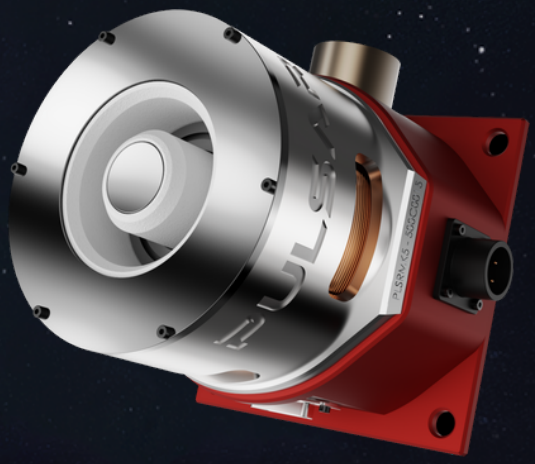
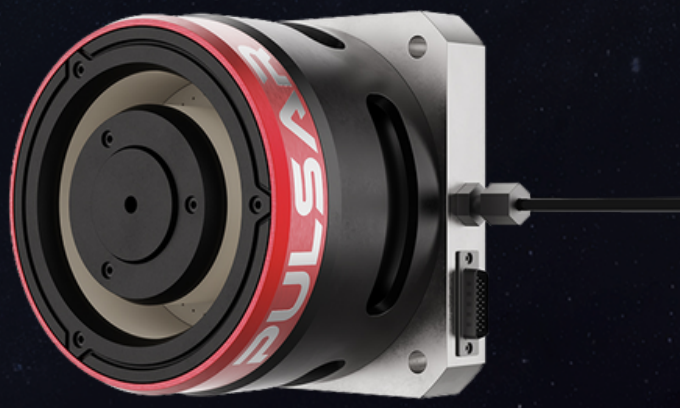
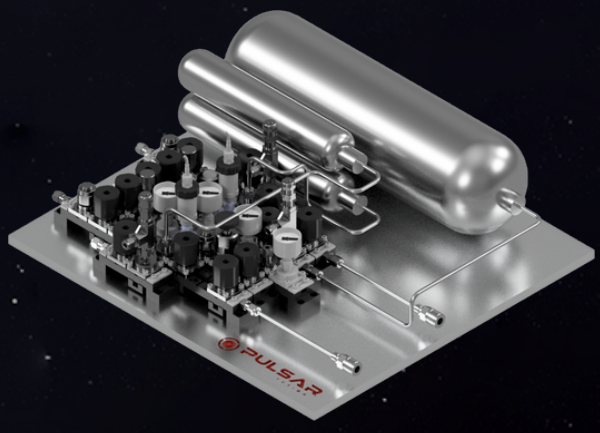
PULSAR FUSION

Electric Propulsion Solutions for In-Space Mission Applications







Hall Effect Thruster Propulsion Engines

01 History and Background

Pulsar Fusion was founded in 2019 by its CEO Richard Dinan and Technical Director Dr James Lambert. Electric Propulsion development started before this in 2016, under 'Applied Fusion Systems Limited' in partnership with Southampton University.
This relationship continues today in the development of our current range of Hall-effect thrusters.

Based at Bletchley in the UK, we have an extensive manufacturing and vacuum testing facility to provide a wide range of Hall Effect Thrusters and their ancillary systems

02 Product Description

Hall Effect Thrusters are a type of ion thruster in which the propellant is accelerated by an electric field for in space propulsion. Hall Effect thrusters use a magnetic field to limit the electrons' axial motion and then use them to ionize propellant, efficiently accelerate the ions to produce thrust, and neutralize the ions in the plume.

Pulsars new range of Plasma Thrusters (100W to 20kW) provide higher performances and in-space mission reliability and durability.

03 Development

Pulsar Fusion has been awarded two significant supporting grants for its HET's:- in 2021 the Southampton University 'Sprint Grant' which was delivered and completed, and in 2022 from the UK Space Agency (UKSA) to develop integrated Fission-based power systems for Electric Propulsion.

Pulsar Fusion continually look for development opportunities to enhance and optimise our range of electric plasma thrusters.

04 Applications

Our thruster products can be used for an extensive range of in-space mission flight profiles, such as station keeping, de-orbiting, and Rendezvous Proximity Operations and Docking (RPOD). In Space applications include multiple satellite deployments, space transportation, space debris management, In Situ Resource Utilisation (ISRU), Lunar and cislunar, In Orbit Servicing and Manufacturing (IOSM) and many other.

Model #	Power Range (W)	Propellants	Assembly Mass (kg)*	Voltage (V)	Current (A)	Nominal Thrust (mN)	Specific Impulse (s)	Estimated Total Impulse (MNs)*	Efficiency (%)	Dimensions (mm)
PULSAR 150W	120 - 180	Ar, Kr, Xe	<2.0	230 - 400	0.5	5 - 13	1000 - 1300	>0.5	50	102x102x80
PULSAR 500W	500 - 700	Ar, Kr, Xe	< 2.5	300 - 400	1.8	12 - 33	1300 - 1550	> 1.6	50	102x102x80
PULSAR 1.5kW	1000 - 2500	Ar, Kr, Xe	< 4.75	350	4.25	100	1725	> 7.2	50	94x94x115
PULSAR 5kW	5000 - 6000	Ar, Kr, Xe	< 12.4	300 - 600	6 - 12	295 - 325	2000-2600	> 23	50	144x144x117
PULSAR 10kW	8000 - 12500	Ar, Kr, Xe	<21.0	300 - 600	10 - 16	567	2569	>38	65	167x167x122
PULSAR 20kW	15000 - 20000	Ar, Kr, Xe	< 43	450 - 600	14 - 18	1010	2025 - 2700	> 72	50	189x189x127

*assume 20000hrs life

Ancillary EP Systems

Pulsar Fusion can offer a completely flexible supply approach to customers' needs for Electric Propulsion. This can be just in the supply of Hall Effect Thruster engine heads or combined with Power Processing Unit's (PPU's) and Propellant Management Units (PMU's).

Power Processing Unit (PPU)

Description

The Pulsar 4x500 PPU is a power processing unit for Hall-effect thrusters (HETs) designed for the highest efficiency, performance and reliability. The 4x500 handles start-up and shut down as well as normal operation of the thruster.

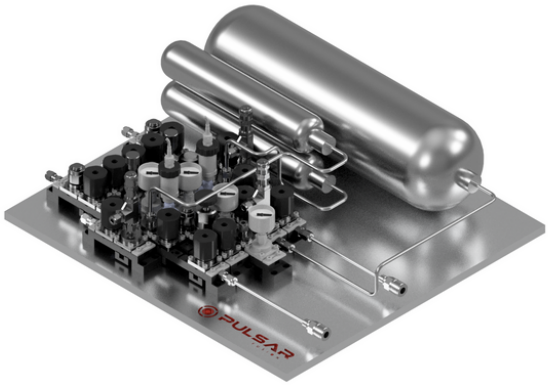
Key Functions

- Provide a control interface to the power processing and distribution functions necessary for HETs.
- Provide a control interface to propellant flow systems for HETs.

Key Features

- Operate up to 4 HETs up to 500W per HET.
- Versatile data interfaces available including CAN, UART.
- Designed for high redundancy cross-strapping configurations with low risk of failure propagation.

Propellant Management Unit (PMU)



Description

Pulsar's state-of-the-art Propellant Management Unit (PMU) is meticulously designed for spacecraft propulsion, with a specialised focus on Hall-effect thrusters. Engineered for unmatched reliability and redundancy, our system guarantees mission success, even in the most challenging conditions. By prioritising orifice plates over mechanical valves, we've reduced moving parts, optimising performance and durability.

The PMU boasts an extensive array of temperature and pressure sensors. This advanced telemetry capability provides users with precise operational data, ensuring meticulous system monitoring and maintenance.

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Vacuum Testing Facilities

Pulsar have three operational chambers at our 8000 sq. ft. vacuum testing facility at Bletchley, Buckinghamshire. Each chamber is equipped with an accompanying workstation. This gives Pulsar and our clients full access to the facilities and equipment required to conduct quality testing of EP thrusters. Each chamber can be fed with Xenon, Krypton, or Argon propellant.

	Chamber 1	Chamber 2	Chamber 3
Diameter (mm)	1500	1300	400
Length (mm)	1060	700	400
Minimum Pressure (bar)	1e-7	1e-7	1e-7
Pump Capacity (mg/s)	11	11	11
Additional Features	15 ports	4 large ports	4 ports

Experience the epitome of controlled manufacturing environments at Pulsar's ISO Class 5 Clean Room, situated within our advanced Bletchley facility. Specifically engineered for the assembly of space propulsion systems, this clean room adheres to stringent particulate and contamination controls, ensuring optimal system reliability and performance. The pre-entry gray room serves as a contamination barrier, providing an essential layer of protection. The clean room itself features dual segregated workspaces, allowing for parallel assembly operations. With Pulsar, you're not just investing in a product; you're investing in a rigorously controlled manufacturing process designed for mission-critical reliability.

Sales Enquiries

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