

Łukasiewicz
Institute
of Aviation

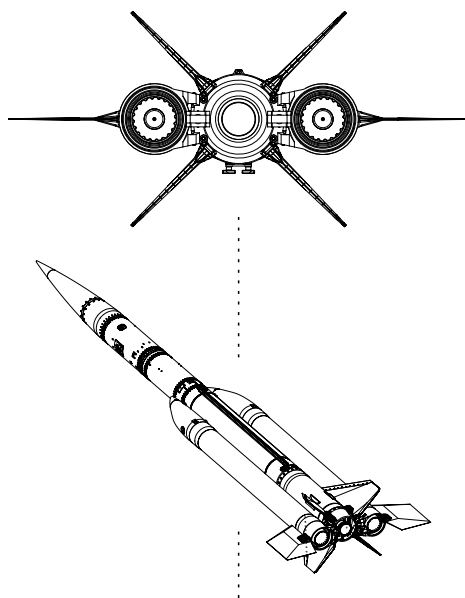
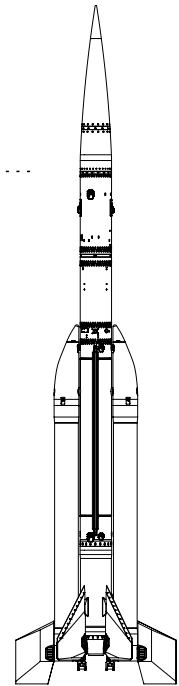


Microgravity,
atmospheric sounding,
validation of hydrogen peroxide technology
in concentration above 98%

ILR-33 AMBER 2K SUBORBITAL ROCKET

CHARACTERISTICS

The ILR-33 AMBER 2K is an innovative, eco-friendly suborbital rocket entirely designed at the Łukasiewicz Research Network – Institute of Aviation. It is the first space platform in the world to use hydrogen peroxide as an oxidizer at a concentration above 98%. In 2024, a successful flight reaching an altitude of 101 km was conducted. This flight validated the rocket and its components in a space environment, confirming the readiness of the systems for similar missions in the future. Technologies based on High-Test Peroxide (HTP) were positively validated, paving the way for further development of eco-friendly space propulsion systems. The AMBER 2K rocket is available both as an autonomous product and as a platform for specialized research services. It can be tailored to various missions and payload requirements, with a wide range of civilian and military applications. The rocket also plays a significant role in scientific research, serving the development and testing of new technologies. Several components of the rocket (nosecone, valves, motors, pyrotechnic igniters, etc.) are successfully used in other R&D and commercial projects.



TECHNICAL DATA

Parameter	Value
Engines	Hybrid rocket engine and 2 solid rocket boosters
Oxidizer	Hydrogen Peroxide (H ₂ O ₂), concentration 98%+
Maximum speed	1400 m/s
Mach Number	4.5
Length	4.6 meters
Maximum flight altitude	120 km
Maximum Range	> 200 km
Payload capacity	30 kg
Maximum G-Force	14 g

Civilian Scenarios:

- Microgravity research.
- Atmospheric sounding (60-120 km).
- Communication testing.
- CubeSat standard satellite qualification.
- Ground infrastructure testing.
- Scaling technology to a new generation of small launch vehicles.
- Launch systems technology testing.

Military Scenarios:

- Use as an air target ballistic imitator – for detection by ground infrastructure (radars) and engagement.
- Possibility of using developed technology modules in military rockets.
- Avionics and control systems validation.
- Specialized training.

FLIGHT TESTS



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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