SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Small Launchers: Concepts and Operations (7)

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ALTAIR (AIR LAUNCH SPACE TRANSPORTATION SYSTEM USING AN AUTOMATED AIRCRAFT AND AN INNOVATIVE ROCKET) - GENERAL OVERVIEW & FIRST RESULTS

Abstract

The market of small satellites under 200 kg is expected to increase dramatically in the next decades due to several factors such as miniaturization, availability of Commercial Off-the-Shelf (COTS) components and constellation projects. However, currently no launch system adequately addresses this market without the constraints of existing solutions such as piggyback launch. A dedicated system providing an available and reliable launch service without these constraints would enable the development of small satellites applications, provided it is also affordable and reliable.

The ALTAIR project (Air Launch space Transportation using an Automated aircraft and an Innovative Rocket), which has been selected in the frame of the European Union's Horizon 2020 research innovation program, is aimed at preparing the development of such a launch system. ALTAIR's strategic objective is to demonstrate the economic and technical viability of a future available, reliable and competitive European launch service for the access to space (Low-Earth Orbit) of small satellites in the range of 50-150 kg. ALTAIR is focused on an innovative semi-reusable "air launch" system, whose carrier will be a reusable automated aircraft designed specifically for the launch mission, releasing an expendable launch vehicle at high altitude. This launcher will use environmentally friendly hybrid propulsion, advanced lightweight composite structures, innovative avionics and an upper stage that provides mission versatility. The architecture of the ground systems will target cost-effective operations. ALTAIR's cost effectiveness will be achieved jointly through its concept of operations, a cost-oriented design approach for all subsystems (carrier, launcher and ground segment) and multidisciplinary design optimisation (MDO) approach. The output of the project will be a detailed definition of the complete system (carrier, launcher and ground segment), associated with a business plan as well as a development road map and an industrial organization proposal. In addition to system design work, flight tests will be conducted with the existing EOLE

demonstrator (developed under ONERA's project management for the CNES PERSEUS project), in order to validate key technologies, including the launcher avionics and its release sequence.

In this paper, a general overview of ALTAIR's approach, methodology and work plan is presented together with first results focused on high-level requirements and market analysis.