



MEETING

Meeting Date	27+28/5/2024	Ref	ESA-SCI-S-MIN-0011
Meeting Place	ESOC (Room K111)	Chairperson	Jan-Uwe Ness (JUN), Miguel Mas-Hesse (MMH)
Minute's Date	04/10/2024	Participants	<p><u>Guillaume Belanger</u> (GB): ESA ESAC, Madrid (ISOC Coordinator and IUG Secretary); <u>Søren Brandt</u> (SB): DTU Space, Lyngby (former PI JEM-X); <u>Jérôme Chenevez</u> (JC): DTU Space, Lyngby (PI JEM-X); <u>Matthias Ehle</u> (ME): ESA ESAC, Madrid (Mission Manager); <u>Carlo Ferrigno</u> (CF): ISDC, Versoix (PI ISDC); <u>Jochen Greiner</u> (JG): MPE, Garching (Co-PI SPI); <u>Margarita Hernanz</u> (MH): CSIC Institut de Ciencies de l'Espai, Barcelona; Roman Krivinos (RK): IKI, Moscow, Russia; <u>Philippe Laurent</u> (PL): APC/Université de Paris (Co-PI IBIS); <u>Julien Malzac</u> (JM): IRAP/CNRS, Université de Toulouse (External Scientist); <u>Jim Martin</u> (JMa): ESA/ESOC (Spacecraft Operations Manager); <u>Miguel Mas-Hesse</u> (MMH): Centro de Astrobiologia - CSIC-INTA (IUG Chair & PI OMC); <u>Jan-Uwe Ness</u> (JUN): ESA ESAC, Madrid (Project Scientist); Francesca Panessa (FP): INAF-IAPS, Roma (External Scientist); <u>Jean-Pierre Roques</u> (JPR): IRAP, Toulouse (Co-PI SPI); <u>Lara Sidoli</u> (LS): IASF-INAf, Milano (External Scientist); <u>Richard Southworth</u> (RS): ESA ESOC (Spacecraft Operations Manager); <u>Pietro Ubertini</u> (PU): INAF-IAPS, Roma (Co-PI IBIS); <u>Ed van den Heuvel</u> (EvdH): University of Amsterdam (TAC chair)</p>
Subject	INTEGRAL Users Group Meeting #28	Copy	<p><u>Wim Hermsen</u> (WH): SRON, Utrecht (Mission Scientist); <u>Julie McEnergy</u> (JME) and Brad Cenko (BC): GSFC (Mission Scientist); <u>Norbert Scharrel</u> (NS): ESA-ESAC; <u>Rashid Sunyaev</u> (RaS) and Sergei Grebenev (SG): IKI Moscow, MPA Garching (Repr. PROTON Launcher)</p>



Action	Actionee	Status
Action 21-10: Deliver Compton mode analysis software to ISDC. Some difficulties encountered with integration using OSA 11 libraries (originally due at IUG #24).	PL	31 Oct 2024
Action 27-1: Coordinate calibration activities to start on time to be completed by end of Post-Operations phase	JUN	Some progress but ongoing
Action 27-2: Include explanation of new calibration approach delivered under Action 23-4 in the OSA webpage	CF	Closed
Action 27-3: Circulate ideas about Fast-TOO Earth observations to the IUG for them to feedback whether there is any interest.	EK	Closed
Action 27-4: Collect IUG input for suggestions of new enthusiastic TAC members	EK	Closed
Action 27-5: Report to EK new PhD theses using INTEGRAL data	IUG	Closed
Action 27-6: Kick off plans to represent INTEGRAL at COSPAR Meeting in Busan.	IUG	Closed
Action 27-7: To increase time resolution of PiCsIT: PL to provide details of the needs for the Compton mode data. Then the IBIS team to issue an OCR for approval by Project Scientist (EK) and Spacecraft Operations Manager (RS) for fast implementation by ISOC	PL, EK, RS	Closed
Action 27-8: Include in the IUG#27 minutes the number of subscribers to the INTEGRAL Newsletter before and after the change of subscription method	JUN	Closed
Action 27-9: Invite other communities to subscribe to the INTEGRAL Newsletter (e.g. Athena, Swarm, see Action 27-2)	EK	Closed
Action 27-10: Organise a dedicated meeting to coordinate the needs of the legacy archive	EK, MMH, PK	Closed
Action 27-11: Inform EK, MMH, PH who should be involved in the meeting and ideas important to be discussed (Action 27-9)	IUG / MMH	Closed
Action 27-12: Prepare a document summarizing all the ideas from IUG what is needed for the legacy archive	MMH	Closed
Action 27-13: CF to reach out to MPE for access to their triangulation information.	CF	Closed
Action 27-14: For AO21 call, write special invitation letter (on behalf of D/SCI) with emphasis on this being last opportunity to use INTEGRAL but care to be taken to keep the door marginally open in case we get an AO22 after all	EK	Closed
Action 27-15: MMH suggested the ESA team that the IUG would be pleased to write a support letter to the ESA management in case it is considered at any time that the ISOC would benefit to increase its manpower.	MMH, IUG, EK, ME	Closed
New Actions	Actionee	Due by
Action 28-0: Send proposals for end-of-life technology testing to ME	PL, MMH	31 Oct 2024
Action 28-1: Announce on webpage and in final ISOC Newsletter that mission specific newsletters will be replaced by a combined monthly SCI newsletter	GB, JUN	Closed
Action 28-2: Check if OMC light curves are VO compliant to provide input to CF	MMH	31 Oct 2024
Action 28-3: Update upper limit server data with support from RK.	GB, RK	Mar 2025



Action 28-4: Share with CF the JEM-X updated version of ISDC catalogue for comparison	JC	31 Oct 2024
Action 28-5: Inform CF when pySPI is ready for distribution	JG	31 Oct 2024
Action 28-6: Include pySPI in MMODA before the INTEGRAL 2024 workshop at ESAC in October 2024	CF	Early Oct 2024
Action 28-7: Agree with MMH and OMC team on next steps for ingestion of new catalogue of detected OMC sources	GB, MMH	31 Oct 2024
Action 28-8: Add sentence to encourage in-person participation on the workshop website	GB	Jul 2024
Action 28-9: Find Spanish speaker for INTEGRAL 2024 conference to talk about women in astronomy	JUN, MMH	Jul 2024
Action 28-10: send PU ideas about gadgets for INTEGRAL 2024 conference	IUG	Jul 2024
Action 28-11: Send the SMP to IUG members	JUN, ME	Closed

1 Welcome, Approval of Agenda (MMH/JUN)

2 Agenda

Monday 27 May 2024, ESOC-VC K11

- 11:30 Welcome - Approval of Agenda MMH/JUN
- 11:35 Status of Actions
- 11:50 Status reports from MM and PS and discussion ME, JUN
- 12:15 Role and members of IUG until end of 2024 and from 2025-2026 All
- 13:00 Lunch
- 14:00 Short reports (only significant highlights) MOC, instr. teams, ISDC, ISOC, NASA, RSDC
- 14:30 Conference planning CF, GB
- 15:00 Coffee Break
- 15:30 Legacy Archive
- 15:30 General update to the Priorities document GB
- 16:00 Update on current activities including data labs, MMODA GB, CF
- 17:00 Adjourn

Tuesday 28 May 2024, ESOC-VC K111

- 10:00 Legacy Archive
- 10:00 Status update of products and catalogues
 - ISOC (15 min) GB
 - ISDC (15 min) CF
 - IBIS (15 min) PU
 - JEM-X (15 min) JC
 - OMC (15 min) MMH
 - SPI (15 min) JPR/JG



- 11:45 Call for community products All
- 12:00 AOB, Wrap Up All
- 13:00 Lunch, Adjourn

3 *Review of past Actions (GB)*

Action 21-10 (PL): Deliver Compton mode analysis software to ISDC.

- PL has worked on it and found a lot of bugs, now has a new PhD student. An update was sent to CF, but it was found later that the solution sent doesn't work.
- Still working on the software following detection of several points related to calibration of PiCsIT with James Rodi and Rome team.
- Document from Rome was shared with PL on May 24 as basis for updates.
- Delivery due End-September 2024.

Action 27-1 (JUN): Coordinate calibration activities to start on time to be completed until end of Post-Operations Phase.

- Paper in preparation by French team on 20 years of ISGRI in space
- Some work was done on cross calibration is done with SPI and NuSTAR with specific sources. Some slides were given to EK for the IACHEC meeting to present the status. Preparing document on calibration updates presenting this work.
- Changing actionee to JUN

Action 27-2 (CF): Include explanations on approach to calibration in the OSA webpages

- Closed

Action 27-3 (EK): to circulate the ideas about fast-TOO Earth observations to the IUG for them to feedback whether there is any interest.

- Fast TOO mode was decommissioned. Replaced by fast RPOS.
- Closed

Action 27-4 (IUG): make proposals for new TAC members.

- Closed

Action 27-5 (IUG): report to EK new PhD theses using INTEGRAL data.

- Inputs were sent and included in the supporting documentation to ESA management for extension case.
- Closed

Action 27-6 (PU): Kick off plans to represent INTEGRAL at COSPAR Meeting in Busan

- 170 scientific events; 1000 abstracts in Astrophysics; 4000 abstracts in total.
- Several sections and some specifically focused on INTEGRAL data. Strong scientific representation.



- One highlighted result will be on the magnetar Nature paper.
- There is a Breaking News section that could be used in case something happens in the coming months.
- Closed

Action 27-7 (PL): To increase time resolution of PiCsIT. PL to provide details of the needs for the Compton mode data. Formulate the needed changes, then on the IBIS team to issue an OCR via the ESA system.

- Closed

Action 27-8 (EK): Find out the number of subscribers to the Newsletter before and after the new subscription process and include in these minutes:

- Before the change, there were 586 subscribers to the int_all email distribution list.
- In the new system, 146 users have registered with consent to the Privacy Notice.
- Closed

Action 27-9 (EK): to invite other communities to subscribe (e.g., Athena and Swarm).

- Not relevant anymore.
- See MM report on new SCI newsletter
- Closed

Action 27-10 (EK, MMH, PK): To organise a dedicated meeting (format to be agreed) before the summer break 2023.

- Closed

Action 27-11 (IUG): Tell the meeting organisers who should be involved and topics important to discuss by the end of May 2023.

- Closed

Action 27-12 (MMH): to prepare a document with draft requirements by mid-June 2023.

- Closed

Action 27-13 (CF): to reach out to MPE for access to their triangulation information.

- Closed

Action 27-14 (EK): For AO21 call, write special invitation letter (on behalf of D/SCI) with emphasis on this being last opportunity to use INTEGRAL but care to be taken to keep the door marginally open in case an AO22 may be possible against all expectations.

- Closed

Action 27-15 (MMH, IUG): Write a letter to the ESA management in case it is considered at any time that the ISOC needs to increase its manpower.

- Closed



3 Reports

3.1 Mission status report (ME)

- All running smoothly with no issues to report since last meeting in May 2023.
- Teams at ESOC and ESAC continue to work well and ensure smooth operations.
- Felix Fuerst left ISOC and is on XMM-Newton and New Athena.
- GB is back full time at ESA with roles as coordinator and archive scientist.
- RS is in the process of handing over before retirement. Jim Martin is taking over technical matters and Marcus Kirsch is taking over management matters.
- Because of new structure of work management at ESA, there are more people in general but fewer dedicated.
- Post-Operations is in final stages of preparation and will be presented to management this summer.
- ISLA priorities document update will be presented by GB.
- Hopefully, IUG will continue to support INTEGRAL during post-operations in 2025 and 2026.
- Science legacy of both data and analysis is planned to be supported for a long time to come in the framework of the ESDC common support for archives and the ESA Datalabs support for OSA.
- Risk analysis results are mostly related to legacy archive products and functionality.
- Report on end-of-life technology testing. [Action 28.0 > Send proposals, likely from ISGRI \(PL\) and OMC \(MMH\), to ME in Q3 2024.](#)
- Misson specific newsletters will be replaced by a combined monthly SCI newsletter. This increases the reach enormously but reduces the specificity of the news that can be shared. [Action 28.1 > Announce on webpage and in final ISOC Newsletter that mission specific newsletters will be replaced by a combined monthly SCI newsletter.](#)

3.2 Mission operations status report (RS)

Operations: No change in consumables, no change in margins, no failures, no issues at all.

Team: RS is leaving at the end of 2024. JM is taking over from RS until May 2025.

IREM data: RS has made some attempts to get in touch with people with limited success. The idea is to be able to keep collecting, using, and making available the IREM data until de-orbiting. CF commented that the main processing step is to transform the times into something related to MJD. Any support with names/contacts related to IREM data is welcomed.

3.3 Project Scientist status report (JUN)



JUN provided a short introduction to his background, and presented a summary of the preparation for the extension case that was presented to the Astronomy Working Group (AWG) and Science Program Committee (SPC) by ESA management.

The mission was extended the last time primarily to do GW science; nothing happened in that area in the last 2 years. EvdH highlighted that the GW event of 2017 is what kept the mission in operations.

JUN underlined that a shift should be made to think about how to maximise the use of INTEGRAL data in the future.

MMH and JUN requested all current IUG members to continue at least until the end of operations. Got confirmations from everyone. The intention is to request continued support during the post-operations phase, but this conversation is delayed to later. ME highlighted that not all missions have UGs in the post-operations phase.

4 Instruments Status Reports

PU stated that he believes his obligation as PI ends with the end of operations. ASI also stops support for the mission. The moment the instrument teams drop off the knowledge is lost.

JPR emphasized that there was never any discussion or planning to handle a mission running more than 20 years. The mission and all the plans were based on a 3-year mission lifetime. It makes no sense to refer to the Science Management Plan (SMP) to request support from the instrument teams at this stage 22 years after launch.

JUN clarified later via email that each mission extension was the result of a negotiation with member states, especially also those providing national support. The extensions had no effect on the SMP, and member status should thus respond positively to funding requests to comply with post-operations responsibilities.

4.1 SPI

4.1.1 IRAP (JPR)

Focusing strictly on the essential, there is an ongoing annealing that will end tomorrow, and this will be the last one. SPI energy resolution performance is now like what it was soon after launch.

4.1.2 MPE (JG)

For the post-operations phase MPE already has the funding from DLR. JG presented the MPE tool PySPI for GRB analysis, and CF asked about sky and background modelling, whether science windows with poor fits would be removed. JG answered that there is no longer a modelling of the background but an analysis slide through pairs of two science windows assuming the background not to change within hour time scales. They also tried with three science windows which, however, is computationally expensive. The PySPI tool is an MPE tool that works independently of OSA, and ME



commented that this software should be shared in the legacy archive. JG confirmed that the tool is already publicly available.

4.2 IBIS

4.2.1 INAF (PU)

Response matrix work to understand the low energy of ISGRI degrades in time with cosmic ray degradation. Low energy threshold started at 15 keV and it is now at 40 keV. Work on catalogue is ongoing, including a combination with BAT data to improve sensitivity. It's a very difficult project, and even with few people, the effort continues.

4.2.2 CEA (PL)

Degradation is related to low threshold and is inevitable due to the accumulation of damage to the detectors. SVOM will be launched next month, and they are interested in doing cross-calibration in the fall. Planning to submit a paper on polarization.

4.3 JEM-X (JC)

Performance: instruments generally work well, but they are getting more sensitive to anomalies like solar flares? Very high-count rates suppress the gain which then shifts most counts to energies lower than those detectable, which effectively makes these counts disappear completely from the output of the analysis.

4.4 OMC (MMH)

Everything appears good, and CCDs have continued to work well. Thermal control is working well. Increase of dark current and hot pixels increases with the radiation damage. Details have been under investigation by MOC and ISOC. This shift doesn't affect operations. Loss of sensitivity is around 2%, which is very low. Around 5000 hot pixels (out of 10^6). All the light curves are already stored in the Spanish VO. There are 20+ yearlong light curves for over 100k targets. [Action 28.2 > MME: Check if OMC light curves are VO compliant to provide input to CF.](#)

5 Centres Status Reports (See slides for details)

- **INTEGRAL Science Operations Centre - ISOC (GB)**
- **INTEGRAL Science Legacy Archive (GB)**
- **ISDC status & OSA: status updates, documentation, results (CF)**

6 Discussion on ISLA (GB + CF)

- MMH: find a better name for EHEA. Community product are usually only catalogues.
- PU: workshop demo planned on ISLA? GB: complete set of products for a few sources; will do a demo on the usage of DataLabs. PU: on 1st day so that people are aware. In 2026 we could do a demo either soon or immediately before the legacy workshop.
- JC: MMODA in EDL? CF: Yes, it is already being used. GB: Plan is to deploy MMODA also at ESAC.



- JC: what about ESA Sky? GB: plan is to update what we have (images) with more recent data. Also add JEM-X all sky map, if possible (as HIPS files).
- Note that NASA SciApp already allows running Jupyter Notebooks on HEASARC tools
- MMH: MMODA gallery will be most used by users? CF, yes, but in addition long-term products that will not be possible with MMODA shall be provided.
- FP: what about upper limits? GB Upper limit server exists as [HILIGT](#) currently out of date for INTEGRAL (10 years old); update and link from EHEA is planned (currently from XSA). LS: there is another tool for UL in XSA directly but only for XMM-Newton.
- RK: Vizier CDS catalogue oriented, how to combine with light curves & images & spectra also from different missions? There is no good archive for HE astronomy linking catalogs; also, upper limit server for INT is really needed => please create such a service.
- All-sky upper limits more important than light curves for all sources? RK: upper limit is easier & more important also for people from other missions. Light curves are a 2nd order priority. [Action 28.3 > GB to give priority to upper limit server with support from RK.](#)
- RK: we also need a final reference catalog, a kind of INT Wikipedia; to be filled by community
- RK: we should agree on requirements to community
- JUN: we only talk about IBIS upper limits; RK: JEM-X has small FOV, but it is same energy band but lower sensitivity than other X-ray missions. JUN agrees that JEM-X upper limits are not critical, as they would likely be less deep compared to, e.g., eROSITA upper limits

7 Discussion on catalogues

7.1 IBIS

- Rome team & Tony Bird: IBIS catalogue from the beginning. GB willing to coordinate communications between all participants.
- MMH: what is the format for delivery, not only OMC but all? GB: the ESDC must write the ingestion software, and bilateral discussions will be needed to agree on formats.
- PU: after 22 years: no ISGRI/PICSIT catalog (it is a detector) but IBIS => two activities: 1) in Russia 2) Rome team coordinated, in the last 10 years financed by ASI working with Bologna & Southampton
- Rome is positive for ISLA with limited work power (from 17 to 2 STE); next major catalog planned: IBIS after revolution 1500 until real time & IBIS+BAT sources combined: IBIS very sensitive in Galactic plane (12'); Swift (20") sensitive for extragalactic sky => significant work! It was done 'by hand' each team ~1500 sources. MMH: must be completed, as final IBIS catalog is one of the most important legacy products
- LS: is it possible to only deliver most solid catalogue, only brightest sources? To reduce workload. PU: This was discussed; but not concluded! I will report this to survey team; yes, work will be much easier. AI was used with the old catalogue as training set (in Southampton) but key person (student) left science
- RK: happy and ready to collaborate.
- Who has resources to provide the platform on how to combine catalogs? ESA?
- RK: maybe drop the combined IBIS+BAT catalog? Give priority to the common work.



7.2 JEM-X

- JC presented work done in 2023 by student to build scripts that generate a catalogue of detected sources on single scw-basis and the plan is to continue working on including sources detected in mosaics on monthly basis.
- Work will be continued in coordination with GB in 2024 and post-ops.
- JC: Source catalogue exists (version Jan 2007; 2003-2007, sources 5-10 mCrab); also, mosaics are generated with weaker sources 1-2 mCrab. Now in collaboration with GB to continue with updates. Also new ISDC catalogue to be released soon is appreciated.
 - [Action 28.4 > JC to share with CF his locally updated version of the ISDC catalogue.](#)

7.3 SPI

- JG offers to provide the SPI GRB catalogue produced using the extensively tested public software. This should be done as quickly as possible because the PhD student has left astronomy, and JG is retiring very soon. Further to this, the software pySPI is soon to be published and could be used in MMODA.
 - [Action 28.5 > JG to inform CF when pySPI is ready for distribution](#)
 - [Action 28.6 > CF to include pySPI in MMODA before for the INT 2024 workshop](#)

7.4 OMC

- [Action 28.7 > GB to get in touch with MMH and OMC team to agree on next steps for ingestion of new catalogue of OMC detected sources](#)

8 Date and Place of next IUG meeting – TBD

9 Users Group satisfaction survey

IUG are encouraged to use the Feedback form on the ISOC web page at <https://www.cosmos.esa.int/web/integral/feedback>

10 AOB Wrap Up (All)

- [Action 28.8 > GB to encourage in-person participation on the conference website.](#)
- [Action 28.9 > JUN and MMH to look for a Spanish speaker to talk about sustainability and/or women in science/astronomy.](#)
- [Action 28.10 > All to send PU ideas about gadgets for conference.](#)
- [Action 28.11 > JUN to send the SMP to IUG members](#)