Paper ID: 48308
interactive
student

46th STUDENT CONFERENCE (E2)
Educational Pico and Nano Satellites (4)

Author: Mr. Balaji viswanathan
ISAE-Supaero University of Toulouse, France, bala.viswa1@gmail.com

Prof. Angelique Rissons
ISAE-Supaero University of Toulouse, France, Angelique.rissons@isae-supaero.fr
Dr. Fabien Destic
ISAE-Supaero University of Toulouse, France, fabien.destic@isae-supaero.fr
Prof. Stéphanie Lizy-Destrez
SUPAERO- Ecole Nationale Supérieure de l'Aéronautique et de l'Espace, France,
stephanie.lizy-destrez@isae.fr
Mrs Benedicte Escudier
Institut Supérieur de l'Aéronautique et de l'Espace (ISAE), France, Benedicte.Escudier@isae.fr
Mr. Matthieu Compin
ISAE-Supaero University of Toulouse, France, matthieu.compin@isae-supaero.fr

RADIATION ANALYSIS OF CUBESAT NIMPH

Abstract

The CubeSat standard has inspired a lot of engineers, researchers and space industries because of its simplicity and its previous success stories. There are various applications of CubeSats such as remote sensing, telecommunications, earth observations as well as interplanetary science missions. In recent times, newer telecommunication technologies are developed and they are needed to be tested in space conditions. Since it is a difficult task to simulate the space environment, CubeSats are used as a test bed for the newer technologies. In order to use the Opto-photoelectronic technology in larger satellites, the degradation of these components due to radiation are needed to be studied. Inspired by the simplicity of CubeSat's, Thales Alenia Space proposed a project CubeSat NIMPH (Nanosatellite to Investigate Microwave Photonics) in collaboration with the CNES, ISAE Supaero and other French Universities. This research presents the process of developing a physical solution to the critical aspects of radiation in the CubeSat NIMPH. This work also shows the accumulated radiation dose through computational methods like Sector analysis and Monte-Carlo methods using TRAD Fastrad software. Results of the analysis provide the maximum dose level and the need for radiation shield for the platform. Based on the detailed review of results, the flower configuration is chosen and the Erbium Doped Fiber Amplifier (EDFA) is made sure that it reaches a cumulative dose of 20 Krad.