

# MEETING

Meeting Date:	26/06/2024 27/06/2024	Ref.:	MoMUG#25
Meeting Place:	ESAC, A24, and Virtual Meeting via WebeX	Chairperson:	Anne Decourchelle
Minute's Date:	05/07/2024	<b>Participants:</b>	<p><b>UG members:</b> Anne Decourchelle (Chair), Enrico Bozzo, Megan Donahue, Phil Charles (OTAC Chair), Jimmy Irwin, Stefano Ettori, Yaël Nazé, Silvia Zane, Margherita Giustini, Iossif Papadakis. <b>In attendance:</b> Norbert Schartel (Project Scientist), Peter Kretschmar (Mission Manager), María Santos-Lleó (Science Operations Manager). <b>Invitees:</b> Natalie Webb (SSC Project Director), Mat Page (OM acting PI), Jelle Kaastra (RGS acting PI), Michael Freyberg (EPIC-pn acting PI). <b>Presenters and interested staff from the XMM-Newton Science Operations Centre.</b></p> <p>Absent: Steve Sembay (EPIC-Mos acting PI), Mike Watson (survey scientist)</p>
Subject:	Minutes of XMM-Newton Users' Group Meeting 25	Copy:	

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

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Description

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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)	R. Saxton
12. Status and Changes of Archive (10m)	E. Jimenez
13. SSC status (20m)	N. Webb
14. Status of 'real-time' transients (15m)	N. Webb
15. Input from the community (30m)	All
16. AOB	All
17. Dedicated Discussion	All

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

1. Opening remarks and welcome.
2. Meeting to be recorded, only for writing the minutes, not to be made public. All agree.
3. Brief self-presentation of all members.
4. Agenda adopted. All agree.

## Overall Mission Status. P. Kretschmar

1. Presentation
2. Questions or Comments
  - a. P. Charles: Chandra is under financial operational pressure, is there any danger of what is happening with Chandra at NASA that it will somehow be reflected on ESA and XMM-Newton?
    - P. Kretschmar: The last review of ESA's science missions, done by the ESA's Science Programme Committee (SPC), in March 2023, approved extension of XMM-Newton operations until December 2026 and indicatively until end of 2029. The plan is to get confirmation of operations until the end 2029 in the next review. Beyond that, everything is open.
  - b. S. Etori: At some point you mentioned that you would like to reach the launch of New Athena, is there anything you can put in operation now to prepare for this scenario? Is there any strategic action we can put in place to prepare everything so that things can be maintained beyond 2027?
    - P. Kretschmar: In space there is little we can do to control degradation. Nevertheless, the scenario is wide open.
  - c. E. Bozzo: In your plot of fuel consumption, the blue line shows the optimistic case, but what is the pessimistic case?
    - P. Kretschmar: It is difficult to estimate. Anything in between the red and blue lines shown in this plot.
    - P. Charles: This is a great engineering experiment; it is about how long can one keep something running remotely in space without having direct access to it.
  - d. M. Freyberg: Do the collision avoidance activities that shall restart in 2027 change the fuel consumption?
    - P. Kretschmar: This will depend on the actual situation. Initially, the activity consists of monitoring the probability of collision by the Space Debris Office. In case of collision probability higher than a given value, the Space Debris Office issues a warning. The reaction to the warning will depend on a few different parameters and the fuel required will in turn depend on the reaction. The amount of fuel needed can vary from zero to something significant compared to the fuel left, but we cannot predict in advance. In the last collision avoidance campaign, no warning was issued, hence no action required from XMM-Newton.
  - e. M. Donahue: For the online workshop (ESA Datalabs), it would be useful to have videos so that we can later point people or students to them.
    - P. Kretschmar: The idea would be to have it recorded. There are another couple of ideas that still need to be consolidated.
  - f. P. Charles: Comment on perhaps a few more activities that could be planned for the 25th anniversary. It stands out that XMM is still going strong. It's the "silver" anniversary. Would it make sense to have something combined with Chandra and XMM?
    - N. Schartel: We keep a good dialog with Chandra, but both agencies are independent and make their own decisions. About the first part of the comment, we prefer not to place too much focus on celebrating 25 years, but rather focus on the new things we want to do in the future, new science coming.

- Further discussions follow.

g. M. Santos: Just a comment, some of the activities mentioned by P. Kretschmar involve both the MOC and the SOC. There is a lot of collaboration between MOC and SOC.

- P. Kretschmar: there is very good collaboration between both teams.

h. S. Zane: A comment, we need to maintain and keep the young generation going to close the gap between XMM-Newton and New Athena. We need to keep the scientific community alive until New Athena comes, otherwise the expertise will die and there will be no one to exploit the mission.

i. A. Decourchelle: You showed some new people coming to support XMM. Are these new people coming in sufficient?

- P. Kretschmar: There have been moves and retirements. The issue is more about keeping the balance between the financial pressure and the things that need to be done. This is what we foresee at the moment. We need to maintain our activities within budget.

#### Report of the Project Scientist. N. Schartel

##### 1. Presentation

##### 2. Questions or Comments

a. S. Etori: Why have we lost the XMM-Newton newsletter?

- N. Schartel: We have now a science newsletter. The dedicated XMM-Newton newsletter has been interrupted. This means that XMM-Newton related news will only appear on our web-pages. The manpower resources have been pulled away. Software updates, calibration activities and so on, won't be announced in the general science newsletter, we can only provide highlights, which include, AO related topics, conferences and science highlights, nothing else.

- P. Kretschmar: This is a high-level decision.

- M. Santos: The release of the catalogue is not allowed either.

- E. Bozzo: Can you add something in the web to subscribe to news? An alert system, like RSS notifications. Users can register so that they get an email. You get something every time there is a new piece of news added. (some general discussion about this point).

- N. Schartel: We can check it.

- S. Zane: There are other newsletters (e.g. IAU) that can be used to reach people. Also, the Athena community could be used.

- Y. Nazé: How about the CCF release list, does it still exist?

- M. Santos: Yes, it does, but only for CCF related announcements.

- M. Santos: The main issue is that the resources that were dedicated to the XMM-Newton newsletter have been moved to the new science newsletter. So, we must keep in mind that resources have now been rearranged.

- N. Webb: Could the SSC take over these announcements. We could investigate it.

- N. Schartel: We won't stop any initiative.

- All: Some discussion and ideas about the newsletter issue. To be continued in the close session.

b. S. Zane: It does look like the situation with XRISM could go on for a while.

- N. Schartel: for the time being, I am giving discretionary time to XRISM as I was approached by XRISM. XRISM has some problem to get the low energy part of the spectra, so RGS observations could help. But if this continues, it should be ruled within the framework of a joint programme.

c. E. Bozzo: Why is the organization of the X-ray Universe conference so expensive?

- S. Zane: I don't think it is expensive. These things cost money. Professional companies should do it, and this costs. It's a huge amount of effort.

- F. Fuerst: I list things used in the latest X-ray Universe as an example of things needed to organize such big events.

- All: some discussion follows.
- d. S. Etori: Does this mean that XMM-Newton conferences will stop?
  - N. Schartel: Only the large X-ray Universe conferences every three years will be maintained, the yearly workshops have to be dropped.
  - S. Zane: 3 years is a very long gap. It's a shame to drop these workshops. Would you consider not removing the yearly ones and maybe dropping the large conference?
  - N. Schartel: The large X-ray Universe conferences cover all topics, small workshops are restricted to a topic. There has been a 10% cut in money for the coming years, something needs to be removed.
  - S. Etori: It's a way to keep the field alive given the state of the different high energy missions. Can we do something about it? Can we help?
  - P. Kretschmar: The main problem is the time used by LOC members to organize the event. We could always provide ESAC as the place if someone else takes care of the organization.
  - S. Zane: If you tell us or identify things ESA could provide, maybe we can take over organizing these workshops with minimum support from ESA.
  - N. Webb: There is a big European project in which they are involved. It's a 4-year project that could be used to support some X-ray workshops. The project starts in September 2024, maybe one of these workshops can be organized on X-rays at ESAC.
  - M. Donahue: Maybe X-ray astronomers should join other conferences on other wavelengths/communities.
  - All: some discussion follows. To be continued in the close session.
- e. E. Bozzo: Anything planned for new X-ray missions (like SVOM) for joint XMM-Newton observations? Should official channels be opened?
  - N. Schartel: This is case by case. XRISM already mentioned. SVOM has little common visibility with XMM-Newton and offers no open time. In general, it always needs to look into all the details.
  - All: some discussion follows.
- f. J. Irwin: About joint programmes, what is the fraction of awarded time versus requested?
  - N. Schartel: It depends on the programme. Panels only allocate XMM-Newton time. The time for the joint programmes is reviewed in the chairpersons panel meeting.

## Report of the OTAC chairperson. P. Charles

1. No Presentation  
Last year of P. Charles as OTAC chairperson.
2. Questions or Comments
  - a. P. Charles: Any news on the coming OTAC chairperson?
    - N. Schartel: No news. Memo already sent to the director of science with suggestions/recommendations.
  - b. S. Etori: can the UG provide recommendation for panel members? We have a good knowledge of the young generation.
    - N. Schartel: Yes, send them to the PS including a suggested category to see what panel they could go to.
  - c. S. Zane: Any plans to change observing time between panels? Can compact objects get more time since there are more ToOs as they are transients?
    - N. Schartel: The observing time per panel is assigned to ensure the same overscription per panel. On the other hand, if there are more ToOs for compact objects, then they are granted more unanticipated time and, therefore, at the end of the cycle they accumulate more observing time.

## User Support and Mission Planning. R. Gonzalez

1. Presentation
2. Questions or Comments
  - a. P. Charles: Comment. ToOs have evolved with time showing the direction in which science is going and the XMM-Newton team has evolved with it. Constraints used to be much tighter in the early days.
  - b. S. Zane: How is the probability computed for gravitational waves?
    - R. Gonzalez: these are given in the notifications.
  - c. M. Freyberg: In the visibility checker, does it also include unavailability, like tank replenishment activities or coordinated observations, or other technical scheduling constraints?
    - R. Gonzalez: Sun, Moon and Earth constraints are included. The eclipse periods are also included. Last, the visibility checker also takes into account the predictions of the XMM-Newton radiation model about when the radiation levels will allow to execute scientific observations. Nothing else is included.
  - d. J. Kaastra: A comment and a compliment on how smooth the planning goes with XMM-Newton considering all the missions that have to be coordinated at present. Congratulations and thank you because it is extremely well done,
  - e. A. Decourchelle: Do you have a way to scan urgent tickets on the helpdesk, or other filtering?
    - R. Gonzalez: No, there is no priority. We answer based on arrival. Some tickets have to be sent to experts and take longer; others can be answered straight away.
    - M. Santos: On the last days of an AO, i.e. near the closure of the call, priority is given to AO tickets.
  - f. S. Etorri: Does XRISM have a separate team dealing with the helpdesk?
    - R. Gonzalez: It's a separate team.
    - S. Etorri: Any plan to merge the teams?
    - R. Gonzalez: No, there is currently no plan.
  - g. A. Decourchelle: Is maintaining the support to ToOs 24/7 a big effort?
    - R. Gonzalez: Urgent ToOs are only considered if they have to be done in the on-going or in the coming revolution. Some triggers do not require such fast response. For some events, however, we cannot wait, the person on call has to deal with them fast. This strategy is mainly meant to be for some gamma ray burst and for GW events, but so far GW alerts have too big position error boxes.

## Calibration EPIC. M. Smith

1. Presentation
2. Questions or Comments
  - a. S. Etorri: What is the time baseline of the observations? (EPIC off-axis flux calibration)
    - M. Smith: The early observations come from the year 2000 and the latest ones from 2021.
    - S. Etorri: But in the meantime, has there been any recalibration of the vignetting?
    - M. Smith: This is all analyzed with the current, consistent, calibration.
  - b. S. Etorri: Is this an issue affecting only the soft band? (EPIC off-axis flux calibration)
    - M. Smith: There are two bands 0.5-2 keV and 2-7 keV band. The effect is different in each band depending on the MOS. pn shows no significant evolution.
  - c. P. Charles: (MOS pattern fraction study) How does this affect the iron line? What is the scale of this effect? What is the impact on science?
    - N. Schartel: The iron line is normally studied in pn.

- Y. Nazé: How about pn?
  - M. Smith: In pn it is very good. There is a small effect, but better than MOS. Anyhow, this affects the flux, effective area, not the energy scale.
  - E. Bozzo: Can this affect the asymmetry of the line? It is important if this could have an effect. Even if mainly pn is used, sometimes to gain photons the three instruments are used together.
  - M. Smith: Unclear. It would have to be looked into.
- d. A. Decourchelle: The structure below 1keV (MOS-to-pn empirical effective area correction), did you try to correct this kind of line structure?
- M. Smith: This is not an effective area issue, so we do not model them. We did try to model the fine structure, but it was difficult to work out if the structure appears due to effective area or some other effects (like redistribution in the MOS). Complicated to disentangle. In the end, the decision was made to fit a constant below 0.6keV.
- e. E. Bozzo: Do these features depend on the nature of the source?
- M. Smith: In the individual spectra we don't see them. We only see them in the stacked spectra. We didn't find any dependency with source properties.
- f. E. Bozzo: NuSTAR-XMM comparison, could the discrepancy affect only bright sources?
- M. Smith: Exposure time calculation related to count rate, pile-up issues (removing the core). Count rate is one of the main factors.
- g. N. Yaze: Cross-calibration with NuSTAR pn Timing, could this be an issue with NuSTAR? (it's a younger mission, maybe they don't have a good handle)
- M. Smith: They are very confident about their calibration. They say they have a good knowledge of the detector and calibration. We kind of exclude NuSTAR as the problem. pn Timing is not designed for spectra, so it is more likely that this is on the pn side.
  - M. Donahue: This correction might also fix the Chandra issue with temperatures. It goes in the same direction.
  - F. Furst: It was shown at the latest IACHEC meeting.
- h. M. Guistini: For fitting energy spectra, how low in energy can one go?
- M. Smith: The recommended values are in the Calibration Status document. Depends on if it is for image or spectra.
  - M. Guistini: There could be conflicting information between the manual and other places. Some astronomers are using 200 eV. People are becoming more interested now in the soft energy band and want to go as low as possible.
  - M. Guistini: How about the MOS correction with respect to pn? If we don't understand the evolution of some calibration factors in MOS, but we correct them based on what we see in pn, aren't we introducing further errors?
  - N. Schartel: The time dependent effects are corrected per camera. Then cameras are compared. MOS has a much lower effective area, and this is why we use pn to correct.
- i. M. Page: The correction of MOS to pn, wasn't this correction also done for RGS (to pn). Is this true?
- N. Schartel: Yes, it was also done for RGS.
  - M. Page: Does RGS do the same thing?
  - N. Schartel: The correction to RGS follows the same philosophy.
  - R. Gonzalez: RGS fluxes are lower than pn fluxes.
- j. A. Decourchelle: Is there any correlation between all these corrections? Are they treated individually?
- M. Smith: This is the problem with empirical corrections which don't have a physical origin determined. We have to go through all other empirical corrections to make sure they don't affect each other. We try

to make them in such a way that they are almost automatic, so they can be double checked easily again.

### Calibration RGS. R. Gonzalez

1. Presentation
2. Questions or Comments
  - a. P. Charles: Does anyone know how these devices behave after 25 years of continuous operations? (regarding the CTE trend with time)
    - R. Gonzalez: There is little information. We are the ones doing the experiment.
    - Y. Nazé: Could this effect also be due to the calibration lamps?
    - R. Gonzalez: It looks more like the detector itself than the lamps.
    - M. Page: In fact, it does look like the solar cycle.
    - R. Gonzalez: SRON is looking into it. At the end of the day this is measured and corrected.
  - b. A. Decourchelle: There was a recommendation in 2020 to work on background subtraction. What is the status?
    - R. Gonzalez: For this, J. Kaastra proposed a method for the smoothing of the background, and we started to work on it. But we could not do much so far. This issue is more on the SAS development side, but it's on hold due to lack of resources. It was started in Python. The method is clear; how to apply it, it's the complicated part.
    - J. Kaastra: It's a very manual tool at the moment, it has to be coded and integrated in SAS. There are lots of things to play with that have to be narrowed down. It needs manpower, which is not available.

### Status of Archive. E. Jimenez

1. Presentation

Order of presentation changed in the agenda.
2. Questions or Comments
  - a. S. Etori: We can see an increase of XSA active users downloads in 2024, do you know the reason for this? The change with respect to previous years is too big.
    - E. Jimenez: Unknown reason. The XSA team claim nothing has changed. Checks have been made for bots, and they claim this is not the reason either. It is also not coming from ESASky requests. This is still under investigation.
    - N. Webb: Could it be coming from requests from China? We see it in the catalogue access, and it can go on for months.
    - E. Jimenez: In this case it has gone on for one year. It's unlikely.
    - All: Some discussion about this.
  - b. N. Schartel: Comment. There are some historical images in the XMM-Newton Image Gallery, but only a handful of them. There were many more, about 400?, in ESA Sci Tech web pages, which are now discontinued. Several of them are from the construction of XMM-Newton and the instruments. These images are of great historical value. Also, for the images without the historical perspective, this is not the way to go, i.e. to conserve them for future generation. How could we ensure that we maintain old and new XMM-Newton images? One place could be the archive, so the content is maintained. Also, some nice images, diagrams or artist impressions are made sometimes for ESA press releases which we should also try to collect and maintain. The archive is one of those places which ESA commits to maintain. Web pages and so on can change and disappear. A suggestion is to recover images and put these images in XSA so they are maintained.



- All: short discussion about this.

## Calibration OM. S. Rosen

1. Presentation
2. Questions or Comments
  - a. P. Charles: Has the degradation stopped? (the presentation showed that we expect that, from now until 2030, it will not further decline by more than 2%)
    - S. Rosen: The degradation is a combination of anticipated loss of sensitivity in the photocathode, and unexpected early-phase contamination. Since the contamination, in particular, is likely to stop building up over time, it is probably not surprising that the decline has slowed as the contamination has also slowed.
  - b. M. Freyberg: OM-Gaia comparisons, the tail of the distribution, is it dominated by the stars with proper motion?
    - S. Rosen: They are accounted for but it is not dominated by proper motion stars.
    - M. Page: It could also be galaxies. The locations could be different depending on the instrument.
  - c. M. Freyberg: Could this AI procedure to identify artifacts in OM be applied to EPIC pn?
    - S. Rosen: Yes, in principle it could.
    - A. Decourchelle: How can we make sure we maintain the code to do this?
    - P. Kretschmar: We have the contact and the code. We could give it away as open-source code. She was not paid by ESA. She worked for 6 months (since January 2024). We could see how to build on this project. This first step was to see if it works and what kind of results it produces. It looks good, so it might be worth continuing with someone else.

## Status of Pipeline. P. Rodriguez

1. Presentation
2. Questions or Comments
  - a. N. Webb: Has all the slew data been processed?
    - P. Rodriguez: Not yet but we plan to do it.
    - N. Webb: The limit for producing spectra has been lowered to 50 counts, also for the light curves?
    - P. Rodriguez: Yes, also for the light curves. The main driver was the spectra, but it will also be applied to light curves.
  - b. N. Schartel: Comment. For point sources we are in a great state. But for RGS, can we go a step further and produce fluxed spectra? With XRISM now and future New Athena, we need this. We need flux spectra if we want people to use XMM-Newton data in the future. This also applies for pn and MOS  
Another point is extended sources. We don't have information on the structure. XRISM provides spectra on a data cube on a pixel level. Can we consider to do the same with pn?; a data cube with spectra for extended sources in flux units. Clean them of background, and we can provide the rest. We need to think of what people are going to be using in the long future. In terms of legacy products, we need to provide things that don't require much knowledge of the instrument and data analysis. Just take the product and use it.
    - P. Charles: Completely support what Norbert said. The approach is conventional for ground-based data and there is a staggering difference in the use if you provide calibrated data.
    - M. Donahue: MUSE is one among several example of ground-based processed data made available to the community and extensively used.
    - J. Kaastra: We have BiRD for RGS. We could also merge RGS and pn.
  - c. S. Etori: Regarding the variability study, is there any information? Is there anything to identify variability on different timescales?

- P. Rodriguez: There are several tests implemented in the pipeline to give information on variability within an observation.
- N. Webb: Also, there is information in the catalogue on source variability within an observation and between different observations.

## Status of SAS. R. Saxton

1. Presentation
2. Questions or Comments
  - a. P. Charles: Regarding numerical recipes, I remember that the NAG library had to be extracted from useage, is this the same thing, is it related?
    - R. Saxton: No, it's not the same. The NAG library is not used now, that is not a problem anymore.
    - P. Kretschmar: ESA is not considered an academic environment and therefore, the license problem is much more complex for us.
  - b. S. Etori: Are you converting everything to Python?
    - R. Saxton: We are not converting to Python, we are removing some perl scripts or other pieces of code (like PGPlot), but are not converting in bulk Fortran or C++ to Python. We could think of some modules, but not everything. It would be too much effort and besides, it is not efficient.
    - S. Etori: SASv23 was mentioned, are there any plans for the release? Do you have a timeline?
    - R. Saxton: We don't know the schedule for SASv23 yet. We plan for a release every year.
  - c. N. Schartel: How can we guarantee that the different versions of SAS can be run in the future and that the results can be reproduced? At the moment, we don't have the means to do it. Should we go in this direction?
    - N. Webb: You can select the calibrations to use and create the corresponding CCF files.
    - M. Freyberg: One would also need to maintain the SAS versions.
    - R. Saxton: The SAS version used to create the different products is in the header of the files.
    - M. Freyberg: But you would still need access to the SAS code.
  - d. A. Decourchelle: What can one do in ESA Datalabs regarding SAS? How many threads have been migrated?
    - R. Saxton: ESA Datalabs is currently available as "Public Moderated Beta", access has to be requested. You have the full SAS functionality, but the interactivity is very limited. Regarding threads, for now we only provide a few Jupyter notebooks to execute some SAS threads.
    - F. Fuerst: You have access to the full SAS through a terminal.
    - P. Kretschmar: The SOC will only provide a limited number of things, like data analysis threads. We are happy, and it should be possible at some point, for people to provide their own threads, but we won't support other people's threads, but we will accept threads. Hopefully SAS functionalities in Datalabs will be ready next year.

## SSC Status. N. Webb

1. Presentation
2. Questions or Comments
  - a. S. Etori: The detections are done on single observations?
    - N. Webb: The two catalogues (point source and stacked catalogue) are done differently. For the 5XMM we will unify this, where we will have only one catalogue.
  - b. M. Page: What fraction of the sky is covered (Slew catalogue)?
    - N. Webb: we don't have the number yet.
  - c. E. Bozzo: How long did it take to process 17199 observations?

- N. Webb: 8.5 days, this was done by the SOC at ESAC.
  - E. Bozzo: Has SASv22 being used?
  - N. Webb: Yes, SASv22 has been used already, the SOC prepared a dedicated Pipeline for this processing.
- d. E. Bozzo: What does upper limit mean? If a source is detected in some observation and not in others, you report a combination of fluxes and upper limits?
- N. Webb: Correct.
- e. J. Irwin: How do you classify sources that are variable from the spectral point of view?
- N. Webb: We use the average spectra.
  - M. Page: In OM we average the magnitudes.
- f. M. Donahue: Is it possible to get an upper limit for a random source?
- N. Webb: You can use the upper limit server, FLIX. This is one upper limit tool from the SSC and at the SOC there is another called HILIGH. Depending on what you want to do, one might be better than the other. There is also RapidXMM, a database of pre-calculated upper limits from all public pointed and slew observations, searchable from the [XSA interface](#)
  - M. Santos-Lleo: Which is also accessible from the archive XSA; you can access there the upper limits.
  - N. Webb: A lot of effort has gone in making sure these different services are compatible.
- g. E. Bozzo: How many flaring stars have you picked up?
- N. Webb: (plots of nature of variable sources) Around 2500 stars. There are many more flaring stars in the catalogue, these are the stars that are not detected in the normal processing.
  - E. Bozzo: This could be used by the Einstein Probe; they need an onboard catalogue of flaring stars.
- h. S. Etori: Do you get feedback on the catalogues, in particular, on how are they used?
- N. Webb: We do, we collect feedback.
  - S. Etori: Does a lot of work go into maintenance?
  - N. Webb: It does, not massive, but it is a lot of work. This is supported by the XMM2Athena project, ending this year, and will continue by the SSC afterwards.
- i. M. Donahue: There is a lot of work on stacking, if you have the exposure maps per pixel, could one use the stack for the upper limits?
- N. Webb: This is already done in FLIX. If the region has been observed multiple times, this is considered.
- j. A. Decourchelle: Is this a mosaic (page 5 of N. Webb presentation, about one of the 4XMM-DR14s fields), Is background subtraction included in these mosaic images?
- N. Webb: No
  - A. Decourchelle: So, most of what you see here is background.
  - N. Webb: This image only shows how some regions have been stacked more than others.
  - N. Schartel: For extended sources, up to what rate do you get them in the point source catalogue?
  - N. Webb: Extended sources are present in the detections and stacked catalogue; it is not a point source catalogue it's a detections catalogue. The extension is identified and given. An extended source could have several sources contained within them, but these are flagged, so using the flags, will get rid of them. More than 80 arcsec, we find very very few sources, a handful compared to the million detections.
  - P. Charles: How does this compare to Chandra?
  - N. Webb: Chandra's PSF degrades a lot off axis, so one cannot use the outer regions, only the central regions. We did a cross correlation with the central regions, can't remember the numbers that came out. Swift might be more interesting; it covers more of the same fields of view. That work was done, we can see if we want to add it to the catalogue. eRosita, is being introduced in the long-term variability study, this is providing very useful information. At present there is no crossmatch with eRosita. The

slew catalogue is matched with ROSAT, it could be updated with eRosita. With ROSAT, XMM-Newton slew has very similar PSF and detection levels.

- k. Y. Nazé: Can these images be used in the image gallery (large mosaics)? It would be good to have good EPIC and OM images.
  - N. Schartel: The idea was that the gallery should be populated by external people.
  - N. Webb: ESASky has great images.
  - Y. Nazé: People want a single nice image to download and use.
  - M. Santos-Lleo: In ESASky images are background subtracted. The flaring background from radiation belts is more complicated to subtract. We don't have further resources to produce nice images.
  - N. Webb: We could still produce some under XMM2Athena for the time left and send them to the image gallery.
  - N. Schartel: The images have to be sent to the Gallery using the web tool. In this way, the person sending the image can also provide the required additional auxiliary information.
  
- l. M. Page: Coming back to Chandra, EPIC positions are excellent and very accurate in the catalogue. The average positional error of XMM-Newton is better than Chandra, because of the off-axis degradation.
  - N. Webb: This is what we found some years ago when we did the cross-correlation between the two.
  
- m. A. Decourchelle: How long will XMM2Athena last?
  - N. Webb: Funded until the end of September, but SSC activities continue and they are also exploring new avenues for funding.

### **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 technical aspects of implementing an alert system to make public some information about identified transients. The code is in place in ACDS pipeline (Quintin et al. 2024) but not activated as no protocol is in place for sending to IRAP. The service is called STONKS (Long Term Variability Estimator). The link is not public yet, but it is included in the presentation. STONKS' output is presented, and examples given. A pdf and a json file are produced with certain information. Only the json is part of the alert, the lightcurve and spectra are not part of the alert, which makes it faster to raise an alert. The system has been tested with the multi-year heritage programme of G. Ponti on the Galactic plane survey. A summary of the results is given in the presentation, which includes some detected variable sources. Fluxes and spectra are shown. Next steps for the alert system are presented. Protocols would need to be developed, screening of EPIC data would be desirable, web server to be developed at IRAP to go live to house alerts and perhaps also send information to interested parties. The development of the server is now ongoing, it's not finished. Phase II of proposal submission would need to be modified to allow PIs to give permission to use their data to make public information about long term variable sources serendipitously discovered. We also need to define how to transfer the answer from the PI to ACDS.
  
  - b. All: a discussion follows on the practical and technical issues that need to be addressed in order for the system to work. For example, it is too late to implement this system in the coming Phase I proposal submission since the process to be followed, the protocol and the server are not ready. In any case, it is natural to leave it for Phase II at beginning of 2025. The information from PIs is only required for approved proposals. The PDF produced at ACDS with information about variable sources is an internal product for assessment. Having the EPIC image with the source identified would help to evaluate whether it is a false detection. It would be good to have some examples so that we can show PIs what these alerts are producing.

## Input from the Community. All

No one received any input.

Further comments:

1. M. Giustini: Soft X-ray community, XMM-Newton is becoming more popular because of its excellent sensitivity to soft X-rays. We need to know how soft we can get, for example, can we go down to 0.2 keV, or even 0.15 keV?
  - N. Schartel: This will depend on the observation. There is no straight cut. We need to check this.
  - M. Giustini: It would be useful for people to know this, and which reference can be used.
  - M. Freyberg: It also depends on where the source is located on the detector (for CTI matters). This information could be put into the calibration status document. *epreject* should be run, which I believe is the default in the SAS. It also depends on the instrument mode.
  - N. Schartel: We should check that the information we have is consistent across all documents we provide.
2. M. Donahue: G. Pratt had an issue with ESAS that was presented last year, regarding GTI filtering, has this being closed?
  - S. Etori: We are now in the process of converting part of the Checkmate pipeline to SASv21 and are in conversations with R. Saxton at the SOC. We haven't moved to SASv21 yet. Most of the issues have been addressed and we will move to SASv22. The issues have to do with the generation of the GTI files.
  - F. Furst: The ESAS documentation has been made more detailed.
3. M. Freyberg: The solution for the astrometry issue when working with SAS large mosaic images, combining different observations, was addressed and is appreciated. For archival reasons it was useful. The fix is in SASv22.

No further input from the community.

## AOB and Dedicated Discussion. All

1. M. Page: Comment as a PI. Very pleased with S. Rosen starting to work on the Jupiter patch to fix the issue in the pipeline.
  2. M. Freyberg: As a PI, thanks to all for the work done now at the SOC which used to be done by instrument teams outside of the SOC and now is done in house, like the instrument monitoring. The SOC is doing a great job.
  3. J. Kaastra: RGS XMM-Newton tasks go very smooth. Still trying some refinements. In 1 year, I will step down as PI. I will keep the affiliation and can be contacted and will participate in coming calibration meetings.
    - N. Schartel: It would be very good to still have you.
  4. J. Kaastra raises the issue of coordinated observations with XRISM. Norbert can make an exception now, but this would have to be formally put in place in further AOs. Matteo Guainazzi has the written offer from Norbert.
  5. E. Bozzo raises the issue again of the importance of XMM-Newton workshops. A small discussion follows. Some UG members put forward some ideas about how to handle workshops and their availability to try and organize these workshops with some kind of support from ESA.
  6. Next meeting date to be agreed.
  7. E. Bozzo and S. Zane will leave the UG. Thanks from A. Decourchelle for their work over these past years.
  8. Thanks to M. Santos-Lleo, she will leave before the next UG meeting. Thanks to her for her work.
  9. Meeting closed for today.
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The UG's executive session started on June 27<sup>th</sup>, 2024 at 11H00. This was a hybrid meeting with attendees being present at ESAC, and with one online participant (using Webex). Present were: Anne Decourchelle (Chair), Enrico Bozzo, Megan Donahue, Stefano Etori, Margherita Giustini, Jimmy Irwin, Yaël Nazé, Iossif Papadakis (partially, online), Silvia Zane, Phil Charles (OTAC Chair), Peter Kretschmar (Mission Manager), María Santos-Lleó (Science Operations Manager), and Norbert Schartel (Project Scientist).

In its 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 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.

**Status: Closed**

**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.

**Status: Closed**

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

**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: Closed** (partly done, MPE team, updated as new recommendation 2024-06-27/02)

**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 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 $\alpha$  with that at Al K $\alpha$  and Mn K $\alpha$ .

**Status: Closed** (partly done, updated as new recommendation 2024-06-27/04)

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

**Status: Closed**

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

**Status: Closed** (partly done, updated as new recommendation 2024-06-27/06)

**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.

**Status: Closed** (partly done, updated as new recommendations 2024-06-27/07, 2024-06-27/08)

**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).

**Status: Closed** (partly done, updated as new recommendation 2024-06-27/09)

### 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: Closed** (partly done, updated as new recommendation 2024-06-27/13)

**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.

**Status: Closed**

### On the OM

**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: Closed**

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

**Status: Closed**

**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.

**Status: Closed** (partly done, updated as new recommendation 2024-06-27/15)

**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.

**Status: Open**

### 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: Closed** (updated and completed in recommendation 2024-06-27/20)

**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.

**Status: Closed**

### On SAS development

**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)

**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: Closed** (for python, updated as recommendation 2024-06-27/26)

**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.

**Status: Closed**

**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 multi-year heritage programs.

**Status: Open** (ongoing)

**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.

**Status: Open** (ongoing)

### 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

**Status: Open** (updated as new recommendation 2024-06-27/28)

2) Astrometric rectification of EPIC images and events after cross-correlation of detected sources with external catalogues

**Status: Open**

3) Alignment of pipeline processing of OM data with current “ad-hoc” processing for catalogue production

**Status: Closed**

**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: Closed**

**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: Closed**

**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**

**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 and inclusion in the ACDS cross-correlation pipeline module in Strasbourg to find highly variable sources. These new products should be included in the science products delivered by the SSC to the SOC.

**Status: Open** (ongoing)

**Recommendation 2023-05-11/12:** The UG recommends to the SOC the inclusion of the new long-term variability science products in the standard pipeline products dataset delivered by the SOC to users.

**Status: Open** (ongoing)

## Survey Science Centre

**Recommendation 2023-05-11/13:** The UG recommends that the SSC, as a proof of concept, uses the public observations of Multi-Year Heritage Programmes to identify and validate long-term variable serendipitous sources and issue an alert (e.g., webpage, ATEL, GCN) when appropriate.

**Status: Open** (partly done, updated as new recommendation 2024-06-27/30)

**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: Closed**

**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.

**Status: Closed**

### 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.

**Status: Closed**

**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.

**Status: Closed**

**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.

**Status: Open**

### On proposal submission

**Recommendation 2023-05-11/14:** The UG recommends that the next AO proposal form (second phase) includes a request to the PI for permission to make the information on variable serendipitous sources in the field of view (e.g., position, flux variability, possible nature) public shortly after the observations. The alert process will be made by SSC and benefit from the experience acquired with the proof of concept developed for Multi-Year Heritage Programmes.

**Status: Open**

### New recommendations and action items

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

**Recommendation 2024-06-27/01:** The XMM UG recommends that the status of the implementation of the previous recommendations be systematically presented and discussed each year during each presentation at the XMM UG meeting. A summary of the progress made and level of advancement, the difficulties encountered, the priority and the indicative timetable for development will be appreciated.

### On calibration priorities for EPIC

**Recommendation 2024-06-27/02:** The pn empirical RMF modelling has concentrated on the low energy response for pn small window mode data. The XMM UG recommends to continue the investigations. This includes identifying suitable sources with sufficiently reliable spectral models to expand the RMF modelling to energies above 1.7 keV, investigating other modes, and time-dependent / spatial-dependent effects.

**Recommendation 2024-06-27/03:** Radial dependency of EPIC flux ratios have been observed based on 2XMM/3XMM and confirmed with 4XMM data. The XMM UG recommends further investigation of vignetting calibration. For this, the XMM UG supports the analysis of raster observations (archival and new) of individual stable sources with more than two observations over sufficient baseline, to allow a comparison of temporal evolution of MOS / pn fluxes for a sufficiently large sample of sources.

**Recommendation 2024-06-27/04:** Latest analysis of the update to pn long-term CTI correction include now substantial integration of Al K $\alpha$  (1.5 keV), Mn K $\alpha$  (5.9 keV) and Cu K $\alpha$  (8.0 keV) emission line data (XMM-CCF-REL-407, Valtchanov et al.). The current issue is to calibrate the quiescent background dependent gain correction. To this end, the XMM UG recommends incorporating the Cu K $\alpha$  line, in addition to the Al K $\alpha$  and Mn K $\alpha$  lines, and using the additional data obtained from the current solar cycle.

**Recommendation 2024-06-27/05:** Comparison of the pattern fractions determined from in-orbit data with the expected pattern fractions revealed unaccounted differences between the MOS spectra created with "singles" versus "singles + doubles + triples + quadruples" patterns, mainly affecting energies above 6 keV and the Si edge widening. They show time-dependent excess in quadruples and time-dependent widening at Si edge. They also have an impact on the effective area (which assumes pattern fractions and respective quantum efficiencies). The in-orbit pattern fractions differ very significantly from the calibration curves. The UG recommends that the calibration curves for the pattern fractions and their impact on the effective area be revised accordingly in order to produce updated response files.

**Recommendation 2024-06-27/06:** Protons entering the mirror aperture generate a non-X-ray background in the observations. Fioretti et al. (Proc. SPIE, V 11822, id. 118221F, 2021) have described their effective area and energy redistribution. The UG acknowledges the development team for the release of the associated proton response matrices to the SAS team. The UG recommends that these proton matrices be made available with an associated SAS task in the next SAS version.

**Recommendation 2024-06-27/07:** The UG acknowledges the low-energy extension of the empirical effective area correction down to 0.15 keV and its availability in the current version of the SAS (and by default processing in SAS 22). The UG recommends to investigate the residual calibration inaccuracies (effective area, redistribution, energy scale), which may be responsible for the uncorrected features observed below 0.6 keV, and to correct them.

**Recommendation 2024-06-27/08:** The UG recommends that the EPIC cameras continue to be monitored over time to track any changes that have an impact on their performance.

**Recommendation 2024-06-27/09:** The UG recommends continuing efforts to improve cross-calibration between XMM-Newton's EPIC detectors and those of NUSTAR.

**Recommendation 2024-06-27/10:** In order to explore the origin of the discrepancy with NuSTAR, the UG was presented with the preliminary results of non-routine calibration offset observations of Sco X-1 to analyse single reflection arcs observations for all mirror shells of the three mirror assemblies. The UG recommends further exploiting these data to compare the results with the simulator outputs, and to determine any possible geometric misalignment that could have an impact on the EPIC effective area.

**Recommendation 2024-06-27/11:** Issues were reported between pn timing mode data and NuSTAR data in terms of spectral shape, energy scale, normalisation, but showing some variations from source to source. The UG acknowledges the ongoing sample analysis of about 80 coordinated source observations and recommends identifying and determining their possible dependencies on source properties (spectral shape, flux), and temporal evolution.

**Endorsement 2024-06-27/12:** The UG acknowledges the work done and in progress on EPIC calibration and the release, since the last XMM UG meeting, of numerous updated calibration files on MOS gain, MOS fixed offset tables, EPIC canned matrix epochs, updated MOS CTI, MOS astrometry, pn long-term CTI correction, time-variable boresight for astrometry, empirical correction for EPIC effective area below 3 keV, time-dependent width of the EPIC-pn spectral response.

### On calibration priorities for RGS

**Recommendation 2024-06-27/13:** New background subtraction methods for RGS detectors have been developed by the RGS team. The code has been provided to SAS. The UG recommends exploring ways of implementing it in SAS, as a nice-to-have for spectral analysis of weak sources.

**Recommendation 2024-06-27/14:** The UG recommends to continue the detailed temporal monitoring of RGS performances and CCF updates, with particular attention to the recent steepening in the decrease of the charge transfer efficiency of RGS 1 and RGS 2.

### On calibration priorities for the OM

**Recommendation 2024-06-27/15:** Standard stars are now used to monitor the time-dependent degradation of OM sensitivity (fits with polynomial functions, replaced by exponential forms). The UG recommends to investigate the time-dependent spatial effects in flat-field analyses for each filter in order to provide a complete assessment of spatial sensitivity variations and to correct them.

**Recommendation 2024-06-27/16:** The UG recommends incorporating proper motion corrections to improve detection associated with unique sources, and investigating how to correct other identified issues, for implementation in the next version of the catalogue.

**Recommendation 2024-06-27/17:** The UG recommends continuing to monitor the temporal evolution of OM performance and updating the calibration files (bad-pixel map, ...).

**Recommendation 2024-06-27/18:** The UG recommends to continue exploring machine learning methods to systematically identify artefacts in images, such as scattered-light features.

### On User support

**Recommendation 2024-06-27/19:** The UG recommends to check and ensure the consistency and updates of information between the calibration documents and other user support documents, particularly with regard to the low-energy end.

**Recommendation 2024-06-27/20:** The UG recommends that the XSA enables queries that use the multi-wavelength information included in the catalogue. The XMM UG considers this to be a high priority. It recommends that multiwavelength XSA queries be functional in time for the ingestion of the 5XMM-DR15 catalogue, which will provide more multi-wavelength information.

**Endorsement 2024-06-27/21:** The XMM UG expresses its deep concern about the discontinuation of the XMM-Newton newsletter, which kept the community well informed about software evolution, and other matters concerning XMM data.

**Recommendation 2024-06-27/22:** The XMM UG recommends that all possibilities be explored to ensure that the community is fully informed of software evolution, and any matter concerning XMM data (RSS of the XMM-Newton web page, HEASARC news page, SSC to provide information, etc.).

**Endorsement 2024-06-27/23:** The UG is very concerned about the termination of the annual XMM-Newton workshops at ESAC, which have been an important event for the X-ray community to discuss specific themes and form the younger generation.

**Recommendation 2024-06-27/24:** The UG recommends to explore alternative possibilities for maintaining regular XMM-Newton workshops.

**Recommendation 2024-06-27/25:** In the context of a possible reorganisation of the ESA archives, the UG wishes to reiterate that it is essential to maintain a nominally operational XMM-Newton archive for users and asks to be kept informed in good time of any future developments.

### On SAS development

**Recommendation 2024-06-27/26:** The UG recommends to remove all problematic dependencies from the rewritten SAS Python code (i.e., PGPLOT/Grace, Perl, HEASARC dependencies).

**Recommendation 2024-06-27/27:** The UG recommends to continue the effort in the development of Data Labs, and associated tutorials.

### Pipeline Processing System

**Recommendation 2024-06-27/28:** The UG recommends investigating how to systematically provide background-subtracted images and background products for spectral analysis. Two methods are being considered for background estimation, using either the results of EPIC Filter Wheel Closed data analysis, or the proton response matrix. The UG would appreciate having a presentation at the next UG meeting on the state of development of the two methods.

### Survey Science Centre

**Recommendation 2024-06-27/29:** The UG recommends that the long-term variability source products issued from ACDS be supplied directly to the SSC for issue of public alerts on observations immediately public or with PI agreement.

**Recommendation 2024-06-27/30:** The UG had recommended that the SSC uses public observations of Multi-Year Heritage Programmes (MYHP) as a proof of concept to identify and validate long-term variable serendipitous sources and issue alerts (e.g. webpage, ATEL, GCN) when appropriate. An initial analysis has been carried out on the basis of a galactic MYHP. The UG recommends to strengthen the analysis with an extragalactic MYHP to validate the proposed detection concept, and the alert procedure.

## General

**Endorsement 2024-06-27/31:** The UG acknowledges the great indefectible and indefatigable commitment of María Santos-Lleó, Science Operations Manager, to XMM-Newton during 25 years of successful scientific exploitation, since its launch in 1999. The UG, on behalf of the X-ray community, thanks her most deeply for her contribution to XMM-Newton and wishes her all the best for the future.

**Recommendation 2024-06-27/32:** Several major retirements of ESA staff are planned. The UG recommends to secure the level of human resources in support of the XMM-Newton and that every effort be made to ensure that the relevant XMM expertise is maintained. The UG recommends identifying these replacements as early as possible, and that a transition period be put in place. This is of crucial importance for positions such as the science operations manager, the project scientist and the mission manager.

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

**Action 2024-06-27/32:** The members of the XMM Users' Group are asked to send their inputs to the XMM-Newton 2025 extension proposal when requested.

**Action 2024-06-27/33:** The members of the XMM Users' Group are invited to send in their suggestions for new XMM-UG members.

**Date of next XMM-UG meeting:** 27-28 may, 2025 at ESAC.

**Closure of the meeting:** This was the last meeting for two members of the XMM UG, Enrico Bozzo and Silvia Zane. Anne Decourchelle, on behalf of the XMM UG, warmly thanked them for their involvement and their important contributions during their mandate.

The executive session ended at 3pm on 27 June 2024.