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Small Launchers: Concepts and Operations (7)

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HYIMPULSE – ACCESS TO SPACE WITH HYBRID PROPULSION

Abstract

At HyImpulse Technologies, the development of the revolutionary Small Launcher SL1 using hybrid propulsion units continues to progress well. HyImpulse's mission is to unlock the full potential of the small satellite industry in Europe and globally by providing sustainable small satellite launch services. Some salient features of this launch service are a high performance (same as Kerolox systems) at a low-cost (1/2 of current operational competition), high safety (0 TNT equivalence, safe to handle, green, non-toxic propellant combination in LOX-Paraffin) and a highly responsive launch cadence (50+ launches/year after 5 years of operation, storage to launch within 7 days). These traits are possible due to the high maturity of the hybrid motor (TRL 7), an excellent use of disruptive, state of the art technologies like composite materials, COTS avionics, and additive layer manufacturing. Additionally, committing to a reduction in carbon footprint, HyImpulse is planning to produce paraffin fuel in a fully carbon neutral way using renewable energy.

The Small Launcher SL1 is a 3 stage launch vehicle with a payload capacity of 400 kg to a 500 km SSO. The vehicle is powered by 8 and 4, gas-generator turbopump fed 75-kN Hybrid Paraffin – LOX (HyPLOX75) motors in the first and second stages, respectively. The third stage will be powered by 4, pressure-fed 25 kN (HyPLOX25) motors. The flight model of the HyPLOX75 motor has already been successfully tested. Another series of tests are currently planned to be held at the Shetland Space Centre (UK) in Q2 2021. Following the tests, the motor will be successfully flight tested through its usage in the Sounding Rocket SR75 technology demonstrator in Q3 2021. Qualification tests for other SR75 subsystems are already well in progress.

This paper will present the updated technological advancements of HyImpulse over the last year and detail the roadmap ahead.