



Integrated Medium for Planetary Exploration (IMPEx): an infrastructure to bridge space missions data and computational models in planetary science

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The FP7-SPACE project Integrated Medium for Planetary Exploration (IMPEx) has started in June 2011. The aim of the project is the Creation of an integrated interactive IT framework where data from space missions will be interconnected to numerical models, providing a possibility to 1) simulate planetary phenomena and interpret spacecraft data; 2) test and improve models versus experimental data; 3) fill gaps in measurements by appropriate modelling runs; 4) solve technological tasks of mission operation and preparation. Data analysis and visualization within IMPEx will be based on the advanced computational models of the planetary environments. Specifically, the ‘modeling sector’ of IMPEx is formed of four well established numerical codes and their related computational infrastructures: 1) 3D hybrid modeling platform HYB for the study of planetary plasma environments, hosted at FMI; 2) an alternative 3D hybrid modeling platform, hosted at LATMOS; 3) MHD modelling platform GUMICS for 3D terrestrial magnetosphere, hosted at FMI; and 4) the global 3D Paraboloid Magnetospheric Model for simulation of magnetospheres of different Solar System objects, hosted at SINP. Modelling results will be linked to the corresponding experimental data from space and planetary missions via several online tools: 1/ AMDA (Automated Multi-Dataset Analysis) which provides cross-linked visualization and operation of experimental and numerical modelling data, 2/ 3DView which will propose 3D visualization of spacecraft trajectories in simulated and observed environments, and 3/ “CLWeb” software which enables computation of various micro-scale physical products (spectra, distribution functions, etc.). In practice, IMPEx is going to provide an external user with an access to an extended set of space and planetary missions’ data and powerful, world leading computing models, equipped with advanced visualization tools. Via its infrastructure, IMPEx will enable to merge spacecraft data bases and scientific modelling tools, providing their joint interconnected operation for the better understanding of related space and planetary physics phenomena.