



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

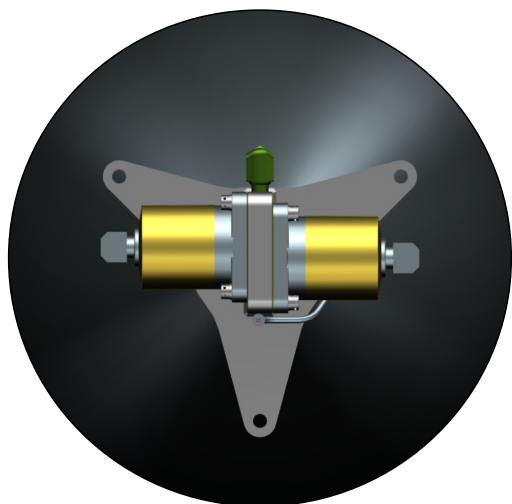
The 500 N-class thruster for future spacecraft is an eco alternative for today's hydrazine-based apogee engines, typically used by satellites to manoeuvre into their final geostationary orbits.

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



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.

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



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