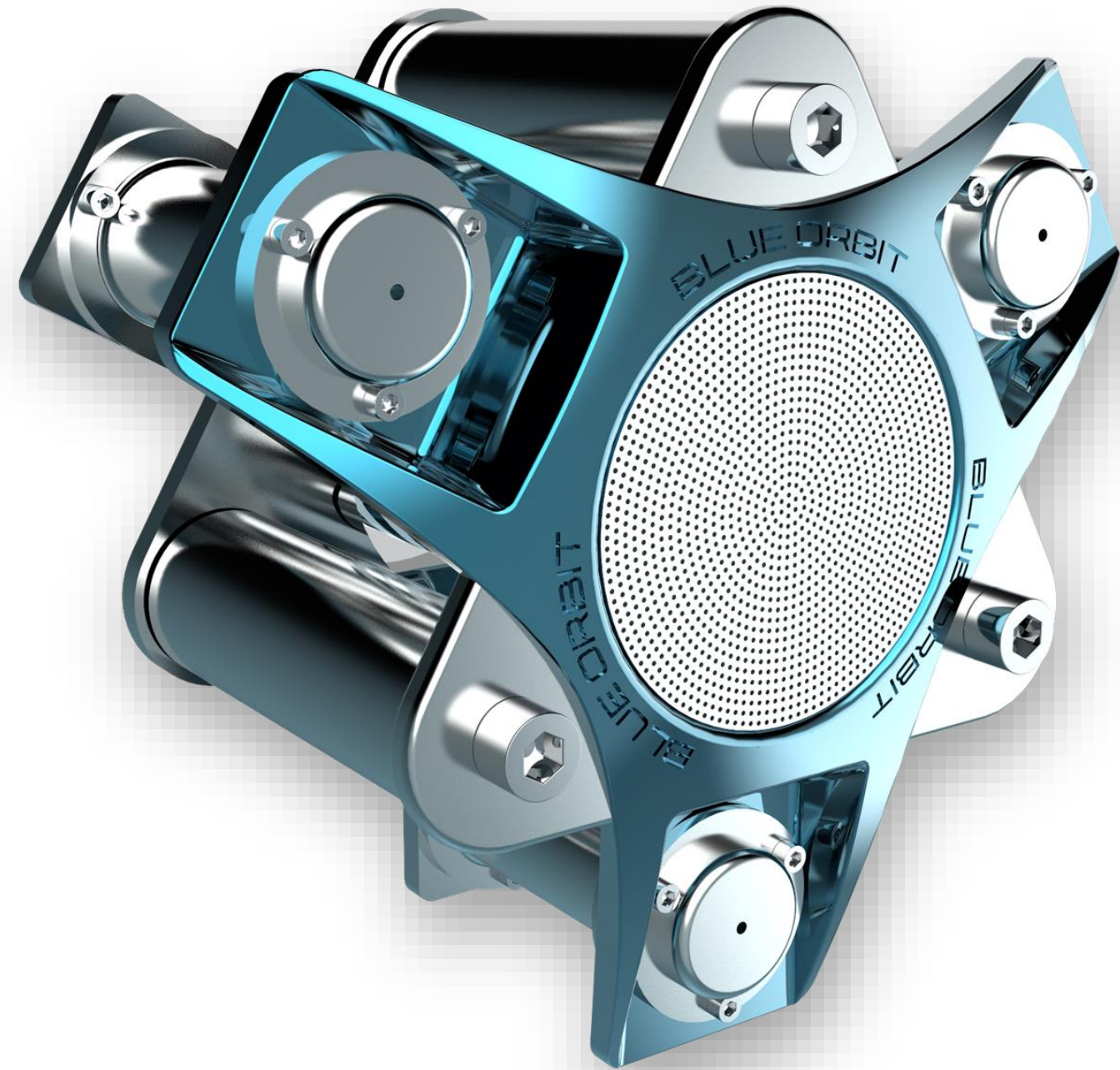


Advancing Space Exploration and Ground Solutions through Plasma Technology

by René Alejandro Cartaya López
Space Tech Expo Europe 2024, Smallsats Conference



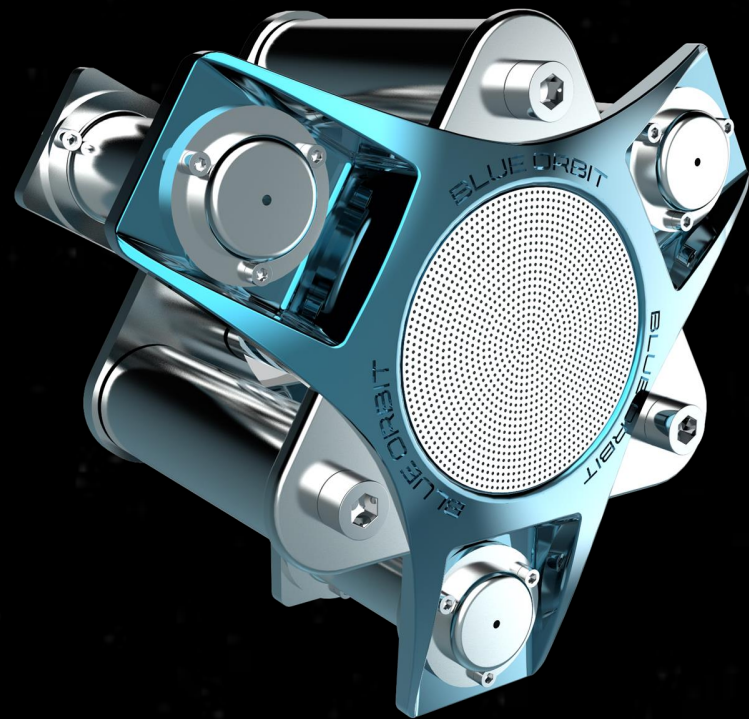
Introduction



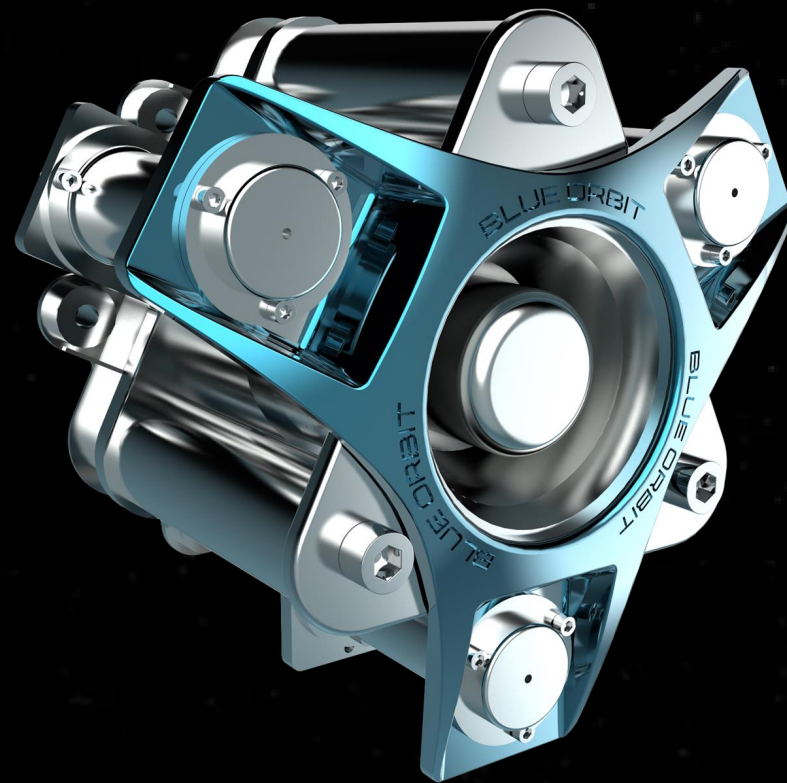
- Blue Orbit Space Systems is an aerospace company based in Bremen, Germany, and focused on advancing space mobility and exploration.
- Our mission is to revolutionise the space industry by leveraging cutting-edge plasma technology to extend satellite lifespan, enhance performance, and drive innovation.
- From Electric Thrusters propelling satellites with precision, to Plasma Jets advancing seafood safety, we're pioneers in transforming industries.

Overview of Plasma Propulsion Technologies

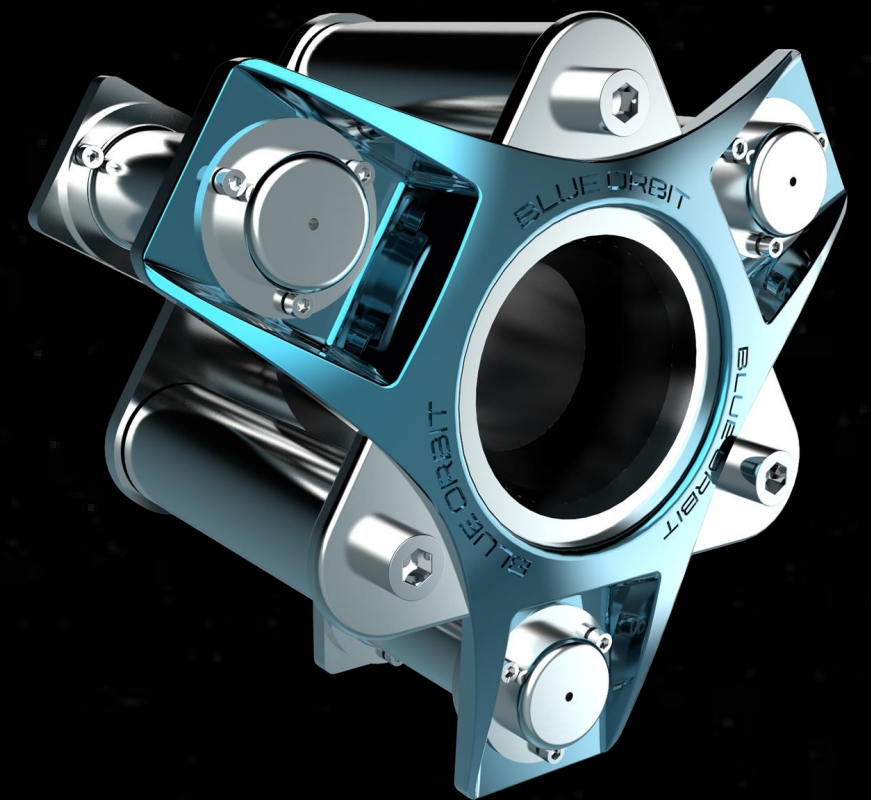
Gridded Ion Thrusters



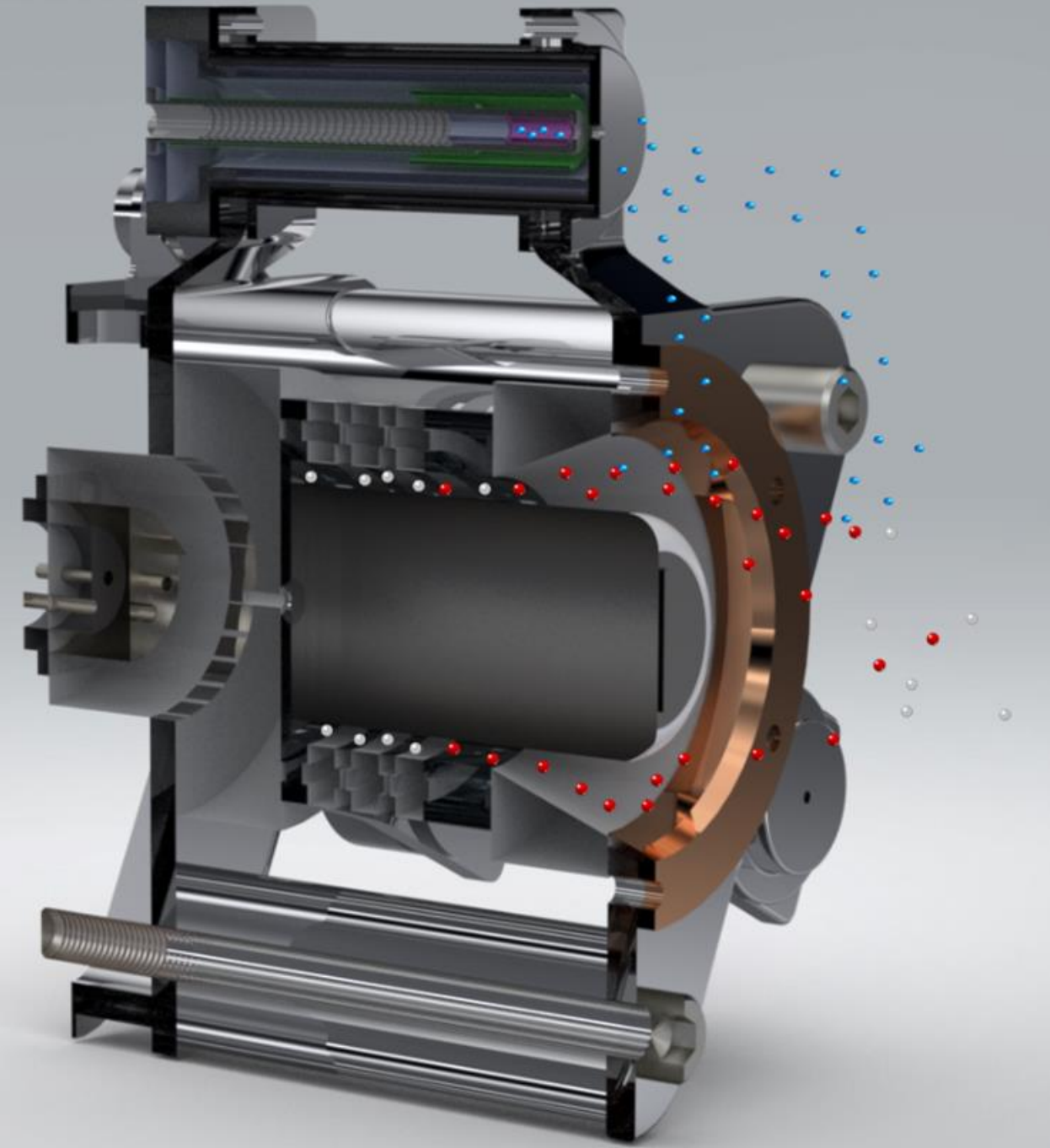
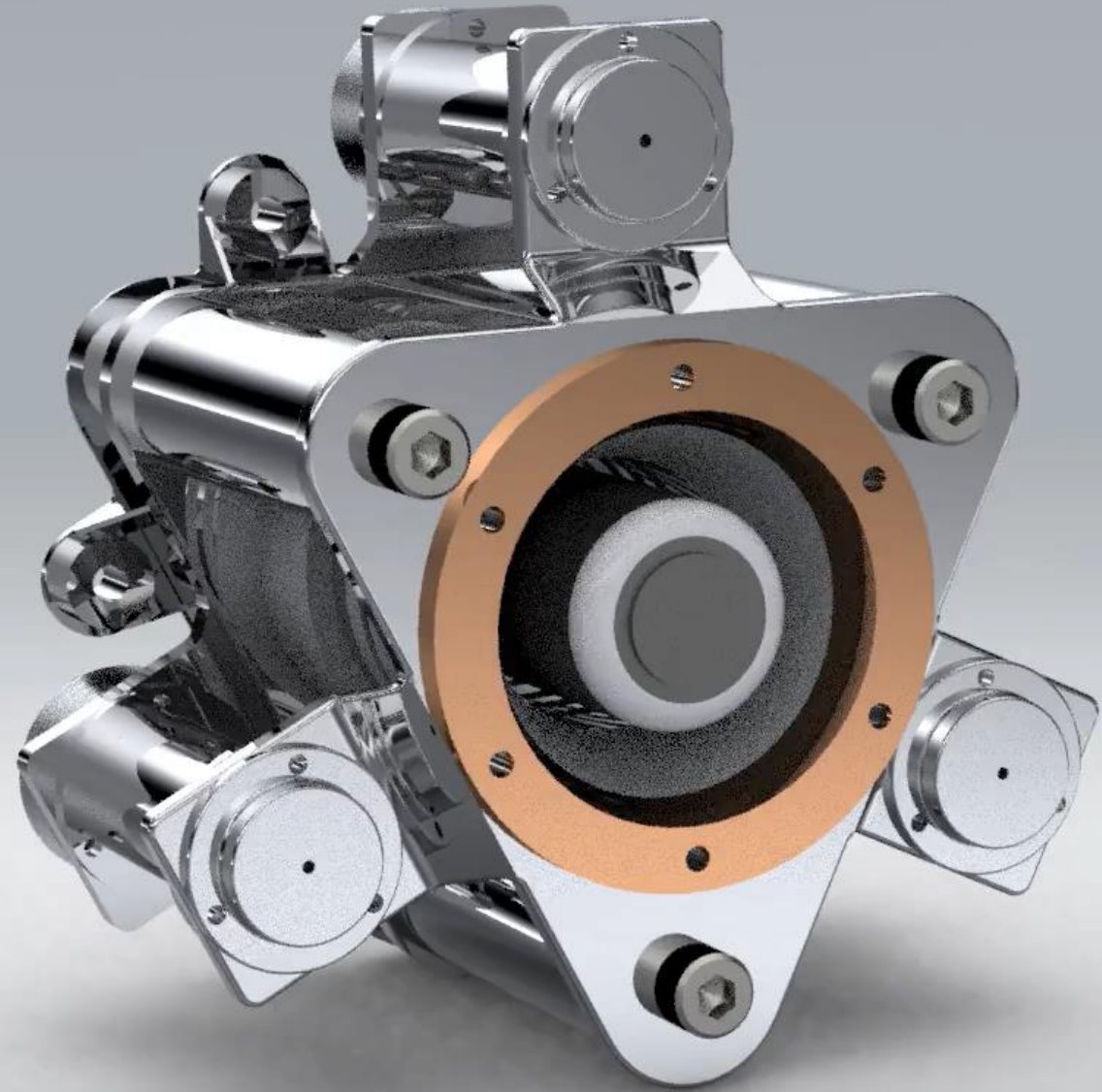
Hall Effect Thrusters



Air Breathing Thrusters

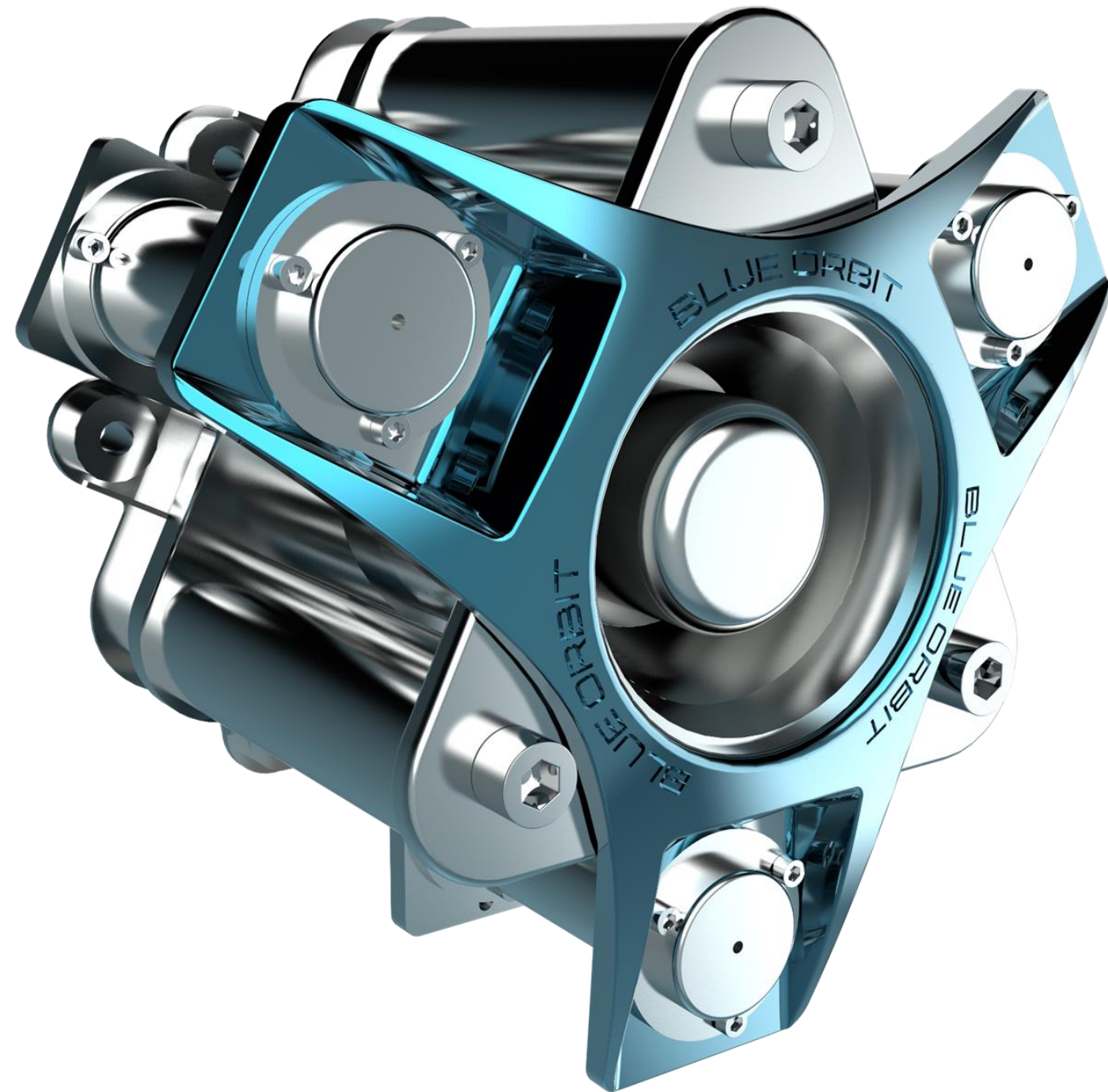


Hall Effect Thruster



Trinity - HET

Hall Effect Thruster



- HETs are known for their efficiency and durability, making them ideal for satellites and deep space missions.
- They provide a high thrust-to-power ratio, essential for long-duration missions.

dimensions:

90 * 85 * 115 mm

thrust:

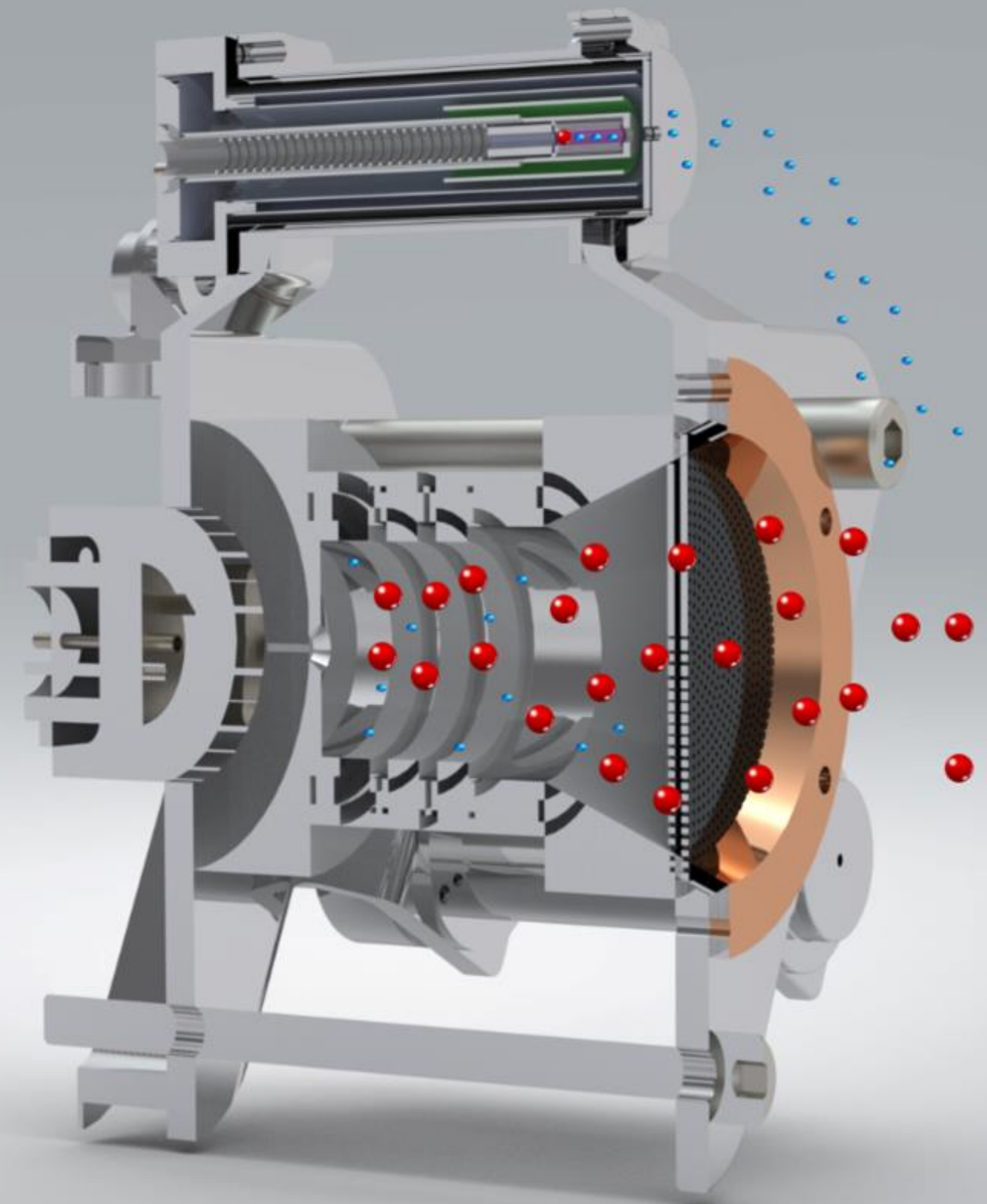
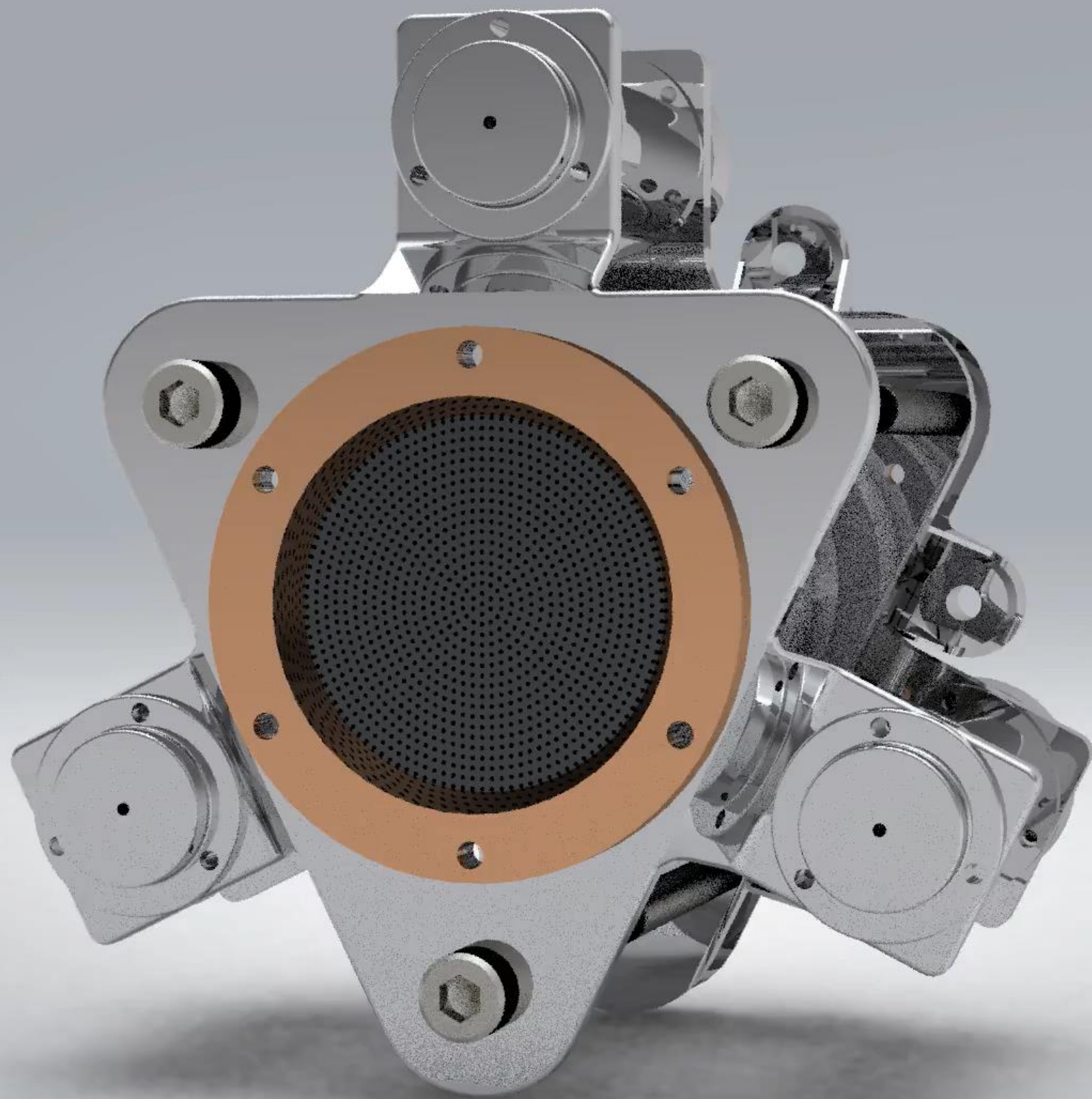
< 20 mN

total impulse:

< 1500 kNs

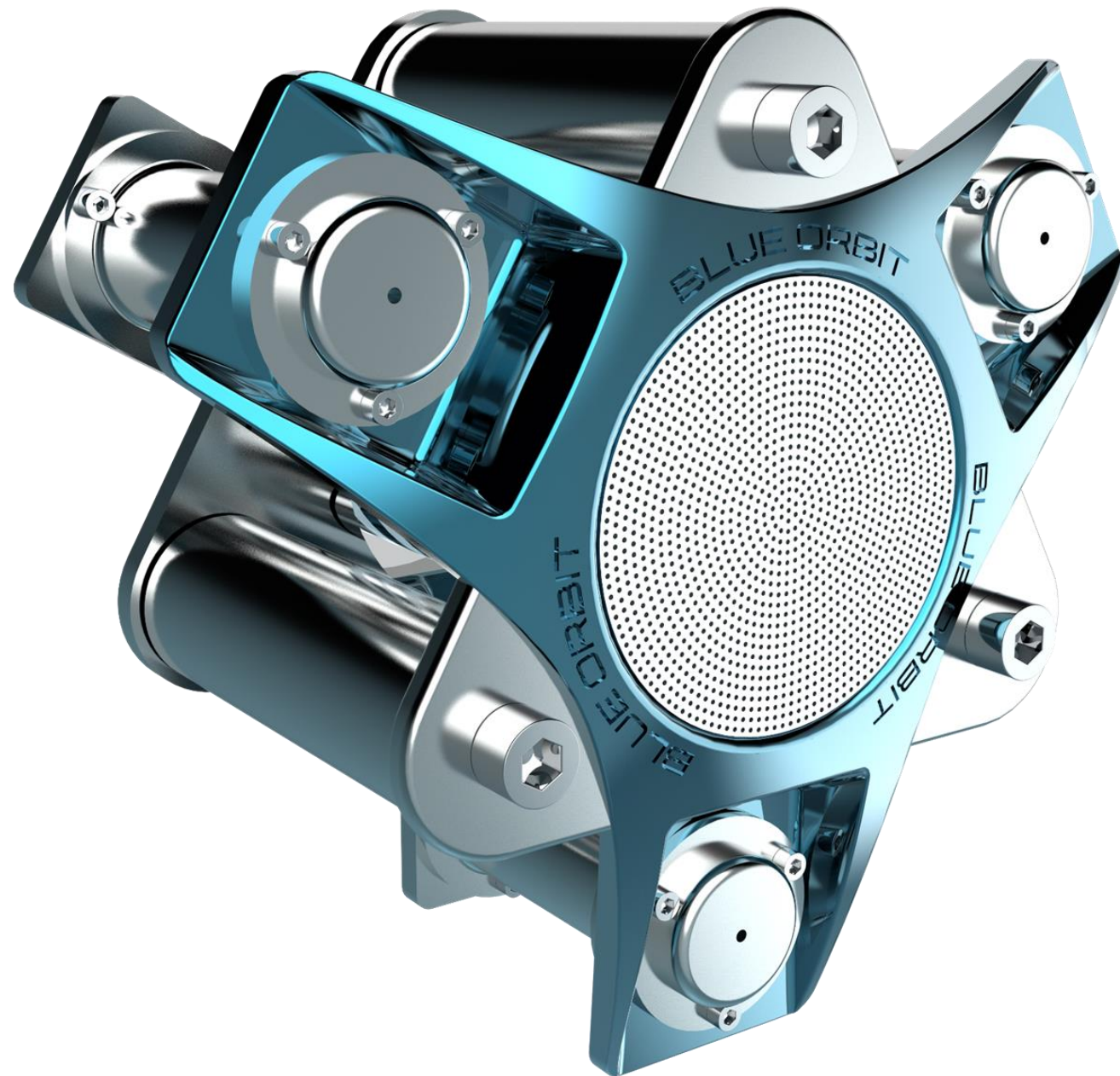
Trinity - HET

Gridded Ion Thrusters



Trinit-GIT

Gridded Ion Thrusters

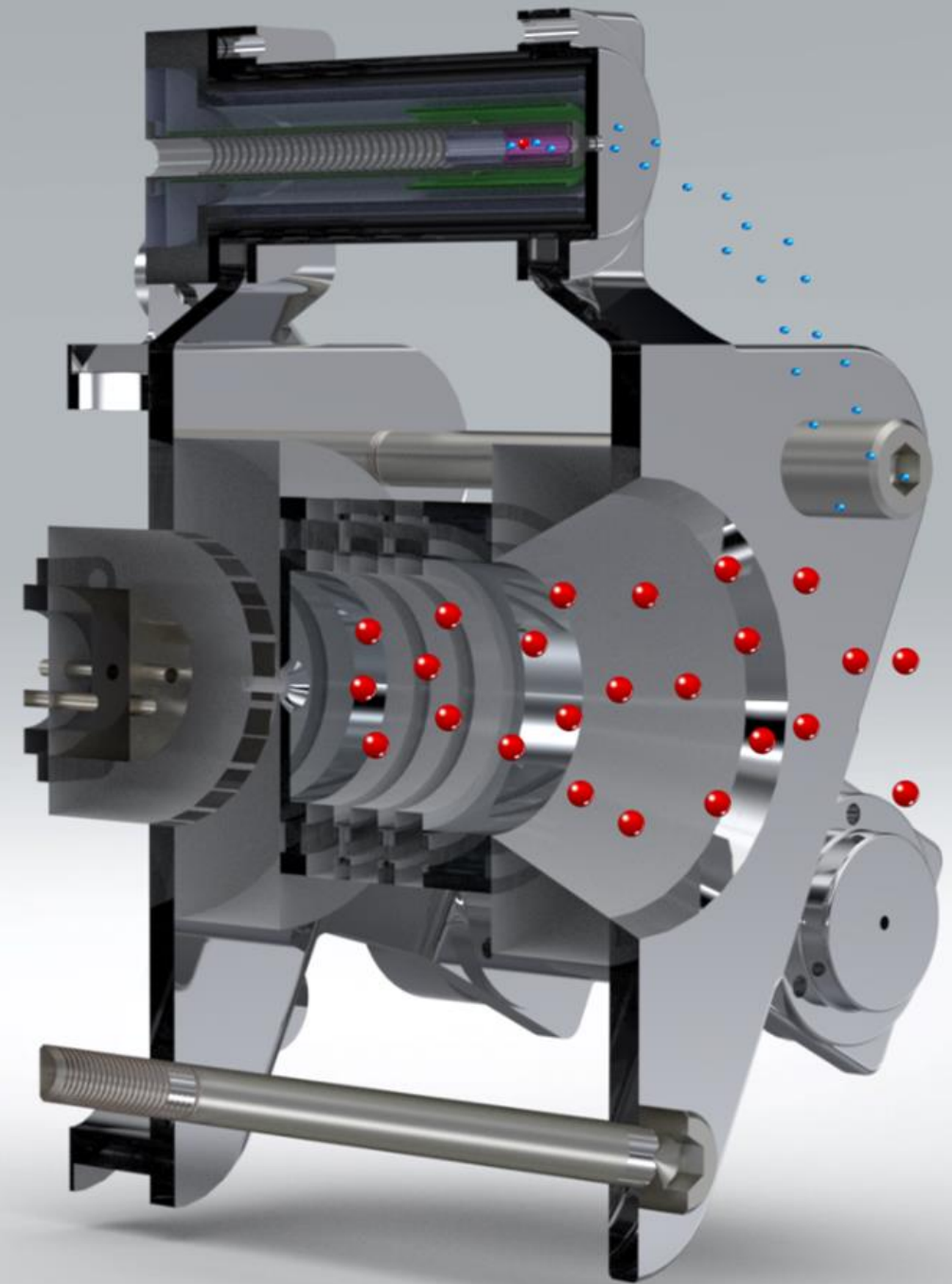
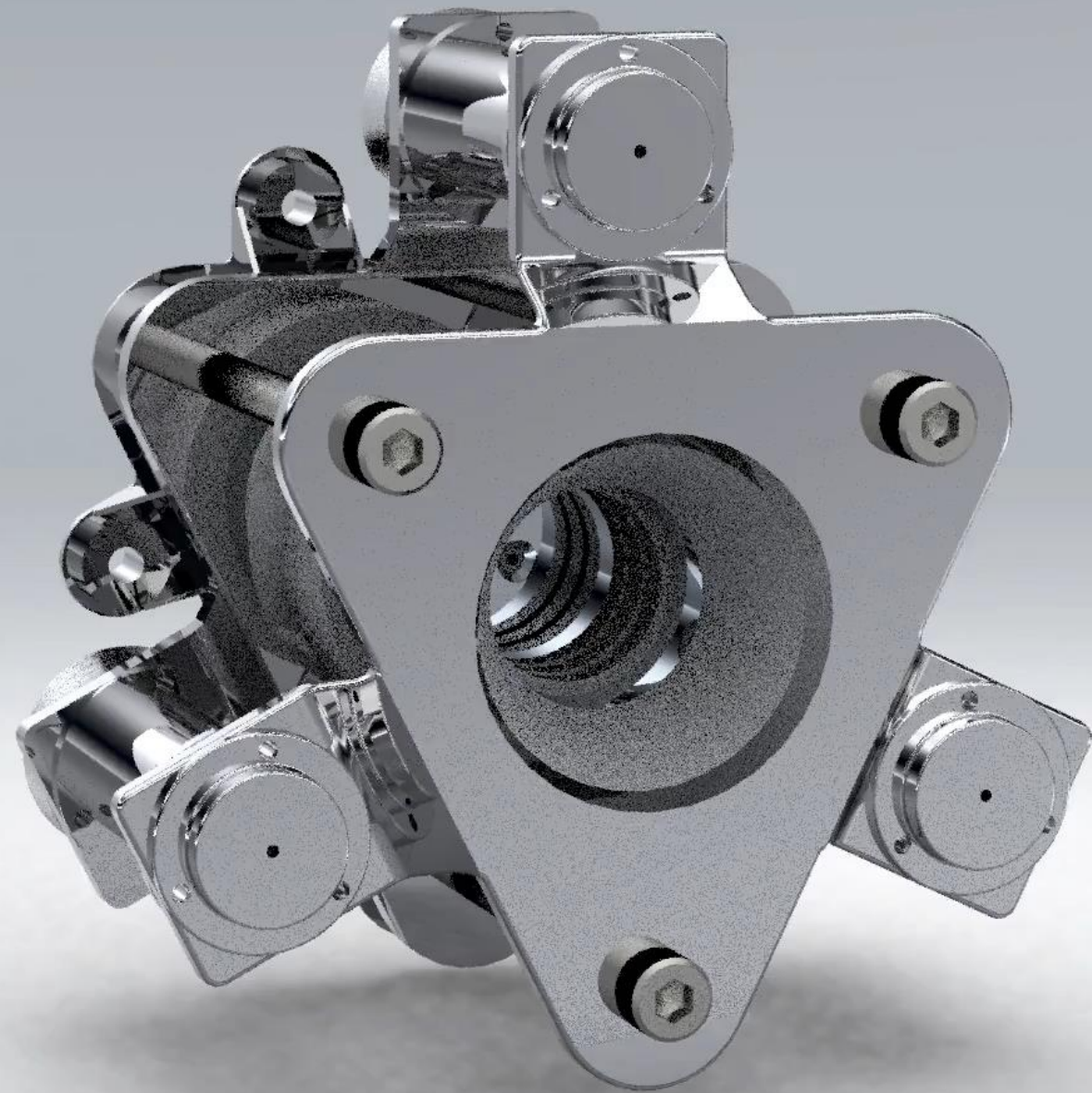


- GITs offer higher precision and exhaust velocity.
- They are particularly useful for satellite positioning and specific scientific missions.

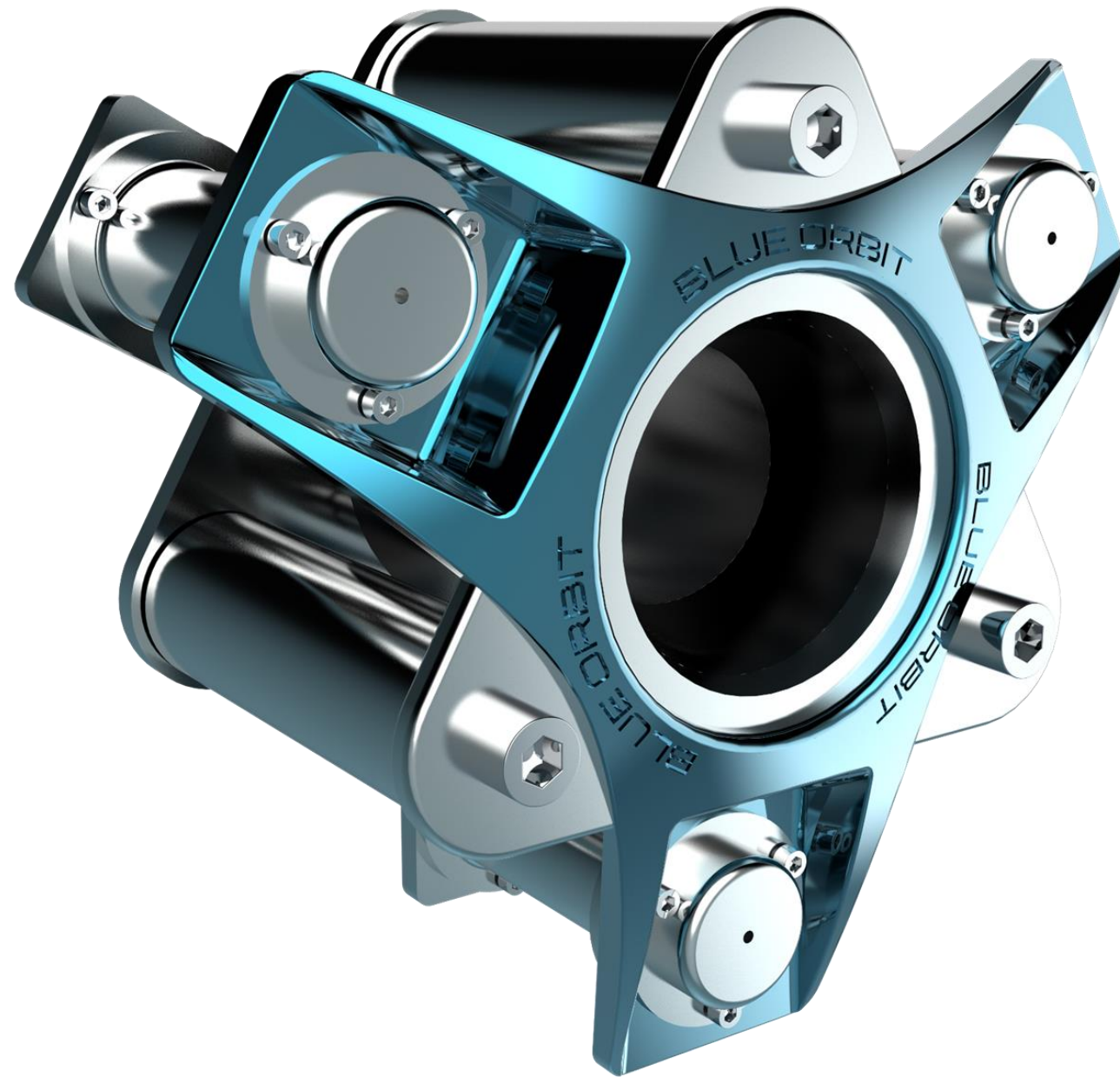
dimensions:	90 * 85 * 115 mm
thrust:	< 50 mN
total impulse:	< 2000 kNs

Trinit-GIT

Air Breathing Thrusters



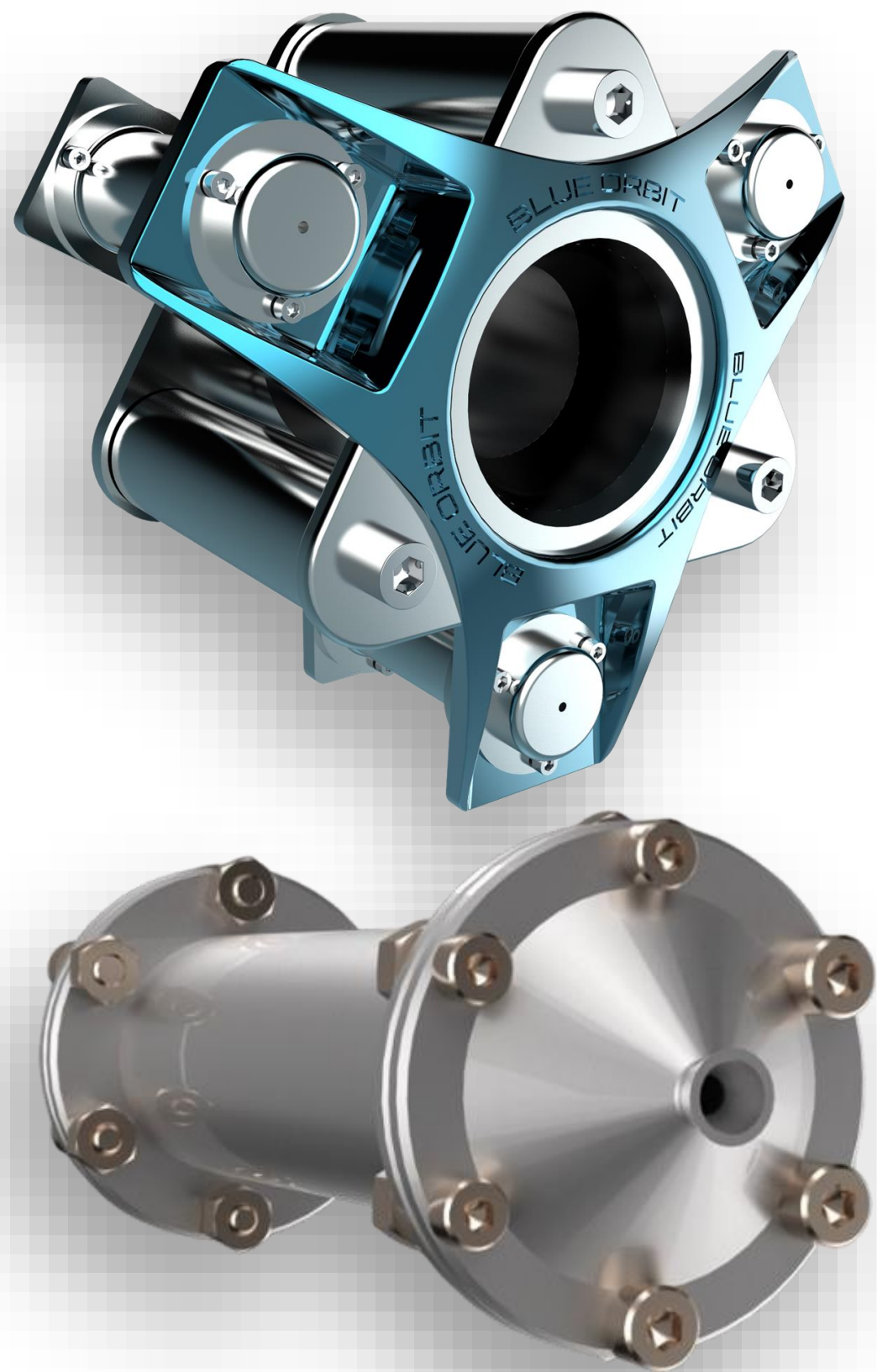
Air Breathing Thrusters



- Air Breathing Thrusters utilise atmospheric gases, enhancing fuel efficiency.
- This technology could extend mission life in low Earth orbit significantly.

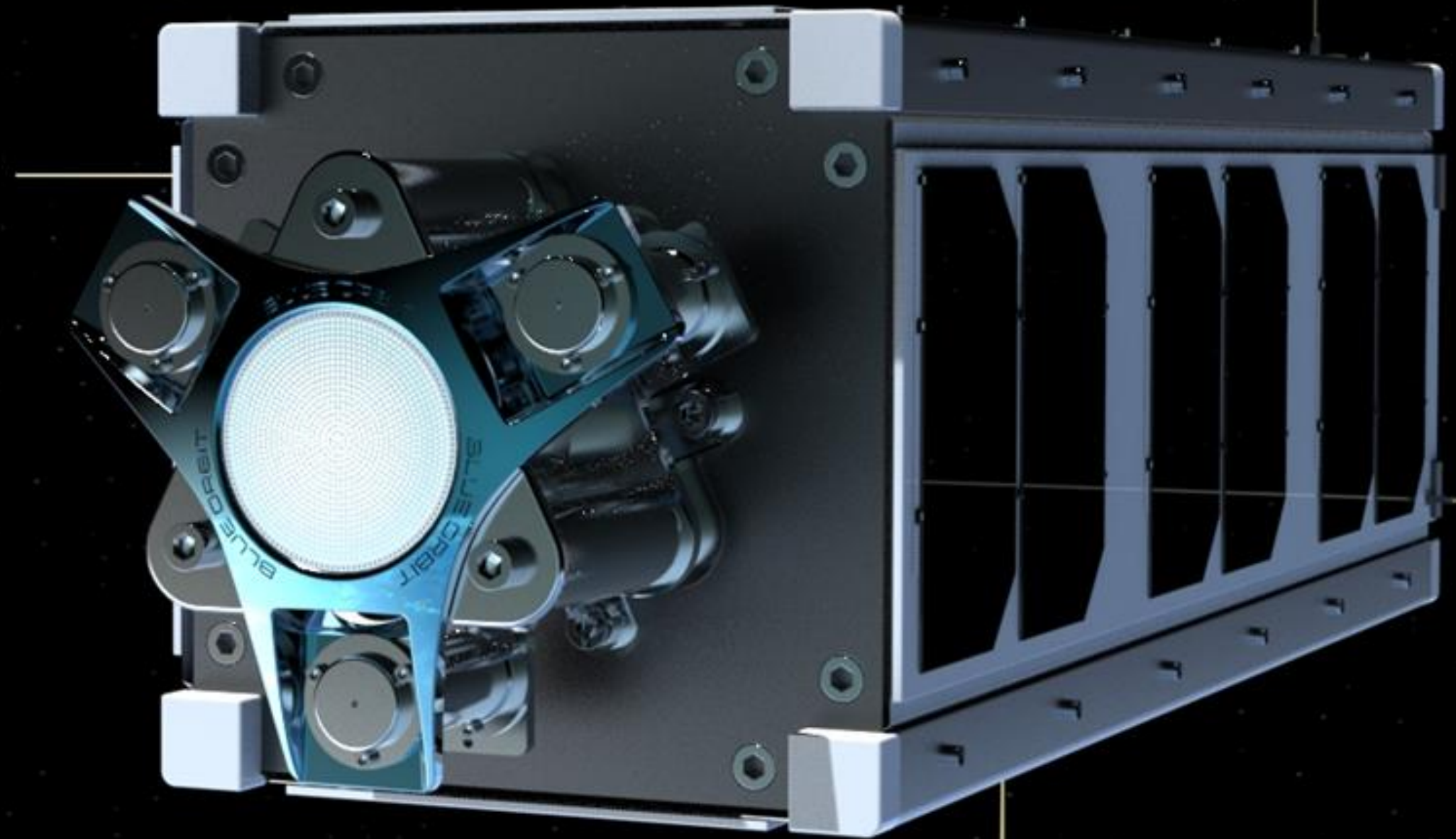
dimensions:	90 * 85 * 115 mm
thrust:	< 20 mN
total impulse:	< 1500 kNs

Air Breathing Thrusters and Spaceplanes



Plasma Technology for Ground Solutions

- Plasma technology is not limited to space; it also offers innovative solutions on Earth.
- Applications include agriculture, energy production, and environmental management.

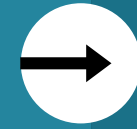


Plasma-Activated Water (PAW) in Agriculture

Water is exposed to cold plasma, resulting in a solution enriched with reactive oxygen and nitrogen species (RONS).

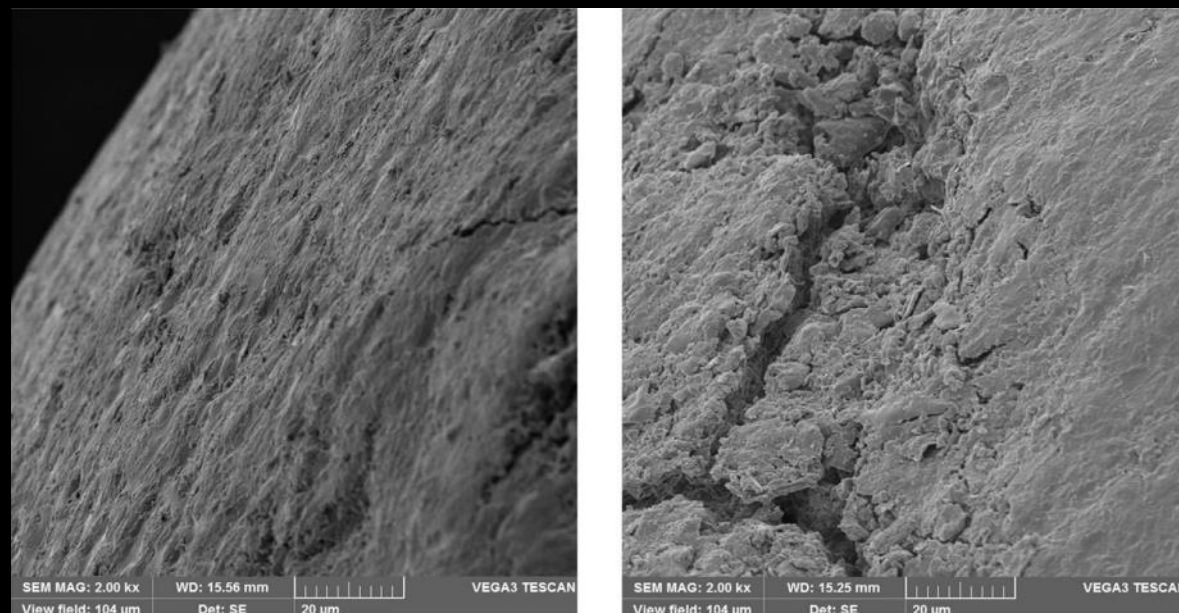


These species impart potent antimicrobial and oxidizing properties to the water.



PAW enhances crop yields, pest resistance, and promotes eco-friendly farming practices.

A brief case study shows significant improvements in seeds treated with PAW.



Before and after Seed plasma treatment. Possible damage to the endosperm and destruction of inhibitory signals, plasma treatment can promote germination.

Retrieved from: doi.org/10.1111/jfpp.13846v



Plasma in Decontamination, Sterilization, Air and Water Solutions



- Plasma plays a vital role in waste-to-energy processes and air purification.
- It contributes to renewable energy efforts by enhancing efficiency and reducing waste.

Synergy Between Space and Ground Solutions



- Plasma technology creates synergies across various sectors: agriculture, seafood, packaging, water treatment, and nanotechnology.
- This interconnectedness enhances both space exploration and terrestrial applications.

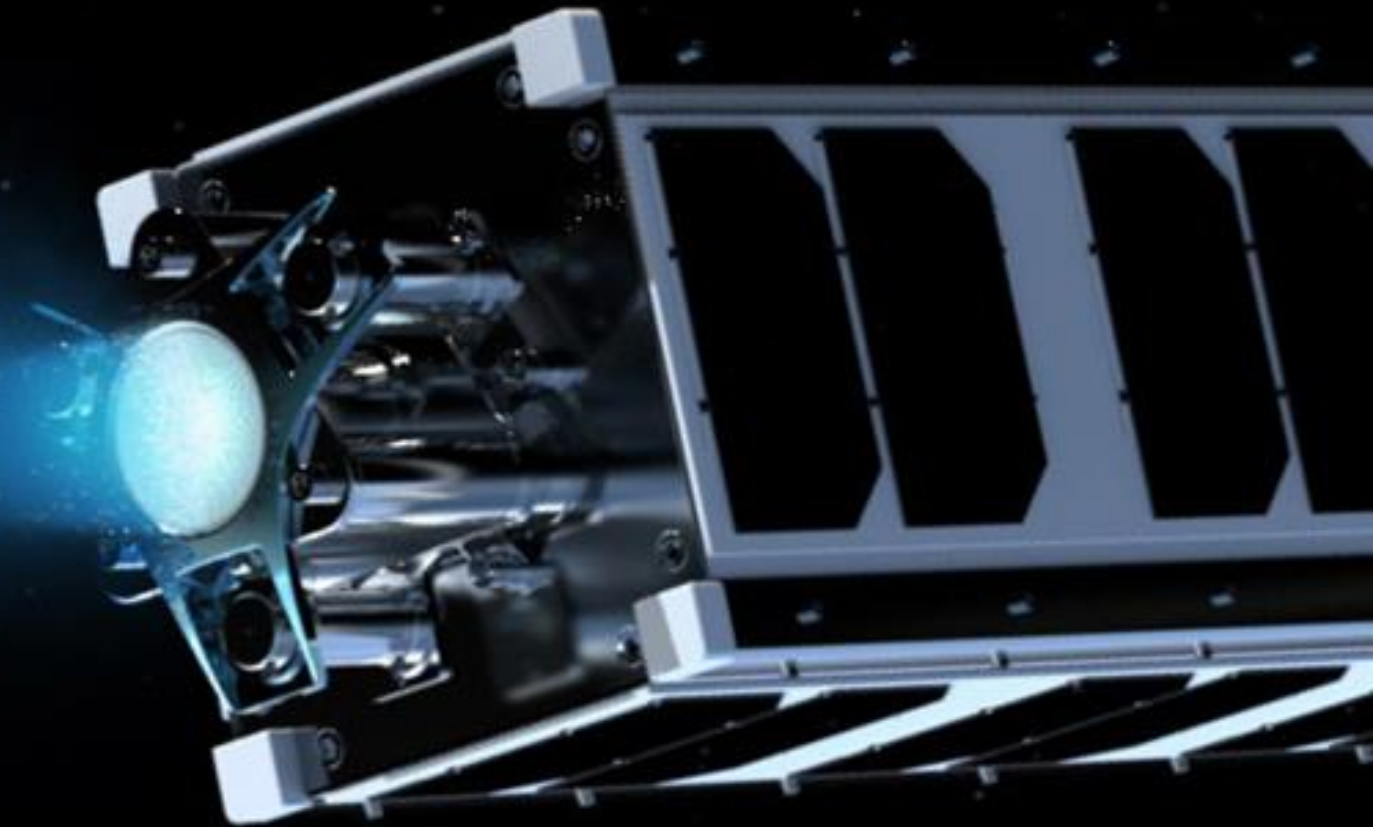


Conclusion

Plasma propulsion for space

- Plasma propulsion technologies are revolutionizing space exploration.
- Plasma also plays a crucial role in agriculture and energy solutions on Earth.

Sustainability is our priority, and reliability our guarantee. Join us on a journey to the future, where limitless innovation and responsible solutions shape a cleaner, brighter world.



BLUE ORBIT



Blue Orbit Space Systems UG
(haftungsbeschränkt)

Fahrenheitstraße 1,
28359 Bremen
Germany

contact@blueorbit.space
www.blueorbit.space

René Alejandro Cartaya López
CEO/CTO & Founder

+49 (0) 173 324 20 95
rene.cartaya@blueorbit.space

Igniting a Brighter Future with Plasma