

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)  
Future Space Transportation Systems Verification and In-Flight Experimentation (6)

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ADVANCED SOLID PROPULSION TECHNOLOGIES DEMONSTRATIONS FOR AIRBORNE  
LAUNCHER AND NEW GENERATION LAUNCHER APPLICATIONS

**Abstract**

This paper presents the different solid propulsion technological options proposed by SNPE Materiaux Energetiques (SME) and Snecma Propulsion Solide (SPS), in association with Dassault Aviation and EADS CASA Espacio, that can be applied to an airborne demonstrator for future Ariane Evolution or Next Generation Launcher. Under a preliminary CNES activity, different airborne launcher concepts capable of low earth orbit small payloads, from 50 kg to 150kg, have been studied since the end of 2004, based on a Rafale multirole fighter. A new impulse was given at the end of 2008 by CNES, CDTI and DLR, in the frame of the Aldebaran Program to focus activities of the project on demonstration of technologies at a scale representative of future space propulsion systems development, such as an operative airborne launcher or an evolution of Ariane 5 or a New Generation launcher applications. In this respect, SME and SPS are proposing the development of attractive and high performance space propulsion technologies to reach a readiness level of 6 or 7 (TRL) within a 5 years time frame. Within this ambitious schedule, a flight demonstration could be foreseen around 2015. Specific roadmaps have been established on advance propellants and associated processes, on a new generation of insulated filament wound case and on advanced nozzle materials. These roadmaps will be completed to define a full flight demonstrator development plan. Current flight demonstration baseline scenario foresees a single body launcher including a solid propellant 1st stage and a liquid propellant 2nd stage. This linear configuration is capable to be implemented under both the central store station of the fuselage of a Rafale and under the wing of an Eurofighter. Different subassemblies demonstrators are proposed, from preliminary design studies to a flight demonstration: an Isp demonstrator for an advanced Oxalane® propellant formulation, a new generation of light insulated case demonstrator and a high performance to cost nozzle demonstrator.