Paper ID: 70078
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29th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
23rd Workshop on Small Satellite Programmes at the Service of Developing Countries (1)

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IOT SATELLITE MISSION ANALYSIS FOR SMART AGRICULTURE AND WATER MANAGEMENT

Abstract

In recent years, the world has witnessed the ubiquitous applications of Internet of things (IoT) for many different scenarios. IoT can provide both accuracy and sustainability in different applications. IoT Satellites can offer an alternative and cost-effective solution for terrestrial communications. This paper presents the mission analysis of a Satellite based IoT solution for Agriculture and Water resources management in Egypt. It defines the system requirements, design and multiple access techniques that ensure successful delivery of uplink sensor data and downlink traffic through a validation scenario, with the development of a proof-of-concept (PoC), aiming to the successful demonstration of target mission capabilities for future evolvement of the mission. The mission demonstrates combination of transmission/reception of MQTT messages via LoRA modem. Messages from different ground terminals are stored on-board the satellite and downlinked as the satellite passes over the destination ground station. The main specifications and constraints of such a store and forward mission are calculated and presented including orbit selection, user's coverage, coverage area analysis, communication links and power budget.

Keywords—Direct to LEO Satellite, Internet of Things, MQTT, Mission Analysis