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EARTH OBSERVATION WITH TIGRISAT: STRUCTURAL AND MISSION DESIGN

Abstract

TIGRISat is an acronym for Telecommunication Innovation Geophysics Research Iraqi Satellite. It has been designed, developed and built at the University of Rome La Sapienza with the support of the Italian Ministry of Foreign Affairs/ Task Force Iraq. The satellite was successfully put in orbit by the Dnepr launch vehicle the 19th of June 2014 from the launch base of Yasny (Russia). The main payload mission choose the sun-synchronous orbit at an altitude of about 600 km. As a secondary payload, mission requirement for TIGRISat were adapted to that orbit. There are only two ground stations for sending commands, one located in Rome and one in Baghdad, while reception is possible also from many amateur ground stations. The objective of the mission is in the field of Earth observation in the visible portion of the electromagnetic spectrum. In fact, the main payload is an optical camera. The requirement of the camera were chosen specifically for the observations of sand and dust storms. Iraq is the country that mostly is interested by sand and dust storms that unfortunately are increasing in intensity and frequency due to several inter independent factors such as scarcity of rain, desertification, and reduction of water from the two main sources Tigris and Euphrates rivers. Reduction of vegetation coverage, worsen the situation and the camera onboard can help also in evaluating the amount of those reductions. The satellite is a 3U cubesat of 4 kg. The structure of the satellite is made of aluminum alloy AL 6061-T6 and was designed to withstand the launcher static and dynamic loads. The paper will report on the status of the mission and will describe the main characteristics of the satellite, its design and tests.