

THE ASI SCIENCE DATA CENTER

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Abstract. The ASI Science Data Center (ASDC, www.asdc.asi.it), a facility of the Italian Space Agency (ASI) is a multi-mission science operations, data processing and data archiving center that provides support to several scientific space missions. At the moment the ASDC has significant responsibilities for a number of high-energy astronomy/astroparticle satellites (e.g. Swift, AGILE, Fermi, NuSTAR and AMS) and supports at different level other missions like, Herschel and Planck. The ASDC was established in 2000 based on the experience built with the management of the BeppoSAX Science Data Center. It is located at the ESA site of ESRIN in Frascati, near Rome (Italy).

Keywords: data center

1 Introduction

The ASI Science Data Center (ASDC, www.asdc.asi.it), a facility of the Italian Space Agency (ASI) is a multi-mission science operations, data processing and data archiving center that provides support to several scientific space missions. The ASDC was established in 2000 based on the experience built with the management of the BeppoSAX Science Data Center. It is located at the ESA site of ESRIN in Frascati, near Rome (Italy). Our main responsibilities are to:

- Provide support to ASI funded missions in the field of the observation of the Universe
- Maintain a permanent data archive (including data, software calibration and scientific expertise) of ASI funded scientific missions.
- Act as the interface between ASIs supported scientific missions and the users' community
- Provide on-line access to archival data, analysis software, calibration files and documentation
- Host a copy of the data archive of international missions where Italy is involved
- Develop and maintain software for the efficient access, analysis and comparison of data.
- Collaborate with other data centers and scientific institutions for the exchange of data, software and expertise.

The ASDC is involved in the missions where Italy participates. These include Swift, Fermi, AGILE, Herschel, Gaia, AMS, and NuSTAR. We provide our extensive expertise in software preparation, data archives and user support. As an example, we developed and maintain the analysis software of the Swift XRT, we are involved in the development of the NuSTAR data reduction system, and we hosts the AGILE Data Center, the scientific component of the ground segment of the completely Italian AGILE ASI mission, in charge of all activities related to scientific data processing, archiving and distribution. From an user point of view, the center is organized around archives and catalogs in one side, and around tools available from the web in the other side.

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2 Data side: the ASDC archives and catalogs

The ASDC is the main archive repository or an archive mirror of most missions with Italian involvement. These archives can be accessed through the Multi-Mission Archive portal (<http://www.asdc.asi.it/mmia>), that allows a query for position (or object name) within the archive of the selected mission. Once displayed, the results are linked to various tools that allows for example the online data processing for users not expert in high energy data analysis (see Stratta et al. 2010).

The ASDC also compiles and provides catalogs of refined data, such as, among others, an on-line version of the AGILE First Catalog (Pittori et al. 2009), the 1st Fermi LAT Catalog (Abdo et al. 2010), and the BZCAT Blazar Catalog (Massaro et al. 2010). These interactive on-line catalogs allow refined queries and filtering options.

All of the above databases are progressively inserted into the Virtual Observatory using the dedicated methods and standards.

3 Tool side: the ASDC webtools

The ASDC has developed several tools aimed to help the use of its catalogs and database. Among them, the Swift/XRT Online Data Analysis, the Data Explorer and the SED builder are the most used.

The On-line Analysis tool enables to run the Swift/XRT software task "xrtpipeline" directly on the web, using the latest software and calibration files. The user can set specific (and customizable) filter options (such as extraction region taking into account effect of pile-up) in order to obtain accurate science-ready end-products (spectra, light curves and event files). It is also possible to directly fit the spectra and light curves using an online version of XSPEC.

The Data Explorer is a tool which allows the user to navigate through the ASDC and external catalogs and provides an easy way to access data. It can be accessed through several places within the ASDC web pages (such as the multi-mission archive or the tool menu). With this tool, it is possible to browse the internal catalogs (grouped by energy band) and/or selected external databases for sources around the current coordinates, in a user defined search radius, plotting the results within a sky map.

The SED builder is a tool which allows the user to construct a Spectral Energy Distribution for any source presents in the ASDC catalogs, querying both internal and external databases. The SED obtained can automatically cover (depending on the available observations) up to 19 orders of magnitudes, and can be enriched by the insertion of user data.

All tools presented here are provided by the ASI Science Data Centre. For any bug or request please refer to: http://www.asdc.asi.it/feedback_all. If you need assistance: <http://swift.asdc.asi.it/helpdesk/login.php?cat=generic>.

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