

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)  
Launch Vehicles in Service or in Development (1)

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VEGA: AN OVERVIEW OF DEVELOPMENT ACTIVITIES AND FUTURE PERSPECTIVES

**Abstract**

The development activities of the European small launcher Vega are running and will lead to the Qualification Flight from Europe's Spaceport in French Guiana in the end of 2009. This will be an important milestone in the implementation of the European strategy in the launcher sector and the guarantee of access to space for Europe. This paper presents technical and programmatic milestones of the Vega Programme achieved during last year, including development and qualification activities for the Vega Launcher as well as for the ground infrastructures in Kourou. Vega has an essential role within the family of European launchers; the four-stage vehicle is tailored to cover a wide range of small missions in low orbit and will complement Ariane and Soyuz. The Vega launcher is a single body vehicle composed of three Solid Rocket Motor (SRM) stages, a liquid propulsion upper module (Attitude Vernier Upper Module, AVUM) and a fairing. The launcher at lift-off is 30.2 meter high and weighs 139 tons.

System activities during last year have been devoted to the consolidation of the launch system design in the frame of the Vega System Critical Design Review outcomes allowing starting the qualification loop activities in December 2007. In parallel, the development activities at equipment and subsystem levels have proceeded allowing the completion of most of the qualification or critical design reviews. The P80 Solid Rocket Motor – the 1st stage motor – successfully completed its qualification firing test in December 2007, one year after the firing test of the development model, confirming the predicted performances and behavior. A few months later, in March 2008, at Italian Air Force Range of Salto di Quirra (Italy, Sardinia), the Z23 Solid Rocket Motor – the 2nd stage motor – completed also its functional qualification with a successful second firing test. The 3rd stage motor, now in a new over-charged configuration (named Z9-A), successfully completed one of the two firing tests needed to demonstrate its ground qualification. The second static firing test is scheduled in February 2009. For what concerns the Liquid Propulsion subsystem, the Vega 4th stage Main Engine (MEA), derived from the Ukrainian RD-869 engine (Yuzhnoye) has already successfully undergone several test campaigns with two qualification models. The firing test campaign at subsystems level (complete Liquid propulsion subsystem in the flight configuration) is ongoing in the P2 test stand in Lampoldshausen (Germany). The Vega ground segment has entered in its final development phase with the completion of the detailed design of various subsystems (mechanical, fluid and control centre). The civil works of refurbishment of the bunker and integration of the Mobile Gantry main structure have been completed. The launch table has been integrated in its position, and will be soon completed with the upper and lower pallets. The umbilical mast is being erected in the launch area, in parallel with the integration of piping for fluid installation. The qualification flight mission has been defined taking into account different targets: mitigation of risks inherent to the first flight, representativity of the mission within the flight qualification domain, compliance with ground/flight safety and programmatic constraints. The main passenger of the maiden flight is the LARES experiment developed by the Italian Space Agency ASI. This spacecraft is a satellite laser-ranging (SLR) experiment, completely passive with no sensors or on-board electronics. The main scientific objective of the LARES mission is the measurement of the dragging of inertial frame due to the Earth's angular momentum, or Lense-Thirring effect, and a high precision test of the Earth's gravitomagnetic field.