29th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
Interactive Presentations - 29th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (IP)

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SPACECRAFT AS A SERVICE, AN OPEN-SOURCE APPROACH

Abstract

In recent years, there has been a constant and continuous effort in the EU to reduce the System Response Time of EO satellites in order to achieve rapid response in time critical EO domains, such as border control, search and rescue and marine environment protection. High-performance computation power on board the satellite is essential for reducing significantly the response-time for such applications via the extraction of the information directly in orbit. The major technical challenges for this goal are the development of high-performance space avionics for edge computing that can provide enhanced in-flight reconfigurability, the integration of this technology into suitable satellite platforms, the virtualization of the hardware and the development of a very heterogeneous cloud computing architecture that can combine ground clusters and remote satellite computers as part of the same network.

OHB Hellas, the Greek subsidiary of the space high-tech group OHB SE, proposes an innovative community-based online web service, as solution, that connects satellite owners and EO users by utilizing onboard reconfigurable HW/SW, cloud services, and open-source tools. The proposed idea cultivates the culture of sharing-economy for satellite owners and maximizes the use of resources in- orbit. The users will be able, through a web portal, to upload payload data processing software, download their missions' results and monitor the satellites hosting their idea/service. This web portal will give the notion to the user that is directly communicating with the satellites, while in fact, the software will pass through the web portal, to the mission control / ground station to be finally transmitted to the satellite(s) and vice versa. The technologies enabling the proposed satellite as a service concept are high performance data processing and the software layer for the hardware virtualisation. By progressively building a constellation of different remote sensing spacecrafts with different capabilities, and matching that with an appropriately flexible ground processing system, a number of services can be achieved over time allowing mission flexibility and quick adaptability to emerging needs. OHB intends to bring its rich heritage in delivering complex, robust and highly reliable space solutions for this purpose targeting in the near future small satellite platforms. OHB proposes to start the implementation of the service in Greece, initially in the domain of EO, aiming to expand in the near future to other domains that would require intelligent automation like Space exploration or connectivity.