

WATER CUBE

CAPSULE CORPORATION

Product Brochure

Rev. 1.0 17/09/2025



WATERCUBE

DEMINERALISED WATER

Green, non-toxic and unpressurised

SIMPLE AND MODULAR

3D printed structures

Plug-and-play

50% faster lead time and lower cost

MINIATURISED

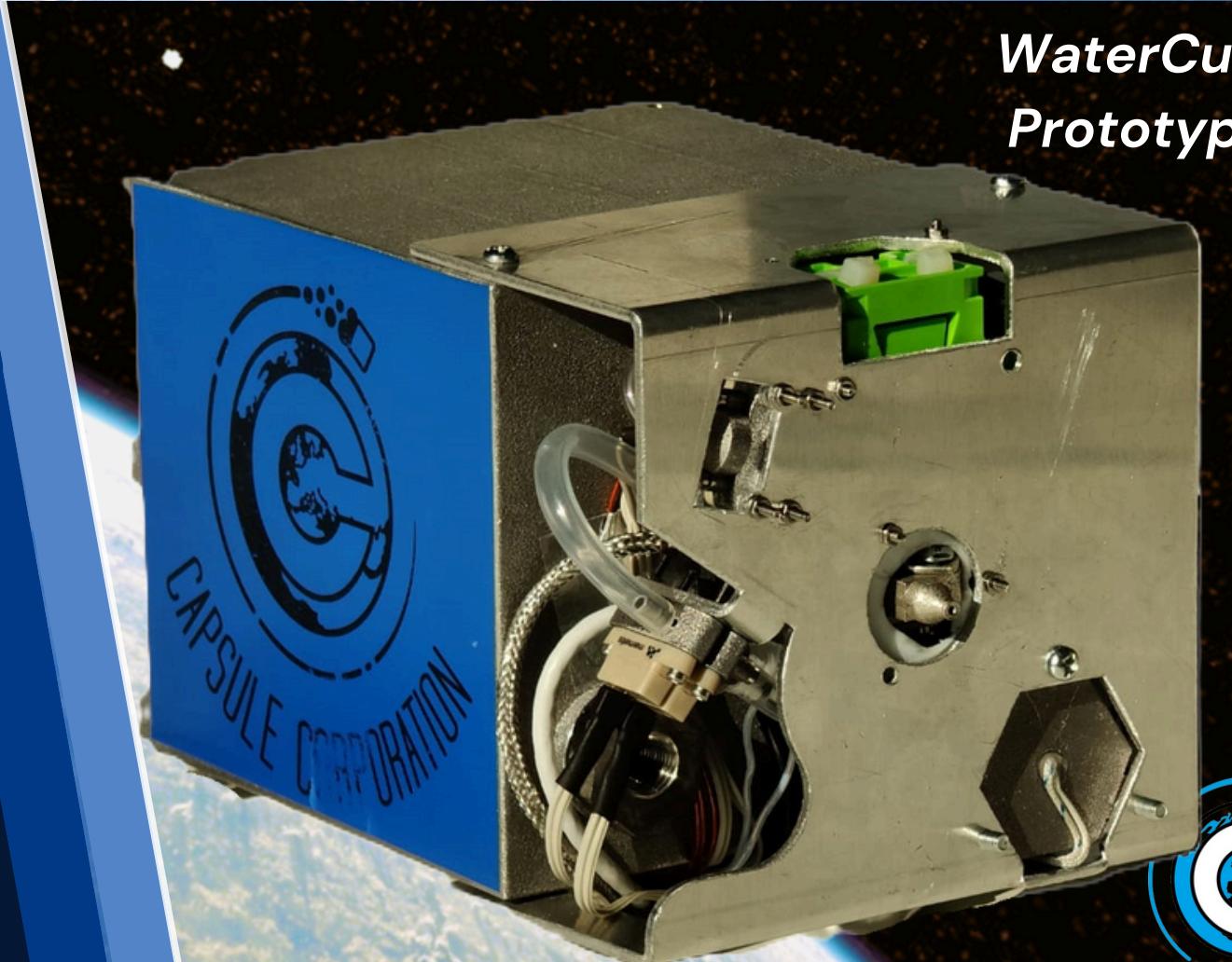
Volume 0.7U - 1.8U

Mass 0.9 - 1.9 kg

Power consumption < 21 W

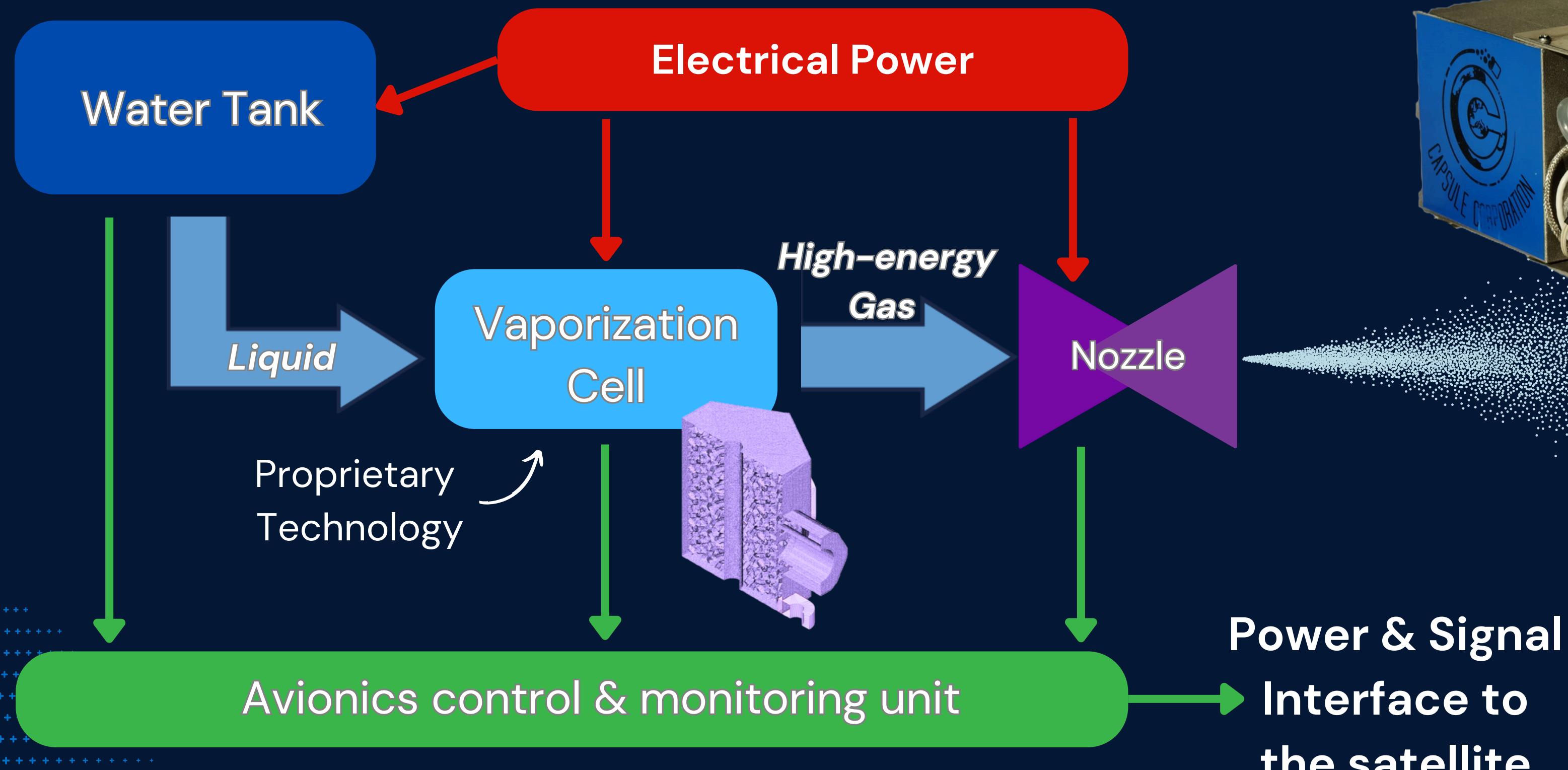
INNOVATIVE

Ultra compact and efficient
proprietary heat exchanger



HOW DOES WaterCube WORK?

EM-02 as-built



SYSTEM DATASHEET (1/2)

	Value	Unit of Measurement
SPECIFIC IMPULSE	95 - 110	[s]
TOTAL IMPULSE	150 - 1100 (*)	[Ns] (*) depending on amount of propellant
THRUST	4	[mN]
POWER DURING FIRING	24 peak (3 minutes) 20 maximum 5 - 15 if used pulsed (**)	[W] (**) pulsed operations yield lower average thrust
UNIT VOLUME	0.7 - 1.8 U (***) 0.9 - 1.9 Kg	[U] (1U = 10 cm ³) (***) depending on amount of propellant
ELECTRICAL INTERFACES	1 power connector micro D-sub; 12 V or 28 V power interface 1 signal connector micro D-sub; CAN or RS-422 signal interface	
MECHANICAL INTERFACES		M3 screws



SYSTEM DATASHEET (2/2)

WaterCube Size [U] (*)	Margined Wet Mass [kg]	Propellant Mass [kg]	Total Impulse @ 95 s Isp [Ns]	Total Impulse @ 110 s Isp [Ns]
0,7	0,95	0,17	158	183
1	1,26	0,43	401	464
1,5	1,79	0,87	811	939
1,7	2,00	1,05	975	1129

Isp [s]	Power [W]
95,1	20,3
100,8	22,7
106,2	25,2
110,7	27,6

PULSED MODE	Value
Average Thrust (depending on duty cycle)	1 – 3 [mN]
Duty cycle and period available	20% – 70% 1 – 30 s

(*) More configurations available,
contact us for information.



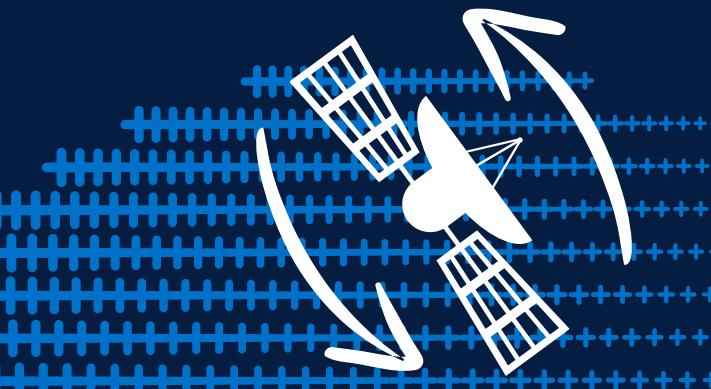
APPLICATIONS



Collision avoidance



Orbital decay drag
compensation in LEO

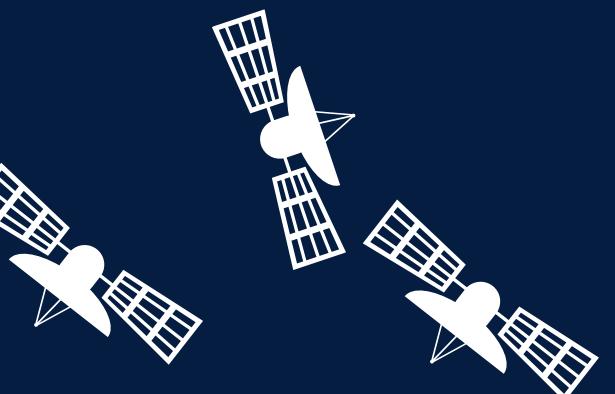


Attitude control and
proximity operations
for SmallSat

Active de-orbiting



Formation flying



CASE STUDY: WATERCUBE

Satellite Form Factor	3U	6U	12U	Smallsat
Propulsion Unit Volume [U]	0.7	1.2	1.5 x 2	1.7 x 4
Propellant Mass [kg]	0.17	0.61	1.74	4.20
Assumed Spacecraft Wet Mass [kg]	5.4	10.8	21.6	100.0
Total Impulse @ 95s Isp [Ns]	160	565	1622	3900
Total Δv [m/s] @ 95s Isp (4 mN thrust/unit; 3 mNs MIB)	29.6	53.8	78.2	40.0
Added Lifetime / Benefits (*CAM = Collision Avoidance Maneuuvre)	<ul style="list-style-type: none"> • Simplified integration and test • 1.5 years + 30 CAM 	<ul style="list-style-type: none"> • Simplified integration and test • 2.0 years + 30 CAM 	<ul style="list-style-type: none"> • Simplified integration and test • 2.5 years + 30 CAM 	<ul style="list-style-type: none"> • Simplified integration and test, reduced propellant loading cost • 1 year + 30 CAM

CASE STUDY: REFERENCE MISSION

Platform type / WaterCube variant	Total dv [m/s]	Mission extension	De-orbiting perigee [km]	De-orbiting time at EOL
3U / 0.7U	37.7	2 years	430	< 5 years
6U / 1U	44.2	2 years	400	< 5 years
12U / 1.4U	34.4	2 years	440	< 5 years
12U / 2x 1U	44.2	2 years	400	< 5 years
16U / 2x 1.6U	52.4	2 years	375	< 5 years

Notes / Assumptions:

- Platform mass density: 1.7 kg/U
- SSO 520 km altitude initial release orbit, average solar flux 100 sfu
- Ballistic coefficient of the satellite 100 kg/m²
- Total Delta-v: rescaled considering gravitylosses for low thrust according to $\Delta v = \Delta v(\text{impulsive}) / 1.5$
- Mission Extension Capability: additional years by means of propulsion maneuvers or orbit maintenance (max. 2 years)
- CAM = Collision Avoidance Maneuver
- De-orbiting time: considering residual delta-v available after Mission extension and 30x CAM performed



BENEFITS: WATERCUBE VS CHEMICAL

Same cost savings for both chemical and electrical

Different cost savings for chemical and electrical

Satellite Form Factor	3U	6U	12U	Smallsat
Propulsion Unit Volume [U]	0.7	1	1.6	1.7 x 4
Integration & test saving cost [€]	54k	63k	72k	116k
Propellant loading saving cost [€]	4.5k	9.9k	16k	67.5k
Launcher documentation saving cost [€]	12k	12k	12k	12k
Cost saving wrt CHEMICAL equivalent [€]	25k	28.8k	21k	26k
Cost Savings to final operator [€]	95K	113K	121K	221K

BENEFITS: WATERCUBE VS ELECTRIC

Same cost savings for both chemical and electrical

Different cost savings for chemical and electrical

Satellite Form Factor	3U	6U	12U	Smallsat
Propulsion Unit Volume [U]	0.7	1	1.6	1.7 x 4
Integration & test saving cost [€]	54k	63k	72k	116k
Propellant loading saving cost [€]	4.5k	9.9k	16k	67.5k
Launcher documentation saving cost [€]	12k	12k	12k	12k
Cost saving wrt ELECTRIC equivalent [€]	54k	104k	157k	311k
Cost Savings to final operator [€]	124K	189K	257K	506K



PRICING

Small	WaterCube 0.7U	€32k
Medium	WaterCube 1.2U	€37k
Large	WaterCube 1.8U	€42k
Custom	Any size between 0.7 - 1.8U	Contact us for details

Propellant Loading
Integration Support
Personnel Training
(AIT & Operations)

Contact us
for details



CAPSULE CORPORATION

WATERCUBE

Questions?

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