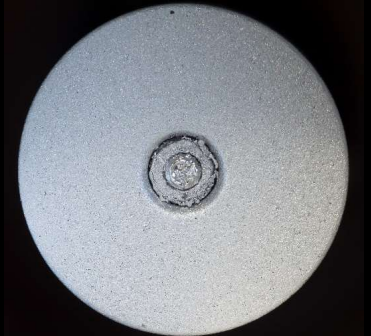


Neumann Space has engineered an innovative plasma propulsion system based on its Centre-Triggered Pulsed Cathodic Arc Thruster technology. The Neumann Drive[®] family of systems is a safe, simple-by-design and efficient propulsion solution for a variety of mission needs.

The Neumann Drive[®] creates a plasma from a solid, conductive fuel rod to produce thrust. Its pulsed operation maintains performance efficiencies throughout power input regimes and allows precise tailoring of impulse bit delivery. The Neumann Drive[®] family are all non-pressurised, and utilise no hazardous substances throughout integration, transport, launch and in-orbit operations.



Solid molybdenum fuel rod surface at atmosphere and firing plasma in vacuum

MEET THE FAMILY

- ND-15** Our first-generation system designed for nanosatellites. One system successfully launched to orbit in June 2023 and a second system awaiting launch in Q4, 2023.
- ND-50** A smaller, lighter, more powerful system currently undergoing system testing. Flight unit deliveries planned in 2023, '24 & '25
- ND-500+** The big brother of the family, the ND-500+ is a solution for SmallSat class spacecraft. Currently in the development phase with a first flight in '25.

TECHNICAL BENEFITS



Unique propellant characteristics

Solid state fuel rod simplifies propellant management. Various metals and alloys can be used to customise performance.



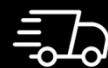
Superior fuel efficiency

High Isp, System can be operated to give pulses precisely when needed to minimise inefficiencies.



Storable integrated and fuelled

Long shelf life enables minimal schedule disruption and responsive access to space.



Simple manufacturing

Well suited for high volume fast manufacturing and assembly. Perfect for constellations.



Quasi-neutral exhaust

No neutralizer required, easy to cluster in close proximity.



Safe

No hazardous substances and chemically inert fuel leads to hassle free handling and logistics, and minimal required training.



Simple design, no moving parts

Simple, robust design reduces launch safety concerns and spacecraft failure modes. ITAR Free.



Scalable

Thrust scales linearly with power, with high total impulse to density ratio at system level.



Refuellable in the future

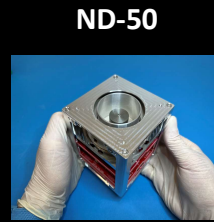
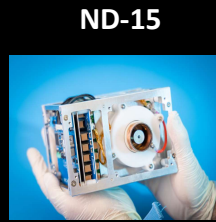
Including from Space debris, ideal for a circular in-space propulsion ecosystem to make space operations more resilient.



Narrow exhaust plume

Increasing the possible footprint of spacecraft.

PRODUCTS



STATUS

Objective	Technology demonstration only	Commercial CubeSat/SmallSat	Commercial SmallSat
Status	In-orbit	Ground testing	In Development
Bus platforms	Skyride (Skykraft), Apogee 6U (Inovor)	CarbSAR (SSTL), EDISON 6U (Space Inventor)	G-Sat (Gilmour Space)
Missions	June'23, Q4'23	2024	2025

PERFORMANCES

Minimum Impulse per pulse	45 μ N.s	150 μ N.s (est)	Up to 1 mNs (est)
Maximum Pulse Frequency	83 mHz	0.67 Hz	Up to 6 Hz
Specific Impulse	1,800 to 2,000 s	1,800 to 2,000 s	2,500 s (est)
System Input Power	2 - 24 W	2 - 50 W	10 – up to 1000W
Dimensions (fuelled)	150 x 100 x 97 mm	100 x 96 x 96 mm	Various sizes
Total wet mass	1.9 kg	1.3kg	10 to 20 Kg

DESIGN & QUALIFICATION

Total Impulse	880 Ns (min.)	1.8 kNs (min.)	Up to 250 kNs (est)
Temperature (operational)	-10°C to 50°C	-20°C to 60°C	-20°C to 60°C
EMC/EMI Test Method (inspired)	MIL-STD-461G	MIL-STD-461G	MIL-STD-461G
Vibrations & Shock	NASA GEVS GSFC-STD-7000B	NASA GEVS GSFC-STD-7000B	NASA GEVS GSFC-STD-7000B

INTERFACES

Input Voltage (nominal)	12 – 50 V	12 – 50 V	28 V
Bus Interface	UART/CAN/ RS485/RS422	UART/CAN/ RS485/RS422	UART/CAN/ RS485/RS422