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ADVANCES IN SPACE-BASED COMMUNICATION: SKYWALKER CONSTELLATION

Abstract

A Low-Earth-Orbit (LEO) satellite constellation for Internet of Things (IoT) is a network of small satellites in low Earth orbit that are designed to provide global coverage and connectivity for IoT devices. These satellites are typically placed in orbits between 500 and 1,500 kilometres above the Earth's surface and are equipped with advanced communication technology to transmit data from IoT devices to the ground. This paper will introduce HEAD's Skywalker constellation, a LEO narrowband IoT satellite constellation with integrated payloads designed to provide advanced space based IoT communication solutions. The Skywalker constellation, developed, planned, and constructed by China HEAD Aerospace Technology Co., Ltd, with a planned 108 satellites and will complete the deployment of the first phase of 48 satellites in 2025. To date, a total of nine satellites have been launched (2017, 2019, 2020, 2021, and 2022) as part of the Skywalker constellation. The HEAD-1 Satellite (demonstration mission) launched successfully in 2017. By securing a substantial investment in 2019, HEAD initiated the production and launch of the Skywalker Constellation. The Skywalker Constellation also carries AIS, VDES, and ADS-B payloads for global ship detection and airplane monitoring services (HEAD-2C / HEAD-2D launched in June 2020). With the first batch of Skywalker satellites in orbit, HEAD can provide data collection services globally at least twice per day. HEAD takes advantage of mature terrestrial IoT terminal development that allows users access to affordable, low power consuming, and reliable ground terminals.

With the deployment of additional HEAD-2E/HEAD-2F Satellites launched in October 2021, HEAD-2G Satellite launched on 4th August 2022 and HEAD-2H launched on 9th December 2022, data collection services will increase to at least three to six times per day globally, thus improving services progressively year by year until completion of the entire constellation in 2025. The Skywalker constellation is an option to solve the requirements for competitive two-way data communication in the agricultural sector, electrical sector (monitoring and smart meters), cathodic protection of pipelines, control of artisanal vessels, the monitoring of fixed assets, and more.