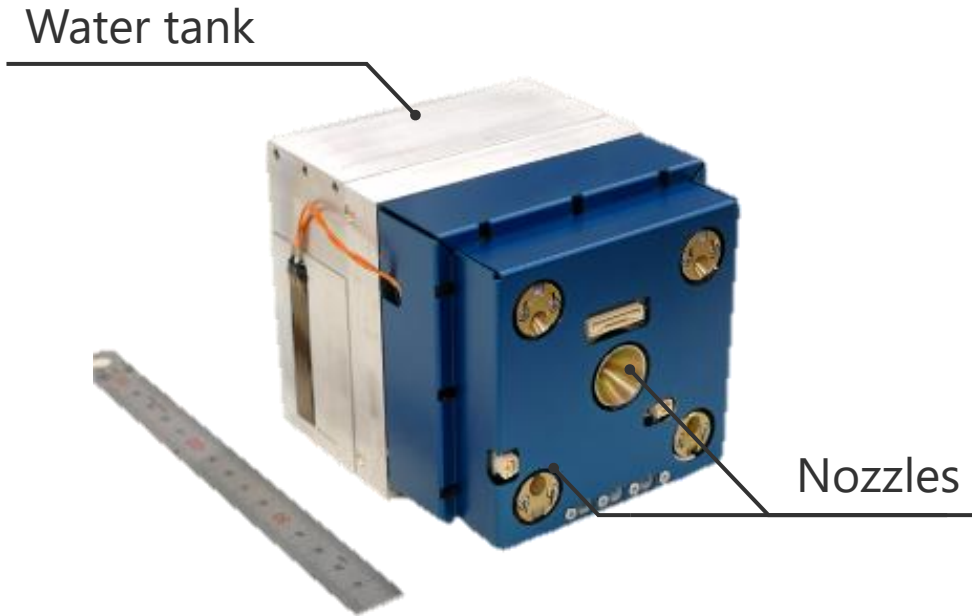


- ⚡ Low pressure system  
(Less than 60 kPa)
- ↗ Scalable water tank  
(From 0.1 kg to required mass)
- ⏸ Redundant flow control system  
( 1 fail-safe valve system)

- First model was demonstrated aboard a 3U ISS-deployed CubeSat in 2019.
- Additionally, two flight model thrusters are to be delivered in 2021 and launched by SLS and Falcon-9, respectively.

# Water Resistojet Thruster (single unit)

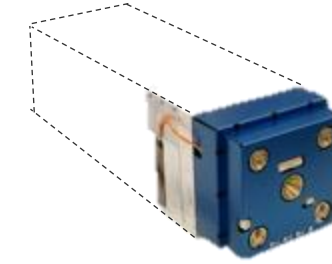


Thrust range	1.0 – 4.0 mN
Nominal Thrust	2.0 mN
Specific Impulse	70 – 100 s
Propellant mass	0.4 kg (1U) * upon request
Total Impulse	> 270 Ns
Thrust to power ratio	0.2 mN/W
Volume w/o tank	0.5U
Dry mass w/o tank	0.8 kg
Command Interface	UART, RS422
Storage temperature	0 – 68 °C
Operating temperature	4 – 49 °C
Supply voltage	5 V and 8 V

## Clustering



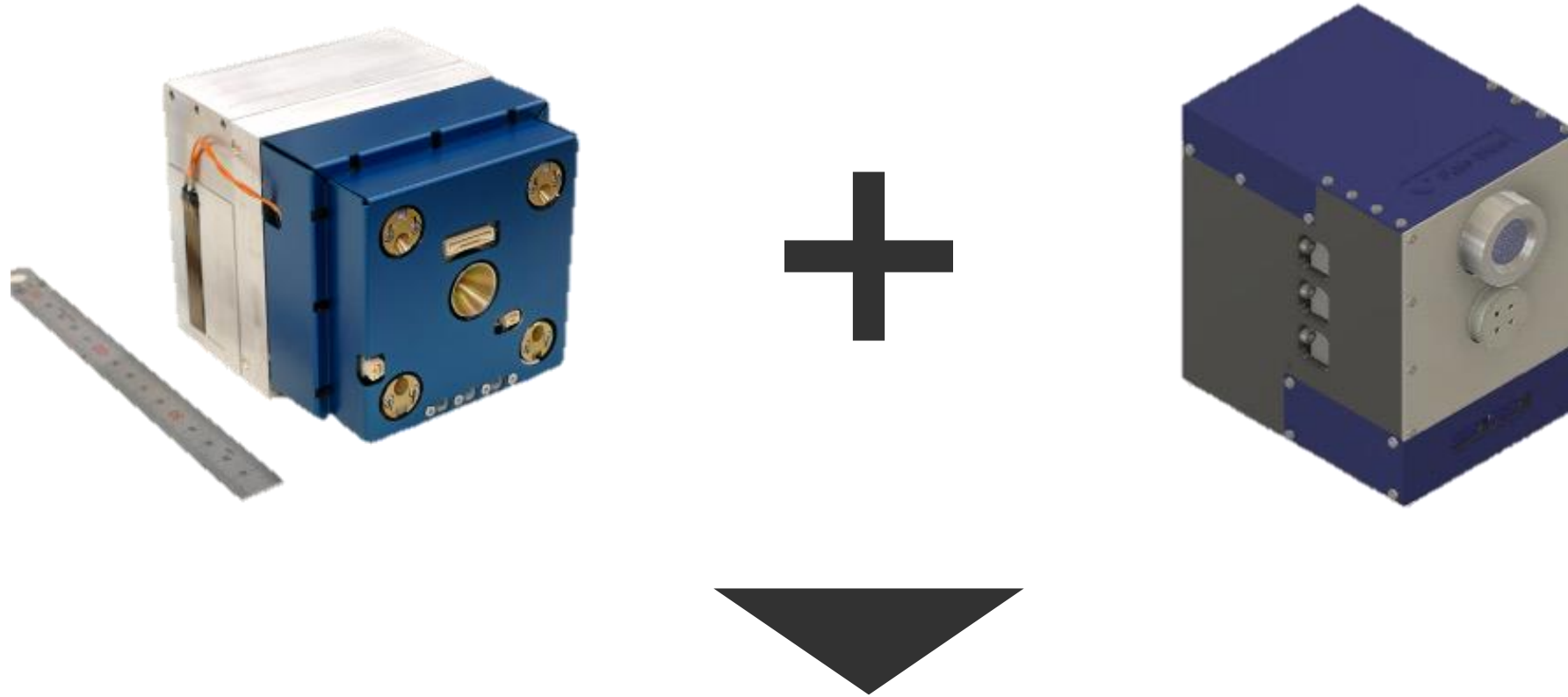
## Tank scaling



	1x unit (1U)	2x unit (2U)	4x unit (4U)
<b>Thrust range</b>	1 – 4 mN	1 – 8 mN	1 - 16 mN
<b>Specific Impulse</b>	70 s	70 s	70 s
<b>Power</b>	5 – 20 W	5 – 40 W	5 – 80 W
<b>Total impulse</b>	> 270 Ns	>540 Ns	> 1080 Ns
<b>Propellant mass</b>	0.4 kg	0.8 kg	1.6 kg
<b>Dry mass</b>	0.8 kg	1.6 kg	3.4 kg

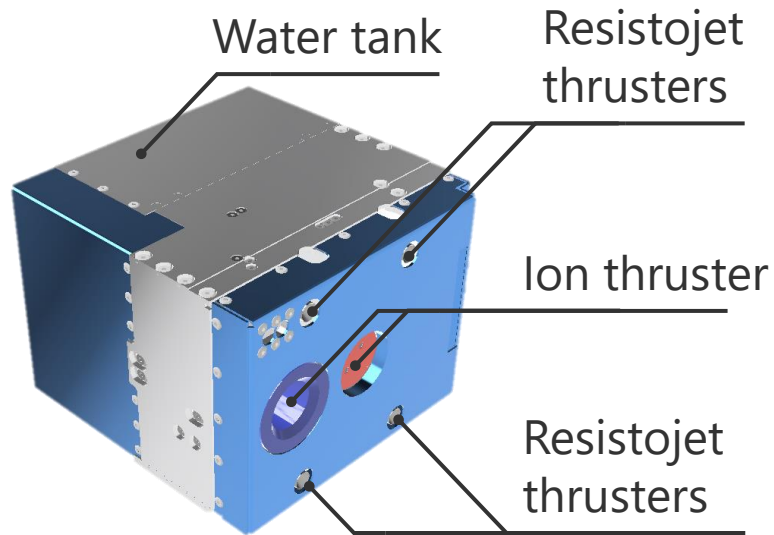
	1x unit
<b>Dry mass w/o tank</b>	0.8 kg
<b>Volume w/o tank</b>	0.5U

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



Hybrid 1U water thruster of ion thruster and resistojet thruster.

# Water hybrid thruster of ion and resistojet



	Ion	Resistojet
Thrust range	183 – 554 $\mu\text{N}$	0.5 – 1.0 mN
Specific Impulse	931 – 1987 s	70 s
Power	25 – 59 W	2.5 – 5.0 W
Thrust to power ratio	7.3 – 9.4 $\mu\text{N/W}$	0.2 mN/W
Number of thrusters	1	1 - 4
Volume	(A) 90 mm x 121 mm x 121 mm (B) 91 mm x 90 mm x 119 mm	
Propellant mass <small>* Upon request</small>	(A) 280 g (B) 110 g	
Dry mass	(A) 1.8 kg (B) 1.6 kg	
Command Interface	RS-422	
Storage temperature	0 – 68 °C	
Operating temperature	4 – 49 °C	
Supply voltage	“5 V and 12 V” or “5 V and 28 V”	