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ORBITNET: AN OPEN-SOURCE SATELLITE FOR IOT DATA TRANSMISSION IN REMOTE AREAS

Abstract

The advent of the Internet of Things (IoT) has revolutionized the way we interact with technology. IoT devices, ranging from smart appliances to sensors and wearables, have become ubiquitous, offering unprecedented connectivity and data collection. However, in remote areas without reliable network coverage, IoT devices are unable to transmit data, limiting their functionality. This paper presents "OrbitNet," an open-source satellite designed to provide IoT data transmission in remote areas.

The OrbitNet satellite is designed to provide reliable data transmission for IoT devices in remote areas without network coverage. The satellite is equipped with a transceiver that communicates with IoT devices, relaying data to ground stations that can connect to the internet. The satellite's design is based on a CubeSat architecture, which allows for cost-effective development and deployment. The CubeSat architecture consists of a small satellite that can be launched into orbit as a secondary payload. This approach significantly reduces launch costs and makes it feasible for organizations with limited budgets to develop and launch their satellites. The OrbitNet satellite is designed to be compatible with the CubeSat architecture, allowing for easy integration into existing satellite networks. The satellite's communication system consists of a UHF transceiver, which is optimized for low-power IoT devices. The transceiver is also equipped with a low-noise amplifier (LNA), which improves the sensitivity and signal-to-noise ratio, allowing for more reliable data transmission. The satellite's power system consists of solar panels that generate power during daylight hours, storing excess power in batteries for use during the night. The power system is designed to be highly efficient, providing enough power to operate satellite's communication system and other subsystems. Ground Station Network To receive data from the OrbitNet satellite, ground stations are required. The ground stations act as a gateway between the satellite and the internet, relaying data from the satellite to cloud-based IoT platforms. Ground stations are typically located in areas with network coverage, allowing for reliable data transmission to the internet. To ensure reliable data transmission, multiple ground stations are required to cover a wide area. The OrbitNet ground station network is designed to be flexible, allowing for the addition of ground stations as required. The ground stations communicate with the satellite using UHF antennas, which are optimized for low-power IoT devices.

Overall, OrbitNet satellite offers promising and a cost-effective solution based on cubesat architecture for providing IoT data transmission in remote areas without network coverage.