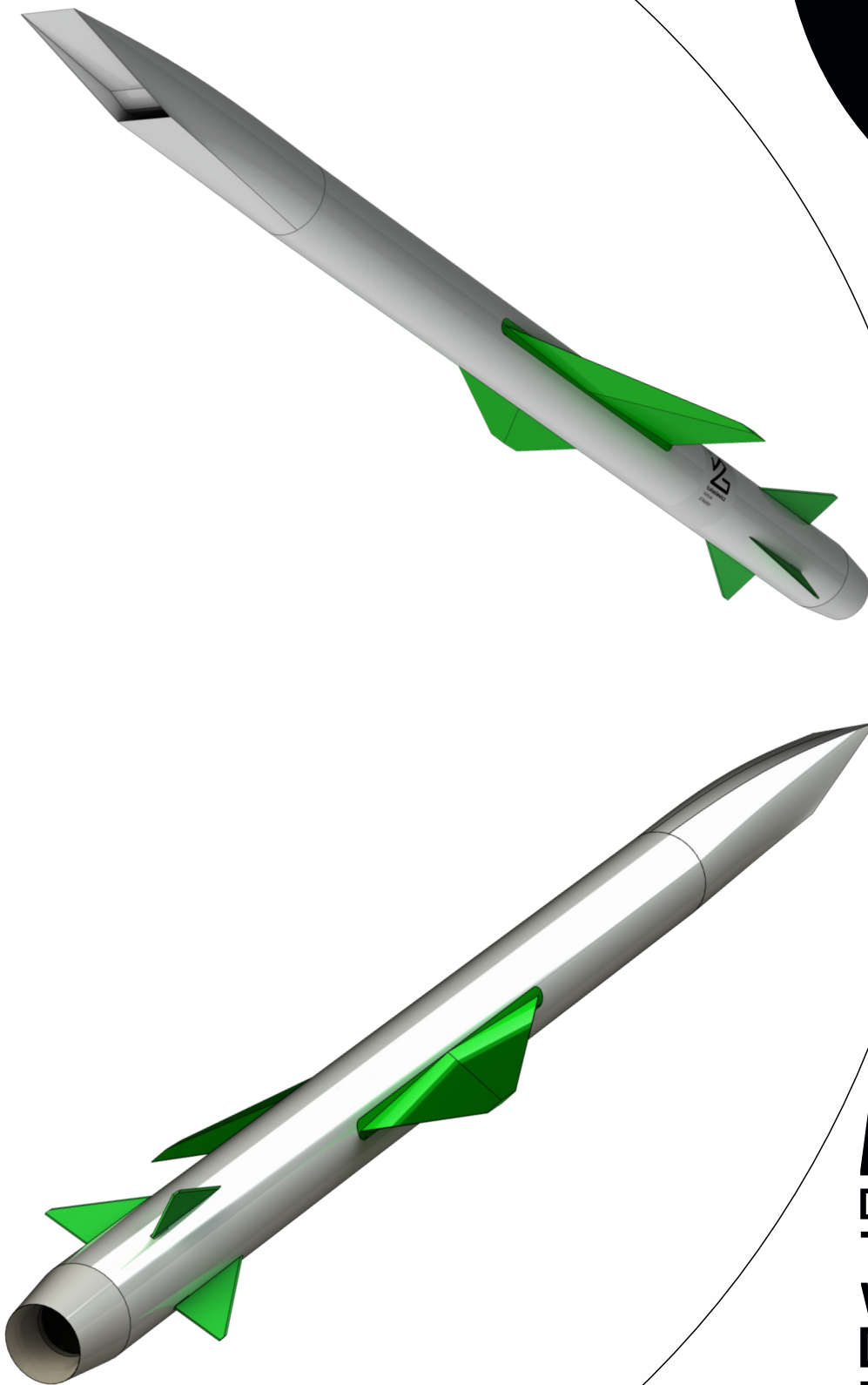




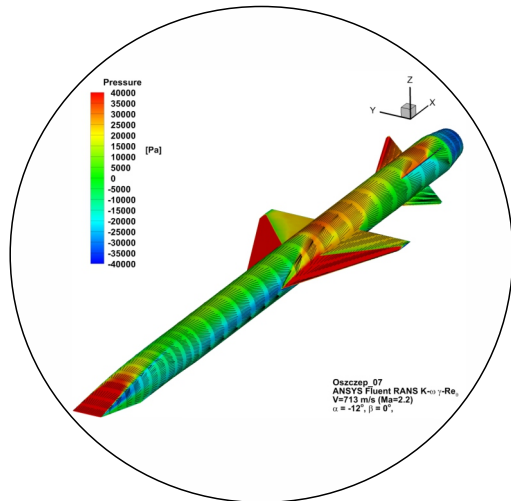
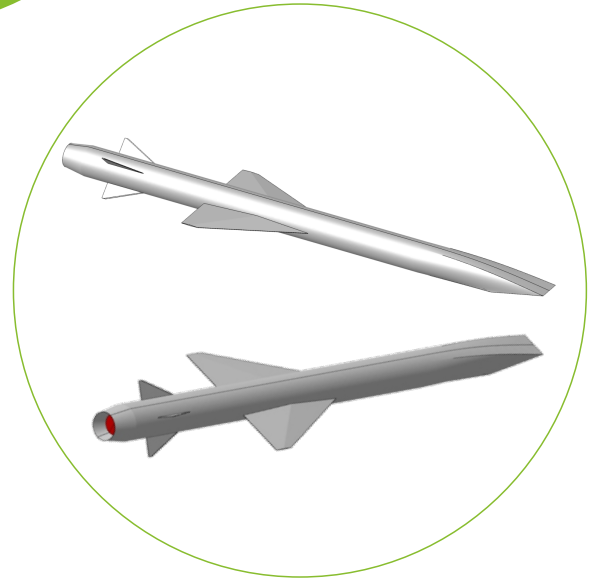
Łukasiewicz
Institute
of Aviation



**MISSILE
DEMONSTRATOR
TECHNOLOGY
WITH ROTATING
DETONATION
ENGINE
[RDE]**

CHARACTERISTICS

For over 14 years, engineers at Łukasiewicz – Institute of Aviation have been advancing the development of rotating detonation engines (RDE). One promising application of this technology is a missile with ramjet propulsion. The concept for this type of missile, currently at TRL 3, showcases significant advantages and innovation, with the potential to revolutionize both the national and international defense sectors. The Institute is offering this technology demonstrator, with the possibility of upgrading its technology readiness level, for further development by an industrial partner.



Technical Assumptions of the RDE Ramjet Missile Concept

Parameter	Value
Estimated speed	Ma 3.2 (at 12 km altitude), Ma 2.1 (sea level)
Possible range	approx. 300 km (at 12 km altitude)
Approximate mass	300 kg, including a 100 kg warhead
Possible dimensions	length 5 m, wingspan 1.3 m
Development time from TRL 3 to TRL 9	approximately 3 years

Activities Conducted by the Institute:

- Development of an engine model with appropriate parameters.
- Production and testing of the RDE propulsion system on a test bench.
- Conceptual and aerodynamic simulations of the missile according to manufacturer specifications
- Aerodynamic testing
- Implementation support

Activities to be conducted by the industrial partner:

- Development of requirements for a missile that meets the operational needs.
- Production and sales.

KEY ADVANTAGES

○ Higher thermodynamic efficiency

Generates higher thrust with lower fuel consumption, resulting in extended range or increased missile speed.

○ Enhanced combat efficiency

A ramjet engine is smaller, lighter, and less expensive than a turbine engine, allowing the missile to carry more fuel or payload. The engine's simple design enhances reliability and reduces manufacturing costs.

○ Supersonic operation

Enables faster delivery of combat payloads and makes it more challenging for adversaries to intercept the missile. The increased kinetic energy of the missile enhances its destructive potential.

○ Operational flexibility

Increased efficiency and the ability to operate across a wide range of speeds and altitudes allow for the missile suitable for various combat scenarios from precision strikes to long-range strategic attacks.

○ Reduced radar and thermal signature

Reduces the likelihood of detection and interception by enemy defense systems.



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.

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