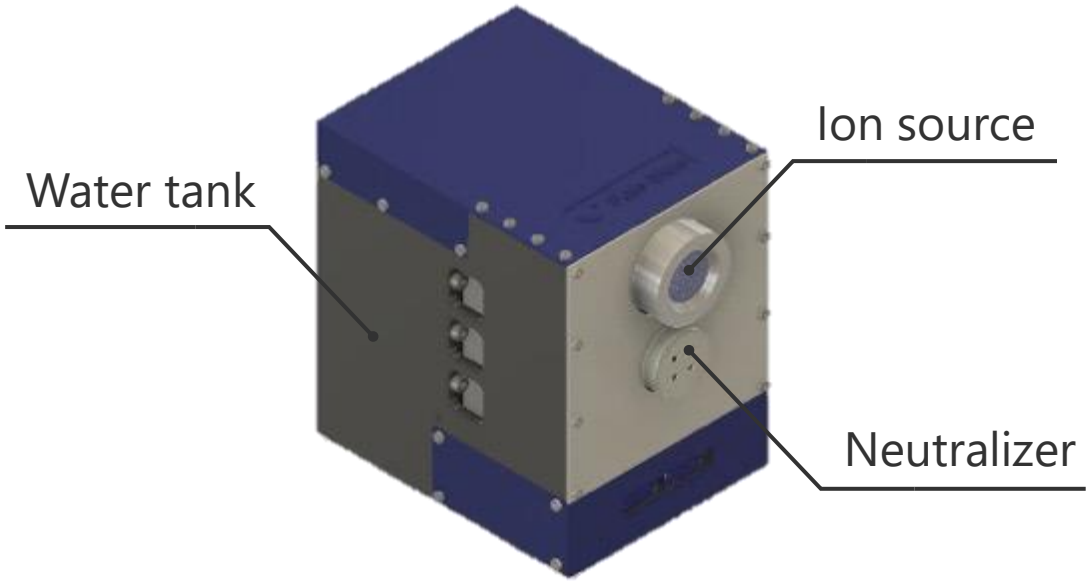
Water Ion Thruster

Pale Blue



Low-power ion thruster
(> 22 W)

w/o hollow cathodes & electrodes
(Long lifetime)

Scalable & low pressure & redundant
(Same as resistojet thruster)

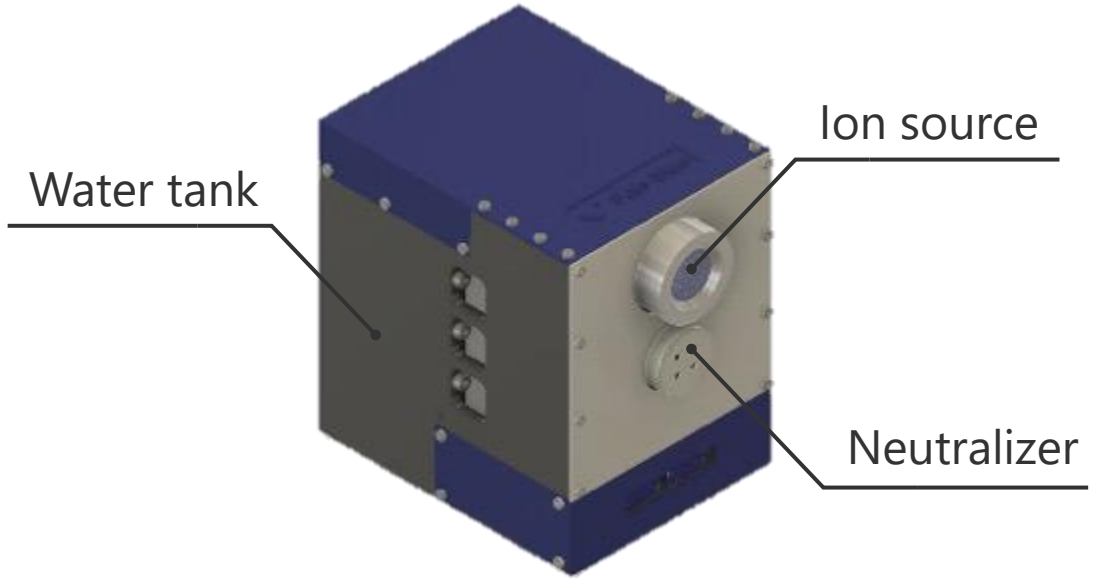
- Two micro discharge ion thrusters driven by xenon have been demonstrated in 2014 and 2015.
- Two flight model thrusters are to be delivered in 2021.

Water Ion Thruster (single unit)

Pale Blue

	Current	Next step (end of 2021)	Future (2022)
Thrust range	136 – 306 μN	152 – 460 μN	183 – 554 μN
Specific Impulse	500 – 968 s	560 – 1452 s	931 – 1987 s
Power	30 – 60 W	22 – 62 W	25 – 59 W
Thrust to power ratio	4.6 – 5.1 μN/W	6.9 – 7.4 μN/W	7.3 – 9.4 μN/W
Total impulse	981 – 3323 Ns	1098 – 2848 Ns	3196 – 6822 Ns

Volume w/o tank	0.7U
Dry mass w/o tank	1.6 kg
Command Interface	UART, RS422
Storage temperature	0 – 68 °C
Operating temperature	4 – 49 °C
Supply voltage	5 V and 12 V



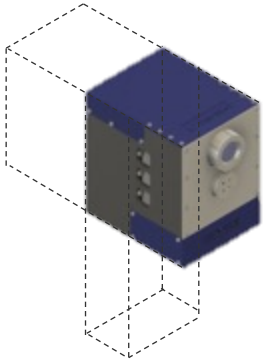
Water Ion Thruster (clustering & tank scaling)

Pale Blue

Clustering

	1x unit (1U)	2x unit (2U)	4x unit (4U)
Thrust range	152 – 460 μN	152 – 920 μN	152 – 1840 μN
Specific Impulse	560 – 1452 s	560 – 1452 s	560 – 1452 s
Power	22 – 62 W	22 – 124 W	22 – 248 W
Total impulse	1098 – 2848 Ns	1098 – 5696 Ns	1098 – 11392 Ns
Propellant mass	0.2 kg	0.4 kg	0.8 kg
Dry mass	1.6 kg	3.2 kg	6.4 kg

Tank scaling



	1x unit
Dry mass w/o tank	1.6 kg
Volume w/o tank	0.7U

- The Limitation of clustering or scaling is determined by only the mass, volume or power of a spacecraft.