

Minutes of Users Group Meeting 10 (6-7 May 2009)

Edited by Matthias Ehle

Approved by voting members on 9 July 2009

In memory of Roberto Pallavicini and Martin Turner

The Users Group noted with sadness the untimely death of two colleagues who had played important roles in the XMM-Newton project: Martin Turner and Roberto Pallavicini.

Martin was a key member of the XMM-Newton project since the mission was approved 20 years ago, led the development of the EPIC MOS cameras and subsequently led the whole EPIC instrument team for over a decade as its Principal Investigator. Roberto made a sustained contribution to the XMM-Newton project in his role as Mission Scientist for almost 15 years.

The Users Group wished to place on record the debt that the whole project owes to both individuals whose dedicated efforts were crucial to the scientific success of XMM-Newton. Their comradeship, their wise counsel and their gracious contributions to the Group's meetings will be sorely missed.

Participants:

Monique Arnaud (Chairperson), Richard Mushotzky (Mission Scientist), Massimo Cappi (external), Frank Haberl (external), Mariano Mendez (external), Jelle Kaastra (RGS-PI), Matthew Page (OM-PI delegate), Steve Sembay (EPIC-PI delegate), Mike Watson (SSC-PI), Arvind Parmar (XMM-Newton Mission Manager), Norbert Schartel (XMM-Newton Project Scientist), Matthias Ehle (Users Group executive secretary).

María Santos-Lleó (Science Support Manager), Ramon Muñoz (Instrument Operations Manager), and interested staff from ESAC and XMM-Newton instrument teams.

Absent: Jacqueline Bergeron, Richard Griffiths (Mission Scientists); Gregor Rauw (external) have excused themselves.

Welcome:

M. Arnaud (Chairperson) opened the meeting on May 6 at 10:00 and welcomed M. Mendez as new external member of the Users Group who is replacing M. Mas Hesse.

Adoption of the agenda:

The agenda was presented and approved by the participants.

Presentations:

The following presentations were given on May 6:

3. Overall Mission Status (A. Parmar; 10:06-10:11)
4. Instrument Operations / Data Generation (R. Muñoz; 10:14-10:39)
5. Report from the Project Scientist (N. Schartel; 10:48-11:11) (End session at 11:33)
6. New Operations Strategy after RF Switch Failure (P. Rodríguez-Pascual; 11:45-12:10)
7. EPIC Background Treatment (I. de la Calle; 12:11-12:24)
8. Calibration
 - 8.1. EPIC Calibration Status (M. Guainazzi; 12:26-13:02)
 - 8.2. RGS Calibration Status (A. Pollock; 13:17-13:40) (End session at 13:50)

- 8.3. OM Calibration Status (A. Talavera; 14:55-15:18)
- 8.4. Cross-calibration Status (M. Stuhlinger; 15:22-16:03)
- 9. SAS Developments and Future Plans (C. Gabriel; 16:04-16:50) (End session at 17:10)
- 10. SSC Status (M. Watson; 17:50-18:21)
- 11. Action items from last meeting (M. Ehle; 18:22-18:32)
- 12. Input from the Community (Mission Scientists; 18:35-19:00)

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, the speakers were frequently interrupted with questions and short discussions, in particular:

- 3. After A. Parmar’s presentation there were a few questions related to ESA mission extensions and the number of voting Users Group members that were deferred to the next day.
- 4. After R. Muñoz’s presentation, M. Mendez asked about the frequency of auto-commanding. R. Muñoz explained that after some debugging in the early phase of the introduction of this procedure, which is in place since October 2008, the auto-commanding is executed in nearly all revolutions towards the end of the science window to cope with increasing radiation.

Since the SOC reduction, the demand for re-processing of ODFs has increased from 2 to about 5% (due to reasons explained on slide 14 of the presentation). R. Mushotzky’s question on how the need for re-processing is identified, was answered explaining that the data aid is checking the observations for any loss of TM or contingencies but also the SAS script ‘Qcheck’ is used as a quality check. Sometimes also users are contacting the HelpDesk to report an apparent problem in an ODF which triggers investigations and eventually reprocessing.

M. Mendez’s question on the public availability of Slew Data Files (SDF) was answered by N. Schartel, explaining that SDF data are already available in the XMM-Newton Science Archive (XSA) but will also be analyzed automatically with respect to the search for transients. Output will be made public on a dedicated SOC web page to allow fast follow-up observations (cf. slide 5 of N. Schartel’s presentation).

Some UG members asked about details on reduced staffing both at SOC and MOC and a possible impact on science. R. Muñoz explained that the loss of expertise certainly has an impact visible for example in the time to react to any contingencies or problem solving. The exact impact is difficult to estimate but was estimated as 5% on time, but without any assessment on the real impact on the quality. The relatively small impact now is explained due to expertise gained over 9 years of operations and to a quiet period with regard to solar activity.

- 5. After the Project Scientist’s presentation, M. Watson asked about the reason for the high number of ToO requests close to the AO deadline. N. Schartel explained that apparently the interest in ToOs is increasing as the normal states of sources are often well known by now so that the wish to observe special states is more prominent. In addition new satellites are in operation that might trigger follow-up requests. M. Santos-Lleó added that at that time of the year (September – early October) the Galactic Centre was visible to XMM-Newton which might add a certain bias, too. Being asked about a possible explanation on why ESA Science News Items have been reduced, N. Schartel explained that in addition to staff reduction in ESA outreach, XMM-Newton News

Items have to compete against other ESA PR activities related e.g. to Mars and Venus Express or ESA launch events. XMM-Newton SOC depends on colleagues from ESA outreach to release XMM-Newton News items to a wider public. The SOC itself does not publish any science highlights on the XMM-Newton web pages nor in the XMM-Newton Newsletter (in the past some details on ToO GRB observations were provided).

M. Cappi asked about outreach activities planned for the 10th anniversary of XMM-Newton. N. Schartel explained that an ESA Press Release is planned but national/further activities are certainly acknowledged and should be coordinated.

R. Mushotzky added that a new person joined the XMM-Newton US Guest Observer Facility that could also become involved in future outreach activities.

UG members discussed the statements made on XMM-Newton citations and publications (slides 25 and 26). N. Schartel explained that he counts papers only if new results based on XMM-Newton data analysis are presented, i.e. not counting theoretical papers nor papers that present XMM-Newton products (images, spectra, light-curves) that have been shown before. UG stressed the point that different criteria that might be applied to other missions can easily result in very different numbers. N. Schartel agreed and will continue with his counting method. In addition he underlined the importance of getting high impact XMM-Newton papers (with high citation rates).

Asked on any impact seen on US scientists making use of XMM-Newton since the (not yet approved) cut of financial support, N. Schartel replied that the amount of requested time from US scientists during the last AO has decreased.

UG members asked for some clarifications on the joint programmes: for joint VLT-XMM-Newton both Time Allocation Committees (TACs) can be asked for approval of proposals. This time none was accepted through the ESO TAC: scientists can only submit a given proposal to one observatory and they have to select the observatory where more time is needed. It is often the case that more time is required in X-rays than in the optical-IR and this is probably the reason why more XMM-VLT time is requested via the XMM-Newton TAC. For the joint Chandra-XMM programme, the SOC received 10 proposals (details were published in Newsletter#82).

6. After P. Rodríguez presentation, UG expressed 'kudos' to all people involved at SOC and MOC for the fast and smooth recovery of XMM-Newton after the RF switch failure and was very satisfied with the reestablished observing efficiency. UG discussed several risk scenarios and possible workarounds (also listed in the presentation, last slide) taking note of a comment by A. Parmar that the TM/RX chains are qualified by industry for 20,000 switches.
7. After I. de la Calle's presentation, M. Arnaud acknowledged the work done by the EPIC Background Working Group (BGWG) in the previous year.

R. Mushotzky and S. Sembay expressed their "long term worry" that support to the BGWG by people from the GOF and Leicester University, respectively, might have to stop in a few years time from now. The approach to get ESAS into the SAS (planned to become a SAS task in version 9), and maybe other BGWG tools, or to reach a higher degree of automation, e.g. for the generation of background files, seems to be the right approach.

UG members underlined the need to compare the different background analysis methods made available by the BGWG (e.g. filter wheel closed data and background modelling à la ESAS versus blank-sky data or a new pn analysis script provided by MPE). This task is considered very demanding and complex (depending on source extent vs field of view and scientific aims) and might probably need involvement of experts outside BGWG to allow for independent checks. M. Mendez added that background methods and tools are also very important for the analysis of small window modes of the EPIC cameras.

8. Calibration

8.1. M. Guainazzi presented the status of the EPIC calibration.

After the talk, M. Cappi asked about remaining redistribution spectral features at 1.8 and 2.1 keV for bright sources in timing mode. M. Guainazzi explained that these edges are dealt with by the rate dependent CTI correction and gave reference to XMM-SOC-CAL-TN-0082 and 0083 available from the XMM-Newton Calibration Documentation web page at http://xmm2.esac.esa.int/external/xmm_sw_cal/calib/documentation/index.shtml#EPIC

M. Watson asked about the usage of the pn burst mode: up to April 2007, 42 burst mode exposures are available in XSA; this mode is not so often asked as only a certain number of sources/science goals need it. A regular monitoring of the Crab is done in burst mode as routine calibration and for cross-calibration purposes.

Related to the observed increasing frequency of some MOS CCDs showing higher noise levels, C. Gabriel explained that a new SAS task 'emtaglenoise' is going to be included in release 9. This task will allow the user to remove noisy CCDs from the analysis. There is no strategy (yet) in this respect in SSC's standard products generation. M. Arnaud underlined that, furthermore, the background will need to be handled consistently. S. Sembay explained that an in-orbit test is planned (details TBC) to verify a possible fix at least for MOS1 CCD5 with a stop and restart of the sequencer.

M. Watson commented on the 2D-PSF, clarifying that the 'spokes' formed as a result of shadowing of the areas between them, due to the mirror support structure.

M. Cappi raised a question on the amount of feedback the SOC is getting with respect to the EPIC calibration. M. Guainazzi explained that users are continuing to contact the HelpDesk as soon as they encounter any problem. For the timing mode calibration, feedback was provided from people in and outside of the SOC that were invited to test the rate-dependent CTI correction. This kind of support is seen as very useful and considered working well. Feedback on the calibration certainly is always encouraged.

8.2. A. Pollock presented the calibration status of the RGS instruments.

Afterwards, M. Mendez asked about the optimum selection of line-rich calibration sources especially as zeta Puppis is not constant (varying by a few percent according to F. Haberl) but the SNRs (like 1ES0102-7219) are. Also NGC 1068 showing a strong C VI line could be used. A. Pollock agreed and made the point that it actually is difficult to find a single best source for all cross-calibration issues.

Being asked about the background handling for the new RGS small window readout mode, A. Pollock explained that analysis and scientific validation is still on-going; the current plan is to provide a source spectrum only (and no background spectrum).

M. Cappi inquired if the evolution of the RGS contamination is similar to the effect seen by Chandra. A. Pollock replied that the RGS contamination model is not constrained due to very big error bars. The RGS team is in contact with people from Chandra and Suzaku to discuss the principles.

8.3. After the presentation on the calibration status of the OM by A. Talavera, R. Mushotzky mentioned that a student at GSFC reported variations in the magnitudes of extended sources (of the order 0.2 in UV) depending on the extraction area chosen. A. Talavera explained that dependence on the extraction area is expected, especially for extended sources, and reminded that SAS by default uses a 35 arcsec diameter circle for UV and a 12 arcsec diameter circle for source extractions for optical filter exposures, respectively. The SAS difference of 2/10th of magnitude should be checked in any case.

8.4. After M. Stuhlinger's presentation about cross-calibration, R. Mushotzky added that the seen 10% differences in the line complex normalizations in the fit to 1ES0102-7219 might partly be understandable as the Chandra and Suzaku contamination are not yet properly modeled. He also suggested that the comparison of relative energy flux in different energy bands (slide 14) should also, if possible, show results from other missions. In addition, cross calibration results presented for 1ES0102-7219 (slide 17) should include also CCD data up to 10 keV.

M. Arnaud explained that the fitted model to the cluster emission could be too simple as clusters are not isothermal. As compared to XMM-Newton, Chandra fits could give more weight to lower temperatures as it is relatively more sensitive in the soft than in the hard energy band.

M. Stuhlinger replied that actually IACHEC (International Astronomical Consortium for High Energy Calibration) has taken an action (J. Nevalainen) to perform a test with 2-temperature models.

N. Schartel and M. Arnaud asked about the significant differences seen between the presented 'good' case of XMM-Newton internal cross calibration (PKS2155-304) and the rather 'bad' example (3C 273). M. Stuhlinger explained that the 'good' example source was observed early in the mission while the 'bad' case was much more recent, pointing towards a possible issue with time dependent calibration which might become visible in such good statistics observations. The XMM-Newton instrument internal cross-calibration across time is shown in slide 9 (right hand side figure) of M. Stuhlinger's presentation.

To conclude the calibration session, M. Arnaud underlined again the importance of a good cross-calibration between XMM-Newton instruments as well as between the different X-ray missions.

9. C. Gabriel's presentation on SAS Developments and Future Plans triggered a number of questions: R. Mushotzky commented that one of the limitations for the HERA system (data processing facility provided by HEASARC) is to serve up to 20-50 users at the same time. C. Gabriel confirmed and explained that SAS currently has about 1000 users per year (although not simultaneously using SAS) and that a higher number of HERA users at the same time could present a security issue for them. Therefore there is actually no duplication of development efforts for HERA and RISA.

N. Schartel asked if the grid version of the SAS in RISA would be frozen with respect to the operating system used. C. Gabriel explained that RISA would be running on a virtual machine in the grid, i.e. it will be stable wrt. the operating system. The envisaged approach for the long term maintenance of the SAS will probably consist in offering both 'flavors': RISA as well as support for virtual machine(s). This approach should especially allow experienced users (who might own sophisticated scripts) to continue using SAS in the way they are used to it within the 'virtual machine flavor'. In RISA, scripts can be ported into work-flows as long as they consist of SAS tasks only.

C. Gabriel explained that the RISA project is carried out by the XMM-Newton project in collaboration with the ESAC Scientific Archives team. As it makes use of grid techniques, RISA is scalable and can be adjusted to the number of users. N. Schartel expressed his concern that RISA might run into performance problems if several users ask for mass processing. However, he also stressed the point that on the other hand the need for re-processing of data might decrease as the calibration (CCF files) will become stable and as pipeline products (from SSC) will further improve such that SAS might only be needed for the analysis of extended sources.

Some questions related to the possibility to further increase SAS performance e.g. by the usage of modern Graphical CPUs or parallel processing was answered by C. Gabriel such that it currently is still unclear if the new CPUs are suited for the SAS. Also SAS is currently not easy to adapt to parallel processing although some task splitting may be possible via e.g. individual CCD processing tasks.

M. Mendez mentioned the problem seen in some publications that authors do not take into account the oversampling of the energy dependent energy resolution of the EPIC cameras (and as such derive statistically good fits that are actually meaningless). The need for a SAS watch-out item was stressed as well as the wish that a binning tool, like 'pharbn' by M. Guainazzi, should be made publicly available. N. Schartel added that there are of course different views on the need to re-bin data before fitting it (cf. C-statistics) but he himself already requested a binning tool for the SAS. The task is currently approved and the plan is to release it after the next SAS version which is due in June 2009.

M. Cappi commented that some of the SAS threads, especially the GUI versions, would need to be updated as some numbers/parameters are not explicitly given there. M. Mendez also mentioned that in the threads about creating PN spectra of a point-like source, the recommended level of a background flare (0.4 c/s in the 10-12 keV range) is given in the "command-line" version, but not in the GUI version. N. Schartel explained that the SAS task 'psechain' (released experimentally in November 2008) should catch all such uncertainties as it only asks for a few input parameters from the user.

M. Mendez commented that the web pages were sometimes confusing concerning the steps needed to install SAS, and in particular because of the separate links for SAS and the auxiliary software (like ds9, xpa, etc). While separate pages connected by links may be more organized, they are inconvenient for the users that have to click on different links for each step. Perhaps the web pages could be looked at for simplifications.

M. Watson and M. Arnaud raised the question if the SAS user profile has changed over the years and how this could be measured. N. Schartel explained that he sees some changes when screening science papers based on XMM-Newton: XMM-Newton data starts to be more frequently included as 'additional info' in multi-wavelength studies. I.e. there is an increasing group of users who are not directly from the X-ray community. M. Arnaud suggested that the user profile could be monitored putting some related questions when people are downloading the SAS (a questionnaire already is in place that could be extended). M. Santos warned that results of such a monitoring might be hampered by the fact that often several (different) users might be served by a single download, e.g. in case of an institute-wide installation of the SAS on a server machine.

10. After M. Watson's presentation on the Status of the Survey Science Consortium (SSC), F. Haberl commented on the shown method for the creation of visual representations of EPIC fluxed spectra, that this method might work OK in case of continuum sources but will fail e.g. for sources like 1ES0102 in which lowest energy events exist due to redistribution. Other UG members expressed their concern that some instrumental features will remain visible which could be misleading for inexperienced users. M. Watson summarized the discussion that for sure more work still needs to be done. N. Schartel added that fluxed EPIC spectra are certainly needed to support the increasing usage of XMM-Newton data by non X-ray experts.

Asked about an update of the status of the slew survey, R. Saxton explained that the next (incremental) release is planned in time for the next XSA archive release foreseen for early summer 2009.

Action items from last meetings:

One Action Item, sixteen Recommendations and five Endorsements were pending since last meeting. Their disposition was as follows:

Endorsement 2006-05-19/11: The UG endorses the future plans for calibration improvements, with particular emphasis on the following areas:

Solve the high energy discrepancies between EPIC-pn and MOS: **Closed.**

Pursue the development of background estimation tools: **Closed; ESAS.**

Develop the off-axis PSF: **Closed.**

Further improve the RGS calibration: **Closed.**

Recommendation 2006-05-19/33: As far as possible, the UG recommends regular updates of 2XMM catalogue in an incremental fashion plus periodic reprocessing of the archive: **On-going.**
Ref. M. Watson presentation.

Recommendation 2007-06-08/39: The priority for timing modes of EPIC-pn needs to be focused on solving the current problems of the timing and burst calibration. Only after they are fixed, the UG would be glad to revise its recommendation about the modified timing. For the time being, the modified timing mode should only be made available on a case by case basis: **Closed & implemented in AO-8.**

Recommendation 2007-06-08/45: The UG recommends that the Background Working Group makes a study of the needs for closed filter data: **Closed.** See **endorsement 2009-05-07/01**

Recommendation 2008-05-07/01: In view of the current pressure on XMM-Newton in a large variety of science areas, and the impact on the Guest Observer Programme, ELPs should currently not be introduced: **Closed.**

Recommendation 2008-05-07/02: The XMM-Newton AO policy should be changed such that VLPs may be accepted for observation in two consecutive AOs. In this case up to 1.5 Msec of observing time may be allocated for observations in the following AO. However, for each individual program the time allocated in the second AO shall not exceed the time allocated in the current AO. The total time allocated to LPs and VLPs together shall remain about 30% of the time available for the AO, but with full flexibility in the time distribution between LP and VLP programmes. Within this limit, the total allocated observing time for a specific position on the sky may be as large as the total visibility period during one year: **Closed & implemented in AO-8.**

Recommendation 2008-05-07/03: The introduction of the slow-slew mode should no longer be investigated: **Closed.**

Recommendation 2008-05-07/04: The new 2D PSF model should be described in a technical document such that derived model parameters (that will be stored in a calibration file), can be understood and interpreted without the need of using SAS: **Underway.** **The algorithm and formula used by SAS to compute the changes of the 2D PSF model parameters with energy and off-axis angle should be described such that they can be implemented in other software, independent of the SAS.**

Recommendation 2008-05-07/05: XMM-ESAS should allow the analysis of all extended sources, i.e. it should also accept pn data as input. If possible, XMM-ESAS should also be made easier or simplified, especially wrt the fitting process: **On-going; XMM-ESAS is planned to become available as a SAS 9 task.**

Recommendation 2008-05-07/06: The EPIC Background Working Group (BGWG) should continue their ongoing work: **Closed.**

Recommendation 2008-05-07/07: It should be possible to select blank sky fields based on the count rate value, i.e. level of background: **Closed. Now implemented: see**
http://xmm2.esac.esa.int/external/xmm_sw_cal/background/blank_sky.shtml

Recommendation 2008-05-07/08: The RISA team should aim at improving their communication with the Hera team to avoid duplication of work: **Closed.**

Recommendation 2008-05-07/09: RISA should be evaluated some time after the first public release: **Open.**

Recommendation 2008-05-07/10: SAS should continue to support different platforms and operating systems: **Closed.**

Recommendation 2008-05-07/11: The 1st version of the OM catalogue should be released as planned including only sources with UV detections: **Closed.**

Recommendation 2008-05-07/12: It should be investigated if a cross correlation of the OM UV catalogue with 2XMM is possible: **Closed. After normalising the FOV, 19% of the 2XMM sources were found to have OM UV counterparts. Further details are given in the presentation by A. Talavera.**

Recommendation 2008-05-07/13: The XMM-Newton and INTEGRAL Users Groups should continue and improve their coordination and interaction wrt future mission extensions: **Closed.**

Action Item 2008-05-07/01: On the SAS team, to check the possibility of improving the SAS wrt processing speed and allocatable memory: **On-going. SAS 9 will allow splitting of (large) PN event files; another SAS release, envisaged for autumn and based on the gcc4 compiler will include both 64 bit OSs and native Mac OS Intel versions.**

Endorsement 2008-05-07/01: The UG endorses the current policy that GO or LP programmes which cannot be fulfilled in a single AO, like monitoring programmes, will have to be re-submitted in each AO for re-approval: **Closed.**

Endorsement 2008-05-07/02: The UG endorses the introduction of the presented joint XMM-Newton/INTEGRAL programme and asks for a review of this concept after one year: **Closed. Programme to be continued for next AO**

Endorsement 2008-05-07/03: The UG endorses the introduction of the RGS multipointing and EPIC mosaicing modes for AO-8. All related open actions on these modes can be closed: **Closed & implemented in AO-8.**

Endorsement 2008-05-07/04: The UG endorses the current XMM-Newton calibration plans and especially the further study of the EPIC PSF: **Closed.**

No formal actions or recommendations were issued during the presentations, rather it was decided to postpone them to the general discussion session which took place during the morning of May 7.

Input from the community and general discussion:

At the start of the general discussion, A. Parmar gave a presentation on future XMM-Newton mission extensions, milestones and scenarios. UG took an action to formulate a recommendation, which at the time of the writing of the minutes has already been sent to the ESA Astronomy and Fundamental Physics Coordinator. In this recommendation the AWG is urged to recommend strongly the extension of the XMM-Newton mission without further cost saving measures.

The remaining part of the general discussion was based on the inputs from the Mission Scientists, UG external members and points collected through the previous discussions. The issues addressed and the recommendations are detailed below.

- A repository of high level XMM-Newton data products

It was discussed if there is a need to provide the astronomical community with a repository in which high-level XMM-Newton science products (e.g. FITS files for Xspec) can be submitted by the authors from papers, where the data is reduced and described. Such a repository would allow the users to download the available data, without a need for own processing, filtering etc. The idea would be to create maybe something similar to the Multi-mission Archive at STScI (MAST). Such a repository might be of interest also for people with no knowledge in X-ray astronomy.

It was mentioned that Aladin and the Virtual Observatory (VO) already include EPIC images and that such an initiative might duplicate the 2XMM and the SSC products in some sense. As the new initiative depends actually on people's input, authors would need to be contacted as well.

As XMM-Newton is rather specific, dedicated and as calibration is changing, the usefulness of such a new (and even of the existing VO activities) was questioned. M. Watson commented that such an initiative could be considered as nice to have but not to be done by the project, as XMM-Newton does not have the needed resources to lead such new initiatives. UG decided to issue the following recommendation:

Recommendation 2009-05-07/01: Although the idea of having a dedicated repository for high level XMM-Newton data products (à la MAST) is interesting, XMM-Newton SOC should not take the lead in such initiatives.

- Action items related to the Report from the Project Scientist

As a result of the discussion, the UG decided to take the following actions:

Action 2009-05-07/01: As M. Arnaud is finishing her mandate as UG chairperson, UG members should send suggestions for a successor to N. Schartel within the next 4 weeks.

Action 2009-05-07/02: In order to start preparations for the next annual XMM-Newton Science Workshop in spring 2010, UG members should send suggestions for possible workshop topics to N. Schartel within the next 4 weeks.

In order to help N. Schartel with the planned review paper on the XMM-Newton and Chandra missions (to be published by Nature), UG members also were invited to provide the project scientist with individual lists of the (five) most important discoveries done with XMM-Newton in their specific field of research. At the time of writing the minutes, N. Schartel had already received this input.

- Large Programmes accepted as C-type (filler) observations

M. Arnaud expressed her concern that large programmes (LPs) accepted as C, i.e. without the 'guarantee' for being performed, might degrade the quality of the large programme as a whole. N. Schartel explained that originally LPs were only accepted as A or B type observations. But OTAC panels decided to accept LPs also in their C time. Of course the impact of a not fully performed programme depends on the science and the possibility to re-submit not performed parts of a programme always exists.

The UG made the following recommendation:

Recommendation 2009-05-07/02: UG recommends that LPs should be considered as coherent entities that should not be cut in time – but the final decision certainly remains with the OTAC panels.

- New Operations Strategy after RF Switch Failure

UG pays a compliment to the teams at XMM-Newton SOC and MOC for the fast recovery of the spacecraft after the switch failure and the completely re-gained observing efficiency.

- General statement about SOC tasks presented under topics "Background treatment", "Calibration" and "SAS development"

The UG congratulates the SOC, Instrument Teams, Background Working Group (BGWG) and SAS developers also from SSC for the tremendous work done on the different aspects of the calibration, background analysis and SAS development.

EPIC Background Treatment

Based on the received presentation and related discussions, UG issued the following endorsement:

Endorsement 2009-05-07/01: UG endorses the new approach for the collection of EPIC filter wheel closed (FWC) data, as recommended by the BGWG and EPIC-Cal team.

The new monitoring procedure consists of dedicated 10 ksec exposures performed once every semester for PN and MOS. For MOS, in addition, FWC slew data will be taken in every 4th orbit.

As the FWC data is expected to evolve wrt. intensity and to show spectral changes over time, cf. presentation by K. Kuntz given during the last BGWG meeting, available at

<http://www2.le.ac.uk/departments/physics-and-astronomy/research/src/Missions/xmm-newton/technical/bg-meetings#mallorca-0409>

the UG formulated the following recommendations:

Recommendation 2009-05-07/03: The BGWG should continue their study of the evolution of the FWC data with time.

Recommendation 2009-05-07/04: The BGWG should provide the community with a tool that allows to select FWC data from the repository based on the time when the data was collected.

In addition, UG suggested that the BGWG should check different methods of background treatment in comparison to each other. As this is considered being a tremendous task, BGWG should try to set up a working group (inviting other experts) to work on a common data set and source sample with well defined analysis goals.

Calibration

UG discussed in detail the status of the calibration and the remaining possibilities for further improvements also in the framework of the mission being in its tenth year of operation and the increasing difficulties of external funding.

N. Schartel asked the UG for a discussion about the XMM-Newton internal cross-calibration and the formulation of recommendations as required. On the one hand the achievements in the cross-calibration work are extremely impressive, e.g. the 7% difference in absolute calibration between MOS and pn most probably is the best what can be achieved for space-born instruments in a spectral range where no standard calibration sources are available (other as in the optical regime). On the other hand, and as long as the spectra from the different XMM-Newton instruments can not rigorously be added, the full scientific content of each observation cannot be explored in the most efficient statistical way.

F. Haberl commented that the normalization of MOS and/or pn can surely be adjusted. The absolute calibration of the MOSs agrees better with other X-ray satellites and therefore a normalisation factor might better be applied to pn. With regard to a common spectral shape, S. Sembay commented that such a goal strongly overlaps with a currently ongoing activity by him and M. Guainazzi: In a first step they are critically reviewing the used cross-calibration

observations which will in a second step allow them to identify systematic differences and to calibrate the data with the aim of deriving a common spectral shape. S. Sembay underlined that the agreement between MOS and RGS does not reflect independent calibration work but is due to the fact that the MOS spectral shape was adjusted in order to agree with RGS.

The UG formulated the following recommendation:

Recommendation 2009-05-07/05: The MOS and pn Instrument Teams should focus on establishing a common calibration for both instruments such that adding the spectra of both instruments can generally be recommended, with the aim to make it available to the general user after the next UG meeting in 2010. In any case, remaining uncertainties in the calibration will need to be well and clearly documented.

M. Page reported about difficulties with a simultaneous analysis of RGS and EPIC data at MSSL, confirming reports brought to the attention of the project scientist. J. Kaastra explained that in his team work is on-going to create a time dependent RGS calibration that is aiming at a solution to bring RGS in even better agreement with the EPIC instruments. A major issue is the time dependency of the effective area (contamination) and that the team is still on the learning curve. It must be seen that the manpower resources are very restricted.

J. Kaastra gave an example that joint fitting of RGS and pn data is possible: In his group a PhD student is establishing a fudge function which adjusts the effective area of pn according to the RGS requirements for a specific observation and therefore allows a joint scientific analysis. This demonstrates that every scientist can elaborate the required fudge function. J. Kaastra offered to make the fudge function publicly available when ready and validated. M. Mendez noted that the described fudge function would help only for a certain point in time as the RGS contamination is time dependent. He suggested that SAS should have a new task 'RGS-fudge' which provides a RGS effective area that is in agreement with pn, or that the effective area calculation in SAS should allow the user to select a calibration which allows joint fitting of pn and RGS. The UG therefore issued the following action item:

Action 2009-05-07/03: The Instrument Teams should establish a time epoch-dependent fudge function for the RGS effective area such that the joint analysis of RGS and EPIC data is possible. Results of this effort should be presented at the next UG meeting in 2010 with the aim to make it available to the general user after the review.

This action item shall not prevent the instrument teams to continue their studies of the cross-calibration. It shall be a SAS 'working package' for the users allowing them simultaneous fits when needed. In any case, remaining uncertainties in the calibration will need to be well and clearly documented.

UG strongly supports the cross-calibration activities between XMM-Newton instrument teams and other projects and recommended:

Recommendation 2009-05-07/06: The XMM-Newton calibration teams should continue to play a leading role in the cross-calibration work involving other current missions and also in preparation for future missions.

SAS

UG recognized the need to study the future of the SAS and, based on the presentation given and following discussions, made the following recommendations:

Recommendation 2009-05-07/07: As the need for RISA is not clear yet, development of this project should remain a long term task with lower priority. Other options (e.g. virtual machines, support for new platforms) should be kept open and investigated as well.

Recommendation 2009-05-07/08: The SAS team should investigate if coordinated efforts can be done to maintain current (X-ray) scientific analysis software packages and prepare for the future with colleagues from Chandra, HEASARC, Suzaku and other interested projects (maybe in the form of a workshop).

Based on the discussion of users performing spectral fits to EPIC data without being aware of the need to bin their data (taking into account the energy dependent energy resolution) the following action item and recommendation were formulated:

Action 2009-05-07/04: A SAS watch-out item should be formulated in order to inform users about the need to re-bin their EPIC spectra before performing spectral fits.

Recommendation 2009-05-07/09: The spectral binning tool, currently approved as a future SAS task, should be released as soon as possible.

SSC

Based on the presentation on the status of the SSC, UG recommended:

Recommendation 2009-05-07/10: The SSC XID programme is considered an important project that should continue to be funded.

- Miscellanea

UG discussed the need to continue having group members that have strong expertise in a wide range of science topics, in particular in order to be prepared for the future and the coming discussions on mission extensions. A maximum diversity of members (maybe even having expertise in non-X-ray topics) and a full participation especially of all voting members is seen as very important.

The discussion ended at midday on May 7th. M. Arnaud thanked everybody for their contributions to the meeting.

Date of next meeting: May 12 (Wednesday) and 13 (Thursday), 2010, starting at 10 am at ESAC.