

45th SYMPOSIUM ON SAFETY AND QUALITY IN SPACE ACTIVITIES (D5)
Insuring Quality and Safety in a Cost Constrained Environment: Which Trade-Off? (1)

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RELIABILITY ASPECTS OF STUDENT SATELLITE SYSTEM

Abstract

In order to get familiarization of Space technology by young students, Design and Development of Nano Satellites activity has been taken at PESIT, Bangalore. The satellite is developed in collaboration with few Top institutions. The Satellite is planned to launch in a Polar orbit with an altitude of about 600 Kms. The Satellite is having several subsystems like Control System (AOCS), Telemetry Tele-command (TTC), On Board Computers (OBC), Communication system etc. It is planned to configure/load the Satellite system with the Commercial off-the shelf (COTS) components so that the cost of satellite can be minimized. At the same time the satellite has to work with high reliability for at least 2 to 3 years duration expected life period of the satellite. The Satellite reliability prediction has been traditionally used as important tool in the design phase of new satellite program. This paper presents reliability aspects of satellite reliability of apportionment for these subsystems is being carried out that will help us in assessing overall reliability of overall mission period. Worst case and derating analysis of all components has been carried out. The whole system is planned to be modeled in computer such that change in any of these components, the computation of reliability of satellite system can be easily predicted and analyzed. Also, such system is adoptable and capable of giving quick response for any change in the component type. The satellite uses all state of art components, hence the task become much more challenging. Though the satellite system does not provide one to one redundancy of all subsystems, all the critical systems and components are being identified, suitable measures has been taken to overcome weakness in the system. These efforts give a good experience to students on a reliable design with COTS components. A suitable scheme for testing has been worked out which will help in designing a satellite system at low cost without compromising quality.