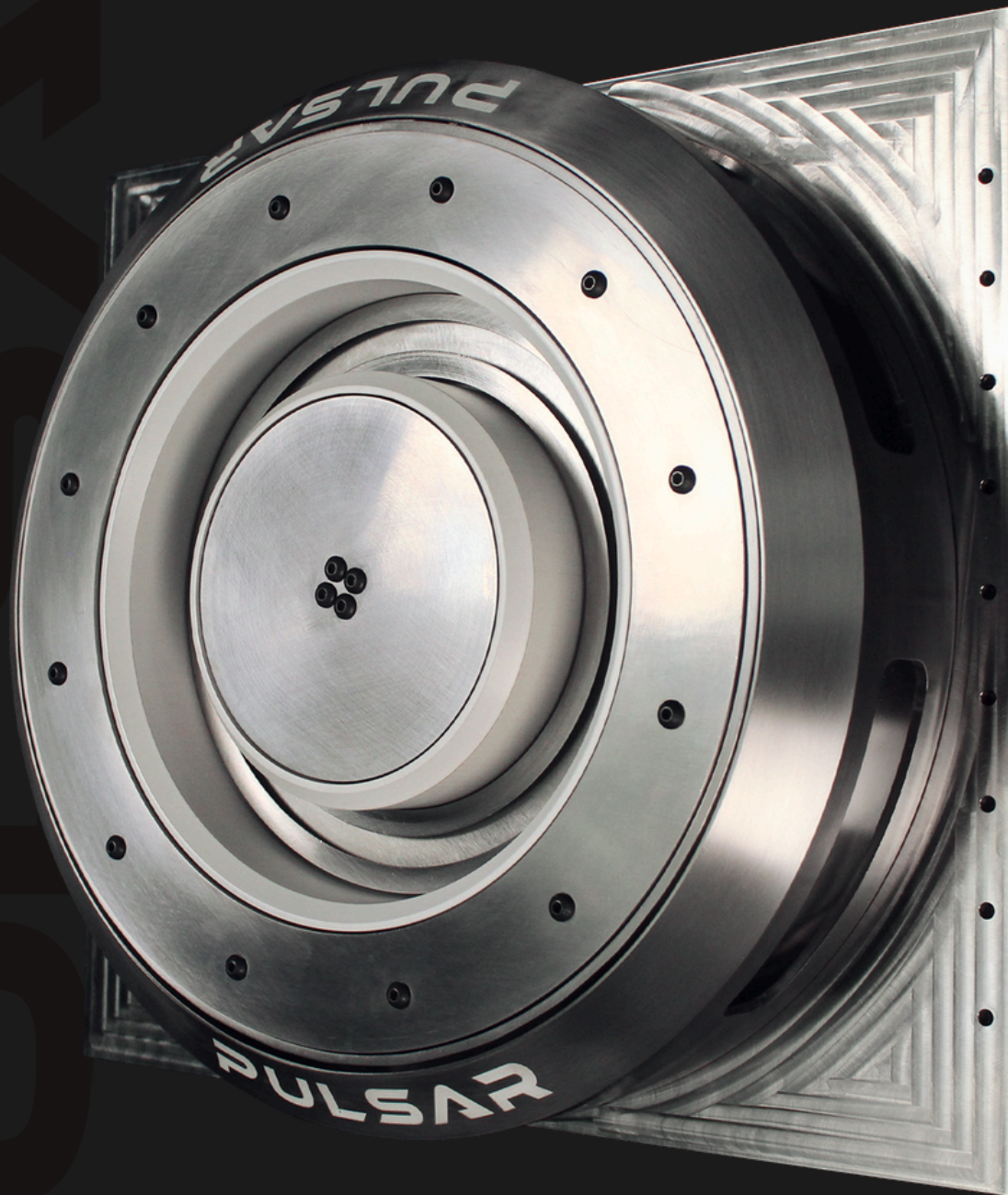


# MARSRANGER

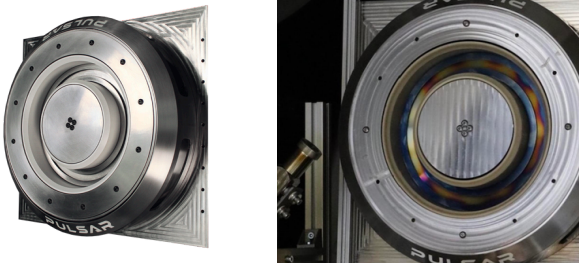


**PULSAR**

**10KW HET**

# Pulsar Orbital Plasma Thrusters

## Pulsar 10KW



### 01 Product Description

Pulsar Fusion have been developing Hall-effect thrusters (HET) technology since 2016. This is 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. Pulsar's new range of Plasma Thrusters provide higher performances and in-space mission reliability and durability.

### 02 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.

### 03 Application

Pulsar Fusion places great emphasis on long-lifetime, mission durability and flexibility. Our Hall-effect thrusters above 5kW are magnetically shielded for lifetimes beyond 20,000 hours. Thruster start-up and shut-down times are also of critical importance to us. Our state-of-the-art laboratory at Bletchley allows us to fine-tune the thrusters to your mission needs before putting them in to production. Our thruster products can be used for an extensive in-space mission portfolio, such as 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 applications.

### 04 Additional Power Ranges

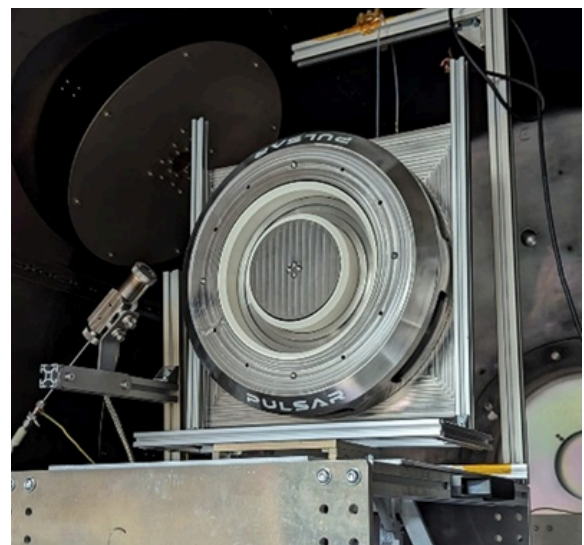
Pulsar Fusion can design and manufacture electric plasma thrusters over much lower power ratings than Kw. Please talk to us about your mission electric propulsion ranges and specifications. Please also refer to our 5kW and 20kW range data sheets.

## Specifications

Assembly Mass, kg	22.9
Dimensions, mm	320 x 320 x 160
Voltage, V	400 - 600
Current, A	14.0 - 17.0
Power, W	5,600 - 10,200
Thrust, mN	605 - 690
Specific Impulse, sec	2,000 - 2,200
Total Impulse, MNs	22.0 - 29.0
Efficiency, %	50

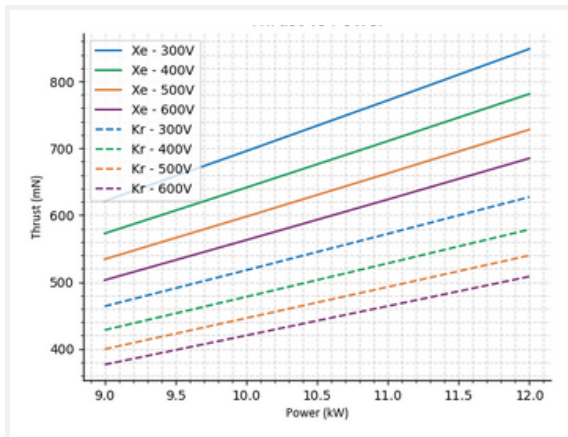
### 05 Bespoke Testing Facilities

Pulsar Fusion conducts extensive and bespoke performance and lifetime testing at our facility in Bletchley, UK. These facilities were developed with industrial and academic partners and is continually expanding and advancing as an electric propulsion centre of excellence. We specialise in providing our customers with bespoke mission testing programmes. Pulsar's experienced team of engineers and technicians provide you with accurate and reliable test and reliability results, and our facility is designed to meet all of your testing needs. With our advanced equipment and expert support, you can trust that your electric propulsion systems will be thoroughly tested and ready to perform at their best. Pulsar has tested it's HET's for structural launch integrity on a vibration table at Harwell, UK in 2021. The thrusters successfully experienced 20GRMS which simulates the conditions of a most extreme launch.

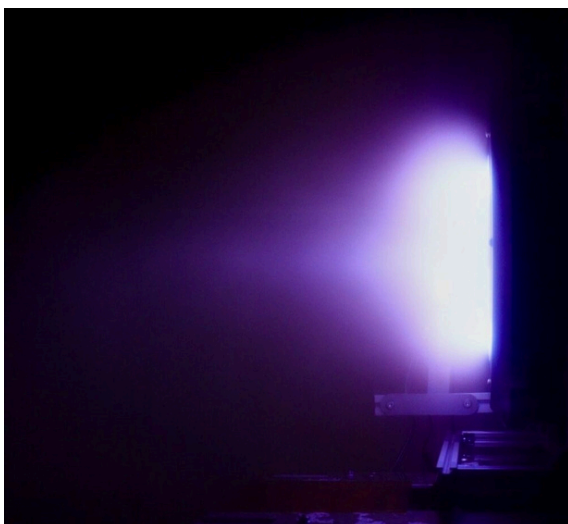
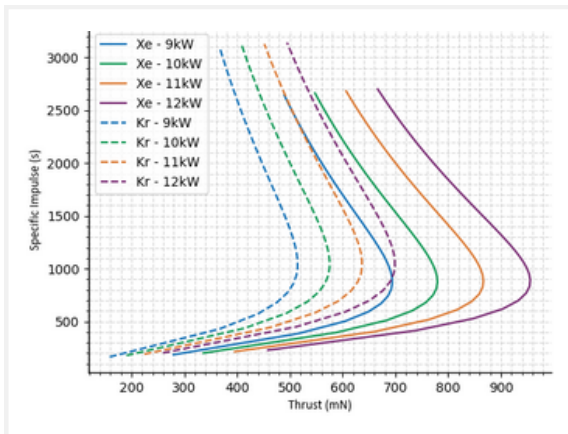


# 10kW HET Data Sheet

## 01 Thrust vs Power

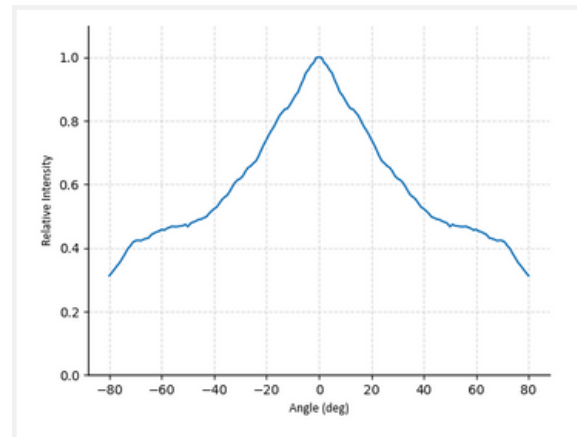


## 02 Thrust vs Specific Impulse

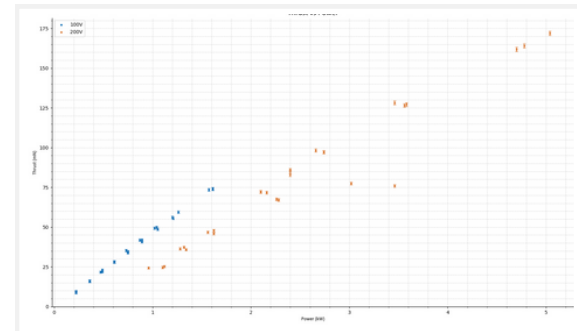


## Experimental Data

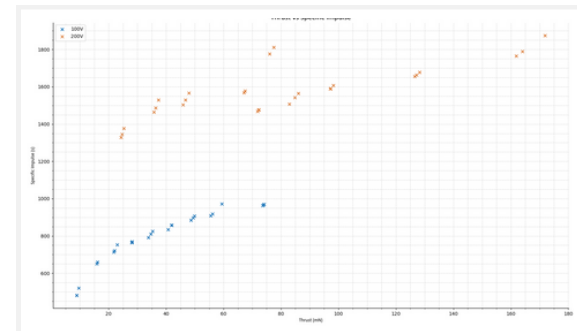
### Plume Distribution



## Thrust vs Power



## Thrust vs Specific Impulse



## Thruster head dimensions

Outer Diameter	388 mm
Height	93 mm
Mounting Plate Length	430 mm
Mounting Plate Width	395 mm
Assembly Mass	229 kg



# State-of-the-Art Testing & Manufacturing



## Our Facility

Pulsar's Bletchlev facility boasts 5 operational chambers within an 8000 sq. ft. vacuum testing site, each fitted with a workstation and capable of using Xenon, Krypton, or Argon propellants.

The facility includes an ISO Class 5 clean room, specifically designed for space propulsion systems assembly, featuring strict particulate controls and dual segregated workspaces for parallel operations. This setup ensures maximum reliability and performance, essential for mission-critical applications.

CHAMBER 1		CHAMBER 2		CHAMBER 3	
DIAMETER	3000MM	DIAMETER	3000MM	DIAMETER	1100MM
LENGTH	5000MM	LENGTH	5000MM	LENGTH	1500MM
MINIMUM PRESSURE	1E-5mBAR	MINIMUM PRESSURE	1E-5mBAR	MINIMUM PRESSURE	1E-7mBAR
PUMP CAPACITY	30mG/S	PUMP CAPACITY	30mG/S	PUMP CAPACITY	11mG/S
FEATURES	CRYOGENIC, TMVAC	FEATURES	CRYOGENIC, TMVAC	FEATURES	15 PORTS

CHAMBER 4		CHAMBER 5	
DIAMETER	1400MM	DIAMETER	400MM
LENGTH	600MM	LENGTH	440MM
MINIMUM PRESSURE	1E-7mBAR	MINIMUM PRESSURE	1E-7mBAR
PUMP CAPACITY	11mG/S	PUMP CAPACITY	11mG/S
FEATURES	4 LARGE PORTS	FEATURES	4 PORTS