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ESPAS, the near-Earth space data infrastructure for e-Science: architecture, data model and first release

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In the frames of the European Commission FP7 Programme, the ESPAS data infrastructure (http://www.espas-fp7.eu) is under development with primary objective to support the access to observations from the near-Earth space environment. This is a region that extends from the Earth's atmosphere up to the inner magnetosphere. Observing instruments that are linked to ESPAS include ionosondes, incoherent scatter radars, magnetometers, GNSS receivers and a large number of space sensors and radars. The ESPAS platform supports the systematic exploration of multi-point measurements from near-Earth space through homogeneous access to diverse data, enhances researchers' capability to develop advanced models of the geospace, supports data assimilation and provides tools for validation of models. The concept of extensibility to new data sets is an important element in the ESPAS architecture.

The first phase that led to the release of the first prototype included the design and development of the initial data model that supports end user queries for near-earth space datasets using any combination of the following search fields: organisation, instruments, characteristics, temporal and spatial constraints. The next step would be the implementation of search for characteristics within the datasets. For the first release only the basic data sources are registered (i.e. EDAM electron density, DIAS ionosonde data, EISCAT Incoherent Scatter Radar measurements). In a second phase, when all databases and enhanced databases will be registered, the ESPAS infrastructure must be extensively tested through the application of several use cases, designed to serve the needs of the wide interdisciplinary users and producers communities, such as the ionospheric, thermospheric, magnetospheric, space weather and space climate communities, the geophysics community, the space communications engineering, HF users, satellite operators, navigation and surveillance systems, and space agencies. The final ESPAS platform is expected to be delivered in 2015.