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SPECIALIZATION AS A SOURCE OF CONTINUOUS MISSION RESULTS OUTPUT FOR DEVELOPING NATIONS: THE SETEC LAB CASE IN COSTA RICA

Abstract

Costa Rica became a space nation in 2018 with the launch of its first CubeSat, Irazú, a joint project between the Central American Association for Aeronautics and Space (ACAE), an NGO, and the Space Systems Engineering Laboratory (SETEC Lab) of the Costa Rica Institute of Technology (TEC), the first of its kind in Central America. SETEC Lab was created amid the development of Project Irazú by the Costa Rica Institute of Technology, with the objective of "leading the creation of capacities in space engineering, to use space as a tool for development in Costa Rica." Due to the novelty of Project Irazú as the first Central American mission, the project received ample media coverage, support from different organizations, and even citizens's contributions via a Kickstarter campaign. Nevertheless, achieving support for a second mission is an entirely different challenge. The laboratory members determined that there would be two possible main paths. The first was to develop a complete second mission and, in some sense, repeat the steps taken for Project Irazú. Without the "novelty" factor, it was considered that in this case, this focus is costly, leads to an emphasis on funding searching, and decreases the speed of specialization. Instead, it was determined by SETEC Lab that to become a world-class organization in a developing country, a better path is to focus on subsystems specialization. For this reason, SETEC Lab focuses on two Earth-observation spacecraft subsystems: remote ground stations for environmental variables monitoring and attitude determination and control (ACDS) for Earth Observation. Due to this choice and taking advantage of the laboratory's capabilities, currently, the laboratory works in two missions: GWSat mission, a mission-led and by George Washington University (GWU), where SETEC Lab develops the ADCS system and a remote ground station system. In exchange, the scientific mission of GWSat will focus on monitoring the water level of wetlands in Palo Verde National Park in Costa Rica. At the same time, SETEC Lab is working with "The Laboratory of Lean Satellite Enterprises and In-Orbit Experiments" (LaSeine) of the Kyushu Insitute of Technology (Kyutech) at the BIRDS project, where TEC is developing ground stations for general environmental monitoring purposes. This paper will describe this laboratory policy, which could benefit organizations in developing countries to maintain a continuous space project flow.