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SETTING THE STANDARD FOR THE 6U INTERNET-OF-THINGS CUBESAT PLATFORM:
DESIGN AND IN-ORBIT PERFORMANCE.

Abstract

In recent years Internet-of-Things (IoT) has taken a flight, literally: The first IoT services are ready to be offered from space. NewSpace companies have lined up to provide these services to the general public globally at any moment in time. This trend is not coincidentally emerging parallel to the developments made in the small (CubeSat) satellite platforms. CubeSats are ready to fulfill their long-standing promise of providing low-cost access to space while giving unprecedented performance when utilized in numbers.

ISIS – Innovative Solutions In Space has been at the forefront of the IoT-revolution by setting the standard for the IoT CubeSat platform. A complete 6U IoT-tailored CubeSat bus has been developed containing a modular designed electronic power system, a dedicated high-speed payload data bus, and a multitude of antennas. The system provides high-performance S-Band data downlink capabilities of up to 4.3 Mbps, extensive power management with peak power generation of up to 45 W, and 3-axis attitude control. A detailed insight will be given into the design and configuration of the platform in relation the mission requirements. In 1,5 years, two of these IoT platforms have been built simultaneously while going through a time-challenging AIV phase. The AIV phase had a strong emphasis on EMC testing due to the many RF systems and antennas co-located on the satellite. EMC testing was carried out both in-house and at the ESA ESTEC anechoic chamber facility and results of measurements on platform EMC and antenna mutual coupling will be provided in this paper.

Both platforms have been launched December 2018 and the results of the early operations and commissioning phase will be described in detail. Months' worth of data collected through a multimode ground station network is analyzed and will be presented. The in-orbit data on power generation and consumption, RF performance, and temperatures will be visualized while a validation with respect to link- and power budget will be made to show the performance of the IoT platform.