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MEETING

Meeting Date 7-8 June 2016

Ref MoMUG#17

Meeting Place ESAC/XMM-Newton SOC B5/B65

Chairperson Martin J. Ward

Minute's Date 13 June 2016

Participants
UG members: Martin J. Ward (Chair), Hans Böhringer, Anne Decourchelle, Maria Díaz Trigo, Ioannis Georgantopoulos, Nanda Rea, Craig Sarazin
In attendance: Norbert Schartel (Project Scientist), Fred Jansen (Mission Manager, by WebEx), Maria Santos-Lleó (Science Support Manager), Matthias Ehle (User Support Group Leader; Secretary)
Invitees: Frank Haberl (EPIC pn acting PI), Jelle Kaastra (RGS PI), Natalie Webb (SSC Project Director); Presenters and interested staff from the XMM-Newton Science Operations Centre.
Absent: UG members Richard Mushotzky, Beate Stelzer, Marco Salvati (OTAC Chair), and the invited external experts Steve Sembay (EPIC MOS acting PI), Mat Page (OM acting PI) and Mike Watson (Survey Scientist) had excused themselves.

Subject
Minutes of XMM-Newton Users Group Meeting 17

Copy

Description	Action	Due Date
Edited by Matthias Ehle. Approved by UG members on 31 July 2016		

WELCOME:

M. J. Ward (Chair) and N. Schartel (Project Scientist) opened the meeting on June 7th at 10:00. New Users Group (UG) members were welcomed and all panel members introduced themselves. M. J. Ward explained the format of the meeting, with an open meeting on the 1st day, and an open discussion session in the morning of the 2nd day followed by a UG member-only executive session in the afternoon.

ADOPTION OF THE AGENDA:

The agenda of the meeting was presented and adopted by the participants.

PRESENTATIONS:

The following presentations were given on June 7th:

Overall Mission Status	(F. Jansen; 10:05-10:30)
Instrument Operations	(R. Muñoz; 10:40-11:00)
Report of the Project Scientist	(N. Schartel; 11:05-11:20)
User Support and Mission Planning	(M. Ehle; 11:45-12:00)
Pipeline Future Plans	(P. Rodriguez; 12:05-12:20)
Mission Extension	(A. Parmar; 14:00-14:15)
Status of the Scientific Archive	(N. Loiseau; 14:20-14:33)
Calibration	(M. Smith*; 14:35-15:15) *with input from R. Gonzalez (RGS) and A. Talavera (OM)
Analysis Software Future Plans	(C. Gabriel; 15:30-15:50)
SSC Status	(N. Webb; 16:15-16:30)

The view-graphs of the presentations are available from the XMM-Newton public web site, under “General User Support” →“Users Group”.

DISCUSSIONS:

During the presentations, several questions were raised and discussions took place:

After the presentation on the Overall Mission Status, M. J. Ward asked about the reduction of key personnel that are part-time working now for future missions. F. Jansen explained that this is happening also in other missions: new missions have no budget prior to adoption and SCI-O department is therefore looking for qualified personnel interested in supporting future mission studies.
The invitation by F. Jansen to UG to provide him with their opinion on the described Spacecraft-Controller (SPACON) arrangement involving XMM-Newton, Gaia and INTEGRAL was deferred to the Discussion session and resulted in **Resolution 2016-06-08/01**. UG was further encouraged to ponder on SOC core activities (e.g. related to SAS, Targets of Opportunity (ToOs), Calibration) that shall not be impacted by the additional SOC efforts needed to start already now the preparation of post-operations. UG issued related **Recommendation 2016-06-08/03.**

After the presentation on Instrument Operations & Data Generation, UG members asked for further details on the reported swap of the electronics chain for the MOS1 camera: R. Muñoz explained that expectations are that the previously unused B-chain can work similarly long as the A-chain. In case of issues with the B-chain, a swap back to the (still usable) A-chain is possible (a study on how to invalidate the false alarm generated by corrupted housekeeping data that triggered the decision for the swap is on-going). The swap of the chains is without impact on the MOS instrument calibration as it only affects the analogue-digital signal conversion.

The Report of the Project Scientist led UG to discuss the ToO policy, especially the current setup that allows OTAC to carry over ToO proposals to a 2nd AO. N. Rea reported that, based on received inputs, there seems to be a strong preference in the community to limit ToO validities to a single AO only. This point of view, however, was not shared by some other UG members: the possibility to trigger a ToO during 3 AOs improves the chances to ask for multi-wavelength follow-ups with other observatories; in addition the longer validity is felt to be justified for XMM-Newton because the fraction of sky visibility at a given time is limited to only ± 20° of the solar attitude angles, among other constraints. Nevertheless, some of the concerns were shared and some changes in ToO policy agreed (Discontinuing the acceptance of ToOs with C-priority, make trigger criteria and strategies public). N. Schartel explained that indeed the plan is to accept anticipated ToOs as A- and B-priority targets (valid for three years) only as of AO-16 (see below for more details). The scientific return from ToOs (faster publications than Guest Observer programmes and larger frequency in high-impact journals) is seen as one of the major strengths of the XMM-Newton mission, a view emphatically shared by UG members and also reflected in **Recommendation 2016-06-08/03**.
Asked about the prospects to improve XMM-Newton public relations through the enhanced presence in Wikipedia, N. Schartel explained that currently the usage of XMM-Newton images posted there is hampered by the existing ESA copyright. Investigations have started aiming at an adjustment of the copyright such that images, e.g. from the XMM-Newton Image Gallery, in the future can be shared under a Creative Commons license.

The presentation on User Support and Mission Planning was followed by UG members asking for further details on the LIGO gravitational wave (GW) event follow-ups with XMM-Newton: the data exchange agreement is complicated and as agreed in the existing Memorandum of Understanding (endorsed by the UG about 2 years ago). M. Ehle explained that the presented new tool would compare GW event error boxes with a repository of contemporaneous GRBs in order to trigger XMM-Newton ToO candidates.

After the presentation on Pipeline Future Plans, UG members asked about the Upper Limit Server (ULS) usage for random sky positions; P. Rodriguez explained that, for a given RA, Dec position, the ULS provides an upper limit flux based on currently available pointed and slew observations. The plan is to improve the ULS speed performance in the future.
Asked about the differences in background handling by the ESAS SAS package versus the method used by the current pipeline, P. Rodriguez explained that ESAS is dealing in a complex way with flaring background models, whereas the pipeline is planned to deal with the quiescent background.

After the talk on Mission Extension in which A. Parmar also described the changes with respect to the scientific evaluation of the mission extension cases, UG was asked to express their opinion on the format and the presenters of the case: Previously these presentations were given by the Project Scientist whereas now the presenter could be another member of the Users Group. After the Discussion session, the UG formulated **Recommendation 2016-06-08/06,** expressing their strong support for the XMM-Newton mission extension, and **Recommendation 2016-06-08/07** describing their proposed approach for the planned Mission Extension presentation.

After the presentation on the Status of the Scientific Archive, UG members asked N. Loiseau to consider unpacking the XSA usage statistics to allow retrieving information also about user countries, figures that might be of interest especially to representatives of ESA member countries. The Archive Scientist acknowledged this suggestion and informed that such functionality is already planned for in a future release of XSA.

After the presentation on Calibration, the UG Chair thanked the calibration team for all their efforts and acknowledged that there is still more to be done in this area.
Related to the mentioned IACHEC-authored paper on cross-calibration that is currently close to submission, UG members would like to be notified when the paper is accepted.

Asked about the calibration comparison of OM data with other UV facilities like HST or GALEX, A. Talavera explained that, since one of the band passes in GALEX was similar to one of the OM UV filters, he had made comparisons on several white dwarfs observed with both instruments which showed very good agreement (within a few per cent). Concerning HST data, he further explained that the standard stars used for OM calibration and monitoring are also HST standards, but no direct comparison has yet been done.
With respect to the issues associated with the energy dependent 2-D EPIC Point-Spread-Function (PSF), UG members asked for further details: N. Schartel reminded them that this PSF model was originally developed by A. Read, validated and implemented together with the SOC, with the main emphasis on the improvement of the automatic source detection. The presented effect on EPIC spectra at high energies was discovered only later. M. Smith added that it is expected (but still TBC) that adjustment of some of the parameters of this PSF model could be sufficient to fix the presented calibration issue.
UG members requested further details on the MOS and OM degradation: The reason for seeing contamination in the MOS2 monitoring but not in the MOS1 is unknown. OM degradation is linked to the degradation of the micro-channel plate and of the photocathode.
UG members further asked about the 'corrarea' correction, which is optional, and about the pn Timing mode calibration, where no further calibration has been done since last year's improvements.

After the presentation on the Analysis Software Future Plans, C. Sarazin asked about the status of the ESAS SAS package. C. Gabriel explained that further development of the package is on-going at the XMM-Newton US Guest Observer Facility, but that the incorporation into the SAS environment and especially in the CCF calibration file structure is still not complete. Only an entire embedding will allow better testing and will enable the necessary CCF version control.

N. Webb presented the status of the Survey Science Centre (SSC), highlighting especially the future plans for catalogue related work. UG members emphasized the importance of catalogue studies that are also addressing variability of XMM-Newton detected sources, e.g. the EXTraS project or another program studying spectra of variable sources and their derived photometric redshifts.

INPUT FROM THE COMMUNITY

As inputs from the community and for further discussion, N. Schartel presented two issues, 1) On the potential change of the ToO policy (i.e. discontinuing the acceptance of anticipated ToOs with priority C, and 2) XMM-Newton 'Legacy'-type programmes that are performed over several AOs and are granted a significant fraction of the available XMM-Newton observing time.

With respect to the ToO policy it was discussed and agreed that, starting with AO-16, ToOs will only be accepted as A- or B-priority targets (and with a validity for triggering of up to three AOs). C-type ToOs (with validity for one AO) will be discontinued. In addition, PIs will need to provide details on trigger criteria, reaction time and observing strategy during Phase I of the proposal submission. These details (and proposal abstracts that have always been publicly available) will be accessible from the ToO Details web page at http://www.cosmos.esa.int/web/xmm-newton/too-details. This practice should reduce the problem of duplication of requests from other PIs. Changes of the ToO Policy will be explained in the 'Policies and Procedure' document and highlighted in the AO-16 opening announcements.

With respect to 'Legacy'-type programmes, N. Schartel explained that one of the outcomes of the recently held workshop "XMM-Newton: The Next Decade" were discussions currently on-going on how to open XMM-Newton for observing programmes that are asking for more time, even beyond the limits of Large and Very Large Programmes. Such 'Legacy'-type programmes would need to be performed over several AOs, due to visibility limitations but also in order to preserve the normal Guest Observer program. Instead of asking the community for White Papers describing the future science with XMM-Newton (a possibility also raised at the recent workshop) it seems to be more efficient to allow for such `Multi –Year Heritage Programmes' to be

proposed in the future. Further details on that approach will need to be worked out together with the OTAC Chair. UG showed their support in formulating the related **Recommendation 2016-06-08/04.**
A. Decourchelle raised a community concern that it seems to be difficult to obtain OTAC approval for relatively small amounts of observing time that might be needed in order to complete an already (almost completely) observed sample of targets. The hesitation by OTAC is understandable as such additional observations are perhaps seen as being incremental and so 'not producing new science' nor might they result in additional publications. However, the UG is convinced that the completion of samples indeed has a legacy value and should therefore be facilitated through OTAC evaluation of identified 'fulfil' programmes, see related **Recommendation 2016-06-08/05.**

C. Sarazin informed the UG concerning the outcome of the NASA Astrophysics Senior Review that included an evaluation of XMM-Newton. He noted that the proposal and presentation (given by S. Snowden, C. Sarazin and N. Schartel) received very positive feedback.

N. Rea presented a community based proposal to perform LIGO GW follow-ups with XMM-Newton slew mode survey observations (cf. Troja et al., ApJ 822, L8, (2016)). N. Schartel explained – as had been communicated previously several times to people involved in this proposal - that in 2006 the slew mode survey was tested and found to be unaffordable: since after a slew is performed the pointing position may need to be manually adjusted (by a SPACON) which, in the case of a slew survey will require considerable additional effort, especially as SPACONs are shared with other missions since 2008. In addition, planning of the slew mode survey requires additional mission planning effort which was not affordable with available resources at that time, and neither is it now especially with reduced resources. It is expected that GW event positions will be known with higher precision in the future so that ToO-like pointed observations will become feasible for follow-up studies.

Community input asking for changes in the way default settings of OM filters are introduced as part of the 2nd phase proposal submission were discussed, but will not be implemented since constraint violations for OM exposures might be introduced by such an approach that will hamper the 2nd phase proposal submission. The current approach - to check and set OM exposures as part of the Community Support & Scientific Planning Team provided Proposal Enhancement activity, following predefined recommendations for default OM exposures (explained in the Users Handbook) - is seen as a valid and well established method to guarantee optimum OM filter settings.

N. Rea reported on calibration related issues that are seen as important within the community: inputs concern the EPIC timing mode calibration; the detection of spurious spikes (< 0.1 s) seen in timing mode periodicity searches; galactic sources with soft excess (< 1 keV) in EPIC; the unknown level of systematic uncertainties in the PSF as a function of energy and off-axis angle (needed in studies of galactic sources and scattering halos). The SOC asked for examples of the first two items. The UG took note and lists calibration matters in order of priority in **Recommendation 2016-06-08/01** and **/02**.

Asked by N. Rea (on the second day) about any possible future joint program with radio facilities, N. Schartel explained that he had approached the European VLBI Network (EVN) but that a joint program with XMM-Newton was in the end not working out. A main concern from the radio side was that a joint program would imply the evaluation of the radio visibility by an OTAC without radio experts. Currently no further activities to set up a joint radio frequency program are planned; the proposal is first to see and evaluate how the joint program with NuSTAR, which involves a large amount of observing time, is working out.
N. Rea further suggested that proposals asking for joint observing time from another facility could be sent to the partners in the joint program for them to carry out a technical evaluation of their part before the OTAC meets. The SOC is indeed already following that approach and a feasibility study is done for all joint programmes and by both partners involved.

The meeting concluded, without any further AOB, on the 1st day at 17:50.

DEDICATED DISCUSSION:

Discussions continued on June 8th starting at 10:00; UG discussed and finalized resolutions, recommendations and action items, based on a draft prepared by M. J. Ward, summarizing items that arose from discussion of presentations received on the 1st day of the meeting.

RECOMMENDATIONS FROM PREVIOUS MEETINGS

In the UG's executive session that started at 13:30, M. Ehle presented, and UG reviewed the status of resolutions, recommendations and action items formulated at previous meetings. Their disposition grouped by topic is as follows:

On Target-of-Opportunity (ToO) Policies:

Recommendation 2014-04-11/03: The UG recommends that a realistic and sufficient amount of observing time is allocated at every AO to anticipated ToO observations. This amount of observing time should be estimated using the real number of ToOs executed in previous AOs, among other factors. The OTAC should allocate up to that amount of observing time by carefully ranking the ToO proposals.
In that scenario the UG recommends that there are no changes in the rules for ToO triggers, and expects that this will decrease the amount of executed normal Priority C observations. The situation regarding the latter point will be reviewed in 2 years time. **Closed.**

On the XMM-Newton Scientific Archive:

Action-Item 2014-04-11/01: While recognising that this might take significant effort, the UG suggests that a useful addition to the EPIC X-ray source archive would be that OM data products would be made easily accessible for every X-ray source. This would probably enhance the use of OM-related data products in the science derived from XMM-Newton data. Both the SOC and the SSC agreed to look into options. **Closed.**

Recommendation 2015-05-22/04: The UG commends the continuing work that has been carried out on this important resource. The UG recommends that all 75 open issues detailed in the attachment related to the mission archive should be closed as soon as possible and with highest priority, and noted that many of these were already available in the previous version of the archive. **On-going.**

On the Pipeline:

Recommendation 2014-04-11/05: With regard to the new pipeline products, the UG notes the addition of EPIC images binned to 1"x1", but strongly suggests to keep the existing 4"x4" format as well. **Accepted & Closed.**

On Ground Station Availability:

Resolution 2015-05-22/01: The UG was informed that the Perth ground station will cease to be available during 2016. Furthermore, frequently other ground stations are unavailable. It is considered to be of the highest priority that continuous ground station coverage be maintained for two reasons. First, the loss of good quality science observations is unacceptable given the high oversubscription factor. Also, the significant temperature fluctuations on the MOS detectors that will occur during eclipse periods, are potentially harmful, and will compromise the data quality over time. Therefore, there is a clear cost benefit advantage in procuring access to ground stations to replace those that become unavailable. **Closed.**

On Assessment of Reaction Wheel Failures:

Recommendation 2015-05-22/01: If a reaction wheel fails for some reason then operations should still continue under a contingency plan for 3 reaction wheel operation, which is already planned. In the event of the loss of a further wheel, it should be considered whether a very restricted operational mode should be implemented. Industry has studied this case, but requires a substantial financial commitment to keep the knowledge of it active. The UG is not convinced that this would be a justified use of resources. **Closed.**

On Calibration Requirements:

Resolution 2015-05-22/02: The UG commends the XMM-Newton project staff for the progress made in this area, and it endorses the report that was tabled at this meeting, document XMM-PS-RQ-002. **Closed.**

On Calibration Priorities:

Recommendation 2014-04-11/01: The UG establishes the following priorities for the calibration activities:

1. ...
2. Understanding the background for low-surface brightness observations
    a. Recognise Dr. David Lumb's contributions and encourage him to continue with the on-going progress on stray-light in-orbit calibration activities. **Closed.**

Recommendation 2015-05-22/02: The UG identifies the following tasks in order of priority;

1. Cross-calibration of the responses of the XMM-Newton X-ray cameras and spectrometers. This is a longstanding issue, and it should be resolved as far as is possible in the near future.
2. Evidence for a shift in gain of the PN detectors, which is dependent on the quiescent background. This should be investigated and quantified, and a correction implemented.
3. Calibrated spectra from NuSTAR and XMM-Newton sometimes show a significant mis-match in spectral slope and offset above 3keV. This is a matter which the IACHEC should be encouraged to investigate.
4. Complete the calibration of the PN Burst Mode, RDPHA correction.

All on-going and kept as **Recommendation 2016-06-08/01.**

On Links between XMM-Newton and NuSTAR:

Recommendation 2015-05-22/03: The UG noted the successful agreement that had been in place for scientifically linked observations between XMM-Newton and NuSTAR. Now that NuSTAR is operating as a partially open time facility, the UG recommends that this agreement should now progress to the level of a Joint Programme (at the level of 1.5Msec on each side), and should be implemented in this way starting from the next mission AOs. In general the UG wishes to encourage the science of multi-frequency programmes. It suggests that means be found to facilitate such opportunities, and that they should be assessed on a case-by-case basis. **NuSTAR part closed; otherwise standard task** (e.g. agreement with JWST under study).

On XMM-Newton Post-Mission Data Analysis:

Recommendation 2015-05-22/05: The UG recognises that XMM-Newton data will continue to be used by the community for many years after the operational phase of the mission is complete. It is important to consider this now, since after the end of this phase the resources available to the project will be much reduced. The preferred way forward is to ensure that data analysis can be carried out independent of a

possible "virtual machine" option which would have a limited lifetime of 10-15 years. The UG endorses the proposal to carry out a study of how a long term solution may be achieved, for example by using ftools. **Closed: superseded by actions under study in the context of post-mission activities.**

On Minimum Requirements for a long-term Scientific Data Analysis:

Action-Item 2015-05-22/03: The UG is invited to contact the Project Scientist with inputs on minimum requirements for a long-term Scientific Data Analysis (aiming ~15 years into the future). Requirements should address analysis goals that should still be possible to attain even when no SAS is running on any machine anymore, when no software support will be available, and when the currently planned virtual machine set-up might no longer be available. Inputs should reach the Project Scientist by July 1, 2015. **Closed.**

On a new OTAC Chairperson:

Action-Item 2015-05-22/01: The UG is invited to contact the Project Scientist with proposals for a new OTAC chairperson needed for AO-17. The UG suggestions should reach the Project Scientist by July 1, 2015. **Closed.**

On a venue for the next X-ray Symposium in 2017:

Action-Item 2015-05-22/02: The UG is invited to contact the Project Scientist with proposals for a venue for the next major international symposium in the series "The X-ray Universe" which is planned for 2017. Ideally the proposals should be specific and point to economic venues, like universities or congress centres. As preparations need to start in 2015 already, suggestions should reach the Project Scientist by August 1, 2015. **Closed.**

RESOLUTIONS, RECOMMENDATIONS AND ACTION ITEMS

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

On Calibration matters of high priority:

Recommendation 2016-06-08/01: As result of some recent investigations, there is now a requirement to implement an iterative adjustment to the parameters for the 2-D PSF. This is in order to minimise the spectral residuals between an angular extracted spectrum and the total spectrum. This activity needs to be considered as of the highest priority because of its impact on many other aspects of the calibration.
The UG recommends to continue working on the previous list of calibration matters that are on-going (cf. **Recommendation 2015-05-22/02**) and then to follow on with a new recommendation:

Recommendation 2016-06-08/02: The time and energy reconstruction of the pn Timing mode should be studied with respect to recently observed discrepancies.

On the Proposal for a SPACON arrangement involving XMM-Newton, Gaia and INTEGRAL:

Resolution 2016-06-08/01: The UG recognises the reasons for this proposed arrangement, which is still under study at this time. However, in order to protect the scientific return from XMM-Newton it strongly recommends that every effort be made to limit the impact of this new arrangement to be below 2%, after one year.

On the Prioritisation of Effort:

Recommendation 2016-06-08/03: It has been agreed that project's effort needs to be directed towards anticipated post operations support wherever possible, so that we are prepared for this eventuality, whenever it may occur. This timing is required due to the very limited budget that is foreseen for this phase of the mission. Since additional resources for this activity are not foreseen, they will inevitably need to be found via some redirection of existing activities. Therefore the UG was invited by the Mission Manager to give a view on crucial elements of various activities which should be protected.
It is indisputable that the activities listed by the Mission Manager, SAS, ToO planning and Calibration, provide essential elements of the project, and so must be maintained. However, for example in the SAS there is the possibility to reduce the number of platforms made available to community, and to continue the plan to eventually withdraw the 32 bit version.
Regarding the ToOs, the UG is convinced that the availability of these is recognised as a major strength of the XMM-Newton project, and often results in very high impact scientific returns. Therefore the UG recommends that the ToOs should not be reduced.
Instrument calibration is a continuous and evolving activity. Clearly without the best calibration input, all scientific results are potentially compromised. Based on community feedback (including expertise within the UG itself), the UG is of the firm opinion that project support available in this area is already too limited, and that any further reduction would be very detrimental, and so should not be implemented.

On Multi-Year Heritage Programmes:

Recommendation 2016-06-08/04: At a recent Workshop: "XMM-Newton: The Next Decade", it was clear that there was widespread support at this stage of the mission, for consideration of a new type of observing proposal. This would encourage visionary programmes which would not otherwise be likely to emerge because of the time constraints within allocation cycles, and also a perception that they would be unlikely to succeed in competition with other more standard proposals. The details of the scope and implementation of this new category of proposal would be discussed further within the UG and with the new OTAC chairperson, with a view to offering it in cycle AO-17.

On "Fulfil" Programmes:

Recommendation 2016-06-08/05: The UG recognizes the need to complete important samples, to observe key targets of other wavelengths and targets otherwise important within an archival context and from legacy considerations. The UG recommends to establish a "fulfil" program to serve such demands better.

On Extension of Mission:

Recommendation 2016-06-08/06: Over 16 years the XMM-Newton mission has been producing world-class science, and there is no sign of this diminishing. No doubt XMM-Newton will continue to produce excellent "stand-alone" science in its energy domain. In addition, we are entering an era of major new

facilities, to which XMM-Newton will provide its unique synergy to the wide astronomy community. Therefore, the UG strongly recommends the extension of the XMM-Newton mission.

On Extension Presentation Format:

Recommendation 2016-06-08/07: UG recommends that the Mission Extension presentation shall be given together by the Project Scientist and the UG Chair.

The executive session ended on June 8th at 15:00.

Date of next meeting: (two days TBC after doodle poll) in May 2017, starting at 10:00 at ESAC.