

SPACE POWER SYMPOSIUM (C3)
Space Power Experiments Applications and Benefits (4)

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AN ANALYSIS ON FLIGHT TEST RESULTS OF KSLV-I LITHIUM-ION BATTERIES

Abstract

KARI (Korea Aerospace Research Institute) developed KSLV-I (Korea Space Launch Vehicle-I), which made its maiden flight on 25 August 2009. The Launch vehicle is designed to send the satellite of the 100kg-class into a low earth orbit. The first flight failed to place STSAT-2A (Science and Technology Satellite-2A) into orbit due to abnormal payload fairing separation. The second flight attempt has been scheduled in May 2010. The EPS (Electrical Power System) of KSLV-I upper stage includes four separate batteries: Functional, Activation, TVC, and FTS. Functional battery is the power source for electronic equipments which consume constant power during the entire flight. Activation battery delivers high power of short duration for pyrotechnic devices and thruster valves. TVC battery and FTS battery are the power sources for electromechanical actuators that control engine steering and for the system to self-destruct the vehicle in the event of an anomaly, respectively. Each battery consists of a number of series/parallel-connected Lithium-ion cells ranging from nominal 28Vdc to 300Vdc. Lithium-ion cells offer low thermal dissipation, high energy efficiency and low cell cost. This allows reducing the weight of the batteries. In this paper, an analysis was also performed with results acquired from two flight tests.