Capabilities of the analysis tools of the IMPEx infrastructure

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Abstract

The EU-FP7 Project "Integrated Medium for Planetary Exploration" was established as a result of scientific collaboration between institutions across Europe and is working on the integration of a set of interactive data analysis and modeling tools in the field of space plasma and planetary physics. These tools are comprised of AMDA, CLWeb and 3DView from the data analysis and visualisation sector, developed at CDPP, as well as Hybrid/MHD and Paraboloid magnetospheric models from the simulation sector. This presentation focuses on how these various tools can access observational and modeled data and display them in innovative and interactive ways. Companion presentations of the IMPEx project comprise of :

- *IMPEx Data Model: a simulation extention to the Spase data model (Hess et al., poster)*
- *Numeric Simulation Tools of the IMPEx Infrastructure (Kallio et al., poster)*
- *Saturn and Earth polar oval position forecast by IMPEx InfrastructureWeb Services based on the Paraboloid magnetospheric model SINP (Blokhina, oral)*
- *Planetary Science Research with the IMPEx Infrastructure (Topf, oral)*

http://impex-fp7.oeaw.ac.at

CDPP, the french Plasma Physics Data Centre

The CDPP (Centre de Données de la Physique des Plasmas) was created in 1998 jointly by CNES and INSU. The CDPP is the French national data centre for natural plasmas of the solar system. The CDPP assures the long term preservation of data obtained primarily from instruments built using French resources, and renders them readily accessible and exploitable by the international community. The CDPP also provides services (AMDA) and tools (3DView, the propagation tool) which are described in this presentation. The CDPP is involved in the development of interoperability (IVOA, IPDA, SPASE) and participates in several Virtual Observatory projects (Europlanet, Helio, Vispanet, IMPEx).

http://cdpp.cesr.fr

IMPEx analysis tools

See also *http://impex-fp7.oeaw.ac.at/tools.html*

Current datasets in AMDA

- **ULYSSES** : Ephem, MAG, SWOOP, URAP (Io tous)
  Stereo : Ephem, SWEA, MAG, PLASTIC
  ACE : Ephem, MAG, SWEPAM
  WIND : Ephem, MAG, SWE
- **MESSENGER** : Ephem, MAG, FIPS, EPS
  Mariner 10: MAG
- **Venus Express** : Ephem, IMA, ELS, MAG
  PVO : Ephem, MAG
- **THEMIS** : Ephem, ESA, MAG
  Cluster : Ephem, MAG, CIS, PEACE, RAPID, EFW, WHISPER, STAFF
  Double Star 1 : Ephem, MAG, HIA
  IMP-8 : Ephem, MAG, MIT
  GEOTAIL : Ephem, MGF, LEP
  POLAR : Ephem, MFE
  INTERBALL-Tail : Ephem, MAG, CORALL
  ISEE : Ephem, MAG, FVA
  Indices : AE, DST, ASY-SYM, PC North, AM, AA
- **ARTEMIS** : Ephem, ESA, MAG
  Kaguya (under discussion): MAG, PACE
- **Mars Express** : Ephem, IMA, ELS, MARSIS
  Mars Global Surveyor : Ephem, MAG, ER, PROXY
- **Galileo** : Ephem, MAG, EPD, PLS, PWS
  Michigan Solar Wind Model
  Voyager 1 & 2 : Ephem, MAG, PLS, PWS
  Pioneer 10 & 11: MAG
  ULYSSES : Ephem, MAG, SWOOPS
- **Cassini** : Ephem, RPWS (SKR, Langmuir Probe), MAG, CAPS
  Michigan Solar Wind Model
  Voyager 1 & 2 : Ephem, MAG
  Pioneer 11 : MAG
- **Voyager 2** : MAG
- **Voyager 2** : MAG

AMDA http://cdpp-amda.cesr.fr

AMDA (Automated Multi-Dataset Analysis) is a web-based facility for on line analysis of space physics time series data coming from either its local database or distant ones. This tool allows the user to perform on line classical manipulations such as data visualization, parameter computation or data extraction. AMDA also offers innovative functionalities such as event search on the content of the data in either visual or automated way, and the generation, use and management of time-tables.

3DView http://3dview.cesr.fr

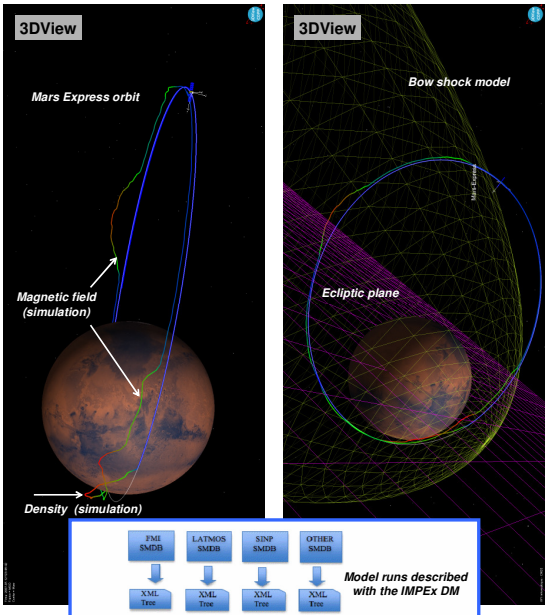
3DView is an open Java application (no registration required) which displays spacecraft and natural bodies orbits in 3D maneuverable scenes. 3DView was initially developed by GFI under CNES funding and will be improved in the frame of the FP7 IMPEx project to display observational data as well as simulation results (from MHD/hybrid codes and analytical models).

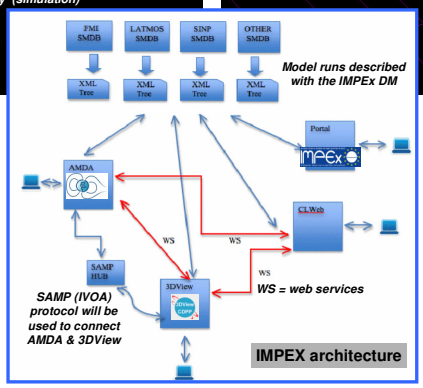
CLWeb http://clweb.cesr.fr

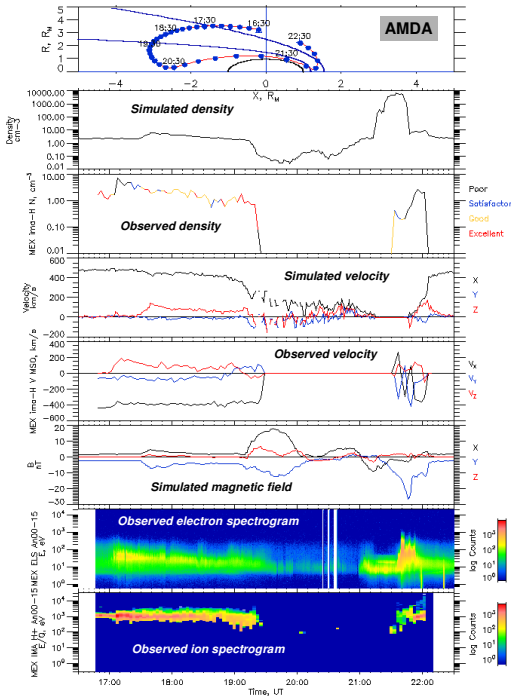
To perform in-depth study, CLWeb can dynamically load calibrations to generate calibrated from raw data (flux, distribution function) or compute moments. As a panel composer, it enables plotting of spectrograms (of multiple types time/energy, time/angle, time/mass, mass/energy, …). Each user has his/her own workspace to store figures, time tables, numerical data or plots. Accessible data comprise of Earth orbiting satellites (Cluster, Themis, …) as well as planetary missions (Mars Express, Venus Express, …)

Case study : Mars environment / in-situ and simulation data compared *from planetary to kinetic scales*

In-situ data : Mars Express / Aspera3 (12/07/2007) – Simulation data : hybrid model from LATMOS







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