WATER CUBE

CAPSULE CORPORATION

Product Brochure
Rev. 1.2 15/10/2025

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

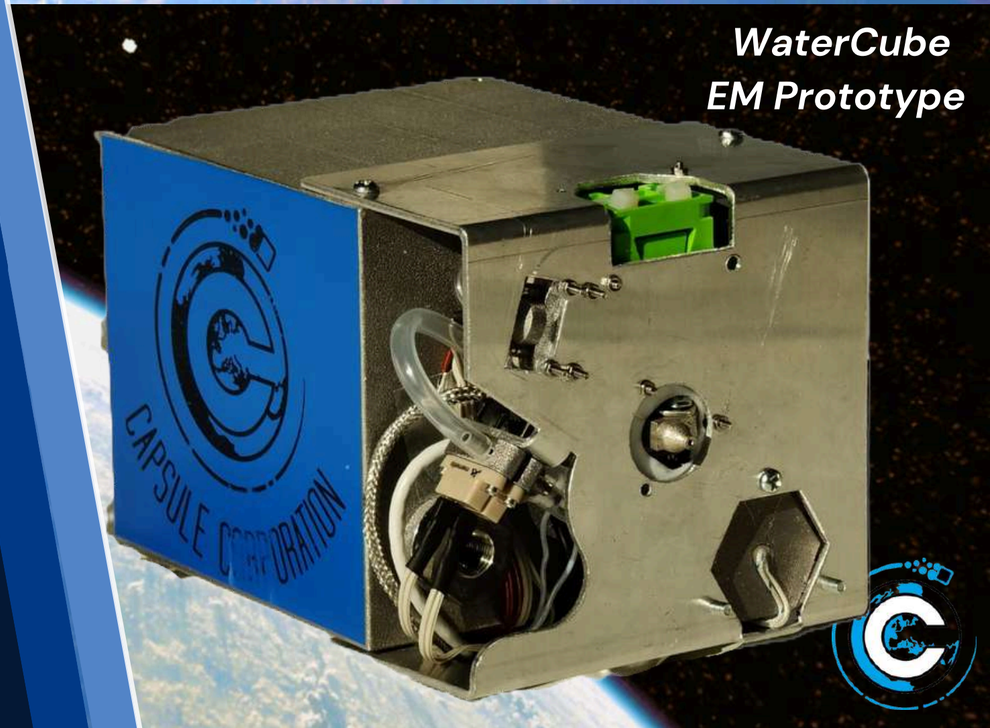
Volume 0.7U – 1.8U

Mass 0.9 – 1.9 kg

Power consumption **< 21 W**

INNOVATIVE

Ultra compact and efficient
proprietary heat exchanger

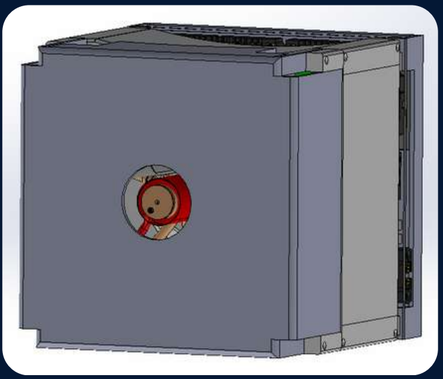


WaterCube
EM Prototype

HOW DOES WaterCube WORK?

EM-02 as-built

Flight Model CAD



Water Tank

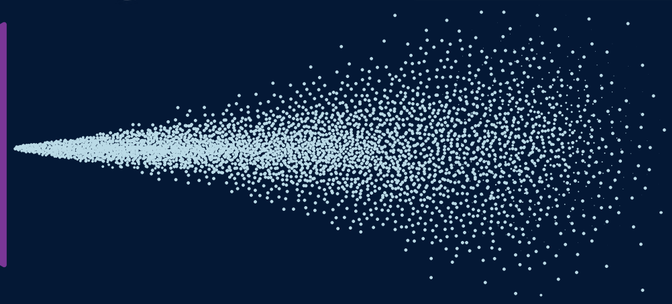
Electrical Power

Liquid

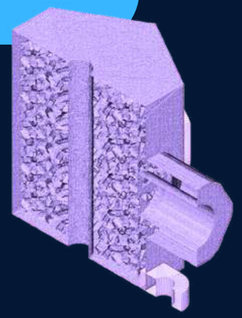
Vaporization Cell

High-energy Gas

Nozzle



Proprietary Technology



Avionics control & monitoring unit

Power & Signal Interface to the satellite

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 cm3) (***) 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.

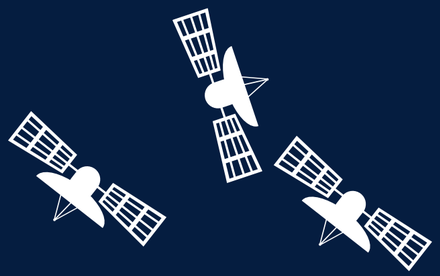
APPLICATIONS

Collision avoidance

Active de-orbiting

Orbital decay drag
compensation in *LEO*

Formation flying



Attitude control and
proximity operations
for *SmallSat*

CASE STUDY: WATERCUBE

Satellite Form Factor	3U	6U	12U	Smallsat
Propulsion Unit Volume [U]	0.7	1.2	1.5 x 2	1.8 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 Maneuvre)	• Simplified integration and test • 1.5 years + 30 CAM	• Simplified integration and test • 2.0 years + 30 CAM	• Simplified integration and test • 2.5 years + 30 CAM	• 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(impulsive) / 1.5
- Mission Extension Capability: additional years by means of propulsion maneuversorbit 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

	Satellite Form Factor	3U	6U	12U	Smallsat
Same cost savings for both chemical and electrical	Propulsion Unit Volume [U]	0.7	1	1.6	1.8 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
Different cost savings for chemical and electrical	Cost saving wrt **CHEMICAL** equivalent [€]	25k	28.8k	21k	26k
	Cost Savings to final operator [€]	**95K**	**113K**	**121K**	**221K**

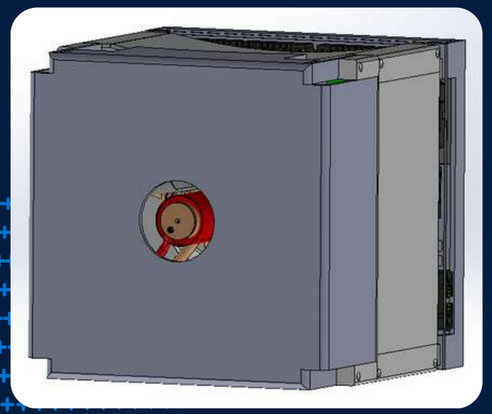
BENEFITS: WATERCUBE VS ELECTRIC

	Satellite Form Factor	3U	6U	12U	Smallsat
Same cost savings for both chemical and electrical	Propulsion Unit Volume [U]	0.7	1	1.6	1.8 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
Different cost savings for chemical and electrical	Cost saving wrt **ELECTRIC** equivalent [€]	54k	104k	157k	311k
	Cost Savings to final operator [€]	**124K**	**189K**	**257K**	**506K**

PRICING WaterCube

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
XL Cluster (for Smallsats)	Any WaterCube size clustered (2x, 3x, or 4x units)	Contact us for details

WaterCube Flight Model 1U Version



Propellant Loading	Contact us for details
Integration Support	
Personnel Training (AIT & Operations)	

CAPSULE CORPORATION

WATERCUBE

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