

IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Small Launchers: Concepts and Operations (7)

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HYIMPULSE – HYBRID PROPULSION BASED SMALL LAUNCHER - UPDATES

Abstract

HyImpulse Technologies is a German NewSpace startup developing a revolutionary Small Launcher SL1 for providing dedicated access to space for small satellites (>500 kg). SL1 is powered using inherently novel hybrid propulsion systems (utilizing Paraffin and LOX as propellants) being completely developed in house at HyImpulse. The utilization of hybrid propulsion units enables provision of a truly low-cost, safe, and responsive launch service. The payload capacity of SL1 will be 400 kg to a 500 km SSO and the maiden launch is currently being planned for 2024.

Based on the emerging requirements of the small satellite market requiring constellation deployments and provision of the last mile delivery services, SL1's launcher architecture has been further improved to cater to the demands. Changes to the launcher architecture include a new third stage powered by a single 75kN HyPLOX75 hybrid motor (that is also used as a modular unit – in the first (8 nos.) and second (2 nos.) stages). A new kick stage derived from the existing Attitude and Orbit Control System (AOCS) is also being designed. This propulsion system would utilize EU REACH compliant propellants.

The current paper will discuss the results of the updates to the launch architecture as well as other technical details about the system developments (such as the development updates of the propulsion system – motor, gas generator, turbopump ; the structures subsystem and the fluids subsystem). The paper will also detail development updates of the technology demonstrator, the suborbital Sounding Rocket SR75 over the last year. The maiden flight of SR75 is expected in late 2022. With the maiden flight, several key subsystems of SL1 (including the HyPLOX75 motor) will already be flight qualified.