SPACE SYSTEMS SYMPOSIUM (D1)
System Engineering Tools, Prcesses and Training (2) (6)

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ELECTRICAL POWER SYSTEM MODELING IN CONDUCTED EMC ENVIRONMENT

Abstract

In this paper, a model of a spacecraft electrical power system to predict the conducted EMI(Electro-Magnetic Interference) environment is described. With an increasing of the power capacity and the complexity in the spacecraft system, it may be caused on-board EMI problem to degrade the system performance. Therefore the EMC(ElectroMagnetic Compatibiltiy) design should be carefully considered at the beginning of system development stage. In order to control the EMI noise and to ensure the system safety margin at the spacecraft system level, the EMI behavior of the electrical power system has to be analyzed by a modeling. The system EMI model is represented the conducted EMI environment of the spacecraft system and organized the power distribution network which is made up power source(an energy storage system and a power conversion/control unit), coupling path(cables or wires), and load(a system electrical unit). The power source model with battery is used to assess the bus impedance in the electrical power system and the power load model with cable harness is utilized to forecast the EMI noise emission of the system. These are combined into the system EMI model which is implemented by EMCAP2000/ESACAP software. Based on this model, EMC evaluation on the LEO spacecraft system is conducted.