

Łukasiewicz – Institute of Aviation

ABOUT THE COMPANY



Location: Warsaw, Poland

Founded: 1926

Employees: 1500

Mission: Łukasiewicz – Institute of Aviation (ILOT) is Poland's largest public entity focusing on R&D in aerospace. With space flight hardware heritage since 1973, its currently focuses on providing cutting edge R&D services to European and American industry. Its specialties include green space propulsion, advanced manufacturing, composite technologies, avionics and environmental testing. Since Poland joined the European Space Agency in 2012 over 30 ESA projects in Space Propulsion and Space Transportation have been acquired with major technical advances demonstrated. Łukasiewicz – ILOT cooperates with all leading European primes in Space Transportation and Space Propulsion and focuses on delivery of unique technologies using 98% hydrogen peroxide as oxidizer.

ESA FLPP ACTIVITY

Project Name: Throttleable Liquid Propulsion Demonstrator

Objective: To demonstrate deep throttling of a green storable bi-propellant rocket engine breadboard in the thrust class of 3-8 kN

Applications – Use cases, commercialisation aspects?

- Lunar/planetary lander propulsion
- Kick-stage propulsion
- Throttling technology development for reusable stages of STS



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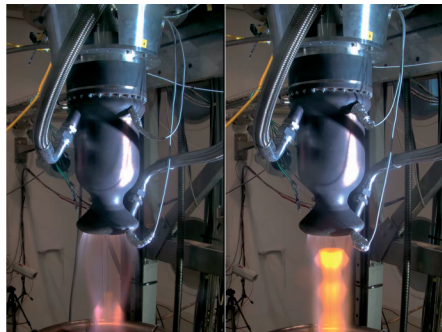
Website and Socials: <https://ilot.lukasiewicz.gov.pl/en/>

Project Name: Throttleable Liquid Propulsion Demonstrator

TECHNOLOGY AND INNOVATION

What we developed: Liquid rocket engine demonstrator utilizing low-toxic storable propellants (98% high-test peroxide & 96% ethanol), capable of delivering thrust up to ~7.5 kN in vacuum.

Unique feature: Deep throttling capability, with stable performance and high combustion efficiency in low thrust region demonstrated, down to 10% (sea level conditions). Possibility to operate in monopropellant and bipropellant modes.



KEY RESULTS

- Demonstrated feasibility of throttleable liquid rocket engine with HTP as oxidizer operating in sea level conditions (10% to 100% of thrust).
- Pressure roughness below 1.5% obtained even for thrust of 20% (sea level).
- Stable performance thanks to developed propellant cavitating venturi control valves and variable-geometry pintle injector.
- Demonstration within a regeneratively-cooled additively manufactured combustion chamber

NEXT STEPS AND MARKET READINESS

- **Roadmap:** ESA TLPD-2 2025-2027, ESA VERCORE and ESA VERCOP 2025-2027, TLPD-3 2027+
- **Opportunities:** Looking for partners and potential customers who would be interested in applying the TLPD engine to a spacecraft/lander/kick stage.
- **Target Launch:** 2030