

Space Environments and Effects Analysis Section

ESA Space Environment Data Infrastructure


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Space Environments and Effects Analysis Section

Current Activities

- SEDAT
- SPENVIS
- SAAPS
- SREM Data System
- SpaceGRID
- ESA Virtual Archive
- ESA Satellite data systems
- NOAA Data System

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SEDAT

<http://www.wdc.rl.ac.uk/sedat/>

- Conglomeration of disparate datasets
- Simplified access to data & Meta-data
- Programmable – User can create new data processing and plotting tools using the IDL language.
- Java Applet/Application client to access SEDAT server – worldwide availability.
- Automatic updates of data sets.
- Users can collaborate and share their processed data and tools among themselves.

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SPENVIS

<http://www.spENVIS.oma.be/spENVIS/>

Long running activity to bring space environment models, and data to the masses.

- Frequent downloads of data from various services – NOAA, ACE, etc.
- A limited set of data (~600 points) can be plotted or downloaded.
- Future activities include using space environment data in the various effects models – SHIELDDOSE, EQFRUX,...
- Comprehensive implementation of space environment and effects models and tools (AP8, DICTAT, etc.).

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SAAPS

<http://www.irfl.lu.se/saaps/>

- Database & Tools Module
 - Solar-Terrestrial Parameters
 - Space Environment Parameters
 - Satellite Anomalies
- Analysis Module
 - Correlation analyses
 - Superposed Epoch Analyses
- Prediction Module
 - Real time prediction of Spacecraft Anomalies & Internal Charging based on K_p .

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SREM Data Management System

http://srem.web.psi.ch/html/srem_index.shtml

- Web based interface to the SREM data from:
 - STRV/1c
 - Proba
 - Integral
 - Other additional SREM opportunities
- Provides Data download capabilities
- Summary Plots
- Documentation on the instrument and host satellite.

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SpaceGRID

- Grids are "super"Internets for high performance computing: worldwide collections of high-end resources – such as supercomputers, advanced instruments, and immersive environments (Caves, 3D visualisation suites,...).
- Multi disciplinary project to investigate application of GRID technology to Space Activities.
 - Earth Observation
 - Space Weather
 - Spacecraft Simulation (charging, radiation effects, thermal simulation, etc.)
 - Space Science – Creation of a federation of existing and future data sources from various sources and instrument types

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ESA Virtual Archive

- Working Group established to identify commonalities between the various ESA data archives (EO, Space Science, MSM, etc.)
- Initiative to investigate the requirements for permanent archiving of large datasets and provide coherent access mechanisms.
- First step was a comparison of existing ESA archives/data systems with the CCSDS Open Archival Information System (OAIS), published 22 Oct. 2001. Results showed the major ESA archives can be mapped to the OAIS model – but differences still exist.

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ESA Data Sources

- Ulysses
 - Ulysses data system available on the Web from either ESTEC or USA. Data is not available in real time or even a timely fashion (PI prerogative).
- SOHO
 - Wealth of images provided in near real time on the Soho web site. Original quality images available through the Soho science data system
- Cluster
 - Science data system available from numerous sites, including RAL, and ESTEC.
- EGNOS
 - TEC reports available either from EGNOS receiver or the Internet (as previously presented).
- PROBA/SREM
 - SREM data is available through the PSDMAS system.

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NOAA Data Service

<http://www.sec.noaa.gov/>

- GOES and ACE data and plots are provided at regular intervals (~5 min, hourly, daily).
 - Energetic particle data (p^+ , e^-)
 - Solar wind data (v_{sw} , n_{sw} , $T...$)
 - Geomagnetic data (IMF, K_p , A_p , F10.7, ...)
 - Solar Images.
- Summary of space weather is provided in "glossy" easy to digest dials, plots, etc.
- Quite mature service that is free to all and available from **ONE** location.

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Conclusions (1)

- European data systems exist that can be a basis for a 1st attempt at a space weather system - although almost all are science missions and may not provide the required real-time data stream or continuity of service (replacement policy).
- The European data systems are currently all working in (semi) isolation. It is possible to acquire the data over the Internet, but access to all data sets using a coherent system is not currently available.
- Software systems and technology for coordinating the data is under development, but requires tailoring to space weather needs.

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Conclusions (2)

- What is required is a coherent access policy/system:
 - Acquire data into the space weather systems in real time
 - Backup, archive and retrieval policies (but not necessarily implementation) must be coherent to ensure continuity of service
 - Hooks into the data systems are required to allow local or remote tool/product development and implementation
 - The instrument PT's must be included in the program to ensure future changes to their systems are catered for in any space weather system.
- The European agencies are becoming organized, but the IT infrastructure and interoperability is lagging.

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