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MEETING

Meeting Date 19-20 April 2012

Ref MoMUG#13

Meeting Place ESAC/XMM-Newton SOC B3

Chairperson Xavier Barcons

Minute's Date 3 May 2012

Participants
Members: Xavier Barcons (Chair), Massimo Cappi, Anne Decourchelle, Christine Done, Manuel Güdel, Frank Haberl, Mariano Mendez, Richard Mushotzky, Craig Sarazin (via telecon); Norbert Scharrel (Project Scientist), Arvind Parmar (Mission Manager), Maria Santos-Lleo (Science Support Manager), Matthias Ehle (UG secretary);
Invitees: Steve Sembay (EPIC PI), Jelle Kaastra (RGS PI), Mat Page (OM acting PI), Mike Watson (Survey Scientist); Presenters and interested staff from the XMM-Newton Science Operations Centre.
 Absent: Catherine Cesarsky (OTAC Chair) had excused herself.

Subject
 Minutes of XMM-Newton Users Group Meeting 13

Copy

Description	Action	Due Date
Edited by Matthias Ehle. Approved by UG members on 27-05-2012		



WELCOME:

X. Barcons (Chair) and N. Schartel opened the meeting on April 19th at 10:00. New members of the Users Group, Anne Decourchelle, Christine Done, Craig Sarazin, and Richard Mushotzky (in his new role as external member) were welcomed. Being the 1st meeting after the recent reorganisation of this group, the Users Group expressed sincere thanks to the former members, in particular the XMM-Newton Mission Scientists (Jacqueline Bergeron, Richard Mushotzky, Richard Griffiths), the Telescope Scientist (Bernd Aschenbach), the instrument Principal Investigators (Steve Sembay, Jelle Kaastra, Mat Page), and the Survey Scientist (Mike Watson). The Chair explained the new format of the meetings, with an executive session at the end of the second day, where the formal UG members will meet. He hoped that the new UG membership and the new format for the meetings would work well.

ADOPTION OF THE AGENDA:

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

PRESENTATIONS:

The following presentations were given on April 19th:

3. Overall Mission Status	(A. Parmar; 10:05-10:35)
4. Instrument Operations	(R. Muñoz; 10:45-10:55)
5. Report of the Project Scientist	(N. Schartel; 11:00-11:25)
6. User Support and Mission Planning	(M. Ehle; 11:55-12:20)
7. Calibration	(M. Guainazzi; 12:25-13:20)
8. SAS Status & Pipeline Transfer	(C. Gabriel; 14:40-15:10)
9. SSC status	(M. Watson; 15:15-15:30)
10. Large Programmes	(N. Schartel; 15:35-15:45)

The view-graphs of the presentations are available on 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, X. Barcons underlined the importance of the science case for the extension of XMM-Newton and strongly encouraged UG members to help providing inputs on scientific highlights in their field of research to the Project Scientist.

Related to the received information on the study and possible implementation of the 4 Reaction Wheel Drive option for the XMM-Newton spacecraft, UG formulated Recommendation 2012-04-20/02 (see below).

After the presentation on Instrument Operations, R. Muñoz was asked about the improvement of observing efficiency. He explained that this improvement is very small, about 3% more of time now dedicated to science. This time has been gained thanks to a more or less equal sharing of improved efficiency in reducing instrument overhead, in scheduling (by e.g. using spacecraft calibration time for parallel instrument calibration) and in reducing the time in contingencies (mainly because of ground stations support to other launches or instrument related events).

There was also a question whether any impact from the most recent solar flares has been detected on the instruments, and M. Guainazzi explained that there is no impact so far.

The Report of the Project Scientist led the UG to discuss their plans for resolutions and recommendations related to public outreach, mission extension, importance of joint and large programmes, and literature impact study. These were formulated in detail on the next day and are listed below.



After the presentation, the UG expressed its agreement with N. ScharTEL's words about the Survey Science Consortium (SSC) contribution to the XMM-Newton project, thanked the SSC and recognized the incredible benefits the project had due to their dedicated involvement. M. Watson acknowledged these words.

The presentation on User Support and Mission Planning was followed by a question on Mosaic Mode observations in the Science Archive (XSA): currently any search is limited to the central position of a Mosaic observation only, but the next XSA version together with planned improvements in the SAS and pipeline processing is foreseen to improve on this. A few other questions were raised: about the start of the AO cycle and scheduling of C-priority targets, how the archive "active users" are defined (people who downloaded data) and about SAS workshop participants (mostly from Europe but also from elsewhere).

After the presentation on Calibration, the UG suggested to formulate recommendations in order to propose priorities in the discussed list of activities foreseen in 2012. A question on the low energy limit of the EPIC-pn timing mode calibration was answered by M. Guainazzi with ~ 0.75 keV being the limit below which measurements start to be dominated by electronic noise. Further topics discussed included: pn-MOS cross calibration, pn timing and burst mode calibration and whether extrapolation from timing results to burst could be applied (the answer being no, because they are completely different in operation) and the time evolution of the astrometry residuals for which there currently is no clear understanding of its origin.

After the presentation on the SAS status, C. Gabriel presented a summary of the Pipeline Transfer from the SSC to the SOC.

M. Watson presented the status of the Survey Science Consortium highlighting especially the activities related to the generation of the 3XMM Serendipitous EPIC Source Catalogue.

After the final presentation of the day on Large Programmes, the UG discussed possible reasons for high citation rates: observations done in synergy with other facilities get higher impact, this may be coupled to the size of the community interested and working in the discussed science topic, possible differences in extragalactic vs. galactic sources (where more target classifications exist), and evolution with time since the start of the mission (early in the mission also short observations had a high impact, now - in general - more observing time is needed).

INPUT FROM THE COMMUNITY

C. Sarazin reported on the 2012 NASA senior review, which was extremely positive and in favour of XMM-Newton. Pending final decision, the recommendation was to continue funding the US Guest Observer Facility at their proposed levels and increase the General Observer funding support even above the requested level.

C. Done reported on an issue seen when comparing EPIC-pn fast mode data of bright sources with RXTE data: a fit e.g. to Crab observations in the energy band 3-10 keV results in a best fit single power-law with index 1.95 for EPIC-pn data, whereas the RXTE fit gives an index of 2.1. She also mentioned a possible notch line at 9 keV. S. Sembay and F. Haberl suggested repeating the fit covering the energy band up to 12 keV, for which the EPIC calibration still is good. M. Guainazzi commented that EPIC-pn calibration is considered being reliable as no change in spectral results is seen using different (imaging and fast) instrument readout modes. Comments from other UG members mentioned possible data-analysis related problems, like pile-up or background subtraction. N. ScharTEL reminded that in the 5-10 keV band EPIC will have overlap with the soon to be launched NuStar mission and $\sim 10\%$ of the AO-11 time has been approved for coordinated simultaneous observations; as a by-product, these observations could help to identify potential problems in XMM-Newton calibration, should they exist. Besides that, M. Guainazzi mentioned that the SOC is already planning simultaneous cross-calibration observations with NuStar since the very beginning of NuStar operations. UG endorsed the project collaboration with NuStar.

A. Decourchelle asked about the status of the cross-calibration with other missions and an update of the related documentation; M. Guainazzi explained the approach of the International Astronomical Consortium for High Energy Calibration (IACHEC): When possible, the group is publishing refereed papers that summarize the status of the cross calibration at a certain time. In order to report on status updates, IACHEC is maintaining a wiki-page at



<http://web.mit.edu/iachec>. It shall be noted that cross-calibration between different X-ray satellites is a best-effort activity of the IACHEC members.

A. Decourchelle brought forward the wish received from the community that higher level images (e.g., with background removed and vignetting corrected for) should become part of the pipeline processing and made available as products in XSA. M. Watson and N. Schartel reminded that processed flare filtered images are available already.

The 1st day of the meeting finished at 17:10.

DEDICATED DISCUSSION:

Discussions continued on April 20th starting at 10:05 and addressed the following items:

- Pipeline generated higher level images
Related to the input from the community item to provide pipeline generated higher level EPIC images, A. Decourchelle further explained the proposal: In order to be more sensitive to diffuse emission, EPIC images could automatically be corrected for exposure time, vignetting and instrumental background, and then smoothed adaptively. F. Haberl noted that this kind of images might be good for certain purposes but other ways of processing might be needed, e.g. for survey observations or source detections. As some processing tools do already exist both at Saclay and MPE, UG later formulated Recommendation 2012-04-20/07 (see below) to assess the possible implementation of such tools into SAS and XMM-Newton pipeline processing.
- Status of the slew survey
Information on latest slews and sources detected is published, a few days after observation, on a dedicated SOC web page at http://xmm.esac.esa.int/external/xmm_products/slew_results/web_slew.shtml
All slew observations are processed in the pipeline, although currently no source detection is performed. Raw and processed data are available from XSA with no proprietary period.
The slew survey catalogues is a 'private' research activity and updates (via XSA) are taking place about once per year.
- Calibration
M. Guainazzi presented once more the list of calibration activities in 2012 explaining to the UG the different items and planned order of priorities; UG later formulated Recommendation 2012-04-20/01 (see below).
- 4 Reaction Wheel Drive
UG understands that the implementation of the 4 Reaction Wheel Drive has become a risk mitigation action (handling of wheel caging will allow running the wheels at lower speed, which is better for the wheel lifetime) in addition to the original goal to reduce fuel consumption, i.e. priority has increased.
UG later formulated Recommendation 2012-04-20/02 (see below).
- Joint Programmes
UG discussed the different XMM-Newton joint programmes in more detail: N. Schartel explained the Swift proposal about a joint programme in which XMM-Newton OTAC is allowed to approve up to 300 ks of Swift observing time. UG later formulated Recommendation 2012-04-20/03 (see below).
As mentioned earlier, about 10% of the AO-11 XMM-Newton time is to be coordinated with NuStar observations. NuStar currently has no AO (just Guaranteed time). With respect to a possible future joint NuStar/XMM-Newton programme, UG formulated Recommendation 2012-04-20/04 (see below).
With respect to the HST joint programme (pilot project) N. Schartel explained that most proposals received by XMM-Newton were asking for UV/X-ray (mostly simultaneous) observations, and gave a brief overview. UG expressed the opinion that these are interesting programmes and later formulated Recommendation 2012-04-20/05 (see below).
- SAS
N. Schartel explained the increasing need of the community to be provided with SAS tools that allow the merging of data in order to make it easier to combine observations. M. Watson agreed and added that the currently available SAS task "merge" is not suited to do this job. The increased need of such tools is at least partially related to the long mission lifetime, because the number of observations of the same field or target has increased, and also partially related to large programmes aiming at deep exposures of single fields. In addition and also associated to a long living mission, the definition of new observing modes has motivated as well the need of new SAS analysis tools. This is the case for the Mosaic mode, which has justified new SAS tools to be



developed, which still need to be improved significantly. UG later formulated Resolution 2012-04-20/05 (see below) supporting the development of such tools.

- **Public Relations**
N. Schartel explained difficulties to get XMM-Newton stories accepted by the ESA Editorial Board. UG strongly encourages the project to continue in the attempt to promote XMM-Newton science results and later formulated the related Resolution 2012-04-20/04 (see below).
- **Catalogues**
M. Watson explained that SSC plans the next version of the XMM Serendipitous Source Catalogue (3XMM) to be ready in 2012 and that after 2012 SSC wants to continue its involvement in the XMM-Newton project, mainly with work on the catalogue (as agreed during the SSC Steering Group Meeting in Nov 2011 in Toulouse). The catalogue work after 3XMM may mainly consist in updating to new versions; SSC expects 3-6 months for processing. In addition to this, SSC can also guide pipeline processing requirements. Currently it is not completely clear how SSC activities are going to continue in the future, but any further catalogue generation would certainly be done in close collaboration with the SOC. N. Schartel added that further updates of the EPIC catalogue are certainly needed. UG later formulated Resolution 2012-04-20/02 and Recommendation 2012-04-20/06 (see below) supporting the SSC plans mentioned.
- **Mission Extension**
N. Schartel will contact UG members asking for input to prepare the science case for the mission extension: top results from the last two years in the research area of the UG member should be summarized in a few sentences together with top priorities for the future (see Action-Item 2012-04-20/03, below), although the later of course are subject to OTAC review and approval. N. Schartel also asked UG if a Galactic plane survey would make a strong case, among other, for future science with XMM-Newton, see Action-Item 2012-04-20/04.
- **X-ray Conference in 2014**
X. Barcons reminded UG members on the request by the Project Scientist to think about any possible location (central European capital) for the next major XMM-Newton organized conference, "The X-ray Universe 2014". No local activities should be started but ideas communicated to N. Schartel.
- **EPIC Background Working Group (BGWG)**
S. Sembay reminded UG that BGGWG activities like the provision of blank sky fields are currently all funded via Leicester University up to the end of 2012. A letter of recommendation from the UG is considered appropriate and will be helpful when asking for additional national funds. UG agreed and formulated Action-Item 2012-04-20/02 (see below).

RECOMMENDATIONS FROM PREVIOUS MEETINGS

In the UG's executive session that started at 13:35, M. Ehle presented and UG revised the status of recommendations formulated in previous meetings. Their disposition grouped by topic is as follows:

Related to EPIC-pn Timing and Burst Mode Calibration:

Recommendation 2010-05-12/02: It should be checked if EPIC-pn timing mode observations for possible background generation exist and can be made available to the community. **On-going**

Related to SAS:

Recommendation 2008-05-07/09: RISA should be evaluated some time after the first public release. **Dropped - UG will re-think opening a RISA related recommendation if needed.**

On Calibration:

Recommendation 2011-05-19/01: The XMM-Newton Project should continue its efforts on the following fronts with highest priority:

- a. Improve the calibration of bright source mode observations (timing and burst mode)
- b. Cross calibration between XMM-Newton instruments and cross-mission calibration
- c. Improve the full 2-dimensional characterisation of the Point Spread Function - **Partly closed**



- d. Improve the absolute wavelength scale calibration in the RGS and the characterisation of the Line Spread Function

Items a, b, and d are on-going and are transferred into Recommendation 2012-04-20/01 (see below).

Recommendation 2011-05-19/02: The XMM-Newton Project should prepare a list of clear strategies for RGS observations that can help to exclude any negative effects from the existing warm pixels in the RGS CCDs on the observations. **On-going**

On the Observing Programme:

Recommendation 2011-05-19/03: The XMM-Newton Project should agree with the HST Project to issue a joint XMM-Newton/HST pilot programme for the next AO, which would include up to 30 HST orbits to be allocated by the XMM-Newton OTAC and up to 150-200 ks to be allocated by the HST TAC in terms of programmes using both facilities. The UG will review the subscription and allocation of proposals of this pilot programme in its 2012 meeting. **Closed**

Recommendation 2011-05-19/04: The XMM-Newton Project should closely monitor the scientific output of the LPs and the VLPs in terms of their publications and any other deliverables that the proposing teams committed to. In upcoming Calls for Proposals it is expected that teams proposing LPs and VLPs make explicit their plans to exploit the granted data and deliver whatever products they commit to. **Closed**

Recommendation 2011-05-19/05: The XMM-Newton Project should prepare a report on the statistics of Time Allocation across the various AOs, which shows the distribution and oversubscription by science categories, and lists the titles and PIs of LPs and VLPs. Should any information on the publications for each scientific category be available in the timeframe of the next UG meeting, this would also be very interesting to be included this report. **Closed**

On the XMM-Newton Mission Extension:

Recommendation 2011-05-19/06: The XMM-Newton Project should make sure that all tests needed for the exploration of scenarios extending XMM-Newton's lifetime are conducted as soon as possible, with the hope that a positive outcome will open the door to having one of the most productive ESA mission ever continuing to deliver top science to around 2025. **Closed**

Recommendation 2011-05-19/07: ESA management should ensure that new accounting system does not jeopardise possible future extensions of XMM-Newton. **Open**

On Information about DDT and ToO Observations:

Recommendation 2011-05-19/08: The DDT and TOO observation web page should be updated on a weekly basis to have the community duly informed about the progress on the programmes. That page should also contain a brief statement about the standard proprietary period policy. **Closed**

On the Transfer of the Pipeline Processing:

Recommendation 2011-05-19/09: ESA management should make sure that ways are found to secure that the Pipeline Processing continues to be successfully operated when at ESAC, as the scientific data products it delivers are key to the very high scientific impact of XMM-Newton. This should be achieved without compromising the rest of the activities conducted by the Project in any significant way. **Closed**

On ESA Press Releases:

Recommendation 2011-05-19/10: ESA management should ensure that the results that XMM-Newton continues to deliver are properly publicised, for which it is necessary having professional support and the right channels to reach the public. **Transferred to Resolution 2012-04-20/04 (see below)**



On the XMM-Newton Science Archive (XSA):

Recommendation 2011-05-19/11: The XMM-Newton Project and ESA management should make sure that

1. Measures are taken now and in the future to secure that the XMM-Newton archive is to be available permanently, well after XMM-Newton operations finish.
2. The specific XMM-Newton Science Analysis Software (SAS) is maintained during a sufficiently long time scale after XMM-Newton ceases operations to ensure that the maximum scientific return from the archive is extracted.

All on-going

RESOLUTIONS, RECOMMENDATIONS AND ACTION ITEMS

The following resolutions, recommendations and action items were formulated by the UG members during their executive session, which took place on April 20th from 13:35 to ~15:00.

On the SOC and external partners of the XMM-Newton project:

Resolution 2012-04-20/01: The UG wants to commend the XMM-Newton collaboration, including the project and the external teams, for the overall excellent work in conducting observatory operations, including the increased efficiency of the observatory. In particular, the UG noted with satisfaction:

- The continued progress done by the calibration team in a number of fronts, especially those recommended in the UG 2011 meeting, timing mode calibration, 2D PSF, etc.
- The dedication of the entire SAS working group, resulting from the partnership between the ESA team and the PI institutes
- The very smooth and successful handover of the pipeline processing activities from the SSC at Leicester to the SOC at ESAC.

On the Survey Science Centre (SSC):

Resolution 2012-04-20/02: The UG congratulates and deeply thanks the Survey Science Centre consortium for having setup the Pipeline Processing System well over a decade ago, and for having provided this service to the project during so many years. The good functioning of the pipeline and the subsequent delivery of user-friendly and high-quality data products, have been instrumental in making XMM-Newton a common user facility, accessible to the entire astrophysics community, regardless of their technical expertise.

On the Literature Impact Study:

Resolution 2012-04-20/03: The UG recognises the very high value of the Literature impact study of the scientific publications obtained from XMM-Newton data conducted by the project, and commends the project for such a necessary and valuable work.

On the Slew Survey and associated catalogue:

The UG considers that the XMM-Newton slew survey and associated catalogue might have a high scientific impact in a number of areas. UG therefore formulated

Action-Item 2012-04-20/01: On the SOC, to report about the status of the Slew Survey and associated catalogue at the next UG meeting.

On Calibration:

With regard to the calibration activities, the UG notes that there are three types of activities:



1. **On-going baseline calibration activities** of the 3 instruments, which should continue with the highest priority. These include, among others,

For EPIC:

- cross-calibration of the MOS and pn EPIC cameras,
- EPIC-MOS CTI and gain software enhancement,
- EPIC-MOS soft X-ray effective area,
- EPIC high-energy optics effective area determination,
- calibration and implementation of the variable boresight correction,
- pileup correction, if a solution is found by end of Autumn 2012, as planned (to be implemented in the next SAS release after SASv12);

For OM:

- OM sensitivity monitoring,
- OM fast mode PSF enhancement,
- V grism flux calibration up to H α ;

For RGS:

- further wavelength scale calibration, for the next SAS after SASv12
- improvement in SAS handling of bins of low effective area, for the next SAS after SASv12
- quantitative cool and warm pixel methods;

It is understood that the IACHEC cross-calibration activities with other missions should also continue on a “best-efforts” basis as part of the baseline calibration.

2. **New calibration activities, specifically the EPIC timing and burst mode calibration.** These modes make XMM-Newton the only X-ray instrument currently available to observe very bright sources and therefore their proper calibration will result in increased scientific return.
3. **Other calibration activities**, which are also important (and listed in M. Guainazzi’s presentation), should be conducted if resources are available.

Recommendation 2012-04-20/01: UG urges the project to secure that expertise on all baseline calibration activities as listed above, existing either at ESAC or at the PI institutes, is kept and secured regardless of the involvement of each of the partners. Baseline calibration activities are essential to continue guaranteeing the scientific capabilities of the observatory, and should be maintained with the highest priority. The EPIC timing and burst mode calibration should also proceed with the highest priority; with burst mode calibration following once timing mode calibration is solved.

On the 4 Reaction Wheel Study:

The UG received a presentation from the Mission Manager on the study and possible implementation of the 4 Reaction Wheel Drive option for the XMM-Newton spacecraft. This is now becoming not only important to open a possible long-term extension of the XMM-Newton lifetime, but also critical as a risk mitigation action for the functioning of the Reaction Wheels. The UG formulated the following related recommendation:

Recommendation 2012-04-20/02: The UG strongly recommends that in order to guarantee the correct operation of the mission, the 4 Reaction Wheel Drive option for the XMM-Newton spacecraft is implemented as soon as technically feasible.

On Joint Programmes:

Related to the joint XMM-Newton programmes, UG made the following recommendations:

Recommendation 2012-04-20/03: The UG endorses the implementation of the XMM-Newton/Swift joint programme that was offered to XMM-Newton by Swift, with a pool of 300 ks from Swift. This joint programme will highly enhance the scientific capabilities of both missions, and it is expected that this observing time will be in great demand.



Recommendation 2012-04-20/04: The UG recommends the XMM-Newton Project Scientist to get in contact with the NuStar project, at appropriate time, to discuss about any possible joint programme.

Recommendation 2012-04-20/05: The UG noted with satisfaction the success of the first trial call for XMM-Newton/HST joint proposals. The proposals approved are mostly working on the synergy, often simultaneous, between X-ray spectroscopy (XMM-Newton) and UV spectroscopy (HST) on diverse areas such as AGN or Exoplanets. In the view of the UG these joint proposals greatly enhance the capabilities of both XMM-Newton and HST. It is therefore recommended that the Project Scientist takes all necessary steps to secure the continuity of this programme.

On Outreach Activities:

The UG received information from the Project Scientist and the Mission Manager about the possible opening of a parallel way to promote high-quality XMM-Newton science results, in addition to the existing path through the ESA Science and Technology page. This option, which would focus on highlighting stories in the XMM-Newton web pages, for the benefit of astronomers and mostly for the X-ray community, would be worked out through ad-hoc consultancy with professional science writers.

Resolution 2012-04-20/04: The UG strongly endorses the strategy of the project on this front, as the new parallel option will give the opportunity to publicise many more interesting scientific achievements from XMM-Newton, complementing those that are successfully publicised by the ESA Science & Technology PR office.

On the Source Catalogue:

In the opinion of the UG, the XMM-Newton source catalogue is a major scientific resource. The UG thanks the Survey Science Centre for a continued effort in producing it. The UG received the news that the SSC is willing to continue working in maintaining the catalogue and providing further releases, as well as in guidance for the processing tasks.

Recommendation 2012-04-20/06: The UG strongly encourages the SSC to continue working for the XMM-Newton source catalogue and recommends that close contact between SSC and SOC is maintained to secure a successful outcome of this joint venture.

On the EPIC Background Working Group (BGWG):

UG followed the request from S. Sembay asking for a letter of recommendation for BSWG related activities taking place at Leicester University (e.g. provision of blank sky fields), and formulated

Action-Item 2012-04-20/02: On UG, to prepare a support letter for EPIC Background Working Group activities at Leicester University, welcoming any additional contributions to the project based on national funding.

On SAS and Pipeline development:

UG formulated one resolution and one recommendation related to future SAS and Pipeline developments:

Resolution 2012-04-20/05: The UG endorses SAS team activities to provide users with the right tools to deal with Mosaic mode observations and with the tools that allow the combination of different observations of the same field or target.

Recommendation 2012-04-20/07: The UG recommends the MPE EPIC-pn and Saclay MOS teams to work with SAS and pipeline teams to assess the possibilities of implementing one of the procedures and tools, previously established by those teams, to create exposure corrected flat-fielded images into the pipeline system.

On Mission Extension:

In order to help preparing the next XMM-Newton Mission Extension request, UG assigned

Action-Item 2012-04-20/03: On UG members, to provide input for the science case of the XMM-Newton Mission Extension request. The Project Scientist will contact UG members about further details and deadlines.



UG discussed the importance of future Galactic plane survey proposals and assigned:

Action-Item 2012-04-20/03: On A. Decourchelle, to contact experts in the astronomical community to prepare the scientific case for Galactic plane X-ray surveys with XMM-Newton, in order to provide the Project Scientist with input for the Mission Extension request.

Date of next meeting: May 16 (Thursday) and 17 (Friday) 2013, starting at 10 am at ESAC.