

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

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DEVELOPMENT PROCESS OF LITHIUM-ION BATTERY TEST PLATFORM DESIGNED FOR  
AEROSPACE APPLICATION

**Abstract**

During mission, the satellite is supplied with required electrical power depending on each phase of the orbit (eclipse or sunlight) or season, until its End-Of-Life. With the same conspet, the UAV system has to cover mission from a few minutes, up to a few hours, or even days. everything depends on the onboard avionics in side (solar or unsolar powered) to cover the action range predefined. this kind of mission is inevitably affected by the embedded battery pack (size, capacity, relaibility,...and lifetime.). In consequence, we should size well the battery-pack and proceed to the qualification and integration tests to cover the intended power budget to the mission (Earth Atmosphere,..., Low Earth orbit-LEO,...). In this context, the development of the on-board energy power system (EPS) requires validation and qualification phases before opting for the modules to be integrated into aerospace flight subsystem. In this work we propose solution to cover the specific testing scenarios of the electrical energy storage module, this by developing a test system emulator to get closer and closer to operating power requirement in mission. The realized system consists of a platform (Hardware / Software) of emulation, test and characterization, allowing to the battery cells (Li-Ion technologies) to be pre-selected and qualified for aerospace mission. The proposed platform could also generate energy budget scenarios to live battery-pack in the same constraints of the satellite in orbit through predefined and reconfigurable cycles or micro-cycles of charge/discharge, which can be looped until the end of specimen life (EOL). Also a method of battery cells selection is proposed to complete our development cycle of battery-packs. This work allows us to carry out batteries tests in a specific environment (controlled temperature) for mission, to perform endurance and characterization tests on Li-Ion cells in order to be qualify for use in aerospace systems.