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HYIMPULSE MINI LAUNCHER – REVOLUTIONARY ACCESS TO SPACE FOR SMALL SATELLITES

Abstract

HyImpulse Technologies GmbH is a German NewSpace startup and spin off from the DLR Lampoldshausen. We are developing hybrid propulsion-based rocket motors for low-cost sounding rockets and small satellite launch vehicles. The intrinsic safety associated with hybrid rockets, enables a reliable, flexible and low-cost access to space with quick turnaround between flights. More than 75 tests have been conducted so far in a sub-scale 10 kN technology demonstrator engine utilizing LOX-Paraffin as the propellant combination. The development campaign for a full scale 75 kN engine is currently on-going successfully at DLR Lampoldshausen. The planned small satellite Mini-Launcher (ML) will deliver a payload of 500 kgs to a 500 km orbit and will be powered by eleven of these 75 kN engines. The serial production and utilization of engines will enable favorable economies of scale in the future. The test campaign for this engine is currently on-going successfully at the DLR Lampoldshausen. The engine will be qualified in flight with a currently developed Sounding Rocket (SR75) in Q1 2021 planned to be launched from Swedish Space Corporation's (SSC) Esrange. The Sounding Rocket will have a payload capacity of 300 kg to a 200 km (sub-orbit) for micro-gravity and atmospheric research experiments, with plans for future commercialization. This paper will present the technological advancements made in the Mini-Launcher development, along with the architecture and concept of operations of the Sounding Rocket.