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MEETING

Meeting Date 11-12 May 2017

Ref MoMUG#18

Meeting Place ESAC/XMM-Newton SOC B5/B65

Chairperson Martin J. Ward

Minute's Date 15 May 2017

Participants

UG members: Martin J. Ward (Chair), Hans Böhringer, Anne Decourchelle, Ioannis Georgantopoulos, Jimmy Irwin (remotely), Christine Jones, Nanda Rea, Beate Stelzer

In attendance: Norbert Schartel (Project Scientist), 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); Craig Sarazin and Richard Mushotzky (former UG members); Presenters and interested staff from the XMM-Newton Science Operations Centre.

Absent: UG members Maria Díaz Trigo, Peter Schneider (OTAC Chair), Fred Jansen (Mission Manager), and the invited external experts Mat Page (OM acting PI), Steve Sembay (EPIC MOS acting PI), and Mike Watson (Survey Scientist) had excused themselves.

Subject
 Minutes of XMM-Newton Users' Group Meeting 18

Copy

Description	Action	Due Date
Edited by Matthias Ehle. Approved by UG members on 28 June 2017		



WELCOME:

M. J. Ward (Chair) and N. Schartel (Project Scientist) opened the meeting on May 11th at 10:00. New Users' Group (UG) members were welcomed and all panel and auditorium 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 panel members, after agreeing to change the order of Roadmap related talks on 'RISA' and 'SAS / medium and long-term Strategy'.

PRESENTATIONS:

The following presentations were given on May 11th:

Overall Mission Status	(M. Santos-Lleó for F. Jansen; 10:10-10:35)
Instrument Operations	(R. Muñoz; 10:35-11:05)
Report of the Project Scientist	(N. Schartel; 11:05-11:30)
User Support and Mission Planning	(M. Ehle; 11:50-12:15)
Calibration	(M. Smith*; 12:15-13:10) *with input from R. Gonzalez (RGS) and A. Talavera (OM)
Roadmap for XMM-Newton Post-Operation	(S. Migliari; 14:30-14:40)
Pipeline	(P. Rodriguez; 14:40-15:00)
SAS / medium and long-term Strategy	(C. Gabriel; 15:00-15:35)
RISA	(A. Ibarra ; 15:35- 15:50)
SSC Status	(N. Webb; 16:15-16:55)

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, UG members asked about the fuel consumption as limiting factor for the XMM-Newton extension beyond 2028. M. Santos-Lleó explained that the current fuel limits are based on conservative assumptions by MOC concerning how much fuel is left and how much can be used. In addition, an assumption of one Emergency Sun Acquisition Mode (ESAM) event per year has been made.

Asked about the plan for replacement of XMM-Newton SOC staff retiring in the near future, M. Santos-Lleó explained that a full replacement is foreseen, dependent on further XMM-Newton mission extensions. UG decided later to issue related **Recommendation 2017-05-11/03**.

After the presentation on Instrument Operations & Data Generation, UG members asked about the handling of XMM-Newton anomalies and emergencies, such as ESAMs, within the future SPACON merger scenario. R. Muñoz explained that safety is not compromised. The approach taken is to define “super-critical events” that will trigger immediate attention in case of SPACON constraints. It should, however, be noted that a negative impact on efficiency (e.g. for resumption of science observations) can be expected, cf. **Resolution 2016-06-08/01**.



The Report of the Project Scientist led UG to a discussion of possible impacts of the new “Multi-Year Heritage” Programmes on Large and Very-Large Programmes. N. Schartel clarified that the time allocation for AO-17 will be changed, reducing the 13 Ms time for A and B category targets to 10 Ms such that extra time for the new programme and for joint programmes (e.g. NuSTAR) will be available. Asked whether people who missed the deadline for Letters of Intent are allowed to submit Heritage Programmes, he confirmed that this option indeed still exists.

Asked about the criteria for the new “Fulfil” Programmes, N. Schartel summarized that this category will allow for proposals that are e.g. asking for observing time for important sample studies that are missing some important targets, for key targets that are linked to studies at other wavelengths, and in general for proposals in which the “legacy” aspect is clearly important.

Details on both new programmes will be provided in the documentation of the call for AO-17.

The presentation on User Support and Mission Planning was followed by UG members asking about the usage of the XMM-Newton Science Archive (XSA): a certain upward-trend seems to exist in the presented XSA usage plots that will continued to be monitored.

Asked for an explanation for the number of revolutions that need to be rescheduled by Mission Planning due to change requests by Principal Investigators (PIs), M. Ehle explained that most requests are already implemented during the proposal enhancement activity. Advanced scheduling of the order of several weeks is important as it allows PIs to organize coordinated observations, and as a buffer in case of problems (s/w or h/w) in the mission planning system, or schedule rejection by the MOC.

Related to “The X-ray Universe 2017” conference registration, J. Kaastra asked why Dutch participants have to pay a higher fee than everybody else: This is an unfortunate anomaly which is a consequence of the Conference Bureau chosen to handle the registration. Participants from institutes located within the EU do not need to pay VAT as the reverse charge mechanism applies. However, for participants from Dutch institutes this is not possible as the Conference Bureau is based in The Netherlands.

After the presentation on Calibration, UG members asked about the planned update of the EPIC Point-Spread-Function (PSF) calibration and its impact on the effective area calibration; M. Smith explained that the PSF and a further effective area correction are both being tested based on point-like sources. These tests are expected to be completed soon and after which both corrections will be released.

Asked about the cross-calibration between XMM-Newton and Swift XRT, N. Schartel explained that some publications by the IACHEC group are addressing this issue. Comparing XMM-Newton with NuSTAR, the new PSF is expected to further improve the cross-calibration. In connection with this the UG issued the **Recommendation 2017-05-11/05**.

After the presentation on the Roadmap for XMM-Newton Post Operations, S. Migliari confirmed that high priority activities (Pipeline and Archive Content) can and have been started already; some activities are ready to be fulfilled before the start of the Post Operations, whereas others will need to come later, some of them up to the end of the Operational Phase, e.g. final bulk reprocessing. In relation to this the UG expressed their agreement with the proposed Roadmap and priorities and formulated **Endorsement 2017-05-11/01**.

The presentation on the Pipeline by P. Rodriguez resulted in some discussion on the limitations for automatic source detection in the case of marginally extended sources using spline fits (that are coped with during screening), sharp features in the presented images of extended emission (that in those images are indeed real and not related to CCD edge-effects), and the plan to improve the computation of the Energy Conversion Factors (ECFs).

UG agreed the presented plan for further Pipeline development and formulated **Recommendation 2017-05-11/02**.

Based on the presentation on SAS, UG members asked if SAS releases as Virtual Machines (VMs) could completely replace current Operating System (OS) specific releases. C. Gabriel explained that VMs are not so convenient to work with. They are imposing an extra OS on top of the one running already existing on the



current hardware. The SOC is carefully monitoring future usage of “Dockers” which could potentially make it easier for the users to work with, but this strategy alone is not expected to allow for the discontinuation of SAS compiled releases during operations. Other strategies were discussed in his presentation, and in the associated document. At the XMM-Newton “End of Mission”, a final SAS release (as VM or Docker) is foreseen, among other options mentioned in the presentation, i.e. offering remote data analysis via web services and providing the SAS source code after being ‘modernized’ and documented.

UG supported the presented medium and long-term strategies for SAS, with the **Endorsement 2017-05-11/02**.

Asked about a possible transfer and reuse of the XMM-Newton SAS for Athena, C. Gabriel explained that such a decision would depend on the outcome of planning for Athena. A significant part of the SAS is XMM-Newton independent (e.g. the data access layers); instrument specific s/w was provided by instrument consortia. The UG addressed a possible synergy with Athena in **Recommendation 2017-05-11/03**.

After the presentation on RISA, the Remote Interface to SAS Analysis, UG took an action to provide feedback on the current implementation as part of XSAv9.4 (**Action Item 2017-05-11/01**), and reported this in **Recommendation 2017-05-11/04**.

Asked about any security issues for RISA, A. Ibarra explained that security and firewall/access are defined by the XSA setups: if users can access data in XSA, then they also can work with RISA.

N. Webb presented the status of the Survey Science Centre (SSC) and the release plan for the 3XMM Serendipitous Source Catalogue incremental releases (DR7 and 8) and development plans for the 4XMM and the stacked catalogue. Asked about the difference between a suggested ‘expert’ versus ‘user’ version of the catalogues, N. Webb explained that the idea is to make the ‘user’ version very robust, i.e. include only ‘top quality’ sources in it, whereas the ‘expert’ version will contain more sources with comprehensive flags that indicate the quality of a source, e.g. if embedded in extended emission, if close to bad CCD areas, etc.

UG expressed their appreciation of the work that SSC is doing, and gave their opinion about plans and the catalogue versions in **Recommendation 2017-05-11/01**.

INPUT FROM THE COMMUNITY

As inputs from the community and for further discussion, UG discussed inputs received 1) asking for a possible increase of Director’s Discretionary Time (DDT) for Targets of Opportunity (ToOs) and 2) on a reconsideration of ToOs accepted in category C, i.e. being valid for one year only, at least for some of the OTAC panels.

N. Schartel reminded the UG that by default ToOs should be proposed during the Announcement of Opportunities, and not as DDT.

With respect to ToOs in category C, he further reminded the UG that this approach was adopted as of AO-16, following discussion and agreement during the 2016 UG meeting. The objective was to improve the situation of pending ToOs: the observing time dedicated to ToOs has not been reduced; there are just fewer pending targets and less duplication as a result of this change. In addition, a 3 year validity of accepted ToOs was seen advantageous as it allows PIs to organize coordinated observations with other observatories for which calls for proposal are not in phase with XMM-Newton AOs, e.g. for bursting Galactic black holes that are selected for follow up with radio observatories.

The UG chair, M. J. Ward, took **Action Item 2017-05-11/02** in order to discuss this issue further with the OTAC chairperson.

Related to the impact of the variable radiation background on scientific observations, A. Decourchelle asked whether SOC is monitoring the radiation. This is indeed the case and documented in XMM-SOC-GEN-TN-0014, a Technical Note updated once per year. She further asked if it could be possible to find a way to



automatically evaluate time lost due to flares and to compensate for this. Time lost when instruments need to be closed due to high radiation is considered. If data continues to be taken then a case-by-case evaluation on whether the scientific objective aimed for and described in the proposal could be achieved with the actual signal-to-noise and live time would be needed, in order to decide for or against the award of compensation time. In the past similar UG discussions led to the conclusion that only the PI can make this evaluation and if appropriate submit a request for additional time, which is then to be evaluated by OTAC. Currently, no alternative option is considered to be feasible.

As both Richard Mushotzky and Craig Sarazin participated for the last time in an XMM-Newton Users' Group Meeting, M. J. Ward thanked them, on behalf of the UG, for all their work for the XMM-Newton project and their long-term commitment (adding up to some 30 years in case of R. Mushotzky!). These words of thanks were strongly supported by all of the participants.

The meeting concluded, without any further AOB, on the 1st day at 17:15.

DEDICATED DISCUSSION:

Discussions continued on May 12th 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 discussions 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 the XMM-Newton Scientific Archive:

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. **Closed: routine task.**

On Calibration Priorities:

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 mismatch 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.



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. **On-going.**

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-going.**

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-going.**

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. **Closed: SAS part.**

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. **Closed: no reduction of ToOs.**

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. **Closed: no reduction.**

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. **Closed: planned for 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. **Closed: planned for AO-17.**

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. **Closed.**

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. **Closed.**

RESOLUTIONS, RECOMMENDATIONS AND ACTION ITEMS

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

On the XMM-Newton Survey Science Centre (SSC)

Recommendation 2017-05-11/01: The UG noted the SSC’s continued valued contribution to the high scientific impact of XMM-Newton, via the production of catalogues and input into other areas such as the SAS development. The SSC is working on provision of a “stacked source” catalogue containing new fainter source detections. This will be a valuable addition to the archive, when it becomes available later this year. Of the various tasks identified by the SSC for the coming years, it is considered highly desirable to give a high priority to new data products that could be used to search for source variability, between separate XMM-Newton observations. Also, it is recommended that effort should be directed towards the provision of one version of the 4XMM catalogue, for the whole scientific community.

On the Post-Operations Road-Map

Endorsement 2017-05-11/01: The post-operations road-map identifies all the key elements required for the mission heritage and identifies the optimized pipeline products and the post-mission SAS sustainability as the two most important features, in that order. The UG endorses the road map and recommends its implementation as far as resources permit, i.e. maintaining current SOC activities as recommended last year (see **Recommendation 2016-06-08/03**).

On the Scientific Analysis System (SAS)

Endorsement 2017-05-11/02: The SAS long term and post-operations survival strategy rests on three pillars: (1) SAS running on a virtual machine platform, (2) RISA and (3) provision of a public source code.



The UG endorses this strategy and recommends its implementation as far as resources permit, i.e. maintaining current SOC activities as recommended last year (see **Recommendation 2016-06-08/03**).

On the Pipeline Processing System

Recommendation 2017-05-11/02: The UG noted the ambitious list of current development activities in the pipeline, incorporating EPIC and OM light curves for a single source into a single file, and including pile-up level estimates in the source products. The UG endorses the current planned developments and recommends continuing the optimization of pipeline products as a high priority.

On the Erosion of Expertize and Cross-mission Synergies

Recommendation 2017-05-11/03: A significant continuing challenge is the erosion of expertise via staff retirements and the potential movement of staff onto other projects. Whilst this process is inevitable the UG recommends that consideration be given to cross-mission synergies with future missions, Athena in particular, in the areas of pipeline products and the associated software.

On the Remote Interface for Scientific Analysis (RISA)

Recommendation 2017-05-11/04: The UG noted that RISA is both a current resource, as well as providing the basis for the long-term preservation of the Scientific Analysis System (SAS). The UG endorses RISA and recommends its further development. Since RISA is still in its early phase, the UG strongly encourages XMM-Newton users, particularly those already familiar with the SAS, to test the RISA in terms of its functionality, and with attention to its key role in maintaining the legacy of XMM-Newton observations. The UG recommends using the feedback from these users and from the UG, to ensure the best possible provision for the post-mission phase.

In addition, UG took the following action:

Action Item 2017-05-11/01: All members of the UG are kindly requested to test out the RISA with the aim of identifying the essential functionality. Reports are to be sent to the Project Scientist (with a deadline of **end June 2017**)

On Calibration matters of high priority:

Recommendation 2017-05-11/05: The NuSTAR off-axis observation of the Crab has the potential to serve as a “standard candle” in the hard X-ray domain by virtue of the significant overlap with the bandwidth of the EPIC detectors. Therefore the UG recommends that the SOC study the implications of this observation in the context of the still open UG recommendations on calibration issues: **Recommendations 2015-05-22/02-1, 2015-05-22/02-3, 2015-05-22/02-4, and 2016-06-08/02.**

On the Target-of-Opportunity (ToO) Observations

Action Item 2017-05-11/02: The chairperson of the UG is asked to contact the chairperson of OTAC in relation to the change last year, which removed the possibility for OTAC to accept TOO observations in the priority C category.



On the Topic for the 2018 Science Workshop

Action Item 2017-05-11/03: All members of the UG are kindly requested to suggest topics for the 2018 scientific workshop to be sent to the Project Scientist (with a deadline of **15 June 2017**)

On Candidates for the UG Chairperson

Action Item 2017-05-11/04: All members of the UG are kindly requested to suggest candidates for the next UG chairperson to be sent to the Project Scientist (with a deadline of **15 June 2017**).

On Candidates for Members of the UG

Action Item 2017-05-11/05: All members of the UG are kindly requested to suggest candidates for future members of the UG to be sent to the Project Scientist (with a deadline of **15 June 2017**).

The executive session ended on May 12th at 14:30.

Date of next meeting: May 17 (Thursday) and 18, 2018, starting at 10:00 at ESAC.