

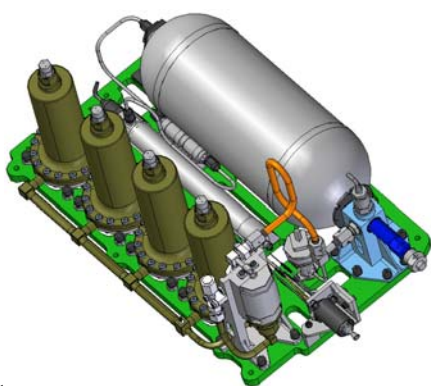
## Microsatellite Gas Propulsion System

SSTL's microsatellite Propulsion System is designed as an in-orbit micropropulsion system test-bed. The first application is ESA's PROBA2 spacecraft. The core design of the system is based around heritage design of SSTL's benchmark Microsatellite xenon propulsion system technology.

The design of the PROBA 2 system is optimised to constitute a platform to incorporate the following demonstration units and thus exhibit an application of their use:

COGEX: Four cool gas generators. These have the capability to re-fill the tank with a certain amount of gaseous nitrogen (>99% pure) at near ambient temperature. The nitrogen is generated from a Sodium Azide based solid charge which generates the nitrogen when pyrotechnically initiated on demand.

FSD – one fibre optic pressure and temperature sensor.



### Features:

- Gaseous propellants are used to avoid any liquid sloshing effects
- Propellant is stored in a 2.1 litre propellant tank, of titanium construction. The tank has a maximum expected operation pressure of 44 bar, with a burst factor of > x10
- The propulsion system is built as a module with integrated thruster. The thruster alignment can be modified at both module and spacecraft levels
- Bang-bang pressure regulation control allows thrust level to be throttled between 10 to 50mN
- SSTL's flight proven resistojet thruster with either 15, 30 or 50 Watt redundant heaters
- Series solenoid valves to isolate the propellant stored in the tank
- Can be supplied with Integrated electronic controller with interface to CAN bus. Could be modified to RS485 if required

### Other SSTL Products

- **Propulsion systems:** Flight proven systems using nitrogen, nitrous oxide, butane, xenon and water propellants, impulses ranging from 1 N.sec to 52 kN.sec
- **Propulsion products:** Resistojet thrusters, Mechanical and Electrical Ground Support Equipment, Design and test services
- **Sub-systems** for C&DH, Power, Comms, ADCS and ODCS sub-systems, various Payloads and ground segments
- **Space missions:** From platform provision to turn-key commercial and science space missions from LEO to GEO, in the 5 to 1,000 kg range
- **Know-how transfer** programmes, including academic and industrial training of entire teams in real mission environments
- **Space Consultancy** for Insurance, Investment and Industrial sectors

### Applications

- Launcher injection correction
- Constellations station keeping and acquisition
- Orbit height maintenance

### Specifications

- Propellant:
  - 500g Xenon
  - 176g Nitrogen
- Thrust: 20 – 50 mN
- Storage Pressure: 40bar abs maximum @ 20°C
- Specific Impulse:
  - 42 sec Xenon @ 300°C
  - 100 sec N<sub>2</sub> @ 300°C
- Total impulse: 380 N.sec
- System Volume: 2.1 litres
- Life duration: > 3 years

### Environmental

- Operating temperature: -20°C to +60 °C
- Vibration > 13.1 grms (all axes)

### Power Supply

- Operating voltage: 28Vdc nominal (24 – 38 Vdc)
- Valve power: 19 Watts open, 0.6 Watts hold
- Thruster : 2 x 15 Watt heaters (30 & 50 W optional)

### Physical Characteristics

- Dry mass: 6.72 kg
- Dimensions: 400mm x 254mm x 215mm (height)

### Contact

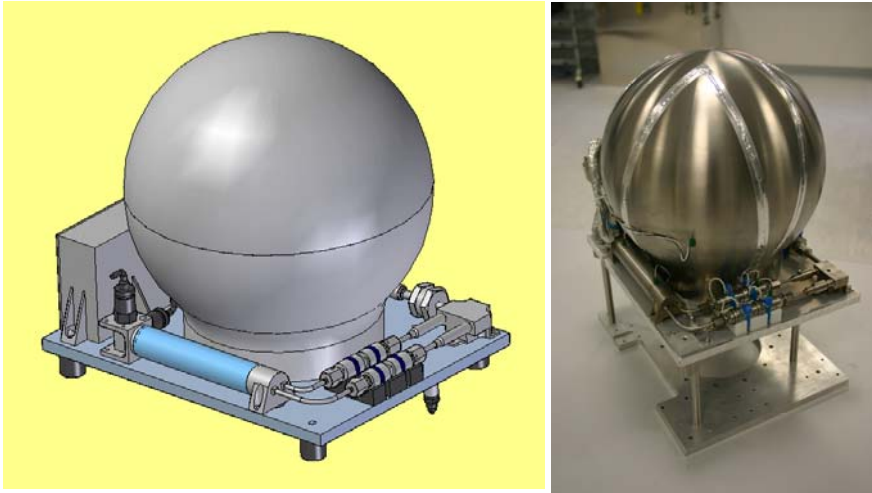
Tycho House  
20 Stephenson Road  
Guildford, Surrey GU2 7YE  
United Kingdom  
Tel: +44 (0)1483 803803  
Fax: +44 (0)1483 803804  
E-mail: info@sstl.co.uk  
www: www.sstl.co.uk

### Issue & Notice

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# Microsatellite Xenon Propulsion System

SSTL's Microsat-150 Propulsion System is designed to provide  $36 \text{ m}\cdot\text{sec}^{-1}$  of delta V capability to a 150kg microsatellite. It can be applied to correct launcher injection errors, to maintain orbit height, to station keeping and acquisition in small satellite constellations, or to general orbit manoeuvres. The system is well suited to advanced small satellite applications. It provides high performance within a compact design, does not impart disturbances due to propellant movement, and avoids significant propellant handling costs.



## Features:

- Xenon propellant is used because of its high storage density and it can be kept as a gas, hence no liquid sloshing effects
- The propulsion system is built as a module and integrated with the thruster feed pipework on the spacecraft
- Bang-bang pressure regulation control allows thrust level to be varied between 10 to 50mN
- Series solenoid valves to isolate propellant
- Propellant tank has a high burst factor of  $> x4$
- Integrated electronic controller with interface to CAN bus. RS485 and RS422 options available
- Full mechanical and electrical redundancy
- SSTL's flight proven resistojet thruster with either 15, 30 or 50 Watt redundant heaters
- Thruster mounting bracket provides full adjustability on the spacecraft
- First flight on BLMIT-1, with 5 more in build for RapidEye

## Other SSTL Products

- **Propulsion systems:** Flight proven systems using nitrogen, nitrous oxide, butane, xenon and water propellants, impulses ranging from 1 N.sec to 52 kN.sec
- **Propulsion products:** Resistojet thrusters, Mechanical and Electrical Ground Support Equipment, Design and test services
- **Sub-systems** for C&DH, Power, Comms, Guidance & Navigation, Attitude Control, various Payloads and ground segments
- **Space missions:** From platform provision to turn-key commercial and science space missions from LEO to GEO, in the 5 to 500 kg range
- **Know-how transfer** programmes, including academic and industrial training of entire teams in real mission environments
- **Space Consultancy** for Insurance, Investment and Industrial sectors

**SSTL is Changing the Economics of Space**



## Applications

- Launcher injection correction
- Constellations station keeping and acquisition
- Orbit height maintenance
- Orbit transfers

## Specifications

- Propellant: 12kg Xenon
- Thrust: 10 – 50 mN
- Max total impulse: 5.65kN.s
- Storage Pressure: 120bar abs maximum @ 40°C
- Tank burst factor:  $> x4$
- Specific Impulse (Isp):
  - up to 48 sec
- System Volume: 7.42 litres
- Life duration:  $> 7$  years

## Environmental

- Temperature (non-op): better than  $-20^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$
- Vibration:  $> 6$  grms (all axes)

## Power Supply

- 28Vdc nominal (24 – 38 Vdc)
- 5Vdc supply for electronics
- Valve power (open/hold):
  - 19/0.6 Watts
- Thruster :
  - 2 x 30 Watt heaters
  - (15 or 50 W optional)

## Physical Characteristics

- Dry Mass: 7.2 kg
- Outline: 300mm x 255mm
- Height: 295mm

## Contact

  
Tycho House  
20 Stephenson Road  
Guildford, Surrey GU2 7YE  
United Kingdom  
Tel: +44 (0)1483 803803  
Fax: +44 (0)1483 803804  
E-mail: [info@sstl.co.uk](mailto:info@sstl.co.uk)  
www: [www.sstl.co.uk](http://www.sstl.co.uk)

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