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ONE STEP AWAY FROM THE RELIABLE BATTERIES FOR SMALL SPACECRAFTS WITH
SOLID-STATE-CERAMIC BATTERIES**Abstract**

During the last decade, several small satellites and space probes have been developed, new design challenges have to be faced such as small size, reduced mass, thermal management and mechanical constraints with their limited ability to carry a certain number of missions and payloads. Combined all these challenges for the actual battery's technology, the application looks really complex or impossible with a reliable power generation and the accomplishment of all safety requirements. This situation leads satellite designers to be reluctant for taking a risk and limit the capabilities of small spacecrafts and number of onboard missions. A new kind of batteries with an advanced technology may be a solution, some satellites designers have tried with the solid-state-polymer batteries, so far until now no space data have clearly showed the real state of these batteries, which it lets thinking that the battery may require more investigation and tests, or did not reach maturity yet to be trusted. With the new lithium solid-state-ceramic batteries, we may be just one step away from a solution to this problem, additionally to the small size and the less weight, more features could be provided with the thermal management, structure simplicity, and safety with no liquid or flammable material. In this paper, the first flight in orbit for the solid-state-ceramic battery is proposed. Regarding the promising result got after a long evaluation process, from launch to space environment, several pack of solid-state-ceramic batteries have been exposed to the hostile vibration and shock which they could endure during the launch, then to the thermal vacuum for the low earth orbit pressure around 10-4 Pa. Batteries have been able to withstand all conditions with no physical degradation or performances loses, they could be able to keep between 95 to 98