

# SAS status and development - medium and long term strategy

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On behalf of SOC SAS&PPS & SAS WG teams

20th XMM-Newton Users Group Meeting

- SAS v18.0 – status and news
- Near-term future plans
- UG recommendations – status and actions
- Medium and Long-term strategy

# SAS 18 schedule

**Release mainly dedicated to performance improvements, reducing helpdesk questions and 4XMM related enhancements**

**Currently undergoing validation at SOC**

**Expected release around end-of-May**

XMM-Newton

XMM-Newton Science Analysis System 18.0 scientific validation plan

XMM-SOC-USR-TN-0031 Issue 1.0

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Revision history

Revision number	Date	Revision author	Comments
1.0	Apr 2, 2019	R. Saxton	Released
0.9	Mar 26, 2019	R. Saxton	first draft

**Non-standard spectra:** - rmfgen can only produce matrices for spectra with standard PI range and pattern selection. Warnings and Errors set in other tasks appropriately

**Radiation Monitor** – make a single radiation monitor file with MRT column – radmonfix. This can be created and accessed by epchain / epproc & epframes – as well as any other tasks

**EPIC-pn offset maps** – choose correct one in the case of multiple maps/exposures

**CAL** - updated for new CAL quantities requiring (minor) s/w changes

**epevents** - performance and missing data fix for discarded line gain correction.

**rgsproc** - better handling of Beta-space processing

**xmmextractor** - fix for RGS beta heliospheric correction.

**emldetect** – preparations for 4XMM: EXT\_ML value propagated for all sources. Pile-up level estimated and stored for all sources.

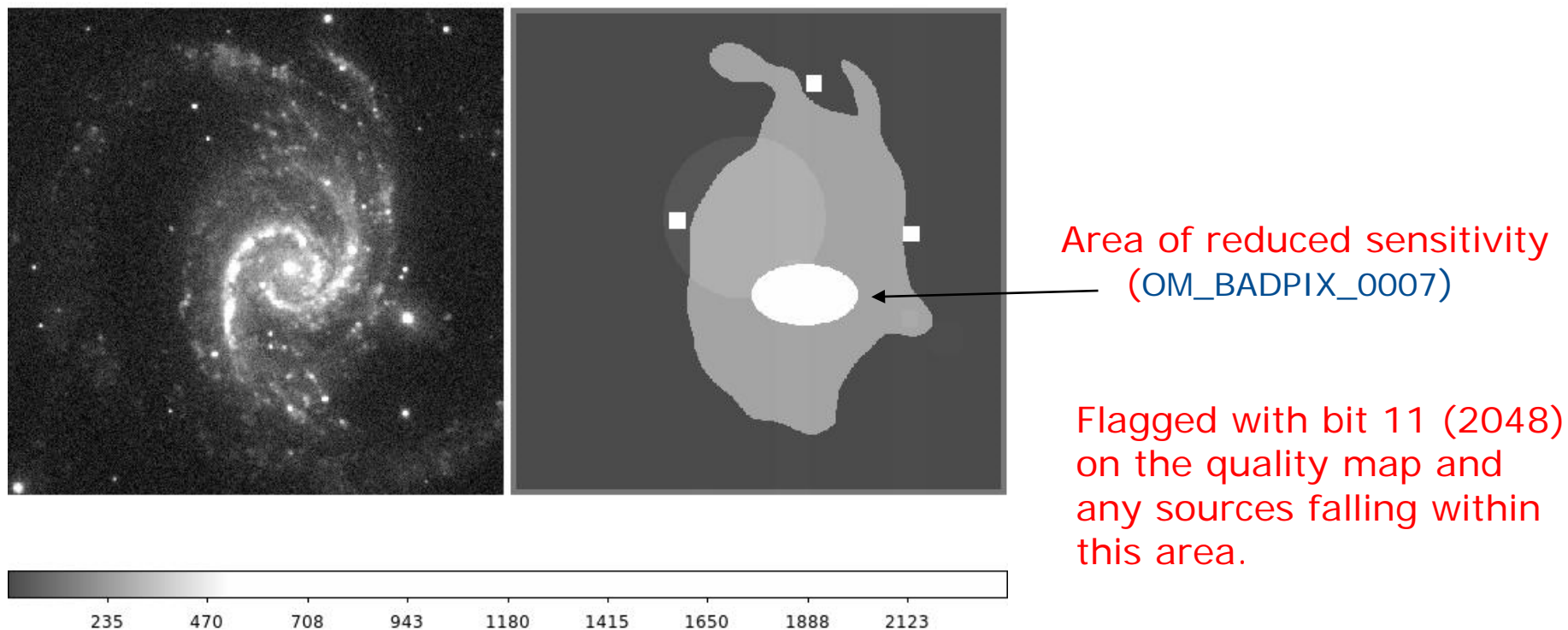
**catcorr** – systematic error changed to 1.29 arcsecs when no position correction applied.

**edtect\_stack** – various improvements

**Large OM mosaics** – an artificial 3000x3000 pixel limit removed from omdetect

**Sensitivity degradation in OM grism** – time dependent correction implemented for OM grisms, defined in OM\_GRISMAL\_0005.CCF. Affects cal, omgrism. Correction factor written into TDS\_CORR header keyword.

**Jupiter Patch** – flag area which has been affected by exposure to Jupiter. Affects cal, msslib, omcosflag, ommosaic, omdetect.



Subset of the OM image and quality map for NGC 1566

- Add support for rate-dependent EPIC-pn BURST mode correction
  - Fix EPIC-pn filter recognition when temperature is low
  - Solve EPIC-pn exposure time problem with huge count rates
  - Concatenate OM fast mode light curves per filter
  - OM quality flag consolidation
- 
- Implement EPIC-pn phenomenological response matrices
- 
- Add multi-threading to improve performance (C++)
  - *cifbuild* – introduce index metafile to avoid opening/closing EVERY file
- 
- Upgrade to latest GCC compiler – gcc 8.3
  - Update to new libc library which is used by latest Linux releases

## On the Remote Interface for Scientific Analysis (RISA)



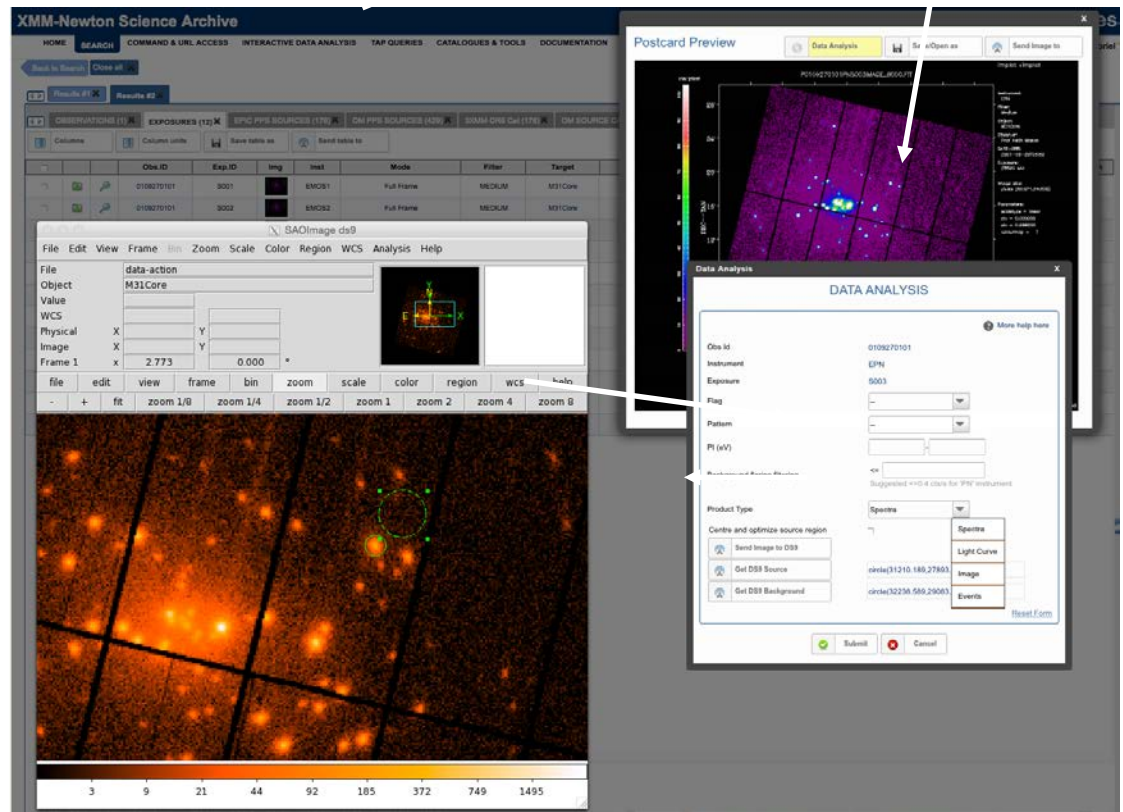
**Recommendation 2017-05-11/04:** The UG noted that RISA is both a current resource, as well as providing the basis for the long-term preservation of the Scientific Analysis System (SAS). The UG endorses RISA and recommends its **further development**. Since RISA is still in its early phase, the UG strongly 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.**

Feedback provided

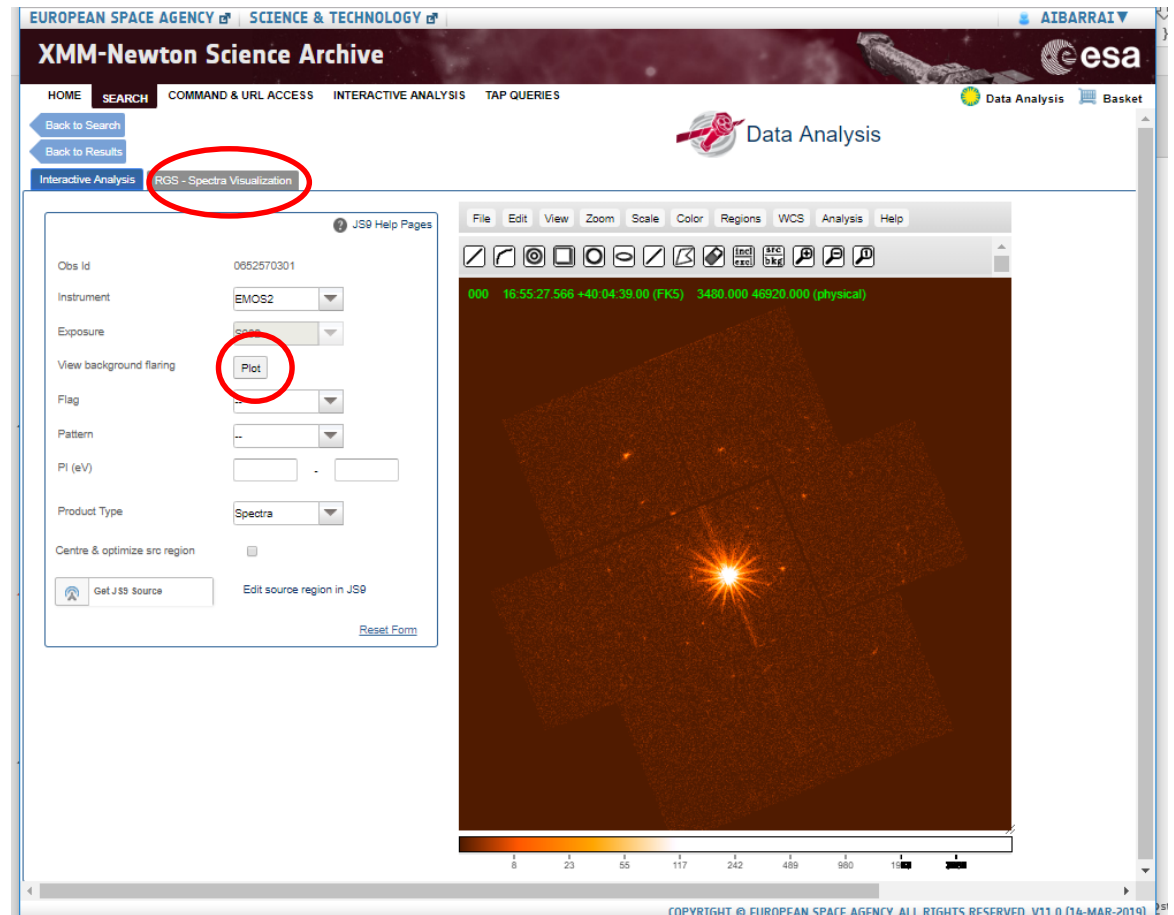
- Simplify interface

# RISA – integrated into XSA

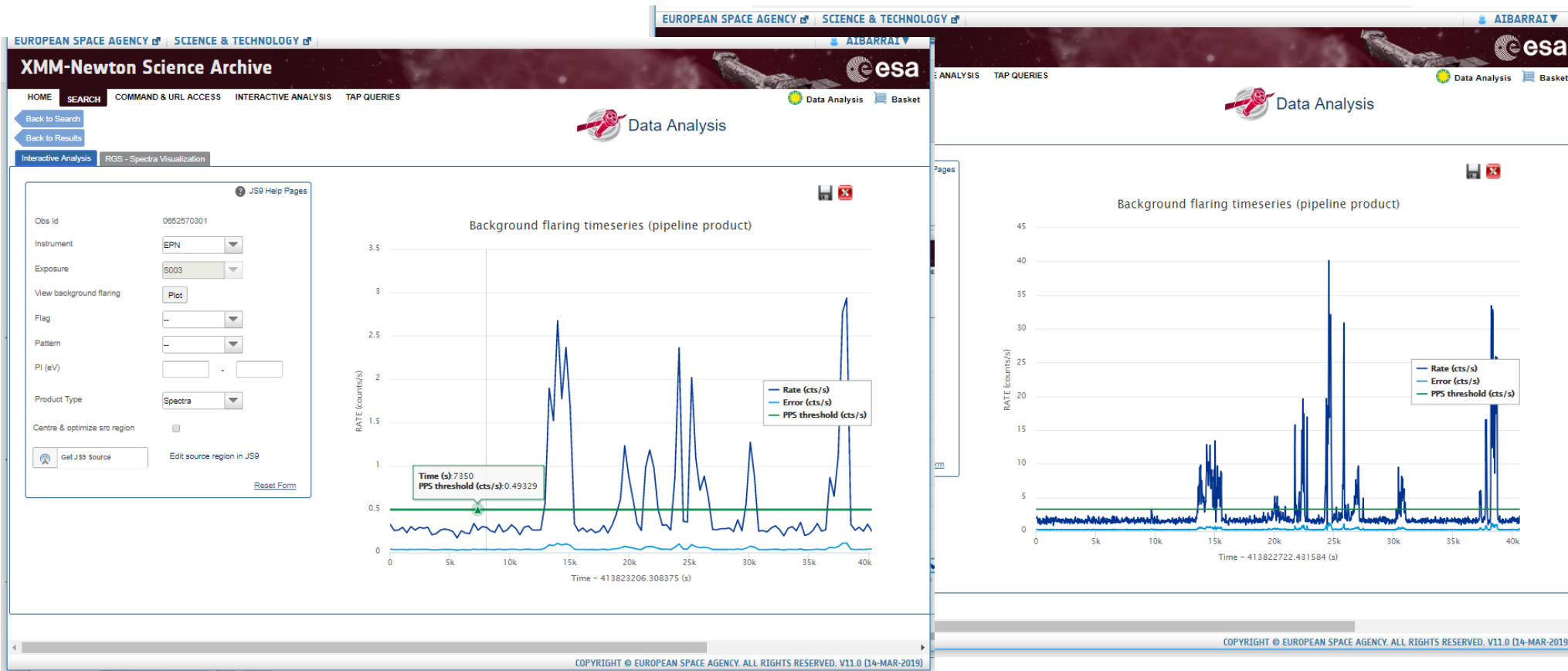
- External Users: 210
- Jobs (2018-05-01 → 2019-05-01): 852 (2.4 per day)
  - ODF reprocessing: 32%
  - PPS reprocessing: 68%
  - SPECTRA: 61%
  - LIGHTCURVE: 24%
  - IMAGES: 7%
  - EVENTS: 8%



- Uses js9 – improved interactivity
- New visualization functionalities for:
  - EPIC background light curves



- Background lightcurve visualization



# Actions from medium / long term plan



## Compilers:

- Maintain a close correspondence from now on with the most advanced compilers possible  
Effort: 4 mw every two years – Time of implementation: ongoing – *SAS 17/18 use GNU/GCC 7.1, SAS 19 to be built with GNU/GCC 8.3* ✓□

## RISA:

- Maintain / extend RISA, integrated into XSA in the future, according to requirements and feedback from the community, Priority 2  
Effort: 4 mw / year – Time of implementation: from 2018 on – *Going well*

## Distribution / VM / Dockers:

- Continue the distribution of SAS in as few binaries as reasonably possible: *SAS 17 & 18 in 4 binaries (including VM – Ubuntu platform)* ✓□
- Start investigating the possibility of replacing the VM by Dockers, Priority 2: - *Initial investigations inconclusive, no Docker release planned in the near future.*

## Migration to Python - Start / continue the migration to Python

- implementing requirements mainly for new PPS graphic products (Priority 1)  
*PPS products based on Python* ✓□
- replacing PGPLOT / Grace (Priority 2)  
*In progress*
- encapsulating Python library (Priority 2)  
Effort: 4 mw – Time of implementation: 2018 - *SAS 17 & 18 uses Conda* ✓□
- replacing scripting done until now by PERL (Priority 3)  
Effort: 63 mw – Time of implementation: 2019/2020 (TBC) - *No progress*
- replacing HEASOFT calls (Priority 4)  
Effort: TBD (needs detailed analysis) – Time of implementation: >2020 TBC

Documentation: building from source / simplify SAS configuration and build:

- Extend the documentation for building SAS (Priority 1)  
*Done* ✓□
- Make sure it can be built by SAS experts outside ESAC, (Priority 1)  
*Done at SRON / MPE / Toulouse* ✓□
- Make sure it can be built by S/W experts (Priority 2)  
*Done* ✓□
- Finish full / comprehensive documentation for building SAS (Priority 3)  
*In progress*
- Make sure it can be built by “normal” users (Priority 4)  
*On hold*

Issues with institutes signing off on their code going public – Numerical Recipes...

# Questions?