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European Digital Upper Atmosphere Server

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DIAS HOME

- ▶ DIAS home
- ▶ Consortium members
- ▶ Project documents
- ▶ Dissemination material
- ▶ Events
- ▶ Links
- ▶ Contact information
- ▶ Access to DIAS system
- ▶ Users' Network

DIAS QUESTIONNAIRE  
enter here

HOME   

For issues concerning the maintenance of these pages please contact the site Administrator



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SAC

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# DIAS Web – Maps: nowcasts



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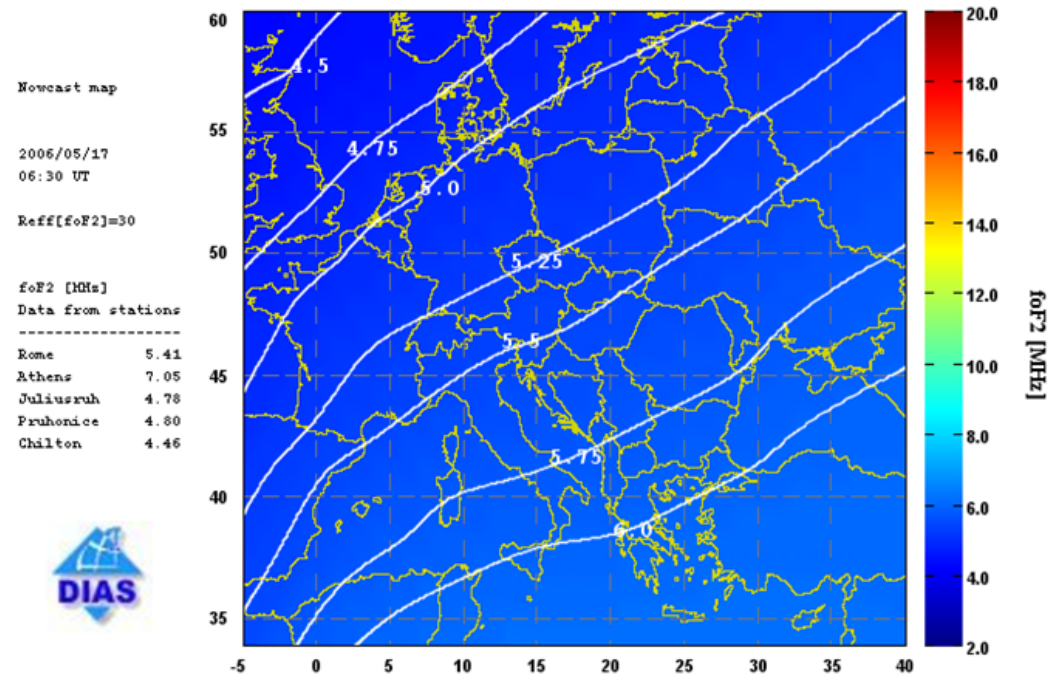
Maps: foF2

- Home Page
- Information
- Ionograms
- f-plots
- SSN plot
- Maps
  - foF2
  - N(3000)F2
  - MUF
- Electron Density
- Historical Data
- Subscription
- Alerts
- Glossary
- User Logout

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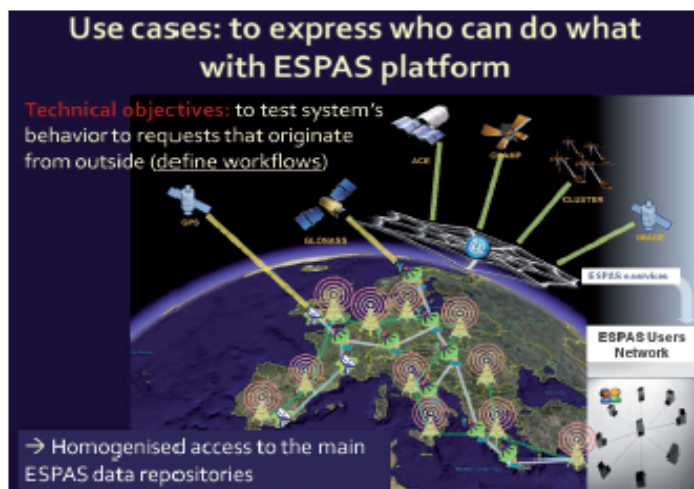
Year: 2006 Month: 05 Day: 17 Hour: 06 Minute: 45 UT



# **ESPAS** near-Earth space data infrastructure for e-science

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## objectives

- Establish the platform to integrate heterogeneous data, with different formats and protocols, from Earth's thermosphere, ionosphere, plasmasphere & magnetosphere
- Provide homogenized access to multi-instrument (different types of sensors: on ground & in space, in-situ & remote) multi-point science data
- Establish policies on data access, publication, standards and quality
- Provide tools for visualization, analysis, model building, data assimilation, model validation, space environment awareness
- ESPAS builds on European sources but interoperates with related international data providers; Align with two ESFRI projects: EISCAT and SIOS





**International  
Innovation**  
Disseminating science, research and technology

**ESPAS:  
Near-Earth  
Space Data  
Infrastructure  
for e-Science**

| 2012 |

## Forecasting the future of near-Earth space



Many processes and interactions in the near-Earth space environment impact our lives on a daily basis. Leading near-Earth space researchers Drs Mike Hapgood, Anna Belehdik and Natalia Manola discuss their strategy for developing a comprehensive EU-based data Infrastructure

Near-Earth Space Data Infrastructure for e-Science (ESPAS) aims to make Europe a foremost player in the efficient use and dissemination of comprehensive near-Earth space environment information. How do you plan to achieve this goal?

The development of a coordinated data infrastructure for the near-Earth space environment will provide homogeneous access to diverse data sources. This infrastructure will be invaluable to research communities in academia, the public sector and industry. Following the development of the basic data infrastructure, the ESPAS consortium will use it as a test bed, implementing several use cases that will enable them to test the specifications and functionality. Based on the results of these tests, and user requirements refined by the consortium, new value-added services will be designed and deployed. Through these additional services, the ESPAS system will address the needs of the interdisciplinary community of users, enabling intensive use from the scientific and the industrial space community, and creating a major impact across a diverse range of scientific and technological areas.

Why does this type of infrastructure not presently exist? What are the major shortcomings of established methodologies that have hindered such research efforts, and how will you address them?

Near-Earth space contains a wide range of environments that are measured by many different techniques. This leads to great

diversity of data types ranging from scalars to tensors, and often at locations that are moving with time, eg. due to spacecraft motion or the scanning of a radar beam. This diversity had previously been viewed as an obstacle, since it did not fit with the data systems developed for the associated disciplines – such as astronomy, which focuses on a few measurement types such as images and spectra.

At what stage is work to establish the infrastructure and what are the next steps you will be taking?

We are working on a data model for ESPAS. This is a fundamental step that will allow us to achieve homogeneous access to all datasets supported by ESPAS. The first release of the platform is scheduled in October 2012. It will be based on a simple basic use case: location of all available data from ground-based experiments and satellite missions, available at certain spatial coordinates and time intervals. For this first release we will register a core set of data sources (Cluster, GRC, DEMETER, DIAS, ESCAT, ISL and SWAO). For the next release, we will expand the scope of ESPAS to register many more data sources, and deploy a baseline set of models and statistical tools that can be applied to the data. We will also deploy a set of administration tools to enable the smooth operation of ESPAS. With the third release, we will deploy additional value-added services (to be selected following the use cases results) and tools for daily monitoring of the ESPAS operation. At the end of EU funding in April 2015, we will also release a quality assurance plan, and associated software maintenance tool, that will facilitate continued operation of ESPAS.

Finally, could you offer some more general thoughts on the role of data infrastructures within space science and more generally?

The scientific community, as well as society in general, needs to take specific strategic actions to safeguard its scientific production, bring together all data and publications in the context of appropriate interoperable global data infrastructures, and offer them for further use. As mentioned in the 'kicking the Waver' report ([http://cordis.europa.eu/fp7/ict/e-infrastructure/docs/fig\\_sd-report.pdf](http://cordis.europa.eu/fp7/ict/e-infrastructure/docs/fig_sd-report.pdf)), the 'vision is a scientific e-infrastructure that supports seamless access, use, re-use and trust of data. In a sense, the physical and technical infrastructure becomes invisible and the data themselves become the infrastructure – available asset, on which science, technology, the economy and society can advance'.

The vision is, in fact, for a collaborative data infrastructure ecosystem of interoperable data infrastructures. ESPAS being one of many infrastructures developed in the European, regional or national levels will ensure its interoperability to this ecosystem – abiding to standards followed by other infrastructures and establishing standards and governance policies for the data it provides. Moreover, it will follow the guidelines produced by the two main Seventh Framework Programme (FP7) horizontal projects: (a) OpenAIRE ([www.openaire.eu](http://www.openaire.eu)) to explore ways of citing ESPAS datasets and link them to publications; and (b) EUDAT ([www.eudat.eu](http://www.eudat.eu)) to guide the low-level services required to provide the level of interoperability and trust of data necessary to support widespread access, long-term preservation for use and re-use.