



Łukasiewicz
Institute
of Aviation



Łukasiewicz
Research Network
– Institute of Aviation
under the ESA project
called GRACE is developing
the green Liquid
Apogee Engine

GRACE GREEN BI-PROPELLANT APOGEE ROCKET ENGINE FOR FUTURE SPACECRAFT

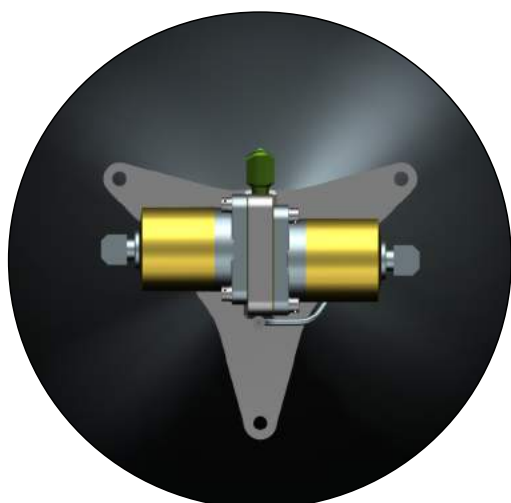
The 500 N-class thruster for future spacecraft is an eco alternative for today's hydrazine-based apogee engines, typically used by satellites to manoeuvre into their final geostationary orbits.

KEY FEATURES

- Dual use possibility – as the spacecraft propulsion subsystem or as the main engine of a microlauncher kick stage.
- Non-toxic propellants – GRACE operates with the highest-class hydrogen peroxide 98%+ and a green fuel – developed at Łukasiewicz-Institute of Aviation.
- Ability to operate in dual-modes: mono-propellant (on decomposed hydrogen peroxide) and bi-propellant.
- Significantly reducing the overall ground operations and safety management costs with respect to standard storable propellants.
- Performance at the level of reference MON/MMH systems.



Green alternative
for future
spacecraft



TECHNICAL INFORMATION

Parameter	Value
Application	GEO satellite, kick-stage
Technology	TRL4,
Readiness Level	first technology demonstrator
Design thrust	420 N [vac]
Oxidizer	HTP 98%
Fuel	TMPDA
Ignition	catalytic

The GRACE engine is developed within projects funded by the European Space Agency. A preliminary demonstrator of the LAE [Liquid Apogee Engine] technology was developed. This is a nearly all-Polish project, supported through ESA's Polish Industry Incentive. Łukasiewicz - Institute of Aviation oversaw management, design and testing.



The Łukasiewicz Research Network - Institute of Aviation

offers a wide range of specialized research, engineering services and products. We provide comprehensive solutions, ranging from dedicated analyzes, simulations, engineering design, through the selection, testing and certification of materials and structures, to rapid prototyping and additive manufacturing.

al. Krakowska 110/114, 02-256 Warsaw, Poland

e-mail: info@ilot.lukasiewicz.gov.pl / www.ilot.lukasiewicz.gov.pl