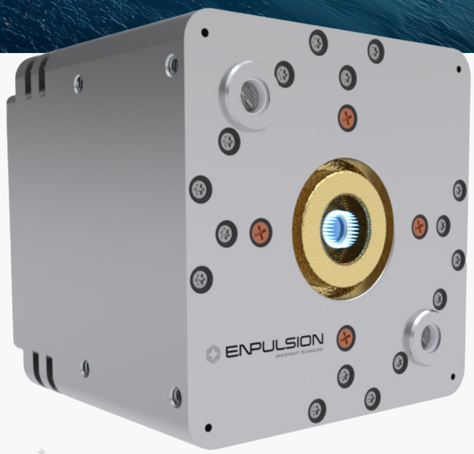
NANO R^3

Configuration: 030

The ENPULSION NANO R^3 is the next-generation FEEP system based on the flight-proven success story that is the ENPULSION NANO (formerly: IFM NANO Thruster). Incorporation of lessons learned from a large number of acceptance test campaigns and in-orbit performance verifications led into an updated electronics design, thermostructural concept, and software functionality. The resulting product – the ENPULSION NANO R^3 – features increased reliability, radiation tolerance, and environmental resilience.



Rad-Tolerant Electronics

All EEE components of the ENPULSION NANO R^3 are procured in lot-controlled batches. Selected sets of these batches are subjected to radiation testing, so that each thruster can be traced back to a fully representative qualification model. Critical EEE components were selected and integrated to be more tolerant to TID and SEE.

Protective Casing

The thruster is assembled into a protective casing that shields the electronics from the hazardous space radiation environment, facilitates handling during integration, and allows side mounting.

Safe and Inert System

The ENPULSION NANO R^3 contains no moving parts and the indium propellant is in its solid state at room temperature. Avoiding any liquid and reactive propellants as well as pressurized tanks significantly simplifies handling, integration, and launch procedures.

Flight Heritage

The ENPULSION NANO R^3 is an updated version of the space proven ENPULSION NANO with more than 240 units in space*. It is directly building on its heritage, leveraging the proven design and component selection. ENPULSION NANO R^3 has a flight heritage of over more than 40 units in space*.

**as per March 2026*

Versatile Performance

Thrust can be controlled through the electrode voltages, providing excellent controllability over the full thrust range and a low thrust noise. Due to the efficient ionization process, the ENPULSION NANO R^3 can provide a higher specific impulse than any other ion propulsion system currently on the market.

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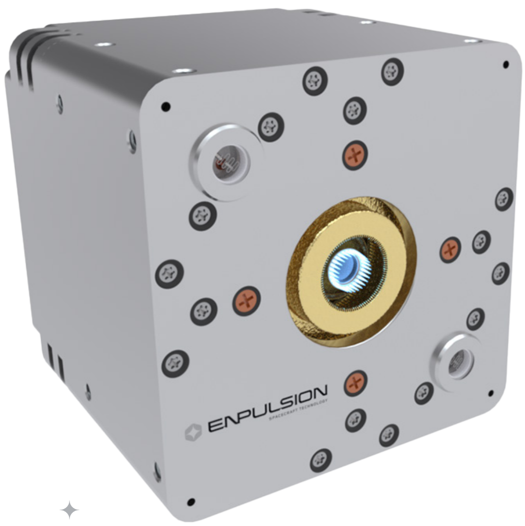
Properties and Performance

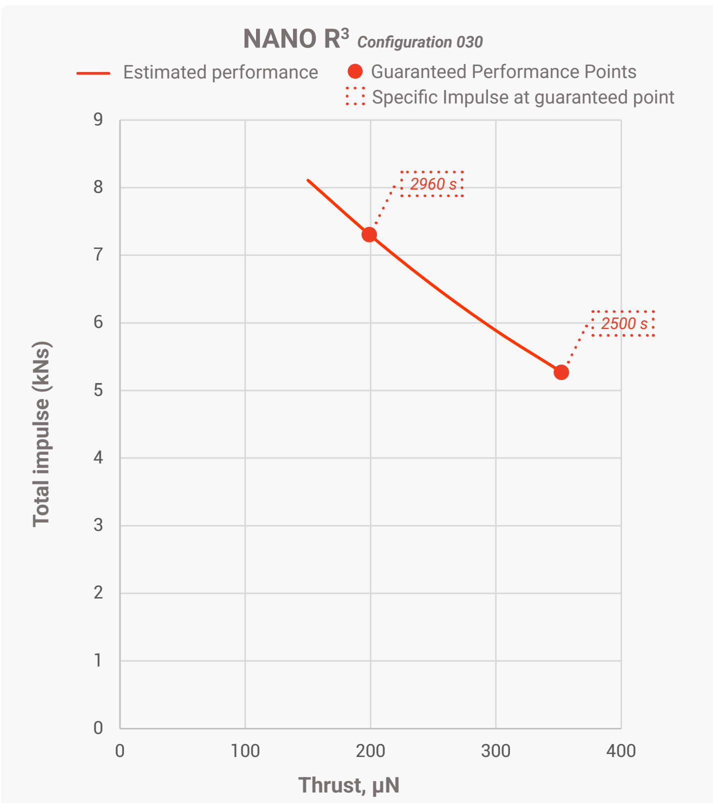
While the required power to operate the ENPULSION NANO R³ starts at around 30 W, at higher power levels one can choose between high-thrust and high-specific-impulse operation.

At any given thrust point, higher Isp operation will increase the total impulse, while also increasing the power demand. The thruster can be operated along the full dynamic range throughout the mission. This means that high Isp and low Isp manoeuvres can be included in a mission planning as well as high-thrust orbit manoeuvres and low-thrust precision control manoeuvres.

NANO R³ *Configuration 030*

OPERATION THRUST RANGE[1]	**150 TO 350 µN**
NOMINAL THRUST[2]	**350 µN**
SPECIFIC IMPULSE AT 350 µN	**2,500 s**
PROPELLANT MASS	**215 g +- 2%**
TOTAL IMPULSE AT 350 µN	**5,300 Ns**
POWER AT NOMINAL THRUST	**45 W incl. neutralizer**
OUTSIDE DIMENSIONS **Excluding protrusions** **Including protrusions**	 **98.0 x 99.0 x 95.3 mm** **100.95 x 99.0 x 97.3 mm**
MASS (DRY / WET)	**<1280 / <1500 g**
TOTAL SYSTEM POWER[3]	**30 – 50 W**
HOT STANDBY POWER[4]	**4 - 7 W**
COMMAND INTERFACE	**RS422 / RS485**
SUPPLY VOLTAGE	**12 V**





[1] The ENPULSION NANO R³ can be operated at a wide range of thrust and specific impulse, depending on the power level available. The operational envelope is based on total system power including typical heater and neutralizers consumption. Performances shown above correspond to maximum thrust to power curves.

[2] Guaranteed 75% performance at EOL

[3] Within operation range of 150µN to 350 µN

[4] Depends on accommodation and resulting thermal environment