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MORAZÁN PROJECT GROUND AND SPACE SYSTEMS: RESULTS OF A SUCCESSFUL
PRELIMINARY DESIGN FOR SPACE AND GROUND SEGMENTS, INTERNATIONAL
COOPERATION, KNOWLEDGE TRANSFER AND LESSONS LEARNED.

Abstract

Morazán is the first Honduran satellite, and the first space mission built collaboratively between three Central American countries. In 2020, the project won the 5th round of the KiboCUBE program organized by UNOOSA and JAXA, and the satellite consists of a 1U CubeSat that will be launched to the International Space Station between 2023-2024. The project aims to be a proof-of-concept for hydrometeorological hazards mitigation in one of the regions highest in risk in the world, while at its core it educates and serves the most vulnerable communities in Honduras, Costa Rica, and Guatemala. Morazán has three missions: a scientific, an emergency, and an educational mission. The three-mission concept was designed to maximize the project's societal and scientific value. First, the scientific mission consists of collecting key sensor data in three hydrometeorological basins to develop an early warning system proof-of-concept. Second, the emergency mission provides means for affected populations to

communicate in case of telecommunication infrastructure loss during an event. Finally, the educational mission consists in providing school students with the knowledge and tools to download Earth images that were captured by an onboard camera, directly from the satellite. The project has successfully passed its Preliminary Design Review, meaning the design activities are mostly complete. This paper presents the project's scientific background, and the lessons learned during almost three years of successful project execution in the framework of international cooperation in Central America. In addition, this paper presents the initial system-level design decisions, the project architecture solution, and how each mission will be accomplished from an engineering perspective. Finally, this paper aims to publicly present an ongoing successful example of satellite development and knowledge transfer, in the hope that it serves as an example for other emerging countries in the space sector.