IAF SPACE POWER SYMPOSIUM (C3)
Advanced Space Power Technologies (3)

Author: Mr. Methawin Jantra
National Astronomical Research Institute of Thailand (NARIT), Thailand, Methawin@narit.or.th

Ms. Mukkaew Sittisombat
National Astronomical Research Institute of Thailand (NARIT), Thailand, mukkaew@narit.or.th

DESIGN AND SIMULATION OF A BIDIRECTIONAL CONVERTER WITH POWER BALANCE CONTROL TECHNIQUE FOR A SPACE-BASED ELECTRICAL POWER SYSTEM.

Abstract

This research aims to design, analyze and simulate a bidirectional converter with a power balance control technique for a battery charging system in space power system, in comparison with a conventional space electrical power system. The proposed converter will regulate the voltage from the battery to increase the voltage at the main distributed bus with a compensation technique that monitors the output power of the converter and computes the compensatory signal that can balance the output power with the input power of the converter. The space electrical power system is simulated by MATLAB/Simulink. This proposed design will assist in reducing the current flow in the system, improving its overall efficiency and reliability. The bidirectional converter will allow the battery to charge and discharge effectively, the main distributed bus can maintain the bus voltage regulation with good responses and stability, thus providing a more flexible power management system for the space power system. Through a comprehensive analysis of the current state-of-the-art and simulation results, this research will demonstrate the feasibility and performance of the proposed bidirectional converter. The results of this research will be valuable for the development of efficient and reliable power management systems for space power systems.
Keywords: The space electrical power system, Bidirectional converter, Current flow.