IAF SPACE SYSTEMS SYMPOSIUM (D1)
Space Systems Architectures (2)

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SA-4S: CONCEPT AND DEVELOPMENT PLAN OF THE SAB AEROSPACE SEPARATION SYSTEM FOR SMALL SATELLITES.

Abstract

Launcher Authorities and Launch Service Providers consider the development of services dedicated to the Small Satellite Community as a key factor. The development of hardware is undertaken in parallel to the set up of dedicated services. An example is the Small Satellite Mission Service (SSMS) which will make possible to embark up to 15 Small Satellites on a single mission aboard the VEGA-C launcher.
One of the key factors for these type of missions is the limitation of the costs to be applied to the customers. From an analysis of the Recurring Costs common to every mission, it is clear that the procurement of the Separation Systems is a significant percentage with respect to the whole hardware needed (e.g. adapters, dispensers, harness). Currently, on the Separation Systems market, there is not a system able to combine good technical performances and competitive costs.

A new separation system is being developed by SAB Aerospace with the main goal of covering this lack.
The system is characterized by having standard mechanical interfaces composed by two aluminum rings rigidly connected to the launch vehicle and to the satellite respectively, by means of screws. The two rings are kept together by clamps hinged along the lower ring external perimeter and actuated using a synthetic cable tensioned by a specific device. The satellite separation process is triggered by a Non-Explosive Actuator (NEA) which releases the cable and allows the disengagement of the clamps through dedicated spring plungers. Once the clamps are disengaged, the upper ring, together with the satellite, is pushed away using axially-mounted separation springs.
Since the use of no explosive devices is foreseen, a low level of shock is transferred to the payload and the system can be repeatedly tested because no component is destructed during the separation sequence.
Moreover, the system is composed by multiple "clamp-and-release" modules whose number can be varied depending on the diameter of the interface rings, so the system is easily scalable and can be adapted to the market evolving needs.

The development plan foresees a Technology Readiness Level (TRL) increasing process supported by development models test campaigns. The project development is running in parallel to the TRL increasing: analytical and numerical simulations are performed to validate the feasibility of the design.
The qualification campaign is schedule for Q2 2019 with the goal of being ready for the VEGA-C Maiden Flight.