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# PROMETHEUS-1: the 1st Portuguese PocketQube

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## Abstract

PROMETHEUS-1, the 1st Portuguese PocketQube (PQ), launched on January 14th 2025, via SpaceX Falcon 9, Transporter-12 Rideshare mission, represents a significant milestone in the rapidly evolving national space ecosystem. With a tiny form-factor of 5x5x5 cm and weighing below 250 g, PROMETHEUS-1 features most of the classical spacecraft subsystems. Its payload consists of a 5 MP camera and a dedicated MCU with machine learning image classification capabilities; an On-Board Computer powered by an ARM® Cortex®-M4F, programmed in CircuitPython; an Electrical Power System with two LiPo batteries and solar cells; a half-duplex Communications System using a LoRa radio operating in the UHF amateur band; and an Attitude Control and Determination System employing PCB-embedded magnetorquers, sun sensors, and a 9-axis IMU. PROMETHEUS-1 serves primarily as a pedagogical tool designed to inspire students by bringing space technology directly into the classroom. The project aims to integrate space technology across multiple engineering disciplines, including Aerospace, Industrial Electronics, and Telecommunications Engineering. It emphasizes a "learn-by-doing" approach that provides students with hands-on learning opportunities about satellite design, engineering, launch procedures, certification, and operation. PROMETHEUS-1 has achieved orbit and initial communication, receiving telemetry and images during its first pass. The PQ-class adoption trend is growing in universities and companies to mature space technologies, with PROMETHEUS-1 contributing to Portugal's capabilities in satellite development.

**Keywords:** PocketQube, LEO, Satellite Engineering, Space Education

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