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MEETING

Meeting Date:	09/06/2021	Ref.:	MoMUG#22
Meeting Place:	Virtual Meeting via WebeX	Chairman:	Rudy Wijnands
Minute's Date:	30/06/2021	**Participants:** **UG members**: Rudy Wijnands (Chair), Stefano Bianchi, Enrico Bozzo, Phil Charles (OTAC Chair), Jimmy Irwin, Christine Jones, Lidia Oskinova, Yaël Nazé, Gabriel Pratt, Silvia Zane**. In attendance**: Norbert Schartel (Project Scientist), Peter Kretschmar (Mission Manager), María Santos-Lleó (Science Operations Manager). **Invitees**: Jelle Kaastra (RGS PI), Natalie Webb (SSC Project Director), Mike Watson (SSC), Frank Haberl (EPIC pn), Mat Page (OM acting PI); **Presenters and interested staff from the XMM-Newton Science Operations Centre**. Absent: invited external experts Steve Sembay (EPIC MOS acting PI) sent apologies	
Subject:	Minutes of XMM-Newton Users' Group Meeting 22	Copy:	

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

Description

Agenda

1. Welcome (5m)	N. Schartel & R.Wijnands
2. Adoption of the agenda (5m)	All
3. Overall mission status (10m)	P. Kretschmar
4. Report of the Project Scientist (20m)	N. Schartel
5. User support and mission planning (10m)	R. Gonzalez
Break (30m)	
6. Calibration EPIC (20m)	M. Smith
7. Calibration RGS (10m)	R. González
8. Calibration OM (10m)	S. Rosen
9. Pipeline development (10m)	P. Rodriguez
10. Status of SAS medium-long term plan (10m)	R. Saxton
11. SSC status (20m)	N. Webb
Break (30m)	
12. Input from the community (20m)	All
13. AOB	All
14. Dedicated Discussion	All

Welcome and Adoption of Agenda. R. Wijnands

1. Opening remarks and welcome.

2. Presentation of 2 new members: Yaël Nazé, Phil Charles

3. ASTRONET (network for the long-term planning of European Astronomy). It is brought to the attention of the group that XMM-Newton is not on their recently presented (about 1 month ago) next Science Vision and Infrastructure Roadmap. The UG has formally contacted ASTRONET to see if it can be included and to explain how important it is to have XMM-Newton on the roadmap, especially in the context of closing the gap with Athena, which is mentioned in the roadmap. It will hopefully be taken into consideration.

4. No further items or comments from other members.

5. Agenda agreed.

Overall Mission Status. P. Kretschmar

1. Presentation

2. Questions or Comments

   a. P. Charles – Congratulates the SOC and the MOC in operating so well during COVID times. Expresses worry about telemetry (TM) drops and asks about a possible explanation and how this can be dealt with in the future.
      - P. Kretschmar adds that studies are being carried out and that at present is not easy to give an answer. But things are being monitored. This has happened in the past but seems to be happening more often. Investigations of what can have possible changed are on their way.
      - P. Charles points that the pressure should be raised to provide an answer.

   b. S. Bianchi – Regarding the TM drops reported, what is the visual impact in the science observations, is it a drop in the light curve? S. Bianchi has a particular light curve where he is unsure as to whether what he sees in the science data is the effect of TM drops, and he would like confirmation. The light curve was sent to P.Rodriguez for off-line analysis of this particular case.

   c. Y. Nazé – related to debris encounters. Do we know if there is a large small debris population that could lead to problems for geostationary orbits or is it only big debris and these are followed and everything is taken care of as much as it can be?
      - P. Kretschmar, it is not completely known, but the risks are low and the worrying factor is low. Peter takes action to find out what the population is and follow up. During closed session, Peter gave an update. Detecting objects smaller than 30 cm in GEO is hardly possible, but there are models for the flux, which are considered good enough to trust the predictions.

Report of the Project Scientist. N. Schartel

1. Presentation
2. Questions or Comments
   a. P. Charles – It is good to see so many ToO that the SOC is able to handle. Have the operations been changed to become more efficient or does it have a price on efficiency?

- N. Schartel, in term of efficiency, having so many ToOs implies paying the price due to rescheduling. In terms of reaction time, it is limited, the fastest is about 6 hours, but it is not necessary to go this fast to most targets. With the gravitational waves coming into play in next AOs, we will have to see how fast we need to go, this will depend on the accuracy of the coordinates of the gravitational wave detection events. Another limit in the ToO that can be scheduled comes from the large number of coordinated observations with other facilities. A priori we do not drop coordinated observations due to incoming ToOs. There are a lot of preapproved ToOs and most depend on visibility of sky regions, in some AOs some ToOs had to be dropped as many were accumulated in the Galactic centre region.

b. R. Wijnands - how does Europe as a whole compare to the whole of the US in terms of proposals? As things are shown, looks like the US is ahead. So, rather than comparing against each European country, how does it compare against the whole of Europe? N. Schartel, as a whole, Europe has more than the US. Europe is about 40% of the total proposals or time, similar to the US. China, Japan and South America are low and very similar
c. P. Kretschmar - should the number of ToO proposal be limited per OTAC panel?
   - N. Schartel, as each panel may have different needs, there is no point in doing this uniformly across the OTAC panels. The important number is the total number of ToOs per AO. As long as operations allow and the SOC can cope with the requests, we should accept ToOs based on their science merit as for other observations.
d. L. Oskinova – how successful are DDT observations and how easy it is to have a DDT observation approved in comparison to ToO time?
   - N. Schartel, DDT are not ToO type of observations, they are extremely rare and are important at another level. DDT are not accepted by OTAC. In general, OTAC chairpersons are also asked, so from that point of view they are as difficult to get as ToOs.

User Support and Mission Planning. R. Gonzalez

1. Presentation

2. Questions or Comments

a. R. Wijnands – Why using a new interface to the proposal submission system (XIPS)? Can we load past AO proposals though this new interface?
   - R. Gonzalez, this is part of the rejuvenation plan of the SOC to modernize the systems and tools used. In the coming AO21 it will not be possible to upload past proposals, but for future AOs this will be one of the new features. The main difficulty now is the correlation of users with past proposal.
b. P. Charles – The ToO rate being about 1 every 5 days, can the SOC handle all? Is this the limit? What happens if we get several coming together?
   - R. Gonzalez, not all ToOs have the same requirement for a reaction time. Average times are about 1 week. Not all ToOs are urgent and require fast reaction times. Not all ToOs are approved, although all need to be evaluated. At the SOC there is a 1-week rotation for taking care of ToOs, where one person is on call for a week, if there is need, this person gets support from the team during working hours.

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Calibration EPIC. M. Smith

1. Presentation
2. Questions or Comments

a. Y. Nazé – How does the PN-NuSTAR correction impact PN with other satellites?

- M. Smith, PN still gives the lowest fluxes of all other instruments. The correction will push PN up and go in the direction to correct discrepancies with others, like Chandra. This correction might even push it beyond what is needed for Chandra. For Swift it is not clear.

b. P. Charles – One of the cross-calibration targets is a blazar, isn't this a problem due to their variable behaviour?

- M. Smith, the cross-calibration observations are strictly simultaneous, so this should not be a problem. Most calibration targets are variable and it is taken into account by taking simultaneous observations

Calibration RGS. R. Gonzalez

1. Presentation

2. Questions or Comments

a. P. Charles – the CCD hotspots, not big effect yet but growing in size, does this suggest a problem for the future?

- R. González, it happens only in RGS1. The growth is slow and should not reach the spectral region. When the mask is not correct because it is smaller than the actual spots is more a software problem that we know we can solve by making the mask big enough. Should not impact the spectral region. Monitoring and corrections will continue.

Calibration OM. S. Rosen

1. Presentation

2. Questions or Comments

a. P. Charles – about the sensitivity decline, given the nature of the detector, is it not expected a decrease in sensitivity with time?

- S. Rosen, the detector suffer degradation with time. It is an aging effect. It is characterized to account for it, but it is not a big effect over 20 years. Nevertheless, it is doing very well.
- M. Page, the decline with sensitivity, the behaviour vs wavelength is not understood. It is known that the largest degradation is in the UV. However, the Jupiter patch has shown that by affecting the photocathode the red light is affected more than the blue light. So, it could be the result of contamination on the optics which are responsible for the low degradation trend seen over 20 years. Which also seems to be stopping in these past years.
- P. Rodriguez, can solar activity play a role in the higher UV degradation?
- M. Page, the background is lower in the UV so it is not clear how this could be a problem. The only part that is colour dependent is the photocathode, so it has to be this the reason for the degradation or something in the system before the photocathode, like the optics.

b. R. Wijnands – What is the Grism status? How often are they used?

- S. Rosen, there is no stats, they are not regularly used. Not clear how often they are used. The degradation is normal. The Grisms work fine. The window goes through the Jupiter patch. No correction is applied but it is planned for the future.

Pipeline Development. P. Rodriguez

1. Presentation

2. Questions or Comments

a. N. Webb – about the astrometric rectification of images, this is done after running the SAS task catcorr, what happens when the SAS task catcorr crashes?

- P. Rodriguez, there is not much that can be done when this happens. There is no alternative for these cases, the correction has to be applied after catcorr.

b. S. Bianchi – will send the light curve via email to P. Rodriguez to see if the effects seen in the light curve are the result of TM drops.

Status of SAS Medium-long Term Plan. R. Saxton

1. Presentation

2. Questions or Comments

a. P. Charles – duplicated data coming in, is this related to the TM drops reported?

- R. Saxton, not necessarily. It looks like this problem has more to do with ground stations problems. The reported TM problems have happened in the past very rarely. It has been brought up to attention recently due to too long observations where it was clearly seen.
- P: Charles, remarks that this is a worrying problem if it has happened in the past, even if at a smaller level.
- R: Saxton, the number of affected observations is not large (table given in the presentation) and this has now been fixed at the software level by removing duplicated frames at the ODF level. The worst case is an observation where 30 minutes have been lost.

b. L. Oskinova – Any plan to integrate ESAS into SAS? The current version is not easy to use. It would also be very good to include the ability to stack several pointings in ESAS for extended sources. This would be a great development.

- R. Saxton, from software point of view products extracted from ESAS can be stacked after the analysis of each observation.
- L. Oskinova, this can be done already, but no easy task is available to combine responses obtained from different ESAS tasks from different observations. Email offline to see what can be done.

c. R. Wijnands – The new MAC processor for laptops might make SAS problematic to run. Any comments?

- E. Ojero, it should not be a problem. Apple provides a solution. Users are already running it and no problems are reported.

SSC Status. N. Webb

1. Presentation

2. Questions or Comments

a. P. Kretschmar – are these new products going to be part of 5XMM or are they going to go into the archive (for long term plan)?

- N. Webb, they will go into SSC or XMM2Athena pages and likely 5XMM, but this is long term.

b. C. Jones – great results, 850.000 X-ray source detections, is this right?

- N. Webb, yes, this is correct. Also, there could be some extra ones in the stacked catalogue. Some sources do not appear in the single observations but do in stack observations. The combination of both catalogues could be close to 1M sources. 100.000 being extended. All these data are available, they are accessible through XSA or SSC pages.
- N. Webb, the Citizen Science web page only has a few hundred thousand, it does not contain all sources.

c. R. Wijnands – nice jobs about transient alerts, is this feasible to implement?

d. N. Webb, this needs to be discussed with the Project Scientist and the SOC. This could be implemented after pipeline processing and screening.
e. P. Charles – the XMM2Athena project is impressive. In terms of serendipitous sources this is where you benefit from improvements of pipeline and analysis system which gives you the most accurate locations based on known objects in the field and it is very important for cross-matches with other wavelengths.

Input from the Community. All

1. No input from the community

AOB and Dedicated Discussion. All

1. N. Webb, Transient alert system. Can it be done?

    a. N. Schartel, implementation could be possible, but needs some investigation. The suggestion for the transients detection to be included as part of the standard pipeline can be studied, but probably not possible to get related products faster than currently achieved by the pipeline products. The only option could be if products related to transients can be made public before all other pipeline products, without manual screening.
    b. N. Webb proposes to include her tasks for transient alert in the pipeline. It is understood by SOC that the normal procedure to include new tasks in the pipeline is to be followed, i.e. SSC could develop a SAS task that then is included in the pipeline. The SOC will send to N. Webb and SSC SAS developers the instructions for integration and development of Python in SAS, which are currently being finalized. The task development is not straight-forward however because uses multi-mission upper limit server which needs access to several catalogues. It will take some time and investigation.

2. N. Schartel asks the UG members for suggestions for workshops for next year.

3. No further comments.

Minutes of UG's executive Meeting on June 10th, 2021

The UG's executive session started on June 10th, 2021, at 14:00. This was on online meeting using Webex Participating: Rudy Wijnands (Chair), Stefano Bianchi, Enrico Bozzo, Jimmy Irwin, Christine Jones, Lidia Oskinova, Yaël Nazé, Gabriel Pratt, Silvia Zane, Mission Manager (Peter Kretschmar), Science Operations Manager (María Santos-Lleó), and Project Scientist (Norbert Schartel).

In the UG's executive session, the UG discussed the 'real-time' transient alerts that the SSC has investigated. Several UG members reported about their own experiences with transient searches and stressed that only a very small fraction of the found transients are, at the end, of high scientific interest. The UG was not convinced about the usefulness of implementing such alerts (given the small field of view of the XMM-Newton instruments) in relation with the workload it would take.

The UG also reviewed the status of resolutions, recommendations, and action items formulated at previous meetings and formulated new ones. For clarification purposes, the UG uses the following definitions: a recommendation is a suggestion or proposal as to the best course of action; a resolution is a decision to do or not to do something.

Recommendations from previous meetings

On the XMM-Newton Survey Science Centre (SSC):

Recommendation 2019-05-08/07: The UG recommends to investigate the viability to implement an automatic source variability search (as developed by the SSC and to be delivered by SSC to SOC in case current testing proves successful) on serendipitous sources found in proprietary data.

Status: Closed

On the changes of SOC organization

Recommendation 2020-06-18/04: A significant continuing challenge is the erosion of expertise via staff retirement and/or movement of staff into other projects. Whilst this process is inevitable, the UG recommends that any transitions will be smooth and that such transitions ensure that the resources required to keep the high performance of XMM-Newton remain available. In addition, the UG recommends that any changes in staff and/or the SOC structure conserve the required specific X-ray expertise (e.g., for TOO planning, calibration, SAS software, etcetera).

Status: Closed (partly reformulated into 2021-06-10/04)

On calibration priorities:

Recommendation 2020-06-08/07: The UG strongly appreciate the efforts made by the EPIC calibration team to further improve the cross-calibration of the XMM-Newton instruments and the cross-calibrate between the XMM-Newton EPIC detectors with the NUSTAR one (to resolve discrepancies between the two observatories in inferred spectral shape and normalizations). The UG strongly recommends to continue these efforts and that the final outcomes (e.g., the improved CORRAREA correction) are incorporated into SAS.

Status: Open

Recommendation 2019-05-08/08: The calibration of the energy reconstruction of the pn Timing and Burst modes continues to improved significantly and the UG strongly appreciate these efforts. The UG is looking forward to the implementation of the rate-dependent PHA correction in the upcoming release of SAS 19. The UG recommends to continue the work on the calibration of these modes (e.g., on the column dependency) and that the final outcomes are incorporated into SAS.

Status: Closed (partly rephrased in recommendation 2021-06-10/09)

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

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: Open

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

Status: Open

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

Status: Open

Recommendation 2020-06-08/13: The UG recommends to continue the investigation of the reduced sensitivity patch of the detector so that correct photometric parameters can be obtained for sources within or close to this position.

Status: Closed

Recommendation 2020-06-08/14: The UG recommends to continue to work on the OM serendipitous UV source catalogue version 5 and is looking forward to the release of this catalogue (anticipated to be at the end of 2020).

Status: Closed

Recommendation 2020-06-08/15: The UG recommends to continue to investigate the spurious periodicities present in fast-mode data for OM sources that are close to the edge.

Status: Closed

On SAS development:

Recommendation 2020-06-08/17: The UG recommends that SAS keeps being further developed and improved. In particular, the UG recommends a full ESAS integration, transforming the code to Python and allowing Python scripting, the release of the full source code (allowing building SAS from the code and ensures long-term preservation of SAS), and the release the upper limit server.

Status: Closed (reformulated into recommendations 2021-06-10/14, 2021-06-10/15, and 2021-06-10/16)

On the Pipeline Processing System:

Recommendation 2020-06-08/18: The UG strongly appreciated the improvements made to the pipeline. The UG recommends to continue improving it and to include the following products and options:

1. Merged OM light curves
2. OM broad band fluxes in OGIP compliant files
3. Broad spectral energy distribution plots including OM and EPIC data
4. Filtering EPIC flaring background in case of multiple exposures
5. Core excised EPIC spectra for bright sources
6. FWC scaling according to the relation between the background rate and the NDSLIN

Status: Closed. Item 6 has been reformulated into recommendation 2021-06-10/18

On the 2021 Science Workshop

Recommendation 2020-06-08/19: The UG strongly prefer to have the 2021 Science Workshop to be held physically at ESAC, however, the UG recommends that preparations are made to host it online in case the Covid-19 crisis has not subsided at that time.

Status: Closed

NEW RECOMMENDATIONS AND ACTION ITEMS

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

On the impact of Covid-19 on operations:

Endorsement 2021-06-10/01: The UG strongly appreciates the efforts done by all XMM-Newton teams to limit the impact of Covid-19 on operations. The UG compliments everybody on how this impact has been minimized and how well things functioned (and still are functioning) during the Covid-19 period.

On Spacecraft operations:

Recommendation 2021-06-10/02: The UG recommends to continue the investigations into the collision avoidance operation and the degradation of the coarse attitude anomaly detector.

Recommendation 2021-06-10/03: The UG very strongly recommends to continue the investigations into the cause behind the telemetry drops and resolve any issues that are found.

On the changes of SOC organization:

Recommendation 2021-06-10/04: The UG strongly recommends that any changes in staff and/or the SOC structure (i.e., in the context of the frame contract changes) ensures the conservation of the required performance and expertise.

On User Support Group:

Endorsement 2021-06-10/05: The UG fully endorses the migration to the XMM-Newton Interface for Proposal Submission (XIPS) and strongly appreciates the efforts that has gone into this migration.

Recommendation 2021-06-10/06: The UG recommends that the users are informed about the migration to XIPS and its consequences (e.g., not yet able to reload old proposals) in all ways possible and well ahead of the next proposal deadline to avoid unpleasant surprises for the users.

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.

On Calibration Priorities:

Endorsement 2021-06-10/08: The UG strongly appreciated the efforts done by all the XMM-Newton instrument teams over the past year to further improve the calibration of the instruments.

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.

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.

Recommendation 2021-06-10/11: The UG recommends to continue investigations whether it is possible to further improve the wavelength scale and the line spread function of the RGS

On the OM:

Endorsement 2021-06-10/12: The UG congratulates the SOC OM calibration and MSSL teams on the release of the XMM-OM SUSS5 catalogue release.

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

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.

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 this processes as soon as possible.

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).

On the Pipeline Processing System:

Endorsement 2021-06-10/17: The UG strongly appreciates all the improvements made to the pipeline.

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.

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

Recommendation 2021-06-10/20: The UG strongly appreciate the long-term activities planned for the pipeline but strongly recommends to start working on these activities already now before knowledge and expertise disappear over time.

On the XMM-Newton Survey Science Centre (SSC):

Endorsement 2021-06-10/21: The UG congratulates the SSC on the release of the 4XMM-DR10 and 4XMM-DR10s and is looking forward to the 4XMM-DR11and DR11s.

Action items for the XMM-Users' Group members:

Action 2021-06-10/22: The members of the XMM-Users' Group are requested to send suggestions for the following topics to the Project Scientist

1) Topics, titles, and chairpersons for SOC for the XMM-Newton workshop in 2022
2) New candidates for the Users' Group and candidates for the chairperson for the Users' Group
3) Input for next extension exercise will be needed autumn 2021 or early 2022

The executive session ended on June 10th at 17:30

Date of next meeting: June 2022 (exact date TBD), starting at 10:00 at ESAC.