

Alpha CubeSat Technology Readiness Level (TRL)*

	System/Subsystem Name	TRL@GT-2	TRL@GT-3	TRL@GT-4	Rational for Stated TRL
		PDR	CDR	FRR	
0	Alpha CubeSat Spacecraft	5	6	7	Alpha CubeSat is a technology demonstration satellite
1	Communications System (COMM)				
	Tethers Unlimited SWIFT-KTX Programmable K Band Transceiver (Avionics+ Software Defined Radio)	5	6	7	COTS K band product being upgraded by vendor to Ka
	Clyde Space, Pumpkin, or equivalent 6U CubeSat Integrated Reflectarray Antenna	7	8	9	Reflectarray antennas are now a COTS product from multiple vendors
	NASA DSN 34m BWG Ka Band 32 GHz Downlink Standard Service Baseline	9	9	9	Available DSN Standard Service
	Alternate Ground Station Ka Band 32 GHz Uplink is baselined	7	8	9	Alternate Ka Band Ground Stations are currently operational
	NASA DSN 34m BWG S or X Band Uplink	9	9	9	Available DSN Standard Service
	Corresponding alternate S or X Band Uplink ground station services (option)	9	9	9	Alternate S or X Band Ground Stations are currently operational
2	Electrical Power System (EPS)				
	Blue Canyon technologies XB1 Module Battery	7	8	9	COTS product
	Clyde Space 6U CubeSat SIDE Solar Panels	7	8	9	COTS product
	Power Management And Distribution BCT XB1 Module	7	8	9	COTS product
3	Data Management System (DMS)				
	Bus Control Subsystem - Blue Canyon Technologies XB1 Module	7	8	9	COTS product
4	Guidance, Navigation & Control (GN&C)				
	Blue Canyon Technologies XACT Module	7	8	9	COTS product
	Blue Canyon Technologies XB1 Module	7	8	9	COTS product
5	Structures & Mechanisms System (S&Mech)				
	Solar Reflectarray Panel Hinge (Qty=4)	7	7	7	COTS products are now available from multiple vendors
	Solar Reflectarray Single Axis Articulation Servo (Qty=2)	7	7	7	COTS products are now available from multiple vendors
	Solar Reflectarray Deployment Mechanism (Qty=2)	7	7	7	COTS products are now available from multiple vendors
	Solar Reflectarray Mount (Qty=2)	7	7	7	COTS products are now available from multiple vendors
	TIB Spacecraft Deployment Mechanism Attach Point	7	7	7	COTS products are now available from multiple vendors
	Passive Power Source Inhibit Mechanism (EPS)	7	7	7	COTS products are now available from multiple vendors
	1U x 3U Ram/Forward Plate Structure	7	7	7	COTS products are now available from multiple vendors
	Mechanical Oxidizer Tank Seal	7	7	7	COTS products are now available from multiple vendors
	2U x 3U Core Structural Spars, Rails & Plate	7	7	7	COTS products are now available from multiple vendors
	Scar for Partial Aft Plate + Hybrid Rocket Ejection	2	TBD	TBD	Potential option to recover margin
6	Propulsion System (PROP)				
	Hybrid Motor Oxidizer Tank Subsystem	5	6	7	Multiple vendors have tested prototypes, integration challenge
	Hybrid Motor Core Subsystem	5	6	7	Multiple vendors have tested prototypes, integration challenge
	Busek BIT-1 Ion Thrusters (Qty=4)	5	6	7	Multiple vendors have tested prototypes, integration challenge
7	Thermal Control System (TCS)				
	EPS Passive Dissipation	5	6	7	Multiple vendors have tested prototypes, integration challenge
	PROP Passive Dissipation	5	6	7	Multiple vendors have tested prototypes, integration challenge
	GN&C Passive Dissipation	5	6	7	Multiple vendors have tested prototypes, integration challenge
	COMM Passive Dissipation	5	6	7	Multiple vendors have tested prototypes, integration challenge
	S&Mech Passive Dissipation	5	6	7	Multiple vendors have tested prototypes, integration challenge
	DMS Passive Dissipation	5	6	7	Multiple vendors have tested prototypes, integration challenge
	PS Passive Dissipation	5	6	7	Multiple vendors have tested prototypes, integration challenge
	Tools to Move Heat	5	6	7	Multiple vendors have tested prototypes, integration challenge
	Tools for Mitigating and/or Rejecting Heat	5	6	7	Multiple vendors have tested prototypes, integration challenge

8	Payload Systems (PS)				
	<i>CubeQuest Challenge Encoded BIT Stream Generator</i>	5	6	7	Multiple vendors have tested prototypes, integration challenge
	<i>System Performance Data Capture & Return</i>	5	6	7	Multiple vendors have tested prototypes, integration challenge
	<i>Deep Space & Lunar Data Capture & Return</i>	5	6	7	Multiple vendors have tested prototypes, integration challenge
	<i>Memorial Spaceflight Canisters</i>	5	6	7	Multiple vendors have tested prototypes, integration challenge
9	Ground Systems				
	<i>Spacecraft Control Center</i>	5	6	7	Multiple vendors have tested prototypes, integration challenge
	<i>Spacecraft Near Real Time State Model Generator</i>	5	6	7	Multiple vendors have tested prototypes, integration challenge
	<i>Capture & Store required navigation bits</i>	5	6	7	Multiple vendors have tested prototypes, integration challenge
	<i>Payload(s) Operations Center</i>	5	6	7	Multiple vendors have tested prototypes, integration challenge
	<i>Payload(S) Near Real Time State Model Generator</i>	5	6	7	Multiple vendors have tested prototypes, integration challenge
	<i>Capture and Store Cube Quest Challenge Encoded BIT Stream</i>	5	6	7	Multiple vendors have tested prototypes, integration challenge
	<i>Internet VLAN</i>	5	6	7	Multiple vendors have tested prototypes, integration challenge
	<i>Automated Command Sequence Generation and Verification Tool</i>	5	6	7	Multiple vendors have tested prototypes, integration challenge
10	Launch Service Provider (LSP) Systems				
	<i>Earth-to-LEO Launch Vehicle</i>	9	9	9	COTS service is available from multiple vendors
	<i>Upper Stage/Trajectory Insertion Bus (TIB)</i>	5	6	7	COTS service is available or planned by multiple vendors
	<i>TIB Fairing (if applicable)</i>	5	6	7	COTS service is available or planned by multiple vendors
	<i>ACS Transportation Packaging</i>	9	9	9	Commercial Cargo is a COTS service
	NOTES:				
	*As defined in NASA/SP-2007-6105 Rev 1 pg 296. Include rationale for stated TRL.				