

Capabilities of the analysis tools of the IMPEX infrastructure

V. Génot (1), M. L. Khodachenko (2), E. J. Kallio (3), F. Topf (2), T. Al-Ubaidi (2), M. Gangloff (1), E. Budnik (1), M. Bouchemit (1), B. Renard (1), N. Bourel(1), E. Penou (1), N. André (1), R. Modolo (4), S. Hess (4), W. Schmidt (3), I. I. Alexeev (5), and E. S. Belenkaya (5)
(1) IRAP, CNRS/Université Paul Sabatier, 31028 Toulouse, France (vincent.genot@rap.omp.eu),
(2) Space Research Institute, Austrian Academy of Science, Graz, Austria,
(3) Finnish Meteorological Institute, Helsinki, Finland,
(4) LATMOS, CNRS/Université de Versailles Saint Quentin,
(5) Skobektsyn Institute of Nuclear Physics, Moscow State University, Moscow, Russian Federation

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. According to [1] these tools are comprised of AMDA, Clweb and 3DView from the data analysis and visualisation sector as well as Hybrid/MHD and Paraboloid magnetospheric models from the simulation sector. This presentation focuses on how these various tools will access observational and modeled data and display them in innovative and interactive ways.

1. Data visualization

The growing amount of data in planetary sciences requires adequate tools for visualisation enabling in depth analysis. Within the IMPEX infrastructure data will originate from heterogeneous sources : large observational databases (CDAWeb, AMDA at CDPP, ...), simulation databases for hybrid codes (FMI, LATMOS), planetary magnetic field models database and online services (SINP). Together with the common "time series" visualisation functionality for both in-situ and modeled data, IMPEX will also provide immersion capabilities into the complex 3D data originating from models. These features make the goal of this presentation. Companion papers detail other aspects of the project (science cases, architecture, data-model, ...). The international context will also be re-reviewed.

2. IMPEX tools

The functionalities of the three following tools will be described. The emphasis will be put on how these tools 1/ can share information (for instance Time Tables or user composed parameters) and 2/ be operated synchronously via dynamic connections based on VO standards.

- AMDA [2] is a web based tools which offers "time series" visualisation capabilities and specializes in conditional search on large datasets,
- Clweb [3] also enables "time series" visualisation together with complex computation on particle instruments products (eg. partial moment of distribution functions, pitch angle, ...),
- 3DView [4] offers manoeuvrable 3D scenes of planetary environments and 3D model results in which virtual spacecraft may be flown in.

Within IMPEX the common objective assigned to the visualisation tools is to enable the best rendering of simulation and model results obtained in the model sector of the project. Examples of such joint renderings will be proposed : 2D plane cuts, field and stream lines, interpolation along spacecraft orbits, ...

3. Conclusions

The IMPEX infrastructure will make possible a selection of scenarios interconnecting visualisation tools like AMDA, CIWeb and 3DView to simulation and model results stored in dedicated databases. The complexity of these products and their joint analysis with in-situ data require advanced visualisation capabilities which combines both 3D and more common 2D "time series" displays. These capabilities will be detailed.

Acknowledgements

The authors are thankful to the EU FP7 project IMPEX (Integrated Medium for Planetary Exploration, <http://impex-fp7.oeaw.ac.at/>, project number 262863), for providing a platform for their research collaboration and communication.

References

- [1] Khodachenko, M., et al. (2011, January). *IMPEX Collaborative Project ANNEX I - Description of Work*. Seventh Framework Programm Capacities Collaborative Project - Proposal Grant Agreement No. 262863.
- [2] AMDA web site : <http://cdpp-amda.cesr.fr/>
- [3] Clweb web site : <http://clweb.cesr.fr/>
- [4] 3DView web site : <http://3dview.cesr.fr/>