

The Family of 25W to 400W Hall Effect Thrusters

25 W Hall Effect thruster

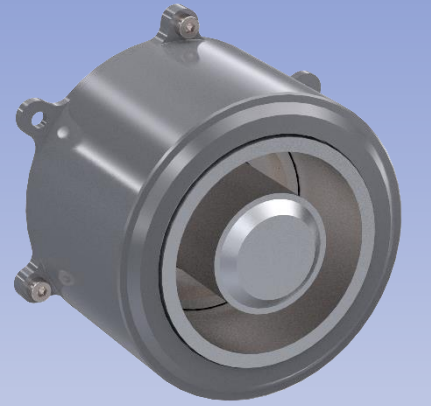
- 1 mN nominal thrust
- Over 25% thrust efficiency
- Up to 50 kNs of total impulse
- Up to 2500 hours operational lifetime

50 W Hall Effect thruster

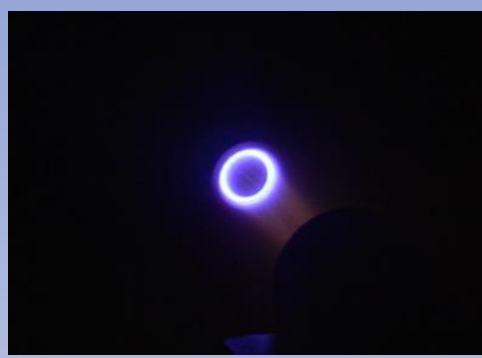
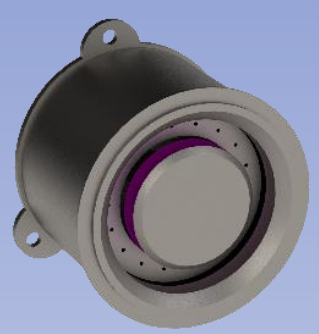
- 3 mN nominal thrust
- Over 32% thrust efficiency
- Up to 50 kNs of total impulse
- Up to 2500 hours operational lifetime

210 W Hall Effect thruster

- 13 mN nominal thrust
- Over 39% thrust efficiency
- Up to 120 kNs of total impulse
- Up to 3500 hours operational lifetime

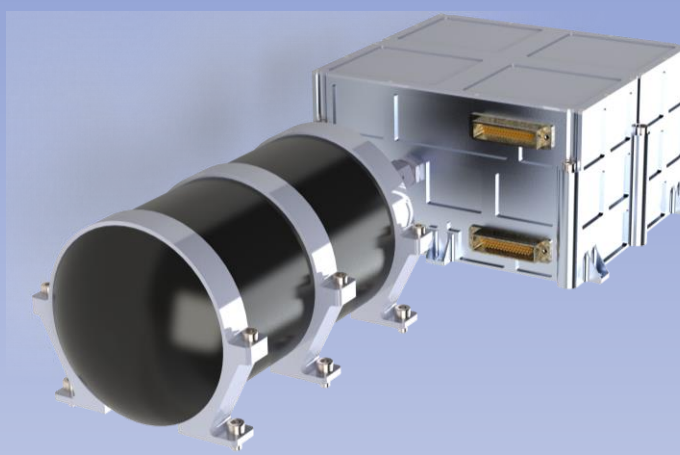


All thrusters are verified to be able to operate utilizing Xe, Kr and Ar
Multimode operation with high thrust mode for orbit transfer tasks and high specific impulse mode for station keeping tasks.



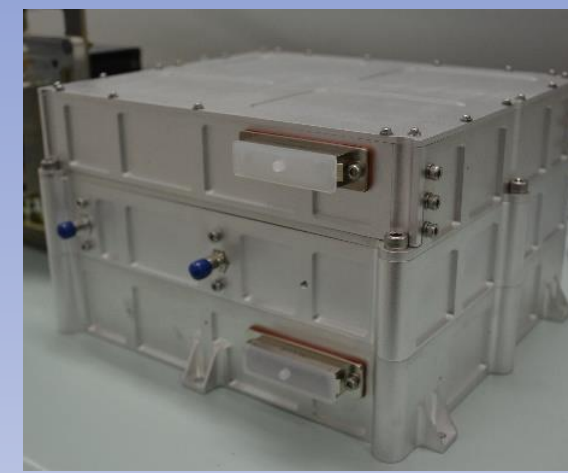
Hall Effect Micro Jet Thruster (HEMPJet)

- 1 to 200 μ N Thrust range with extreme resolution and precision
- Extremely low thrust noise of 0.1 μ N/Hz^{1/2}
- Up to 7 kNs Total Impulse
- 7000 hours in-orbit operational lifetime
- Xe, Kr, Ar, N₂ or synthetic gases operation capability



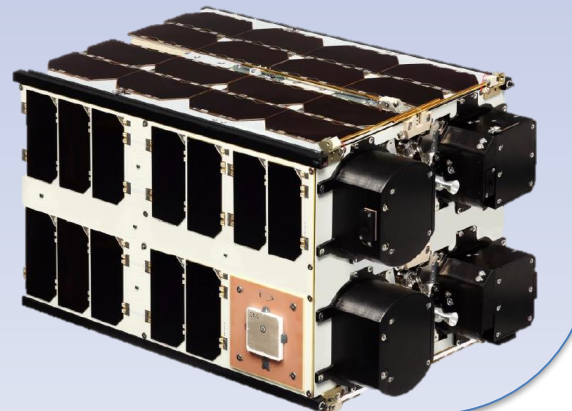
Highly Integrate Power Processing, Control, and Gas Feeding System

- 7x isolated DC-DC converters to supply and control satellite payloads
- Up to 8 precision mass flow or pressure outlets.
- 2 gas inlets for different gases operation capability
- Supports thrusters multimode operation by varying mass flow rate and discharge voltage level

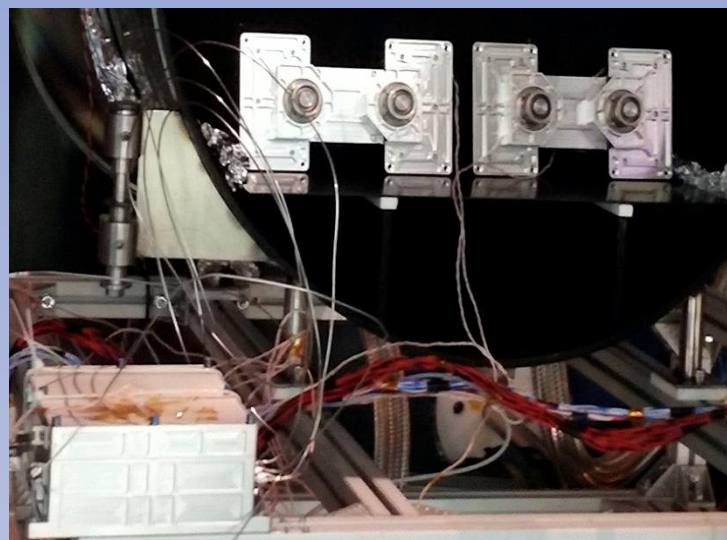


Mission payloads

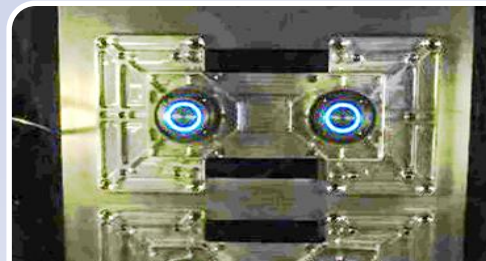
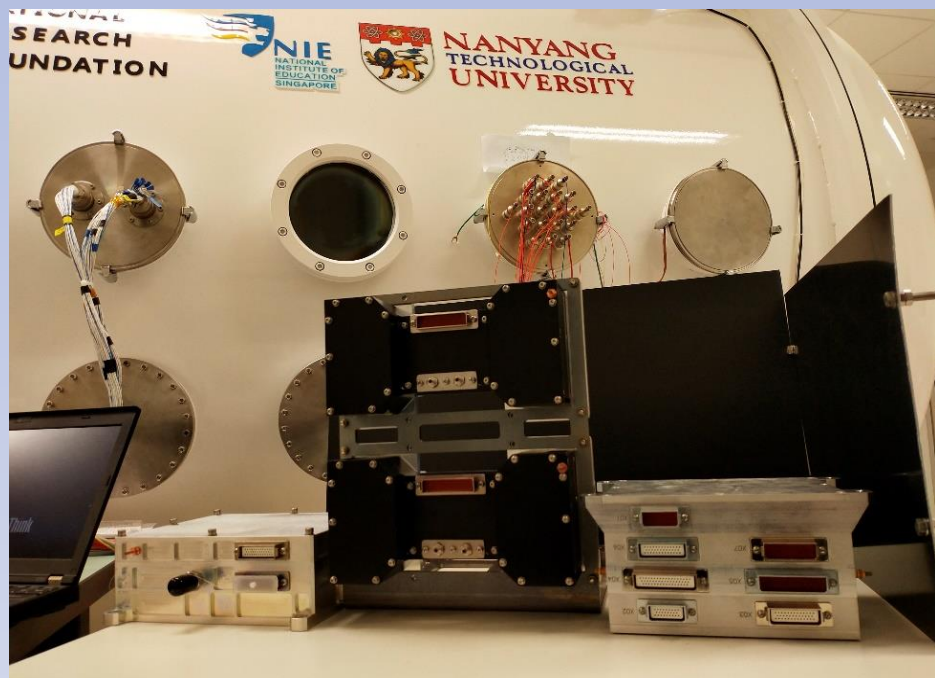
- Plasma plume and object multi-mode imaging and observation for near-field plume diagnostics and far-field imaging.
- Langmuir probe and Faraday Cup
- Inertial and microgravity experiments Low Frequency electromagnetic field measurements unit
- Low Earth Orbit space weather and ionosphere



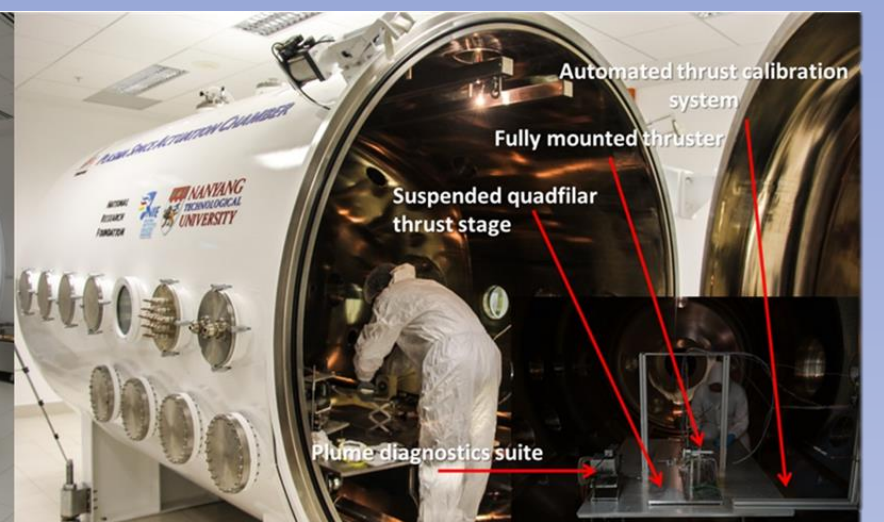
TAIJI-1 Propulsion System in collaboration with UCAS



Submicronewton thrust level propulsion system developed at PSAC was launched into space with TAIJI-1 mission on 31 August 2019. It fulfilled all the requirements during in-space performance evaluation in every planned scenario and still remains in operation on board of TAIJI-1 mission. All 4 sets have been ignited >1000 times with zero-error record to date.



Testing facilities



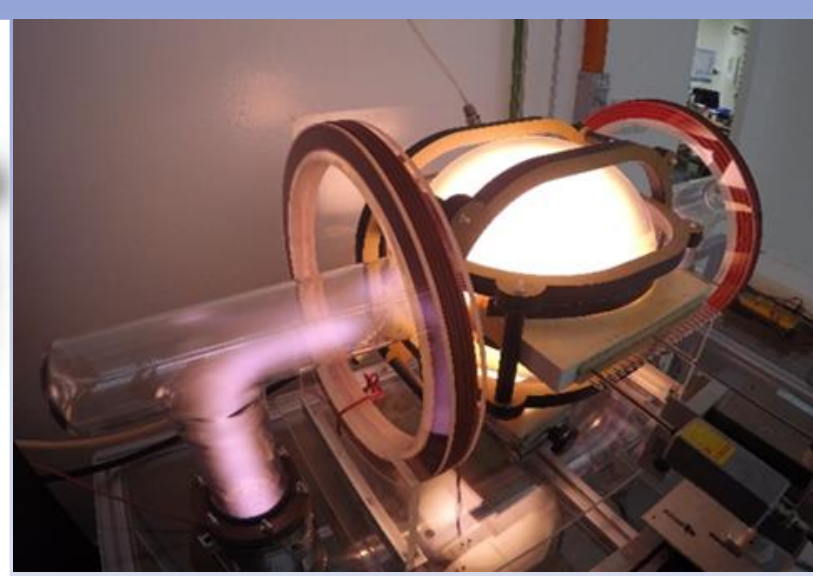
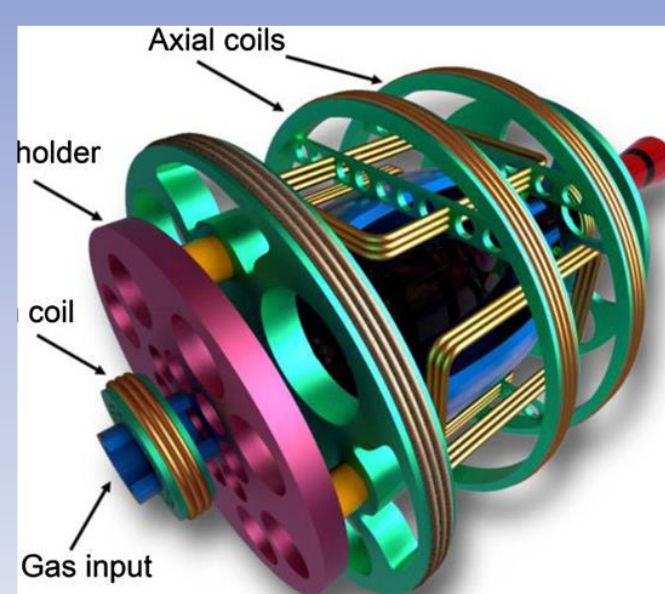
PSAC laboratory has the following testing capabilities

- Space propulsion system performance evaluation system, including:
 - Space environment simulation vessel
 - Thrust balances of sub micronewton and 10s mN
 - Plasma parameters evaluation system
 - Ion plume monitoring system
 - Thrust vector alignment tests



GER-Rotamak Thruster

Pure electromagnetic propulsion system that works on non-inductive Rotating Magnetic Field (RMF) current drive.



PSAC recent publications

- Hopes and concerns for astronomy of satellite constellations. **Nature Astronomy**. <https://doi.org/10.1038/s41550-020-1141-0> (2020)
- Explore space using swarms of tiny satellites. **Nature**, 562, 185 (2018)
- Prospects and physical mechanisms for photonic space propulsion. **Nature Photonics**, 2, 649 (2018)
- Smart nanomaterials in space: recent progress in electric propulsion systems for small satellites. **Nature Communications**, 9, 879 (2018)