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Access to Space for Small Satellite Missions (5)

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SSMS (SMALL SPACECRAFT MISSION SERVICE) DISPENSER

Abstract

The SSMS Dispenser developed by SAB Aerospace is one of the major Element of the Small Spacecrafts Mission Service (SSMS). The SSMS project, funded by ESA, has the objectives to offer a low cost ride-share launches into LEO to the growing small satellites demand, from CubeSat and nanosatellites class to mini-satellites class and at the same time to increase the European launches rate. A design-to-cost approach has been followed in the definition of the system in order to have the highest filling ratio of the launcher P/L fairing with the lowest structural mass considering different aggregates of satellites. After a feasibility phase, in which several technical solutions and manufacturing processes have been investigated, the design converged to the use of simply structural elements combined in different modules and to the use of different combinations of the modules to meet the project targets. The system is made of modules of flat sandwich panels with aluminum honeycomb core with CFRP skins connected together with aluminum and CFRP brackets. Combining the modules, it can be possible to achieve 7 configurations of the SSMS Dispenser, each one of them allowing the accommodation of different aggregates of satellites. According to the market survey performed by AVIO/ESA these 7 configurations will cover all the possible markets needs and satellites accommodation in line with the LV performances. These configurations are grouped into 2 families, the classical “Piggy Back” solution (HEX1, HEX2) and the new “Ride Share” solution (PLAT1, PLAT2, PLAT3, FLEXI3 and FLEXI 4). An additional requirement in the development has been the fully compliance to the zero debris rule, the accommodation of the spacecraft has been studied in order to allow the separation of the spacecraft in every position with proper margins without releasing any passive mass. The complete SSMS structure will indeed then re-entry with the last stage of the Launch Vehicle. In parallel to the development of the modular structure, in order to maintain the system flexibility, a modular Electrical S/S has been developed to comply with the different configurations of the dispenser and to have common elements between them, in order to keep the costs as low as possible. The Proof of Concept flight (POC) will be performed in summer 2019 with the “ride share” configuration called Flexi3 with a PFM approach. With this configuration, all the major constituents of the system will be produced and submitted to ground qualification.