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PROJECT IRAZU: ADVANCES OF A STORE & FORWARD CUBESAT MISSION FOR
ENVIRONMENTAL MONITORING OF COSTA RICA.

Abstract

In 2007, the Government of Costa Rica announced to the world its ambitious goal of turning into the first carbon neutral country by 2021. Following the announcement, governmental institutions, universities, NGOs and private companies have worked arduously through the creation of different initiatives to reach that goal. One innovative project is Irazú, consisting of the design, construction, launch and operation of the first Central American satellite. The project is not just intended to enable a baseline for training scientists, engineers, and managers in the necessary skills to execute an end-to-end space project; it also pursues to demonstrate a Store & Forward (S&F) system that enables remote sensing of biomass and carbon dioxide fixation data from a fast growth tree plantation in the lowlands of Costa Rica to a

research center for its post-processing and analysis. Irazú is being led by the Central American Association for Aeronautics and Space (ACAE) and the Costa Rica Institute of Technology (TEC), and involves a variety of national and international stakeholders from the government, academia, and industry. This paper is a continuation of previous reports on Project Irazú presented at the Workshop on Small Satellite Programmes for the Service of Developing Countries over the last five years in the International Astronautical Congress. The project has already reached significant milestones, such as the approval of the final design presented in the Critical Design Review (CDR), the purchase of the spacecraft components using funds from the successful crowdfunding campaign and the consolidation of a space systems team at TEC. The mission architecture for an S&F system was defined, consisting of three main components: the remote station, the spacecraft, and the ground segment. The design of Irazú was reviewed and approved by experts from the National Aeronautics and Space Administration (NASA), Kyushu Institute of Technology (Kyutech) and Delft University of Technology (TU Delft). Advances in the Assembly, Integration & Test (AI&T) phase are presented and discussed, which include the development of spacecraft components, testing of the communication links, assembly of the satellite and the initial results from field data collected with environmental sensors developed by TEC. International cooperation is emphasized in this phase since Costa Rican engineers will be conducting testing at the laboratories of the Kyushu Institute of Technology. Furthermore, advances in the satellite frequency registration process for an emerging space nation are presented, as well as the lessons learned.