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Presentation title

SATMAR: in-orbit demonstration of RF monitoring and maritime signal exploitation capabilities with an SDR payload

Abstract

Growing congestion in the radio-frequency spectrum poses an increasingly serious challenge to civil and defence operations. Unintentional interference, unauthorised spectrum use and deliberate jamming can disrupt communications, navigation and other essential services. Space-based sensors can complement terrestrial monitoring networks by providing repeatable coverage over wide geographical areas. This presentation reports on the in-orbit RF monitoring and SIGINT capabilities of SATMAR, a 6U CubeSat designed and developed by Alén Space and launched into LEO in June 2025. SATMAR supports monitoring across three frequency bands—the maritime VHF band, L band and S band—covering a broad range of signals of interest. At the core of its payload is TREVO, an in-house software-defined radio that enables flexible on-board signal acquisition and processing. Captured signals can be processed on board or downlinked for further analysis in the ground segment. In-orbit demonstrations include the demodulation and decoding of AIS Long Range frames and the reception and demodulation of maritime VHF voice communications, including transmissions on Channel 16. Together, these results provide Alén Space with a flight-proven technology base for the development of next-generation RF monitoring and SIGINT payloads.

Short bio

Sebastián Cánovas Carrasco, Ph.D., is the Space Applications Area Manager at Alén Space, where he leads multidisciplinary teams developing SDR- and FPGA-based payloads for RF spectrum monitoring, SIGINT, geolocation and satellite communications. He has contributed to the definition and in-orbit operation of the SATMAR mission and to several RF interference detection and geolocation initiatives. Previously, as a DSP Technical Lead, he developed advanced signal-processing solutions for underwater acoustic and sonar systems on major naval platforms.