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OPTIMIZATION ON MISSION OPERATIONS OF THE HANDICAPPED FORMOSAT-2

Abstract

Since its launch in May 2004, FORMOSAT-2 satellite has been operated on orbit for more than 9 years. The satellite carries two mission payloads: the Remote Sensing Instrument (RSI) for earth imaging and Imager of Sprites and Upper Atmospheric Lightning instrument (ISUAL) for the purpose of scientific observations. The RSI is operated on daytime while ISUAL is active on nighttime. To meet both mission objectives simultaneously, the satellite operations planning has been more complicated. In order to maximize the usage of the on-board resources the satellite attitude maneuver activities and power charge/discharge cycles has been heavily increased as well. Under such fully engaged operations scenario and with a design life of 5 years, it is inevitable that the satellite encountered many anomalies, either permanent or temporary. In particular, one attitude gyro (totally four) and one reaction wheel (totally four) have been failed. This paper presents the major anomalies and resolutions in the past years and focuses on some of the anomaly investigations such as the “sequence cyclic overload” failure. Optimization on the mission operations of the handicapped FORMOSAT-2 is presented in detail. It still can provide about 80