

MEETING

Meeting Date:	10/05/2023 11/05/2023	Ref.:	MoMUG#24
Meeting Place:	ESAC, A24, and Virtual Meeting via WebeX	Chairperson:	Anne Decourchelle
Minute's Date:	28/06/2023	Participants: UG members: Anne Decourchelle (Chair), Stefano Bianchi, Enrico Bozzo, Megan Donahue, Phil Charles (OTAC Chair), Jimmy Irwin, Stefano Ettori, Lidia Oskinova, Yael Nazé, Gabriel Pratt, Silvia Zane (remotely). In attendance: Norbert Schartel (Project Scientist), Peter Kretschmar (Mission Manager), María Santos-Lleó (Science Operations Manager), Markus Kirsch (Spacecraft Operations Manager) Invitees: Natalie Webb (SSC Project Director), Mat Page (OM acting PI, remotely), Mike Watson (SSC, remotely), S. Sembay (EPIC/MOS acting PI, remotely), F. Patat (ESO Head of Observing Programmes Office, remotely); Presenters and interested staff from the XMM-Newton Science Operations Centre. Absent: Jelle Kaastra (RGS acting PI), Frank Haberl (EPIC/PN acting PI)	
Subject:	Minutes of XMM-Newton Users' Group Meeting 24	Copy:	

Description	Action	Due Date
Edited by Ignacio de la Calle. Approved by UG members on		

Description

Agenda

1. Welcome (5m)	N. Schartel & A. Decourchelle
2. Adoption of the agenda (5m)	All
3. Overall mission status (15m)	P. Kretschmar
4. Report of the Project Scientist (30m)	N. Schartel
5. Report of the OTAC chairperson (10m)	P. Charles
6. User support and mission planning (20m)	R. Gonzalez
7. Calibration EPIC (40m)	M. Smith
8. Calibration RGS (20m)	R. Gonzalez
9. Calibration OM (20m)	S. Rosen
10. Status of Pipeline (20m)	P. Rodriguez
11. Status of SAS (10m)	A. Marston
12. Status of Archive (10m)	E. Jimenez
13. SSC status (20m)	N. Webb
14. Serendipitous 'real-time' transients: population and science case (15m)	N. Webb
15. Report on gender/age balance in XMM-Newton proposals (15m)	N. Schartel
16. Presentation on the double anonymous NASA evaluation (15m)	M. Donahue
17. Presentation on the double anonymous ESO evaluation (15m)	F. Patat
18. Input from the community (30m)	All
19. AOB	All
20. Dedicated Discussion	All

Welcome and Adoption of Agenda. N. Schartel & A. Decourchelle

1. Opening remarks and welcome.
2. A. Decourchelle first year as Chairman taking over from R. Wijnands.
3. S. Etori new UG member.
4. Additional presentation introduced by OTAC Chairperson, P. Charles.
5. Meeting to be recorded, only for writing the minutes, not to be made public. All agree.
6. G. Pratt on SAS talk will be discussed during the Input from the Community session. No further items, comments or modifications to the agenda from other members.
7. Agenda agreed.

Overall Mission Status. P. Kretschmar

1. Presentation
2. Questions or Comments
 - a. E. Bozzo: are there any concerns that fuel replenishment activities, in particular introducing large temperature gradients, could have an unexpected long-term effect in something else?
 - P. Kretschmar: many years of study went into this before any kind of operation was implemented, including validation and different checks.
 - b. L. Oskanova: about the auxiliary tanks, were they initially designed to transfer fuel into the main tank?
 - N.Schartel: the tanks were simply connected, tank operations to transfer low amounts of fuel from the auxiliary tanks into the main tank were only foreseen necessary near the end of extended mission (~10 yr).
 - c. S. Etori: what is ARES?
 - P. Kretschmar: ARES (Analysis and REporting System) is a parameter database system that is becoming the standard at ESOC for off-line analysis of operational data and generation of periodic and specific reports. Missions like EUCLID and BepiColombo are starting to use it here at ESAC. It is used to monitor instrument performance. Here at the SOC, we are in the process to modify the flow of the telemetry received from the MOC such that the instrument parameters that are routinely extracted to produce monitoring and performance reports are stored in a centralized and unique coherent way in the ARES system. Once all these monitoring data are stored in the system it becomes much easier to access them. It's a slow process but work is undergoing. Also, if this becomes the standard, more people will have the knowledge of how the system works and will not be dependent on very specific knowledge of different databases and tools.
 - d. E. Bozzo: Is there anything from the operational point of view in plan for the synergy between XRISM and possibly EINSTEIN probe?
 - P. Kretschmar: The XRISM SOC has taken some things from XMM-Newton. Otherwise, not very much is planned. With the current setup for XRISM, a bit different than what was done for HITOMI, ESA involvement is somewhat different. Things like comparing RGS and XRISM spectra, it is not clear it can be done in time within the available resources.

- E. Bozzo: and for the EINSTEIN probe the synergy will be important, so if it flies this year, is there anything planned to do? for example, a quick follow up of discovered sources. Is the SOC planning something from the operations point of view?
 - N. Schartel: joint calibration observations are planned. Joint scientific observations will have to be decided based on what comes in the proposals. One of the main points is to see how quick they can get identifications. With the enormous number of alerts expected, we need to see out of all that could come what is the percentage of interesting ones. Of those, we could follow if we have the possibility, two or three days later. This is feasible, and then on exceptional cases we can follow immediately.
 - E. Bozzo: So, there is no quick communication channel in place?
 - P. Kretschmar: several attempts have been made with the EINSTEIN probe team over these past years to set up a communication system, and although this is seen as a good idea by the team, nothing concrete is in place as of today. We will keep trying to do our best.
- e. A. Decourchelle: regarding the launch of EUCLID, and the fact that there will be joint spacecraft controllers for four missions, do you expect any impact for XMM-Newton?
- P. Kretschmar: it is not really expected.
 - A. Decourchelle: and financially, any impact expected?
 - P. Kretschmar: no impact as well. There is no cost increase expected in the future. Also, INTEGRAL will be coming out of the equation by keeping operations at a minimum.
 - A. Decourchelle: Do you expect any evolution in terms of budget for XMM-Newton?
 - P. Kretschmar: we expect the economic effort to remain constant.
 - N. Schartel: GAIA will also be out of the equation. After ~mid-2025 there is only XMM-Newton and EUCLID.
- f. A. Decourchelle: regarding the tank replenishment, has it been moved now to once every year?
- P. Kretschmar: After a review with Airbus after the first 2 replenishments, it was decided to do the exercise every year. At the beginning we hoped it would be enough every two years. This is an ongoing study with industry and is carefully monitored with MOC.

Report of the Project Scientist. N. Schartel

1. Presentation
2. Questions or Comments
 - a. S. Ettori: what is the connection between Letter of Intent for Multi-year Heritage Programmes and the actual number of proposals? From the past, is it a one-to-one ratio?
 - N. Schartel: No, there were less proposals.
 - b. Y. Naze: XMM-Newton keep a record of publications that make use of XMM-Newton data, are publications sorted by subject?
 - N. Schartel: No, the categories are done based on how the XMM-Newton data is being used.
 - c. N. Schartel comments about an agreement with JWST to have a joint program with XMM-Newton which should be available in the next AO.
 - d. E. Bozzo: about the request for suggestions on science workshop 2024 topic and chairperson, how do we send suggestions?
 - N. Schartel: send the suggestions to me via email. The selection of the topic is more complicated than the chairperson, and the chairperson should relate to the topic.

Report of the OTAC chairperson. P. Charles

1. Presentation
2. Questions or Comments
 - a. E. Bozzo: The fulfill program category is well explained. It's good if the panel members can uplift a proposal to A or B priority based on the scientific impact of the program. This is better than the solution where panel members suggest that the science is good but should be resubmitted in the next AO. This sounds like an arbitrary decision which delays for another year the execution of the program. If the science is good the program should automatically be uplifted and count towards A or B time.
 - P. Charles and S. Zane support this approach.
 - G. Pratt: This point was raised by me last year. The concern is that the TAC could say one year that the science is good and should be resubmitted as GO next year, then the program is submitted as a GO in the next year and the TAC now recommends resubmission next year as a fulfill, entering an endless loop. That was one of the concerns raised and that should be avoided. Maybe something should be added to the description of the fulfill program, although this is more some advice that should be given to the TAC or the chair of the TAC.
 - E. Bozzo: it should be the case that if the program is good, the program is accepted as fulfill, or it is uplifted to A or B, those should be the only possibilities (or reject of course).
 - S. Bianchi: although agrees, there might be a scenario where it could be useful to recommend that the program is resubmitted as a GO. As fulfill targets are done under C time, it could be that the TAC thinks that all observations should be observed in order to achieve the science goals, and not just some of them, that in this last case, the program has no value with just a few of the sources in the program being observed and should be resubmitted as GO.
 - S. Ettori: This could be solved by introducing the ability to uplift to A and B the program.
 - N. Schartel: sometimes there is no A and B time in the panel to uplift the fulfill program.
 - E. Bozzo: the main issue is to avoid going into an infinite loop of resubmissions.
 - S. Ettori: how about introducing a time restriction or limit to the fulfill program time to be uplifted. If the time is above a threshold, it cannot be uplifted. Also, in this case, the fulfill program won't compete against large programs.
 - N. Schartel: competing against large programs is not a problem as it is C time.
 - S. Ettori: but we are talking about moving them to A or B once they are uplifted.
 - L. Oskinova: if a 2-page justification program is so compelling that is uplifted and competes directly against a program that needed 5 pages of scientific justification and didn't get time, why not allow it?
 - N. Schartel: an issue could be that the panel finds the science good and thinks there is more potential than just a fulfill, however, it could be that they don't find these two pages of justification sufficient to compare it with others.
 - All: this is a TAC decision and is difficult for it to happen, but if it does, it would be because the science is so compelling than even with two pages they manage to compete against a large program. As long as the judgment of the TAC is based on science.
 - L. Oskinova: as a last general remark, maybe it should be mentioned that in the recommendations to proposers it should not say to submit the proposal next year as a GO or large program.
 - N. Schartel: it is agreed that it should not be suggested to use this approach. There is a similar issue with the recommendation to use Chandra time, and their panels coming back to us saying that it is best to use XMM time. This issue is more difficult to tackle. Recommendations should only be made based on the suitability of using the requested instrument, never to redirect to the other instruments.

The detailed discussion and actions to take are left for the closed session.

- b. T. Marston: raises the issue of data protection, which might affect the OTAC. Has the issue been raised to the OTAC?
 - N. Schartel: this still has to be addressed. But it is being addressed already by other missions and we can learn from them.
 - P. Kretschmar: we are trying to get one scheme cross mission.

User Support and Mission Planning. R. Gonzalez

3. Presentation

4. Questions or Comments

- a. G. Pratt: about JWST Cycle 2, can you ask for JWST time in XMM proposals?
 - R. Gonzalez: it's the other way around, JWST Cycle 2 has already received two proposals asking for XMM time.
 - L. Oskinova: how do numbers compare between Technical Evaluation and Enhancement?
 - R. Gonzalez: we do the technical evaluation of other observatories proposals asking for XMM time. This is to support their respective OTACs. Of those proposals approved by the OTACs, we do the Enhancement.
 - E. Bozzo: do we know how many proposals are rejected based on the Technical Evaluation provided by XMM?
 - R. Gonzalez: No, these are decisions taken by the TACs. We do not have access to this information. This also works both ways, we send to other observatories XMM proposals asking for their time so that they provide XMM TACs the Technical Evaluation according to their observatories.
 - M. Donahue: How many Technical Evaluations come up with results that invalidate the program?
 - R. Gonzalez: not many. Major problems are mainly due to visibility and duplications.
- b. G. Pratt: For LIGO-Virgo-KAGRA alerts, is it assumed only a single pointing? Can we increase the probability of catching GW events by scanning an area until the probability of catching it is above a given threshold?
 - R. Gonzalez: Yes, only one pointing per event, the plan is that XMM just points to the point of maximum probability. Most of the events cover a very large area in the sky of several degrees across, so doing a raster is not feasible. This hasn't been considered.
 - N. Schartel: the sources are also extremely weak, for example, for the only GW with EM counterpart so far, Chandra didn't detect the counterpart in the first observation of this event. The summary is that XMM has to consider the probability of detecting one of these events within the EPIC FOV.
 - R. Gonzalez: we have a minimum requirement of 30% chance for the event being within the EPIC FOV of an observation centered on the maximum probability location and a maximum visibility in the current revolution greater than 5 ks. If these conditions are fulfilled, the plan is to do a re-planning of the revolution and we are considering this replanning to be automatic at the SOC side.
 - A short discussion follows.
- c. L. Oskinova: regarding XIPS, the telephone numbers should not be mandatory. Can you just keep the phone only for PIs and remove it for Cols?
 - N. Schartel: this can be dropped. It will be requested for next year.
- d. L. Oskinova: regarding ToOs and distribution per day, it actually reflects sky variability.
 - R. Gonzalez: no correlation is found between the number of ToOs per day and external events
 - N. Schartel: What this table shows is what is of interest for XMM.
 - A short discussion follows.
- e. A. Decourchelle: regarding the number of ToOs and fuel consumption, is this a problem?
 - R. Gonzalez: There are no problems with that. There are no limitations.

Calibration EPIC. M. Smith

1. Presentation
2. Questions or Comments
 - a. S. Etori: about the PSF, are you referring to the model by late 2011?
 - M. Smith: it is the current model, the one called ellbeta model which is the one from 2013.
 - b. L. Oskinova: as a user, what is the recommendation for fitting in XSPEC PN and MOS for soft energies? Is it recommended to fit them simultaneously with the same parameters?
 - M. Smith: I would say no, there are systematic differences between the instruments, but it would depend on the case. In some cases, it might make sense to do it.
 - E. Bozzo: in general, I would say it makes sense to fit them together as you might realize some artifacts are just instrumental as they appear in one instrument and not the other. It's good to check. If a feature appears in all instruments is likely physical. Having 3 instruments is an advantage.
 - c. G. Pratt: regarding the PSF, is this the PSF at high energies?
 - M. Smith: the effects on the PSF are mainly at high energies.
 - d. G. Pratt: regarding the proton response matrix, how does that work in practice?
 - M. Smith: one models the background for the different background components, which need to be folded through their respective responses. These responses are for the Quiescent particle Background.
 - e. Y. Naze: regarding the specific task new in SASv21 (evenenergyshift) for correcting gain and adjust energy scale, is this applied automatically?
 - M. Smith: no, this is for specific cases for the user to decide and apply.
 - N. Schartel: This is only for Timing and Burst modes, for which there are exceptions of bad observations where the user might want to apply this correction.
 - f. Y. Naze: in the studies of NuSTAR vs XMM calibration, are there any updates?
 - M. Smith: there are no changes with respect to last year since there has not been any calibration changes since last year. There has been some work in describing how Chandra fits inside the picture, but nothing has been introduced since last year.
 - g. A. Decourchelle: hasn't something been done to help the cross calibration with NuSTAR?
 - M. Smith: this was already available last year (empirical correction applied to EPIC-pn to bring it in line with NuSTAR). The problem with these empirical corrections is one never knows who is correct. There are of course some justifications to choose one vs the other.
 - h. M. Donahue: there are corrections of the energy scale, but are these corrections simple offsets? You introduce the corrections at two energies, at Cu Kalpha and other at Mn Kalpha, do they agree?
 - M. Smith: there is some interpolation between the two, at Mn there is an offset, at Cu there is an offset and what happens in between is an interpolation. There is an option in the SAS task (epspatialcti) to use one or the two energies.
 - i. E. Bozzo: Is epspatialcti applied automatically?
 - M. Smith: No, the user has to do it explicitly; it is not automatically applied.

- j. E. Bozzo: regarding the cross-calibration between PN and MOS, two plots shown of the ratio of MOS1 and MOS2 to PN show a 20% discrepancy between the instruments, is this correct?
 - M. Smith: this is correct, at around 10keV this is the order of the discrepancy. There is an empirical correction that has been released to flatten the energy range between 2-10 keV. The correction flattens the MOS to the PN.

Calibration RGS. R. Gonzalez

1. Presentation
2. Questions or Comments
 - a. E. Bozzo: about the wavelength scale, what are the units in the X-axis?
 - R. Gonzalez: units are mA, the distributions are for RGS1 and RGS2, orders 1 and 2. The widths of the distributions are around 5 mA. There are two distributions in each plot, shaded blue and red lines. Red lines correspond to emission lines in faint stars just for comparison. In faint stars, there are less lines and some uncertainties in some corrections, like the proper motion of the stars the scatter is slightly larger, and the widths of the distributions are around 7-8 mA. But the main point to show in these plots is that for the brightest sources, with well-defined emission lines, the scatter is lower, and the widths of the distributions are around 5 mA.
 - b. A. Decourchelle: regarding the background subtraction recommendation from the UG 2020, has anything been done, is this still open?
 - R. Gonzalez: this work involves a mixture of SAS development and calibration, and although work has been started, nothing has been done in the past year. Some work has been done on the derivation of a smooth background according to an algorithm developed and provided by J. Kaastra, but nothing else has been done in the past year.

Calibration OM. S. Rosen

1. Presentation
2. Questions or Comments
 - a. A. Decourchelle: Regarding the time-dependent spatial degradation, could this effect explain what is seen in the V filter in terms of time-dependent sensitivity degradation?
 - S. Rosen: in terms of why the V and W2 filters are the ones that show the highest deviations from the expectations after 2010, we don't know, we don't understand why this is. But in terms of why is happening, you might have more rapid degradation at the boresight, which explains why the standard stars drop rapidly at the beginning, and then because of this spatial evolution, it's the field stars from the catalogue that might be more affected, which will explain why they drop below the standards. This needs to be verified.
 - b. M. Donahue: Is the same illumination used for all the filters?
 - S. Rosen: yes, the blocked filter is used, and the illumination is reflected off the back of the blocked filter. This approach is used for all the filters, but the flat field is on the green side, and we are trying to find out what the spectral profile is for the LED lamp.
 - P. Charles: what is known about the long-term properties of these LED lamps? Has anyone looked at this on the time scales representative for XMM?
 - S. Rosen: it is not clear what the characteristics of these LED lamps are. This is very old information.
 - c. N. Webb: why do you use a matching radius of 1 arcsec, why not using the actual errors of the detections?
 - S. Rosen: we should do, this was just to get the analysis of the photometry for those cases where there was a reasonable very close match, it was not designed to pick up the set of matches that we think are valid matches.

- d. N. Webb: why is the OM catalogue called SUSS6 and is not just an incremental version of SUSS5?
 - S. Rosen: the OM catalogue historically had its own numbering, which is different than the approach used for the EPIC catalogues, so we are following its own approach. But SUSS6 is essentially an incremental catalogue.
 - A. Decourchelle: when will there be another bulk reprocessing?
 - S. Rosen: the aim is 2024. We have the advantage of having access to the products of the pipeline, so it's all there. In the past the two processes were independent. So, this is an advantage now in terms of time, plus it does not take that long to put the catalogue together. Once we have the bulk reprocessing, it won't take much time to put SUSS7 together.
 - M. Page: to clarify, SUSS6 is not an incremental release in the sense of just adding sources to SUSS5, is going to use sources from the pipeline.
 - S. Rosen: This is correct, it is using the source list from the pipeline, so it is not just adding new detections, it does more things, and from that point of view it is not strictly an incremental catalogue, this is correct.

Status of Pipeline. P. Rodriguez

1. Presentation
2. Questions or Comments
 - a. P. Charles: do we understand what happened with the crash of the pipeline? Has it been understood and is it now protected against it in the future?
 - P. Kretschmar: it was a human error and safeguards have been put in place. It was expected that the restore would be fast, and it wasn't.
 - A. Marston: the backup system was revised, and safety measures put in place (some discussion follows on possible safety measurements).
 - A. Decourchelle: did this crash have any impact on science? Did it affect an observation that needed a quick analysis?
 - P. Rodriguez: This only affects the production of the PPS, the ODFs were always available unaffected.
 - b. A. Decourchelle: for the remote system for screening, how many people access it? Does this represent a problem in terms of single point of access or dependence on the network? Any plans to have a mirror site?
 - P. Rodriguez: we have 4 screeners now, 3 of them at the SOC. The access is not an issue although it is true that is a single point of failure. On the other hand, the maintenance is easier, and the consistence of the software used by the different screeners is easier to guarantee. The access is not a problem in terms of data or images transferred over the net. We don't plan to have mirror sites for now as the usage of the screener system is not too heavy.

Status of SAS. A. Marston

1. Presentation
2. Questions or Comments
 - a. M. Donahue: Chandra is also moving to Python. One issue is that Python is more *flaky* in terms of its sensitivity to versions. Establishing the exact Python environment takes a lot of work and it's hard.
 - A. Marston: we need to control the environment so that it does not interfere with SAS. Most of what we are doing in SAS with Python are wrappers, the essence of the code, the algorithms and so on, is not changing. The one place where Python is being introduced, is in the plotting packages. No major changes are introduced for example in areas like memory management to try and increase the processing speed (some discussion follows on Python and its usages, advantages and disadvantages).

- R. Saxton: Python has been introduced in SAS but not to replace any C++ code. The only real Python code is in the plotting area (we use now matplotlib instead of pgplot).
- b. G. Pratt: is ESAS less monolithic now that it is fully integrated in SAS? Has everything been done for ESAS?
 - R. Saxton: A lot of work has been put by the GOF into ESAS. ESAS is more modular now; tasks can be called separately. The SOC has the source code, and if necessary, the SOC can change it although it is not expected as the GOF will keep supporting it. SAS 21 represented a major change in the ESAS infrastructure, not the functionality itself, but the structure of it.
- c. S. Ettori: Why is the SAS code not public? Is it just because of the use of numerical recipes?
 - T. Marston: yes, it is the main dependency, but there are others.
 - S. Ettori: How do we get rid of numerical recipes?
 - T. Marston: The solution is to replace it by public code, but in some cases, the same results are not achieved by the current SAS and the public code. This has to be carefully checked.
 - P. Kretschmar: work has been done by the ESA PA/QA department to try and assess all the pitfalls that the code could have in terms of licensing. It is a huge effort. Removing dependencies is not just a matter of renaming things, it must be a complete restructure of the code. It is also a matter of how much work this will take, which is very difficult to estimate.
 - T. Marston: We cannot assure that by the end of 2023 there will be a release of the full code. The report ESA made does not go outside numerical recipes. But several libraries need to be checked.
 - A. Decourchelle: are there alternatives to Python?
 - A. Donahue: it is not so much a matter of alternatives, but the support required. Setting up Python and the libraries can be complex. Having a functional environment requires knowledge that most people might not have. People will have to have a step-by-step on how to do this.
 - T. Marston: this is one of the motivations behind ESA Datalabs. Within Datalabs you can set up the right environment. The user does not have to worry about this or setting up the right calibration files. For example, all the CCFs are in a machine already connected to Datalabs. No need to go and download or find them. The SOC oversees the setup, the user only takes care of the analysis.
 - A. Decourchelle: So, what are the limitations on the use of Datalabs?
 - T. Marston: there are conversations on the minimum memory or cpu requirements of each environment, per user. At the moment, the backend is not big enough to cope with many users connecting at the same time.
 - P. Kretschmar: ESA is in the process of getting a realistic Datalabs setup. They need to get a realistic number of users to accommodate resources.

Status of Archive. E. Jimenez

1. Presentation
2. Questions or Comments
 - a. A. Decourchelle: Does the UG need to provide priorities on the future tasks shown?
 - E. Jimenez: Not so much. Next year will be very busy with the bulk reprocessing and ingestion of the catalogues.
 - P. Kretschmar: A new web page framework is also going to be implemented. We can collect ideas for 2024 but we are already committed to some big changes.
 - A. Decourchelle: This Angular migration, will it take a long time?
 - E. Jimenez and P. Kretschmar - Its planned for the end of the year 2023, but it is not likely to happen. It will be started, but it is unlikely that there will be a fully working version of the frontend by the end of 2023. The same work is being done for all archives, so XMM-Newton will benefit from this work.
 - b. E. Bozzo: would it be possible to implement some easy way to get flux upper limits (UL) in places with GW? For example, an image of a past observation where you could click and get an UL?

- R. Saxton: there is a tool to do this. It does not operate with images, but you can provide coordinates and it will give you UL, also, it considers the stacked catalogue (stack images to go deeper).
- E. Jimenez: XSA gives you this from the interface, but not UL on stacked images.

SSC Status. N. Webb

1. Presentation
2. Questions or Comments

- a. E. Bozzo: According to this, accuracy depends on the position of the field of view, with the introduction of the correction for these shifts, does accuracy improve by one arcsecond or to within arcsecond?
 - N. Webb: accuracy is improved by one arcsecond.
 - G. Pratt: what is the source of the astronomy errors in the field of MOS?
 - N. Webb: it is not well understood. There is not a clear idea behind.
 - N. Schartel: Could it be due to the introduction of the 2-dimensional PSF?
 - N. Webb: It is not likely the source of the problem. It could be down to a misalignment of the CCDs, but this needs to be understood. This effect is not seen in pn. A report is on its way which will highlight possible causes.
- b. L. Oskinova: Regarding spectral fitting for the catalogue, are spectral fits only done to pn?
 - N. Webb: No, the fits are done to pn and MOS together.
 - N. Schartel: what if the spectrum of a source is different from one observation to another observation?
 - N. Webb: There is an intelligent selection which can be justified on the spectra that is used. We also check that adding another spectrum improves the signal to noise. If it does not improve things, the spectrum is taken out and not combined, which would be the case of a source that changes state.
- c. L. Oskinova: About searching for transients, do you also look for periodicity?
 - N. Webb: this does not look for periodicity, but we have something else running for which we might have results next year.
- d. N. Schartel: Can you put a number on social media followers?
 - N. Webb: it's on the hundreds. However, some articles on twitter are seen by thousands, but they don't follow.
- e. P. Charles: for those new sources that are found that are variable, wouldn't it be possible to run something automatically like a periodogram with basic settings? That would be an obvious next step to work out the nature of the variability.
 - N. Webb: An FFT is run on each detection in the framework of the pipeline. But for the long-term variability, this is over the past 30 years or so. One does not necessarily have good sampling, some of these might have only two points (two observations), others can have hundreds. Others are a combination of upper limits and detections. There are other ways of identifying this and it will be talked about tomorrow.
- f. S. Etori: did you try to characterize extended sources?
 - N. Webb: No. We focused on point-like sources.
- g. S. Etori: do you have usage statistics of the catalogue?
 - N. Webb: if one takes the two servers, IRAP and Strasbourg, it is between 10k and 12k access per year. This is without counting XSA (ESA) or other access places, like NASA or Vizier, but I don't have the figures from these other places.
- h. J. Irwin: about transients, are you tracking sources that are short- and long-term variable?

- N. Webb: so, the short term with more than 100 epic counts are already identified within the catalogue today. We then identified those that are short term and long term but have not pursued this further. But we do have the list of those that show short- and long-term variability.

Serendipitous 'real-time' transients: population and science case. N. Webb

1. Presentation
2. Questions or Comments
 - a. Scientific results are presented. As a result of the presentation, a discussion follows on the practicality to implement an alert system to follow up identified transients. The code is already in place at Strasbourg. Typical timescales of the alerts would be of the order of 3 weeks and alerts would be provided through dedicated web page, ATEL, ... Issues regarding the proprietary rights of the observation and what information could be provided on the identified sources, or if one would need to ask agreement from the PI and so on, are discussed. The target of the observation would never be checked and reported, this only applies to serendipitously detected field sources.
 - b. The feasibility and issues of using a strategy like this to find counterparts for GW is discussed. There are both scientific and technical issues which would need to be investigated further before committing to a program like this.

Report on gender/age balance in XMM-Newton proposals. N. Schartel

1. Presentation
2. Questions or Comments
 - a. Most of the materials, results and conclusions presented come from an ESA publication in preparation led by Arvind Parmar; *ESA Science Programme Missions: Contributions and Exploitation*, which also addresses the gender issue. There is a specific section in this report about XMM-Newton Observing Time Proposals. This report will be published as a book and will be of public access.
 - b. The *XMM-Newton Observing Time Proposals* section addresses the gender issue from many points of view; OTAC panel gender composition, fraction of female PI per AO since AO2, comparison of proposal submission and acceptance male vs female (divided by country), fraction and time of accepted proposals male vs female according to priority A, B, C, ...
 - c. Some plots compare male vs female XMM-Newton PIs in terms of years since PhD. Also, the acceptance fraction of all XMM-Newton PIs vs the year of the PhD is presented. This is presented for male and females and compared.
 - d. Total numbers for Observing Time Proposals. Parameters like proposals submitted, number of accepted proposals, percentage of accepted proposals, time requested, time accepted and so on are given and compared in terms of male vs female and split into A, B and C category proposals.
 - e. A discussion follows on personal experiences with OTAC panel participation. The effectiveness of the double anonymous approach for proposals is also discussed under different scenarios, like how is this implemented or enforced in different missions.
 - f. A short discussion follows.

Presentation on the double anonymous NASA evaluation. M. Donahue

1. Presentation
2. Questions or Comments
 - a. Proposals are prepared so they can be reviewed without seeing the name and institution of the proposer. Other 'rules' are included, like not using reference numbers, to use no-self-identifying language, do not try to speculate who the identity of the proposer is,
 - b. Doing dual anonymous, involves extra work. The work is done towards focusing the panel discussion on the science. Things like the publication history and experience of the proposers is not discussed in the main assessment.
 - c. Chandra reports there was extra work in managing proposal discussions, including needing an extra person in the room to adjudicate conversations that go off topic and answer concerns about proposal language that might reveal the proposer.
 - d. HST outcome in terms of gender success rates over the last few cycles are discussed. The gap between gender success rates lowered but it is not eliminated when comparing cycles 27, 28 and 29 versus previous cycles. Results also show significant improvement for the first-time proposers with the implementation of dual anonymous reviews (from about 5% to 30%). Also, women with PhD before 2000 had a lower success rate than men before, same or worse success rates after. The fraction of successful proposals led by more senior male and female PIs has decreased with the move to dual anonymous.
 - e. For Chandra, proposal success rates outcomes are discussed in terms of male vs female as a function of cycle. Dual anonymous was introduced in cycle 23.
 - f. Conclusions: dual anonymous reviews at NASA, Chandra, HST/JWST are well received by the reviewers. It requires some extra work. Results show a benefit for first time proposers, and improve the credit earned by successful early-career scientists for their real intellectual contributions to the proposal. The effect on gender-balanced or intersectional issues (age or gender) are not so clear. Dual anonymous is a tool but won't solve all issues.
 - g. A short discussion follows.

Presentation on the double anonymous ESO evaluation. F. Patat

1. Presentation
2. Questions or Comments
 - a. Proposal submission takes place twice a year. There are around 900 proposals per semester. There are 13 panels (6 members each).
 - b. Dual anonymization was considered at ESO as a result of a time Allocation Working Group recommendation in 2016.
 - c. A study carried out (Patat 2016) before double anonymous was introduced, already highlights a strong dominating component related to professional seniority of the applicants. From 2016 onwards, a number of actions have been introduced to implement double anonymous and certain personal information is asked to the PIs. So, it is now easier to conduct a study similar to Patat 2016. The mechanism was introduced step by step.
 - d. At ESO, instructions were provided to reviewers and applicants from P106 (3 years ago). The first call was introduced as a dry run to gather information on effectiveness of the implementation. From P107, it was deployed. From an interface, it is possible for reviewers to flag violations of the double anonymous

guidelines. These violations are collected and evaluated by ESO and marked as mayor, minor or no-issue. This introduces more workload in the team. Major violations lead to disqualification. The proposal is still discussed in the panel and scientific feedback given to the PI, but it will be disqualified. At the end of the process, a recommendation is made to the DG. Some numbers are given and discussed as example for P111.

- e. The office provides support and help on how to make the proposal anonymous, which again introduces more workload. No concerns were expressed by the users. The panels were supported in their work both online and offline. The Scientific Assistants were instructed to check the discussions. No case of team identity discussions was reported. The majority of the user community were glad about the changes. The reviewers were happy with the changes as their work is simplified and lots of noise is removed from the panel scientific discussions.
- f. The analysis of the changes of systematics as a result of introducing double anonymous is in progress. The results are expected to be similar of those of HST.
- g. A short discussion follows.

Input from the Community. All

1. G. Pratt: presentation on CHEX-MATE.
 - a. CHEX-MATE is one of the first two MYH programs, 3 Ms observations, 118 sources. CHEX-MATE dataset is fully reduced with SASv16 without major problems and is now moving to SASv20. Some issues have been identified in the use of ESAS when moving from SASv16 to SASv20. The analysis pipeline developed by the team calls directly ESAS commands, so it is not easy to update if the syntax changes, as it has happened in SASv21.
 - b. One issue identified is that the pn count rate in the 10-14 keV band changes by 14% from SASv16 to SASv20 with the same selection and data. Deeper investigations concluded that in pn-filter, there is a difference in the events filtering criteria between both SAS versions (SASv16 uses ((FLAG & 0x766a0f63)==0) and SASv20 uses (#XMMEA_EP)). There is no indication of this in the SASv20 documentation. The effect is visible in the images, some bright pixels are not excluded in SASv20.
 - c. Another issue, anomalous MOS CDDs are excluded in SAS depending on weather they are considered noisy or not based on some HR threshold value. The thresholds have changed from one SAS version to the other. It is not documented either.
 - d. In SASv20 there seems to be a problem with backscale. For small regions (radial width < 30 arcsec) in the center of the detector, SASv20 backscale values are discretized and, in some cases, appear to be larger than the geometric area. The origin of the problem is not identified yet.
 - e. These issues have an impact in the scientific results, especially in background dominated sources. They are time consuming to identify and fix. It would be good to keep the old ESA names and make ESAS backward compatible in terms of parameters, structure and file naming.
 - f. Recommendation:
 - i. Provide a rapid patch to SASv20 to apply the same FLAG selection as in previous versions (pn-filter).
 - ii. Provide full documentation to ESAS tool and change log with ALL changes from version to version, including default filtering values.
 - iii. Try to keep any new version of ESAS tools backward-compatible, using the standard ESAS names as default.

- g. R. Saxton: The ESAS code is developed by NASA/Goddard Space Flight Center. A lot of testing and validation was also done at SOC. Further significant changes are planned for the next SAS version. These changes may be quite useful for you.
 - A short discussion follows.
- 2. S. Bianchi: From simultaneous XMM-Newton and NuSTAR observations, it appears that the PN SW iron line is shifted by around 20 eV. This is seen in three very bright AGN observations. In NuSTAR this also happens, the line is shifted by more than 20 eV, and will be reported there. But is the SOC aware of this happening with the current SAS and calibrations?

M. Smith: This looks like an energy scale problem. The energy scale evolves with time, so the observations must be aligned with the corresponding calibration for the epoch. Regardless of this, we can investigate these problems in detail, considering the calibration files and settings used. The recommendation is to send the files through the helpdesk.
- 3. S. Etori pointed out the recent analysis presented in Nevalainen & Molendi (2023, A&A 676, A142) on the cross-calibration of the EPIC instruments (with some differences with respect to the available “corrarea” tool (discussed in Sect.8, XMM-CAL-SRN-0321/<https://xmmweb.esac.esa.int/docs/documents/CAL-SRN-0321-1-2.pdf>). The work has been noted but no action in this direction is under consideration.

No further input from the community.

AOB and Dedicated Discussion. All

- 1. No further comments.
 - 2. Meeting closed for today.
-

The UG's executive session started on May 11th, 2023 at 11H30. This was a hybrid meeting with most attendees being present at ESAC, and with several online participants (using Webex). Present were: Anne Decourchelle (Chair), Stefano Bianchi, Enrico Bozzo, Megan Donahue, Stefano Ettori, Yaël Nazé, Jimmy Irwin (online), Lidia Oskinova (online), Gabriel Pratt, Phil Charles (OTAC Chair, online), Peter Kretschmar (Mission Manager), María Santos-Lleó (Science Operations Manager), and Norbert Schartel (Project Scientist), Silvia Zane (excused).

In the UG's executive session, the UG reviewed the status of recommendations, and action items formulated at previous meetings and formulated new ones.

Action times and recommendations

Action times and recommendations from previous meetings

Action 2022-05-17/19: The members of the XMM-Users' Group are requested to send suggestions for venues and chairpersons for the Science Organizing Committee for the XMM-Newton-organized 'The X-ray Universe 2023' conference in 2023.

Status: Closed

Action 2022-05-17/20: The UG chairperson (Rudy Wijnands) will ask the SSC Project Director (Natalie Webb) to make an assessment of the rate of those transient types that would warrant 'real-time' alerts and to present a brief summary of the outcome during next year's UG meeting.

Status: Closed

Action 2022-05-17/21:

The OTAC chairperson (Phil Charles) will discuss with the OTAC panel chairpersons their experiences with the fulfil program and will report the outcome of this discussion to the UG during next year's meeting.

Status: Closed

On calibration priorities for EPIC

Recommendation 2020-06-08/09: The UG recommends to continue the investigations into the pn empirical RMF modelling (e.g., expand to energies >1.7 keV, include other modes, epochs, and spatial regions) and incorporate the outcome into SAS.

Status: Open (ongoing)

Recommendation 2020-06-08/10: The UG recommends to implement the spatial and temporal refinement of the pn energy scale as presented in Sanders et al. (2020, A&A 633, 42) as a calibration product.

Status: Closed

Recommendation 2020-06-08/11: The UG recommends to continue the investigations into the off-axis flux calibration of the EPIC cameras.

Status: Open (ongoing)

Recommendation 2021-06-10/09: The UG recommends to finalize the analysis of the possibility of a column by column rate-dependent PHA correction of pn in Burst and Timing modes and publish the conclusions.

Status: Closed

Recommendation 2021-06-10/10: The UG recommends to continue to improve the MOS redistribution and determine the impact any improvement has on the MOS-to-PN cross calibration at low energies.

Status: Closed, calibration up to date

Recommendation 2022-05-17/03: The UG strongly recommends to continue the efforts to further improve the cross-calibration of the XMM-Newton instruments and the cross-calibration between the XMM-Newton EPIC detectors with the NUSTAR ones (i.e., to resolve discrepancies between the normalizations) and that the final outcomes are incorporated into SAS. The UG also recommends to investigate options to improve the soft energy calibrations (below the NUSTAR lower energy boundary).

Status: Closed, rewritten 2023-05-11/01, 2023-05-11/02

Recommendation 2022-05-17/04: The UG strongly supports and recommends the production of an analysis guide for observation specific rate-dependent PHA correction (for the PN Burst & Timing modes).

Status: Closed

Recommendation 2022-05-17/05: The UG strongly recommends to further streamline the process of CTI correction and to fully implement the energy scale calibration at Cu K α with that at Al K α and Mn K α .

Status: Open (ongoing)

Recommendation 2022-05-17/06: The UG recommends to verify the pattern fractions determined from in-orbit data with the expected pattern fractions.

Status: Open (ongoing)

Recommendation 2022-05-17/07: The UG recommends the creation of proton response matrices and to make them available through SAS.

Status: Open (ongoing, depending on Fioretti et al. inputs)

On calibration priorities for RGS

Recommendation 2020-06-08/12: The UG recommends to continue the evaluation of new methods for background subtraction for the RGS detectors.

Status: Open

On the OM

Recommendation 2021-06-10/13: For consistency, the UG recommends that future OM catalogues are based on results obtained using the general pipeline instead of internal software.

Status: Close

Endorsement 2022-05-17/09: The UG strongly appreciate the efforts of the SOC OM calibration and MSSL teams to prepare the XMM-OM SUSS6 catalogue and is looking forward to its release in late 2022 or early 2023.

Status: Open

Recommendation 2022-05-17/10: The UG recommends that the determined update for the OM time-dependent sensitivity degradation (for the filters) is applied prior to the SUSS6 catalogue generation and release.

Status: Revised, Recommendations 2023-05-11/04, 2023-05-11/05, 2023-05-11/06

On User support

Recommendation 2021-06-10/07:

The UG recommends that the XSA enables queries that make use of the multi-wavelength information included in the catalogue.

Status: Open

On SAS development

Recommendation 2021-06-10/14: The UG considers it to be very important that ESAS is fully integrated (if indeed possible) and therefore strongly recommends to complete this process as soon as possible.

Status: Closed

Recommendation 2021-06-10/15: The UG considers it to be important that the SAS source code is made public (and that any remaining copyright issues are resolved) and that the distribution and installation of SAS is made easier and in modern ways. Therefore, the UG strongly recommends to complete these processes as soon as possible.

Status: Open (ongoing activities)

Recommendation 2021-06-10/16: The UG recommends to complete the transformation of the code to Python and eliminate all problematic dependencies (i.e., PGPLOT/Grace, Perl, HEASARC dependencies).

Status: Open (closed for python, open for Pgplot..)

On Pipeline Processing System

Recommendation 2021-06-10/18: The UG recommends to continue to implement the option for FWC scaling according to the relation between background rate and the NDSLIN in pn.

Status: Open

Recommendation 2021-06-10/19: The UG recommends that the new features planned for the next release of the pipeline are indeed included at that time. In particular, the following products and options:

- 1) Apply results from the EPIC Filter Wheel Closed data analysis to background estimate for image creation and products for spectral analysis
- 2) Astrometric rectification of EPIC images and events after cross-correlation of detected sources with external catalogues
- 3) Alignment of pipeline processing of OM data with current “ad-hoc” processing for catalogue production

Status: Open

Recommendation 2022-05-17/11: The UG strongly appreciates the continuing efforts to improve the pipeline and the proactiveness of the team to investigate new analysis techniques (such as AI, machine learning, novel analysis techniques for super resolution). The UG strongly recommends that, when possible, such new techniques are implemented in the pipeline and to keep an eye out for any additional new techniques that might become available.

Status: Open

Recommendation 2022-05-17/12: The UG strongly appreciate the efforts already initiated to ensure the retention of knowledge and expertise related to the pipeline and recommends to continue these efforts.

Status: open

Recommendation 2022-05-17/13: The UG recommends that the option to generate redistribution matrices for individual spectra is included in the pipeline.

Status: Open (already coded but not yet activated)

On Survey Science Centre

Recommendation 2022-05-17/15: The UG strongly appreciate the efforts made by the SSC for the 5XMM catalogue and the planned and proposed additions (e.g., adding multiwavelength information from the OM and other catalogues). The UG recommends that the viabilities of the proposed inclusions are investigated and, if possible, that they are implemented.

Status: Open

On peer review process

Recommendation 2022-05-17/17: The UG strongly realizes the importance and possible effects of conscious and unconscious biases during the peer review process. The UG strongly recommends to further investigate (if possible) to what degree these biases negatively affect the XMM-Newton review process and in what way. For the upcoming proposal cycle, the UG recommends not to change the review process to become double anonymous and strongly recommends that the OTAC panel members are instructed and informed about potential biases during the review process.

Status: closed

NEW RECOMMENDATIONS AND ACTION ITEMS

The UG formulated the following new recommendations, endorsements, and action items:

On Calibration Priorities:

Recommendation 2023-05-11/01: The UG acknowledges the ongoing efforts to improve the cross-calibration of XMM-Newton instruments and reduce the discrepancies between MOS and pn in the soft-energy band and at higher energies. The UG recommends continuing the investigation of the possible causes of the differences and monitoring the temporal evolution of factors already identified (contamination, rmf, ...) to regularly update their impacts.

Recommendation 2023-05-11/02:

The UG recommends continuing efforts to improve cross-calibration between XMM-Newton's EPIC detectors and those of NUSTAR. It recommends monitoring the evolution of the flux and shape of the PN and MOS spectra relative to NUSTAR, using regular simultaneous observations to update, when appropriate, the empirical correction of the EPIC spectral shape (Fürst 2022, CAL-TN-0230-1-3.pdf).

Recommendation 2023-05-11/03: The UG recommends to update the RGS rectification factors with respect to EPIC-pn, to be consistent with the PN calibration for observations after February 2019.

On the OM

Recommendation 2023-05-11/04: The UG recommends the production for late 2023 of the XMM-OM SUSS6 catalogue with the current calibration.

Recommendation 2023-05-11/05: The UG recommends further analysis on the time-dependent sensitivity based on standard stars to assess the validity of using them to track time-dependent sensitivity degradation, investigating spatial effects in flat-field analyses and providing a complete assessment of spatial sensitivity variations.

Recommendation 2023-05-11/06: The UG recommends that the next version of the catalogue, SUSS7, expected in 2025, integrates with a bulk reprocessing of the data, the appropriate correction of the time-dependent sensitivity degradation, in line with the archive.

On User support

Recommendation 2023-05-11/07: The UG recommends to update the XMM-Newton Hierarchical Progressive Surveys (HiPS) in ESASky, which is lacking a few years of observation, and to maintain afterwards regular update visible in ESASky in a timely manner.

On SAS developments

Endorsement 2023-05-11/08: The UG acknowledges the steps made in the SAS developments with the full integration of the extended X-ray emission analysis (ESAS) and the introduction of python to run SAS routines and notebooks. The UG supports continuing the huge efforts to

eliminate all problematic dependencies of the SAS, aiming at providing a public SAS code and an easier SAS installation.

Recommendation 2023-05-11/09: The UG recommends to keep documenting precisely the changes between SAS versions (and ESAS tool), with a change log keeping all changes from version to version, including default filtering values. It recommends trying to maintain new versions of ESAS tool backward-compatible, using the standard ESAS names by default. This is particularly important for the analysis of extended sources in long-term programs such as mega-year heritage programs.

Recommendation 2023-05-11/10: The UG recommends that adequate user support be made available to facilitate and optimize the use of new SAS developments, particularly for python, with dedicated documents or tutorials.

On Pipeline Processing System

Recommendation 2023-05-11/11: The UG recognizes the scientific potential of the systematic search for new serendipitous point sources in XMM-Newton observations, and the value of having their long-term variability available on the basis on existing catalogues. The UG recommends the systematic activation of the code developed by the SSC in the ACDS source detection pipeline in Strasbourg to find highly variable sources.

Recommendation 2023-05-11/12: The UG recommends including products generated in the ACDS pipeline for long-term variable sources in the science products delivered by the SOC to users.

Recommendation 2023-05-11/13: The UG recommends that the SSC identifies and validates these long-term variable serendipitous sources and issues an alert when relevant (webpage, ATEL, GCN) using the public observations of the Multi-Year Heritage Programmes from now on.

Recommendation 2023-05-11/14: The UG recommends that the next AO proposal form (second phase) includes a request to the PI to allow the information on variable serendipitous sources in the field of view (position, flux variability, possible nature) to be made public shortly after the observations, following the process demonstrated for Multi-Year Heritage Programmes.

On the Survey Science Centre

Endorsement 2023-05-11/15: The UG acknowledges the SSC for taking the responsibility of the production of the slew catalogues, with a first release expected late 2023. The UG highly appreciates the efforts made by the SSC to explore various aspects of the data (spectral, short- and long-term transients) with the aim to provide new legacy products raising the profile of XMM-Newton.

Peer review process

Recommendation 2023-05-11/16: The UG was presented with a detailed report on the gender and age balance of PI in XMM-Newton proposals, and on the dual anonymous evaluation of NASA and ESO proposals. The UG recommends retaining the current XMM evaluation process, which is producing satisfactory results.

Recommendation 2023-05-11/17: The UG recommends that OTAC panel members be systematically informed of potential biases upstream of the evaluation process, in order to raise their awareness.

Recommendation 2023-05-11/18: The UG recommends systematic monitoring of gender and age balance in XMM-Newton proposals. To this end, the UG recommends requesting additional personal data (year of PhD and gender of principal investigator) in the AO proposal form.

Action items for the XMM-User's Group members:

Action 2023-05-11/19: The members of the XMM-Users' Group are asked to send their suggestions for names for the next OTAC chair to the project scientist.

Action 2023-05-11/20: The UG members are asked to send suggestions for the theme of the 2024 science workshop and for the chairperson.

Action 2023-05-11/21: The UG members are requested to send suggestions for celebrating the 25th XMM-Newton anniversary.

Date of next XMM-UG meeting: 26-27, June 2024 at ESAC.

Closure of the meeting: This was the last meeting for three members of the XMM-UG, Gabriel Pratt, Stefano Bianchi and Lidia Oskina. Anne Decourchelle, on behalf of the XMM-UG, warmly thanked them for their involvement and important contributions during their time as members.

The executive session ended on May 11th at 15:00.