

Maximizing the scientific return: the evolution of the XMM-Newton Scientific Analysis System

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The XMM-Newton Science Analysis System (SAS) is the software package used for calibration and reduction of data from the mission, leading to more than 1000 refereed scientific papers published in the last 5 years. SAS maintenance, further development and distribution are under the responsibility of ESA's XMM-Newton Science Operations Centre (SOC) located at the European Space Astronomy Centre (ESAC) near Madrid, Spain, in coordination with the Survey Science Centre (SSC, University of Leicester, UK), representing a collaborative effort of more than 30 scientific institutes in Europe and the USA.

The concept of a user friendly data analysis S/W package distributed to the observers, from which a subset is used under a fixed configuration for "pipeline production" of all the mission data products (corresponding to different instruments) shows great value. Observers can reproduce the data calibration and reduction performed with the best general parameters, or they can refine the data analysis, tailoring it to their own particular goals.

Free access to the data and software, together with a substantial support, not only in terms of documentation but also from a helpdesk staffed by experts, represent especially an opportunity for those scientific communities in developing countries which have not, hitherto, been involved in X-ray astronomy hardware and mission development, for financial reasons.

The maturity of both calibration and data reduction capabilities, reflected in the recent substantial upgrade to a new SAS version, has led to the project of reprocessing the whole of the XMM-Newton data gathered so far. This reprocessing is currently underway and should finish before the summer of 2006, leading to the re-population of the XMM-Newton archive with a set of high-level scientific products, highly homogeneous in terms of quality and calibrations, as well as to the generation of the largest catalogue of hard X-ray sources ever compiled (~2-300000 entries, mostly previously unknown sources).

We intend to review different aspects of the upgrade of the data reduction software and the underlying calibration, which together enable the worldwide Scientific Community to maximize the scientific return of the XMM-Newton mission.