

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)  
Interactive Presentations (IP)

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ITALIAN CONTRIBUTION TO THE ESA MINISTERIAL CONFERENCE 2016: NEXT  
GENERATION OF THE EUROPEAN VEGA LAUNCHER FOR NEW GREEN AND REUSABLE  
SPACE MISSIONS

**Abstract**

At the last Ministerial Conference (CM-16), Italy provided a relevant contribution to the development of the VEGA Evolution Preparatory Programme (VEGA-E), with the primary objective of ensuring an independent access to space for Europe in a secure and safe environment, as foreseen by the new Space Strategy for Europe. The programme is mainly conceived to enlarge the launch service opportunities of the VEGA launcher and provide access to a wide range of missions (from LEO to MEO, GEO, HEO and escape orbits) through its spin-off. VEGA represents one of the best small launcher in the international arena. In order to guarantee a high degree of competitiveness and flexibility in the European and worldwide market, Italy is committed to providing a strong contribution for its consolidation and performance improvement. A natural evolution of the current Vega configuration is the development of a European Liquid Oxygen-Methane (LOx-CH<sub>4</sub>) engine for the Vega Upper Stage (VUS) which will substitute the current storable liquid upper stage and the stage Zefiro-9. The environmental friendly LOx-CH<sub>4</sub> engine, representing a breakthrough in the liquid space propulsion, will enable simplification of the launcher architecture, higher performances and mission flexibility, cost reduction and improved safety specifically in propellant handling and operations. Therefore, VUS engine is one of the most important element of the VEGA-E programme and raises a wide interest as demonstrated by its oversubscription at the CM-16. The activities will focus on the design, manufacturing of the first Development Model (DM1) and its firing test. In the frame of VEGA-E, a further extension to the VEGA launch service market capabilities will be granted by the VEnUS electric propulsion module, for orbit raise, launch services to MEO for constellations and highly elliptic Earth orbits for scientific/exploration missions, and with possible enhancement for On-Orbit Satellite Services in GEO. The upstream of the Space Economy will be reinforced with re-usable space transportation systems. The Intermediated Experimental Vehicle (IXV) programme demonstrated the maturity of the technologies enabling the atmospheric reentry of a spacecraft from LEO. The continuation of the programme, named Space Rider (Step-2.1), was ensured at the CM-16. Space Rider will open the way to an affordable, reusable, end-to-end European space transportation system service to routinely

access and return from orbit with a space vehicle integrated with VEGA-C serving as a platform for IOV/IOD and microgravity laboratory in LEO with the goal of qualification flight in 2020.