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1KUNS-PF AFTER ONE YEAR OF FLIGHT: NEW RESULTS FOR THE IKUNS PROGRAMME

Abstract

1KUNS-PF (1st Kenyan University Nano Satellite – Precursor Flight) is the first 1-Unit CubeSat developed by the Republic of Kenya, and the first nano-satellite selected for the “KiboCUBE” programme. The satellite was conceived as a collaboration between the Japan Aerospace Exploration Agency (JAXA) and the United Nations Office for Outer Space Affairs (UNOOSA), and it was developed and tested by a joint team of students from University of Nairobi and Sapienza University of Rome. The realization of the CubeSat was aided by the Kenyan Space Agency (KSA) and the Italian Space Agency (ASI), with the economic and technical support of the Italian companies NPC S.r.l. (New Product Concept) and Robotics S.r.l. (a Sapienza Spin Off). The CubeSat was deployed on May 11th, 2018 from the International Space Station (ISS) using the Japanese Experiment Module “Kibo” and, as of February 2019, it is operating nominally in orbit. The data transmitted from the satellite are received by its two Ground Stations, located in Rome, Italy and in Malindi, Kenya: both stations were developed and built by students, feature a centralized data collection system architecture and can receive the satellite in its high-baud configuration. The on-board cameras proved to work nominally, and the primary mission objective of transmitting to ground panchromatic images was fulfilled. The secondary objective of testing the flight hardware and software in the space environment for more than nine months and the results achieved, are invaluable for the next steps of the IKUNS (Italian-Kenyan University Nano-Satellites) research programme. This collaboration between Sapienza University of Rome and University of Nairobi, managed by ASI in the framework of ASI-Sapienza Agreement, aims at developing nano-satellites, as the future 1-U CubeSat. IKUNS-B/LEDSAT., which is expected to launch on 2020, with the objective to test new optical orbit and attitude tracking capabilities from ground employing LEDs on-board a spacecraft. This paper will discuss the development of the 1KUNS-PF CubeSat, the educational gain acquired by the students in the cooperation of the Italian and Kenyan Universities, and future developments of the IKUNS mission.