PERFORMANCE MATRICES FOR CUA PROPULSION SYSTEMS (15 MAY 2020)

WELL-DEVELOPED SYSTEMS:

PARAMETER / PROPULSION SYSTEM	CHIPS (1U)	PUC (1U)	MVP (1.15U)	UNITS
Thruster System Package Volume	865	865	1,150	cm^3
Available Tank Volume	627	667	495	cm^3
Propulsion Technology	Micro-resistojet	Micro-plasma discharge	Micro-resistojet	–
Propellant	R134a (R236fa opt.)	SO_2	Polymer Fiber (Delrin)	–
Power Draw when Firing (Avg. Duty Cycled)	25 (15.6)	15 (10)	45 (13.5)	W
Specific impulse	76	70	66	sec
Mass Flow Rate	40	6.5	7.0	mg/s
Thrust	31	5	4.5	mN
Total impulse	478	593	334	N-s
Vol. Impulse (total impulse / system volume)	553	653	290	N-s/liter
Propellant Mass	617	815	516	g
Dry Mass	758	641	622	g
Propulsion System Wet Mass	1,375	1,500	1,138	g
Delta-V capability (**for 4 kg s/c Wet Mass**)	125	167	89	m/s
ACS Capability	Yes	No	No	m/s
Maximum continuous thrust time (rest time)	10 (6)	20 (10)	3 (7)	min
TRL	5-6	6	6	–

EVOLVING SYSTEMS *(ESTIMATED DEVELOPED PERFORMANCE)*:

PARAMETER / PROPULSION SYSTEM	MPUC (1.5U)	MPUC (2U)	FPPT (1.0U)	FPPT (1.7U)	UNITS
Thruster System Package Volume	1,500	2,000	1,000	1,715	cm^3
Available Tank Volume	770	1,220	150	390	cm^3
Propulsion Technology	Monopropellant		Pulsed Plasma Thruster		–
Propellant	H_2O_2-Ethanol		Teflon Fiber		–
Nominal Power Draw	3		48		W
Capacitor Bank Energy	N/A		16	32	J
Specific impulse	180		1,000 – 1,700	1,600 – 2,400	sec
Mass Flow Rate	100		0.017 – 0.036	0.011 – 0.022	mg/s
Thrust	160		0.28 – 0.35	0.27 – 0.34	mN
Total impulse	1,550	2,460	3,240 – 5,500	13,450 – 20,180	N-s
Vol. Impulse (total impulse / system volume)	1,030	1,230	3,240 – 5,500	7,840 – 11,765	N-s/liter
Propellant Mass	862	1,366	330	857	g
Dry Mass	1,600	1,850	1,210	1,975	g
Propulsion System Wet Mass	2,462	3,116	1,540	2,832	g
Delta-V capability (**Propulsion Wet Mass + 10 kg**)	159	259	330 – 560	1,405 – 2,110	m/s
TRL	4 (est. 6 by May 2022)		5 (est. 6 by Nov. 2020)		–

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