

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
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SPACE DATA ROUTERS FOR THE EXPLOITATION OF SPACE DATA

Abstract

The goal of the “Space-Data Routers” project is to boost collaboration and competitiveness of European Space Agency, European Space Industry and European Academic Institutions towards an efficient architecture for exploiting space data. The objective is to increase communication flexibility in Space and to form a mission-/application-oriented communication overlay for data dissemination, on Earth. Technically, that is achieved by deploying the Delay Tolerant Networking (DTN) stack and by integrating the interfaces of various Space and Internet Communication and Networking Protocols, including TM/TC, Space packets, and AOS along with Ethernet, TCP/IP and UDP. In parallel, the overlay employs the agencies’ policies for resource and data sharing as well as for data exploitation. These concepts will be implemented through the development of the Space-Data Router (SDR): a DTN-enabled device that: (i) incorporates the Space Agency administrative instructions and policies for data dissemination and resource utilization and (ii) integrates the DTN protocol stack with application, network and link layer protocols.

Analysis, prototyping, and evaluation of the SDR concept is subject to an EU FP7 Project in the 2010 Space Call performed by the Democritus University of Thrace (DUTH), the National Observatory of Athens (NOA), the University of Plymouth (UoP), Space Internetworks (SI), and VEGA Space GmbH. The project is based on previous work on DTN including DTN/IP Test-bed Studies performed by DUTH under ESA Contract. The SDR project will make use of and enhance this test-bed focussing on DTN policies, security mechanisms, and advanced routing services. The prototyping activities will also include experimental studies of deploying a DTN-overlay over CCSDS link layer protocols (TM/TC packet protocols and AOS) both in a simulated environment and in a test set-up using ESA infrastructure software and commercial TM/TC processing equipment.

In the presentation we will present the general SDR concept, detail the design characteristics of the device, and discuss the expected impact of their deployment, emphasizing on the flexibility of data dissemination, adaptability to space assets and enhancements in inter-agency operations and space communications in general. Finally we will present the evaluation scenarios already developed, expand on the prototyping plans, and report initial results of work related to deployment of the DTN overlay over space link protocols.