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INTEGRATION OF SMALL PLATFORMS TO GEOSS END-USER SERVICES: 3-STAR PROJECT

Abstract

3-STAR is a new cubesat educational project under development at Politecnico di Torino. It has been thought in response to the GEOID call for proposals issued by the ESA Education Office. GEOID initiative wants to settle an orbiting constellation of Cubesats to be operated by the GENSO ground-stations network. GEOID is expected to be the communication backbone of the initial version of the HUMSAT system, which main goal is providing support for humanitarian initiatives especially in developing areas, and implement a wide range of applications such as climate change monitoring, remote disaster tracking or public health communications. The platform proposed is a 3U Cubesat. The service module is derived from the e-st@r cubesat (http://areeweb.polito.it/ricerca/E-STAR/). The satellite carries two payloads: HumSat payload (a simple but reliable communication module compatible with Humsat system) and P-GRESSION (Payload for GNSS remote sensing and signal detection) which aims at performing measurements by means of radio-occultation technique and scattering theory, using GNSS signals. The 3STAR satellite has been designed to cope with the mission objective of providing communication support in areas without infrastructures. The potentialities derived by accommodating a second payload enable its employment for monitoring and support purposes. In a constellation of small satellites it can serve as: • Telecommunication backbone: it will provide a Store-and-Forward service for ground-sent information and radio bridges in case of natural disasters. • Remote-sensing support: data collection from ground and air-borne sensors, monitoring different areas and enabling the recognition of fast (and slow) modification in the surface. Services in terms of enduring and recovering from emergencies have been thought in a user-needs scenario: need of maintaining communications where no infrastructures are available; need of radio bridges for Green Cross operations, where communications are difficult because of the morphology; interest for radio amateurs community in using the constellation network, etc. The platform will be able to collect data from sensors, connect to a specific network, and system can be set up for different projects: possibilities include avalanche detection, earthquake sensing, animal tracking, meteorological data and much more. 3STAR project aims at developing the space and ground technology needed to support an always-growing user infrastructure. There will be no limitations to the systems and users allowed to connect to the network, apart from the compliance with the interface requirements set by the protocols.