philippe Laurent	CEA/APC	PL
Alexander Lutovinov	IKI Moscow	AL
Angela Malizia	INAF Bologna	AM
Julie McEnery (remotely)	NASA	JM ( <i>June 11</i> )
Norbert Pfeil	ESA, ESOC	NP ( <i>invited</i> )
Jean-Pierre Roques	IRAP Toulouse	JPR
David Salt	ESA, ESOC	DS ( <i>invited</i> )
Richard Southworth	ESA, ESOC	RS ( <i>host but not present due to last minute issue</i> )
Pietro Ubertini	INAF Roma	PU
Ed van den Heuvel	Univ. Amsterdam	EvdH

## 1 Welcome, Agenda, Actions, Recommendations

Marcus Kirsch welcomed the IUG members in place of Richard Southworth who could not attend due to personal circumstances.

### 1.1 Agenda

Agenda was accepted with no additional items.

### 1.2 Actions

*Action 20–1 on CF: Coordinate the activity to produce a report on cross-calibration (due TBC)*

On-going—The focus has been on releasing the new OSA, and this cross-calibration effort should really be done with the new OSA.

*Action 20–8 on EK: Contact to gather results of the multiple cross-calibration efforts from teams involved (due June 2019).*

On-going—Sent an email. Didn't receive responses. A plan of action should be elaborated. (Updated due date.)

*Action 21–1 on PL: Send template of LoI to AL, and explain what to do.*

Closed.

*Action 21–2 on EK/LH: Maintain a set of publicly available slides on mission status to be used for presentations (due Feb 2020).*

On-going—Due date changed.

*Action 21–3 on GB/EK: Consider idea of a WG on the legacy archive.*

Closed—This activity will be considered again at a later date.

*Action 21–4 on LH/EK: Make list of priorities for most essential INTEGRAL-related activities and discuss at IUG (due Nov 2019).*

On-going—Due date changed.

*Action 21–5 on EK/ME: Consider longer AO periods to reduce pressures from workload.*

Closed—For the time being, this will not be done as it would cause too much disruption.

*Action 21–6 on EK/LH: Draft letter to reply to expert users.*

Closed.

*Action 21–7 on PIs: Review the status of the documentation available to the public (due Nov 2019)*

On-going—no progress to date. Very important to the user community that the information be up to date.

*Action 21–8 on GL: Submit OCR to perform test on TM packets at 8 ms time resolution*

Closed.

*Action 21–9 on RS: Investigate what caused the anomaly at the start of scw 201500260010*

Closed—RS reported on investigation by email.

*Action 21–10 on PL: Deliver Compton mode analysis software to ISDC. Some difficulties encountered with integration using OSA 11 libraries (due Nov 2019).*

On-going—Due date changed. See discussion below.

*Action 21–11 on RS: Report on result of study by solar array expert team.*

Closed—See discussion below.

*Action 21–12 on LH/EK: To draft a request to Lorenzo Natalucci to finish the cross-calibration paper on the Crab (due July 2019).*

On-going—Has not been done. Actionee changed from IUG to LH/EK

*Action 21–13 on LH: To clarify issues with MoUs/LoI, and consider inclusion of wider INTEGRAL community (due at IUG 22).*

Closed—Discussion held and position adopted during IUG 22 (see below for details).

*Action 21–14 on PL: To begin writing ISGRI calibration report and report at next IUG (due at IUG 23).*

On-going—Has not been started, due date defined.

Action 21–15 on EK: To discuss with CF how to present the cross-calibration results and OSA11 results on the web (*due TBD*) EK and CF to agree on a date.

Pending work by LN related to Action 21–12. Due date modified.

Action 21–16 on GB: To oversee implementation of computation of time allocation per panel in TAC software (*due May 2019*).

Closed.

Action 21–17 on CF/EK: To propose a solution to include discussion session at 2019 INTEGRAL conference (*due Dec 2018*).

Closed.

Action 21–18 on IUG members: To propose early career scientist candidates to PU for Revniostev prize (*due Jan 2019*).

Closed.

Action 21–19 on PU: To send email to begin discussion towards a MoU with LIGO/VIRGO (*due Jan 2019*).

Dropped—Not applicable anymore due to new public data policy.

Action 21–20 on PL: To contact EGO direction on behalf of the IUG to ask about MoU (*due Jan 2019*).

Closed—EGO are open to collaboration. More geared to common software development and analysis workflows.

### 1.3 Recommendations

*Recommendation 36: IUG recommends generating a report on the cross-calibration of the INTEGRAL instruments after the official release of OSA 11.*

On-going—Plans to produce this report have been made (see Action 21–14).

## 2 Mission Status Report — ME ([viewgraphs](#))

- ME presented a Mission Manager report. In response to a question, he reported that no reduction in budget is currently foreseen.

## 3 Project Scientist Status Report — EK ([viewgraphs](#))

- EK presented the Project Scientist report.
- The scientific focus of the mission has shifted towards more ToOs in recent years.
- With the release of OSA11, ISGRI calibration should be a priority to maximise scientific return to the user community. The release of Compton mode software also offers the potential of additional scientific return.
- A review of AO17 submissions suggested no significant change in the number of proposals submitted this round. The use of appropriate metrics to capture quality and quantity is important for users and for ESA.
- The next INTEGRAL workshop was proposed to be hosted by INAF Rome and held in September 2020 in Sardinia, possibly in partnership with another high-energy mission.

It was noted that the 2022 conference will celebrate 20 years of INTEGRAL and should focus on INTEGRAL science.

<b>Action 22–1 on LH/EK</b> <i>To contact the Chime collaboration to make links with INTEGRAL.</i>	<b>Due: IUG 23</b>
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<b>Action 22–2 on EK</b> <i>Consider reducing the proprietary period for data from 1 year to 6 months.</i>	<b>Due: IUG 23</b>
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<b>Action 22–3 on PU/LH</b> <i>Make a list of things to do to get the conference preparation moving.</i>	<b>Due: Sept 2019</b>
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<b>Recommendation 36:</b> Make production of ISGRI calibration files a top priority <i>The IUG recommends making the production of ISGRI calibration files to allow the analysis of all data back to the start of the mission with OSA 11 a top priority.</i>
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## 4 Instruments and Ground Segment

### 4.1 SPI — JPR ([viewgraphs](#)), EJ ([viewgraphs](#)), and RD ([viewgraphs](#))

- RD presented his summary of the status of SPI. JG will take over RD's role and will attend IUG meetings to allow for a smooth transition.
- It should be possible to improve the ACS calibration, as was previously done in 2003.
- JPR presented his summary of the status of SPI and mentioned the cross-calibration between SPI and other instruments (from IACHEC), which looks very good.
- Regarding the two detectors whose different behaviours during previous annealings are not understood, the plan is to investigate during and after future annealing, also preferably after eclipse season. The low energy threshold is still at 18 keV and energy resolution is within 15% of the initial resolution at commissioning.

<b>Action 22–4 on RD</b> <i>Find out if Andreas Von Kienlin can work on retuning the ACS parameters to improve response as was done during commissioning.</i>	<b>Due: IUG 23</b>
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### 4.2 JEM-X — SB ()

- SB presented the summary of the status of JEM-X.
- The plan is to ingest the improved calibration files into the IC tree for the whole mission over the next year.

### 4.3 IBIS — PU ([viewgraphs](#)) and PL ([viewgraphs](#))

- PU and PL presented the IBIS status.
- PICsIT may detect events that ACS does not. For bright events, PICsIT has much better time resolution.
- Several views were expressed in response to the TAC question about instrument team use of proprietary software for polarisation analysis. The consensus was that a team that has developed its own software tools for a particular purpose should not be obliged to make them openly available. Interested scientists are free to collaborate with the instrument teams on an ad hoc basis to address specific science questions.

<b>Action 22–5 on PL</b>	<b>Due: IUG 23</b>
<i>To work with Rome team to provide updated PICsIT response matrices.</i>	

<b>Action 22–6 on EK</b>	<b>Due: Feb 2020</b>
<i>Formulate a reply to TAC about the question of the polarisation software, and a statement to be posted on the INTEGRAL AO documentation and News.</i>	

<b>Action 22–7 on PL</b>	<b>Due: IUG 23</b>
<i>Check mission documentation for agreement on software deliverables from instrument PI in regards to polarisation-specific software.</i>	

#### 4.4 OMC — AD ([viewgraphs](#))

- Albert Domingo presented a summary of the status of OMC.

#### 4.5 MOC — ([viewgraphs](#))

- David Salt and Norbert Pfeil presented a summary of the status on operations, power evolution, fuel consumption, array degradation, etc from the MOC.
- The predicted behaviour of the solar arrays, in which the long-term degradation is stable for a long time and then rapidly deteriorates, has not been seen in XMM-Newton. The IUG felt it would be valuable to address this point for INTEGRAL.

<b>Action 22–8 on RS</b>	<b>Due: IUG 23</b>
<i>Explore and present an update on the long-term degradation of solar arrays.</i>	

#### 4.6 ISDC — CF ([viewgraphs](#))

- CF presented an update of activities at ISDC.
- For the on-line INTEGRAL analysis, it is not currently feasible to remove the limit of 50 science windows due to resource issues (storage and computing power) and the web interface. However, the system is scalable.
- Updates to HEAVENS are not planned.
- IBAS software is being validated with the new calibration.
- The reason why the curve of OSA 11 is flat at the start and rises later is not well understood. There are periods during which the response evolves rapidly and others when it doesn't. It does not appear to be directly related to radiation.

<b>Action 22–9 on CF</b>	<b>Due: Sept 2019</b>
<i>Request update about IBAS software validation from Sandro Mereghetti.</i>	

<b>Action 22–10 on CF</b>	<b>Due: Sept 2019</b>
<i>Investigate how to isolate the HEAVENS from main ISDC services.</i>	

#### 4.7 NASA GSFC — JM ()

- Julie McEnergy reported from GSFC.
- Cross-promotion of the Fermi symposia and the INTEGRAL conferences was endorsed.

**Action 22–11 on JM/PU****Due: IUG 23**

*Explore and propose ways to promote INTEGRAL at Fermi, and equivalently, to promote Fermi at INTEGRAL conferences.*

**4.8 ISOC — GB ([viewgraphs](#))**

- GB presented a status update on ISOC activities since the last IUG meeting.
- IUG members expressed the wish that the SEPP project talk to the users (not only developers). There are/were many similar activities: VO, HEASARC, ISO, ESRIN archives, HEAVENS, etc. Some of them can still be talked to and their experience taken on board. GB clarified that currently the project is technical, studying the basics, defining the infrastructure and that the work is being led by a users group of archive scientists and developers at ESAC.

**4.9 RSDC — SG ([viewgraphs](#))**

- SG presented a summary of activities at RSDC.

**5 Discussion Items****5.1 Open Multi-Messenger Astrophysics (MMA) Collaboration to a larger INTEGRAL Community**

Overall the consensus was that reporting different results for the same event from different teams is not particularly helpful for the wider community who may rely on GCN information to trigger their own observational programmes. On the other hand, the data are publicly available and different teams should not be in any way prohibited from publishing their findings. It was agreed that the teams continue to operate as they do currently. The INTEGRAL Project Scientist will step out of the MMA team to ensure impartiality and encourage dialogue as necessary.

**5.2 Cross-mission Calibration**

- GB presented a summary of the plan for the IACHEC to present a white paper for the Decadal Review to get an endorsement of the importance of cross-calibration activities to maximise the science return from all the high-energy missions.
- Difficulties include the broad energy range being considered (X-ray to high energy gamma-ray), the lack of papers that clearly describe how to handle instrument differences and how to decide which instrument is 'correct'. While this cannot be solved in absolute terms, the use of Monte Carlo simulations for calibration in the absence of a real or reliable calibration source is the best that can be achieved.
- PU presented results from PICsIT analysis and mentioned improved spectral matrices still had to be produced.

**Action 22–12 on GB****Due: IUG 23**

*Explore possibility of institutional support from ESA for calibration activities*

**Recommendation 37:** Institutional support from ESA

*The IUG recommends seeking institutional support from ESA to allow much needed progress for cross-calibration activities that would increase the value of data from current ESA missions like XMM-Newton and INTEGRAL, as well as future missions like Athena and Theseus, in addition to supporting the scientific community at large in the efforts of using several high-energy instruments and obtaining more relevant and constraining scientific results.*

**Action 22–13 on PU****Due: IUG 23**

*Coordinate and ensure the delivery of PICsIT spectral analysis matrices.*

**5.3 OSA 11 Calibration**

- CF mentioned the intention of producing more calibration files with the help of limited additional manpower at ISDC.
- The new ISGRI calibration has issues at the low-energy end (30–60 keV), which are being investigated using Sco X-1.

**Recommendation 38:** Calibration at low and high energies

*The IUG recommends to the IBIS team to combine observations of the Crab and Sco X-1 in order to have data to address calibration at both high and low energy. Coordination with NuSTAR would be helpful.*

**5.4 OSA Workshop**

- A workshop should be held when the online analysis software is released. This can be used to teach people how to make use of INTEGRAL data, without having to learn how to use OSA.

**5.5 15 Year Special Issue**

- EvDH reported on the status of the special issue. The deadline was moved from April to August. EK and GB invited and accepted joining EvdH and LH as editors. One paper, that on SS 433, has been received.
- It was viewed as important to be inclusive when considering co-authors for the review papers.
- A press release at the time of the 2020 INTEGRAL conference will be made to announce the special issue.

**Action 22–14 on EvdH****Due: Dec 2019**

*Find out what is the production deadline in order to have the special issue published before Sept 2020 in order to have a press release at the next INTEGRAL conference.*

**5.6 Gender Balance — LH ([viewgraphs](#))**

- LH presented the results of the HST study on gender balance that shows there is indeed an unconscious bias visible in the results of the TAC decisions. Gender balance of TAC members was addressed in the selection and therefore was not an effect. Half the conversations were about the proposers from personal connections and relationship. This

prompted a move to a completely anonymous TAC process with double-blind evaluations. After this implementation, the discussions within the TAC shifted to 100% on the science.

- Numbers for INTEGRAL up to AO-16 were extracted by Celia Sanchez following a request by LH and EK. These show that women submit 21% and men 79% of proposals, but 74% of women’s proposals are accepted versus 66% for men.

**Recommendation 39:** Double-blind TAC evaluation

*The IUG recommends the INTEGRAL mission consider moving to a double-blind TAC evaluation of proposals and to gather/examine additional data in relation to gender-balance across ESA Science missions.*

## 5.7 Future AOs

- EK raised the matter of introducing legacy programmes through the IUG.
- The consensus view was that legacy programmes could be pursued through the usual TAC processes and therefore no change to current practice is required.
- To widen interest in INTEGRAL data, it was agreed that consideration should be given to reducing the proprietary period from one year to 6 months.

## 5.8 Preparing INTEGRAL’s Legacy

- EK encouraged everyone to think about INTEGRAL’s legacy.
- The current IBIS catalogue is complete to revolution 1500.
- There is no current plan for a final INTEGRAL catalogue. The production of a final legacy catalogue requires significant manpower and effort, not currently available within the teams. A larger collaboration, with additional funding (e.g. via ESA, EU) may be required. There is a lack of clarity as to who should be responsible for the production of such a catalogue.
- The OMC team has its own archive and plans to reprocess everything once more at the end of the mission for the legacy. CAB plans to keep its own archive beyond the lifetime of the mission.
- Modern software tools and machine learning approaches should be incorporated into the development of a final catalogue.

**Action 22–15 on PU**

**Due: IUG 23**

*Gather inputs from stakeholders for a further discussion on the topic of working towards a final INTEGRAL catalogue at the next IUG.*

## 5.9 IUG Feedback

- LH expressed thanks to ESA on behalf of the IUG for the continued support.
- Thanks to AL and VB for their contribution over the last three years.
- Consensus was to keep to the current 6-monthly IUG meeting cadence.

## 6 AOB

- AL reported on progress on Baikal neutrino observatory, and plans to make a LoI with EK for collaboration with INTEGRAL.

- A discussion ensued about the rationale behind creating MoUs with other collaborations. It was emphasised that this is the only way in which data can currently be accessed from such teams and therefore MoUs should be pursued where relevant for INTEGRAL's scientific return.

## **7 Next Meeting**

The next meeting will be at ESTEC on 26–27 November 2019.