IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Emerging Space Ventures, including Space Logistics and Space Safety for Sustainability (9-D6.2)

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EUROPEAN NEWSPACE VERTICAL ORBITAL LAUNCHER: ACHIEVEMENTS OF THE H2020 ENVOL PROJECT

Abstract

In the past two decades, following the technological improvements in the miniaturisation of electronics and on-board systems, the space launch market has witnessed a substantial growth in the number of small satellites to be launched into low-Earth orbits. Meanwhile, the New Space mindset pushes towards the commercialization of a faster and cheaper access to space. However, the growth of these sectors is not supported yet by available, reliable, cost effective, dedicated launch vehicles. To answer these needs, nine European aerospace companies have joined forces as part of the ENVOL project, that aims to provide Europe with its first commercial, competitive and green launch service. ENVOL will follow a true NewSpace approach to offer low-cost, frequent and flexible access to low-Earth orbits to small satellites. The partners bring together a multidisciplinary set of competences fit to address all the key building blocks needed to create a commercially viable and competitive launch service.

The launch vehicle will rely on the green and storable hybrid rocket propulsion based on hydrogen peroxide (H2O2) as liquid oxidiser, matured by Nammo over the past decade. Its overall architecture will be based on modularity to reduce costs and improve quality and production. Moreover, the development of four demonstrators is planned to raise the launch system maturity. These concern the main critical technologies such as the composite oxidizer structural tanks, the H2O2 turpbopump and the launcher and payload avionics. The ground segment will have the simplest and fewest possible interfaces with the

launch vehicle in order to be low-cost, automated, flexible and easily deployable. The payload systems are designed following the varying requisites of different customers and will be able to adapt to different mission profiles. Consequently, the avionics dealing with the payload have to be standardised and modularised to reduce costs, enhance the launcher availability and provide a customer-centric payload service model that can comply with the requirements of satellites. The project will also focus on the business and development plans built on industrial expertise, which ensures the competitiveness of its proposed launch service on the space market. Concurrently, ENVOL will define an organisation capable of attracting investments, while ensuring that the work performed in the project will be transferred into a commercial activity servicing the small satellite launch market.

The article will present the ENVOL project, its status and results achieved, with a focus on the system architecture, the next steps and possible future evolutions.