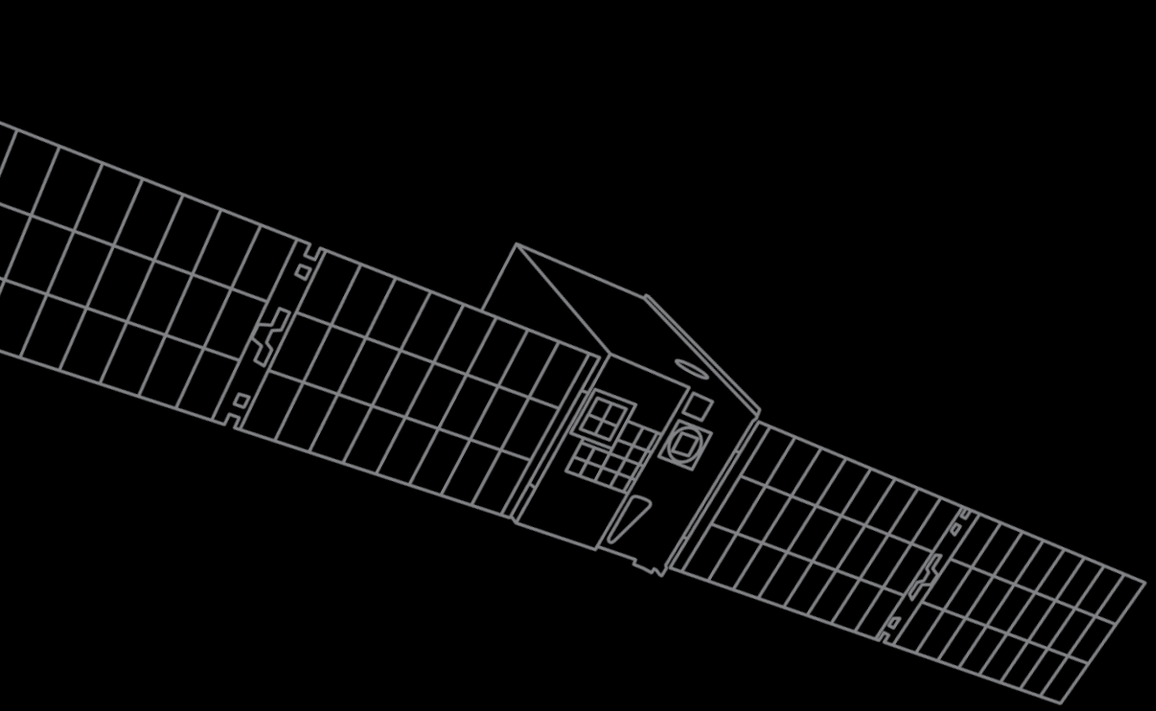
BLUE CANYON
TECHNOLOGIES

BLUE CANYON

SPACECRAFT BUSES,
SYSTEMS & SOLUTIONS



SPACE AWAITS

With our suite of spacecraft services and technology, your team can build, test, launch and operate, all using BCT's revolutionary microsats, CubeSats and components.

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WHO WE ARE

We are a complete end-to-end spacecraft company and a leading provider of small satellite solutions, including microsatellites, CubeSats, components, and mission operations. Our attitude determination and control components are one-of- a-kind, allowing for industry-leading precision pointing platforms.

Our affordable spacecraft systems and components are built for use in academic, commercial, and government missions and applications. With cost-efficient, flight-proven, high-performance, high-reliability spacecraft solutions, we are capable of supporting all types of space missions, from university-led science exploration to national defense satellite constellations.

The hardware that we deliver is robust, resilient and radiation tolerant. We have experience with missions that require secure communications, including Type-1 hardware encryption. Inside 135,000 square feet of state-of-the-art facilities, we craft cutting-edge spacecraft and subsystems which support LEO, GEO, Lunar and interplanetary missions.

With high-volume manufacturing, highly integrated spacecraft buses, and flexible ground software, every stage of our process is designed to maximize your payload mass and volume on-orbit while minimizing your overall mission cost.

TECHNICAL CAPABILITIES

BCT is widely recognized for demonstrating world-class technical performance on small, cost-constrained, and high-volume systems. This reputation is rooted in successes across a wide variety of mission and product types, including:

- Arcsecond-class on-orbit pointing for every BCT CubeSat and microsat spacecraft platform (more than 6 types)
- On-orbit operations in LEO, GEO, and deep space (including a XACT GN&C system on the first interplanetary CubeSats)
- Flight heritage including more than 150 star trackers, 600 reaction wheels, and many dozens of turnkey GN&C systems
- Mission successes spanning optical imaging, commercial SAR, exploration astronomy, weather, communications, DoD/IC, and other types
- Five consecutive AIAA Smallsat Missions of the Year awards leveraged BCT hardware

Our technical team brings many decades of combined smallsat and traditional-space experience to every spacecraft subsystem and program phase, enabling BCT to successfully optimize low-cost and short-schedule spacecraft/constellation programs.

Our core spacecraft components provide best-in-class performance to cost ratios. BCT Reaction Wheels (in all sizes) support exquisite optical pointing missions, our arcsecond-class star tracker meets demanding requirements for astronomy and other missions, and our turnkey CubeSat and microsat GN&C systems provide world-leading smallsat pointing, geolocation, propulsion control, and other capabilities. BCT's new smallsat Control Moment Gyroscopes (CMG) enable a disruptive leap in spacecraft agility and data collection capacity, meet very stringent control and stability requirements, and do so at unprecedented smallsat SWaP-C.

BCT's standard CubeSat platforms support a wide array of mission types and orbits, having supported missions in in LEO, GEO, and cislunar space. These CubeSats use many of the same components and software as our largest microsats and offer similar performance at a smaller scale and cost. BCT systems have been especially successful at controlling large deployable payloads, hosting, and controlling novel thruster systems, integrating payload and bus control logic for autonomy, and supporting other cutting-edge technologies.

As with CubeSats, BCT's microsat buses leverage our vertically-integrated bus component portfolio to provide leading on-orbit performance at low cost. Bus SWaP-C is minimized so that maximum resources can be allocated to the payload. When desired, standardized bus interfaces/infrastructure allow customer-provided software autonomy applications to "fly" BCT buses under the supervision of our flexible and powerful autonomous bus fault protection. As with our CubeSats, BCT microsats support missions ranging from LEO to GEO and cislunar space.

Since the first flight of BCT hardware in 2015, generational enhancements to our product portfolio have provided ever-increasing resistance to radiation-induced upsets. Typical BCT products are now in their 3rd or 4th generation, advancing in technical performance, radiation tolerance, manufacturability, and overall capability with each iteration. Further advances both incremental and disruptive are on the horizon and drive our expectation that BCT's technical solutions will continue to expand the envelope of what's possible.

OUR MISSIONS

We are building spacecraft for academic, commercial, and government missions. With hundreds of flight articles delivered and dozens of spacecraft performing on-orbit, our work has spanned across components, full Attitude Control Systems for CubeSats and microsatellites, and complete spacecraft avionics. To show you just what we're capable of, we've included a small sample of our missions:

CUBESATS

RAVAN

Johns Hopkins University Applied Physics Laboratory (JHU/APL)

- Objective: Successfully demonstrated a radiometer and paved the way for constellation Earth radiation budget mission.
- BCT Provided: XB3 CubeSat Bus

TROPICS NASA CUBESAT CONSTELLATION

MIT Lincoln Laboratory

- Objective: Provided rapid-revisit passive microwave measurements over low-latitude tropical regions.
- BCT Provided: Constellation of seven XB3 CubeSat Buses

AGILE MICROSATELLITE (AMS)

MIT Lincoln Laboratory

- Objective: First-of-its-kind mission that demonstrated that a CubeSat can reliably operate in very low-Earth orbit.
- BCT Provided: XB6 CubeSat Bus

CIRCE

US Naval Research Laboratory and Defence Science and Technology Laboratory UK

- Objective: Utilized two CubeSats flying in tandem formation in low-Earth orbit to measure the ionosphere and radiation environment space from multiple vantage points.
- BCT Provided: XB6 CubeSat Bus

CSIM

University of Colorado

- Objective: Measured solar spectral irradiance to understand how solar variability impacts Earth's climate and to validate climate model sensitivity to spectrally varying solar forcing.
- BCT Provided: XB6 CubeSat Bus

CUBERRT

Ohio State University and NASA

- Objective: Observed, detected, and mitigated radio frequency interference (RFI) for microwave radiometers.
- BCT Provided: XB6 CubeSat Bus

HALOSAT

University of Iowa and NASA's Wallops Flight Facility

- Objective: Successfully measured soft X-ray emissions from the halo of our Milky Way galaxy.
- BCT Provided: XB6 CubeSat Bus

STARLING

NASA Ames Research Center

- Objective: Successful demonstration mission that proved the capability of affordable, distributed spacecraft missions, or swarms, in low-Earth orbit.
- BCT Provided: XB6 CubeSat Bus

TEMPEST-D

Colorado State University

- Objective: Demonstrated radiometer that will provide temporal observations of cloud and precipitation process in a future constellation.
- BCT Provided: XB6 CubeSat Bus

ASCENT

Air Force Research Laboratory

- Objective: Successfully demonstrated mission of a small satellite in Geostationary orbit.
- BCT Provided: XB12 CubeSat Bus

LINK XVI

Viasat and Air Force Research Laboratory Space Vehicles

- Objective: Tested as a network relay with the use of a Link 16 terminal on a small satellite in low-Earth orbit.
- BCT Provided: XB12 CubeSat Bus

CUTE (Colorado Ultraviolet Transit Experiment)

CU Boulder LASP

- Objective: Observes distant exoplanets by traveling in front of their stars, and determining some of the materials in the atmospheres.
- BCT Provided: XB6 CubeSat Bus

CLICK A

NASA Ames

- Objective: Click A is the first of three CubeSat Laser Infrared CrosslinK (CLICK) Spacecraft used in a mission to demonstrate technology to advance communications between small spacecraft, plus the capability to gauge their relative distance and location.
- BCT Provided: XB3 CubeSat Bus, Mission Operations Support

Slingshot-1

The Aerospace Corporation

- Objective: First-ever BCT-built 12U bus carrying 19 payloads to low-Earth orbit. Mission will demonstrate the accessibility of integrating numerous payloads into a single interface.
- BCT Provided: XB12 CubeSat Bus, Mission Operations

PREFIRE

Jet Propulsion Laboratory (JPL)

- Objective: Seeks to reduce uncertainty in polar energy fluxes, the processes that influence them, and, with improved modeling, the societal implications of polar climate change.
- BCT Provided: Two XB6 CubeSat Buses

EZIE (Electrojet Zeeman Imaging Explorer)

Johns Hopkins APL and NASA Goddard

- Objective: Image the magnetic fingerprint of the auroral electrojets using Microwave Electrojet Magnetogram (MEM) instruments
- BCT Provided: Two EDU units, Three XB6 CubeSat buses, Payload integration, Mission Operations

CAT

Johns Hopkins Applied Physics Laboratory

- Objective: Demonstrated sponsor payload performance in CubeSats flying in formation using differential drag to maintain spacing.
- BCT Provided: Two XB3 CubeSat Buses

MICROSATS

D2S2

Air Force Research Laboratory

- Objective: Demonstrate extraordinary mobility between orbital regimes in a small spacecraft with a useful space domain awareness payload.
- BCT Provided: Saturn-class Microsat Bus

GNOMES

PlanetiQ

- Objective: Commercial satellite constellation dedicated to weather, climate, and space weather.
- BCT Provided: Microsat Spacecraft Bus

R3D2

DARPA and Northrop Grumman

- Objective: To space-qualify a new type of Kapton membrane reflectarray antenna.
- BCT Provided: ESPA-class Microsat Bus

METHANESAT

MethaneSAT, LLC

- Objective: Will provide global, high-resolution quantification of methane emissions from oil and gas facilities, as well as measure surface-level methane emissions from other sources of human-triggered methane emissions.
- BCT Provided: Saturn-class Microsat Bus

OSAM-2

Made in Space

- Objective: A technology project developing the necessary additive manufacturing technology to build large-scale structures in space.
- BCT Provided: Saturn-class Microsat Bus

BLACKJACK

DARPA

- Objective: Will provide global persistent coverage through operation of one or more payloads from up to six DoD mission areas.
- BCT Provided: A low-Earth orbit constellation of 10 Saturn-class Microsat Buses

COMMERCIAL IMAGERY PROGRAM

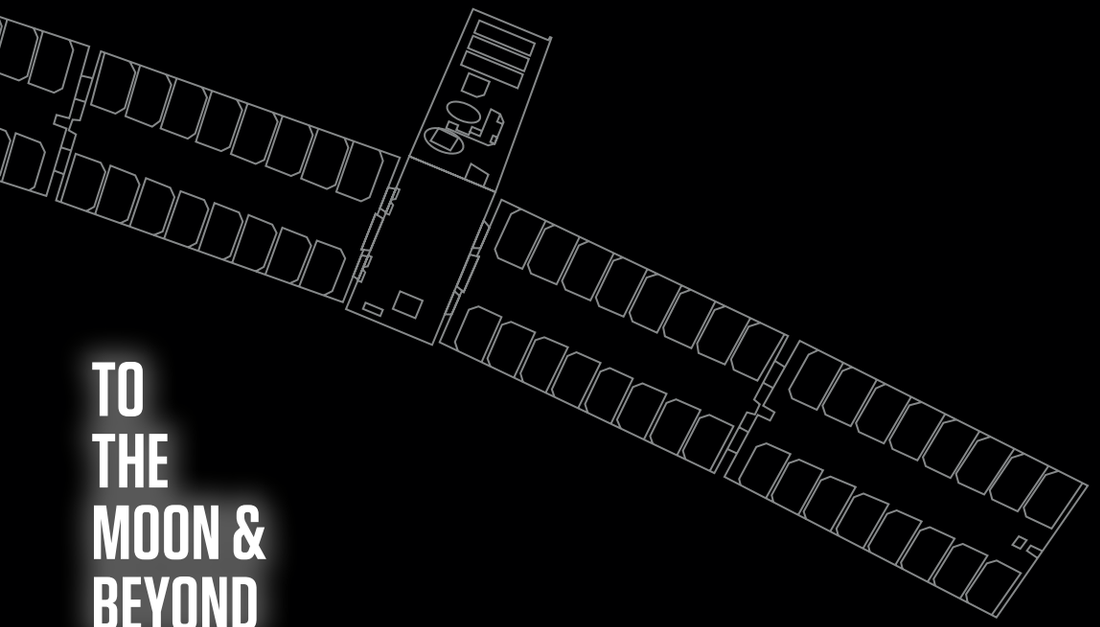
Commercial imagery customer

- Objective: Earth imagery in low-Earth orbit
- BCT Provided: Venus-class Microsat Bus

ZEUS

Government

- Objective: Highly successful mission
- BCT Provided: Seven “Half ESPA” custom microsat spacecraft



TO THE MOON & BEYOND

MarCO
Customer: NASA JPL
Destination: Mars
Objective: Accomplished a successful mission that tested out miniature spacecraft technology in deep space
BCT Provided: XACT-15

Lunar IceCube
Customer: Morehead State University
Destination: Lunar Orbit
Objective: Searching for water ice on the Moon
BCT Providing: XACT-15

NEA Scout
Customer: NASA MSFC
Destination: Interplanetary
Objective: Flyby of an asteroid with solar sail propulsion
BCT Providing: XACT-15

BioSentinel
Customer: NASA Ames
Destination: Heliocentric
Objective: Detected, measured, and correlated the impact of space radiation in living organisms
BCT Providing: XACT-15

Lunar Flashlight
Customer: NASA JPL
Destination: Lunar Orbit
Objective: Mapping for volatiless
BCT Providing: XACT-50, Solar Panels

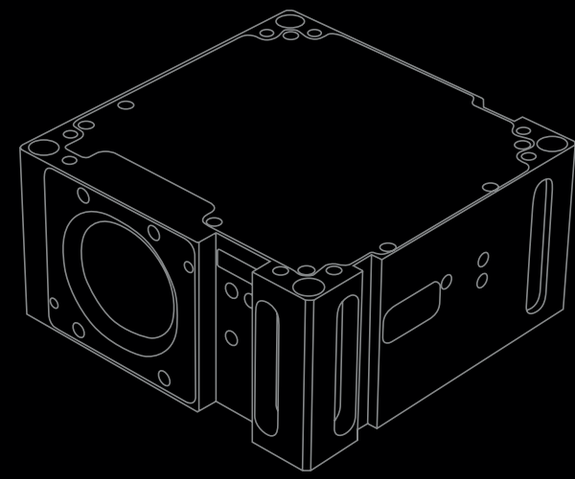
CuSP
Customer: Southwest Research Institute
Destination: Interplanetary
Objective: Heliophysics
BCT Providing: XACT-15

EQUULEUS
Customer: University of Tokyo and JAXA
Destination: Earth-Moon, L2
Objective: Trajectory control experiment in cis-lunar region, imaging of Earth's plasmasphere, lunar impact flash observation, measurement of dust environment in cis-lunar region
BCT Providing: XACT-50

OMOTENASHI
Customer: AeroAstro
Destination: Lunar surface
Objective: Demonstrated nano-lander
BCT Providing: XACT-15

ArgoMoon
Customer: Argotee
Destination: Earth (6 months)
Objective: Took historically significant photography of the EM-1 mission
BCT Providing: XACT-15

LunaH-Map
Customer: Arizona State University
Destination: Lunar orbit
Objective: Mapped hydrogen around Lunar South Pole
BCT Providing: XB1 Avionics



SPACECRAFT SOLUTIONS

Our family of spacecraft offers complete end-to-end solutions for your mission needs. Featuring an extremely precise, highly powerful integrated spacecraft bus platform — ranging from a 3U CubeSat to an ESPA-Grande satellite — our versatile systems are built to accommodate any and all types of missions. With robust power systems, secure data handling, and resilient performance, our suite of solutions are time-tested and proven-reliable, even under the harshest of conditions. Get ready for a new era of peak-performance, cost-efficient spacecraft solutions.

DEPLOYMENT FOOTAGE
Tempest-D and CubeRRT

XB3 SPACECRAFT

CLASS
3U

ENERGY STORAGE
6.8 Ah

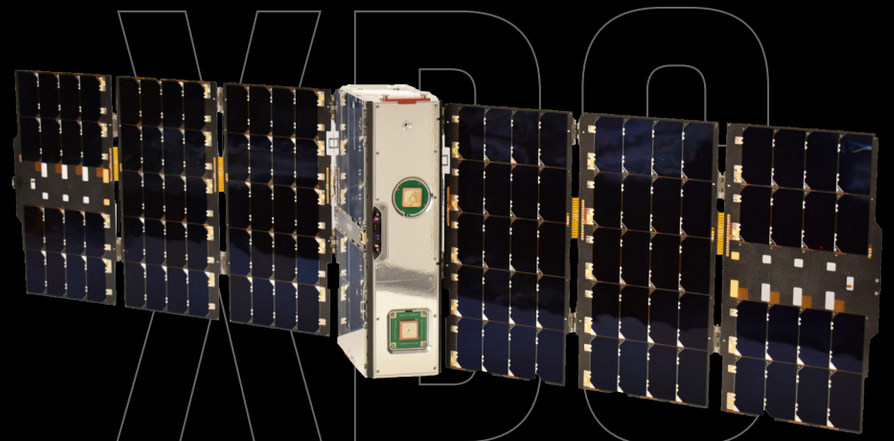
POINTING ACCURACY
±0.003 deg (1-sigma) for 2 axes, 1 Tracker

ORBIT ALTITUDE / ORBIT LIFETIME
LEO > 5 years | GEO > 2 years

SOLAR ARRAY POWER
27W

AVAILABLE PAYLOAD VOLUME
1.5U (typical)

XB6 SPACECRAFT



CLASS
6U

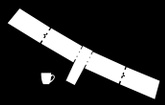
ENERGY STORAGE
6.8-20.4 Ah

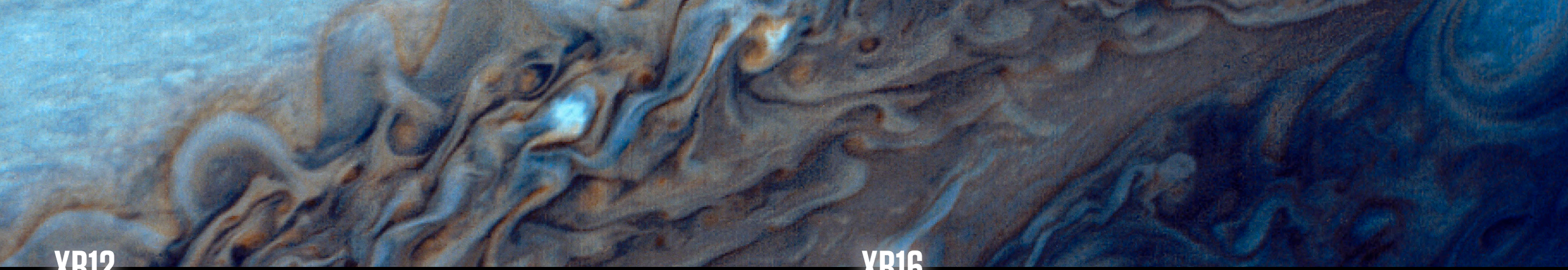
POINTING ACCURACY
±0.002° (1-sigma), 3 axes, 2 Trackers

ORBIT ALTITUDE / ORBIT LIFETIME
LEO > 5 years | GEO > 2 years

SOLAR ARRAY POWER
92W - 108W

AVAILABLE PAYLOAD VOLUME
4U (typical)

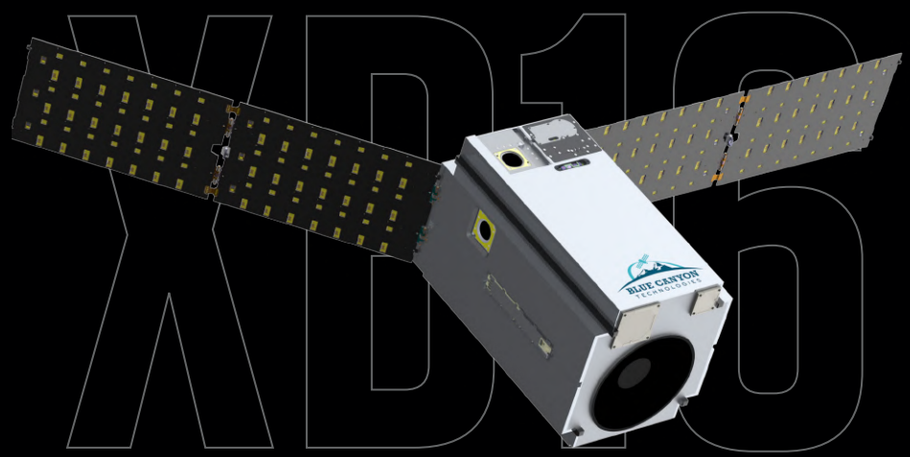




XB12 SPACECRAFT

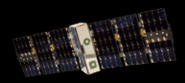
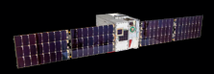
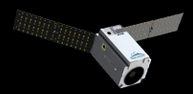
CLASS 12U	ENERGY STORAGE 6.8-20.4 Ah
POINTING ACCURACY ±0.002° (1-sigma), 3 axes, 2 Trackers	ORBIT ALTITUDE / ORBIT LIFETIME LEO > 5 years | GEO > 2 years
SOLAR ARRAY POWER 92W - 108W	
AVAILABLE PAYLOAD VOLUME 8U (typical)	

XB16 SPACECRAFT



CLASS 16U	ENERGY STORAGE 6.8-20.4 Ah
POINTING ACCURACY ±0.002° (1-sigma), 3 axes, 2 Trackers	ORBIT ALTITUDE / ORBIT LIFETIME LEO > 5 years | GEO > 2 years
SOLAR ARRAY POWER 92W - 108W	
AVAILABLE PAYLOAD VOLUME 12U (typical)	

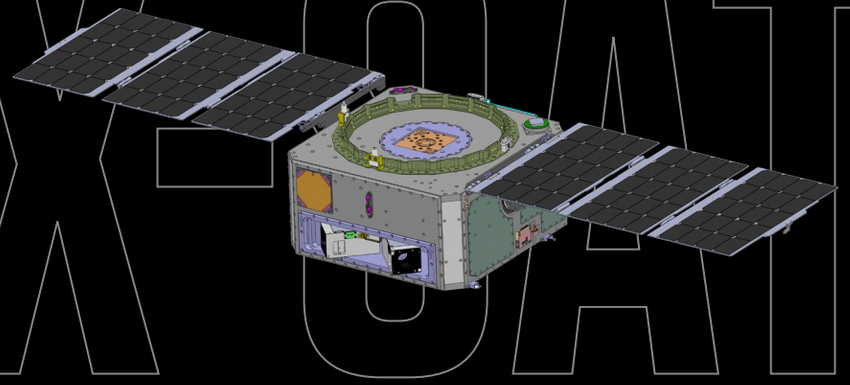
CUBESAT SPACECRAFT SUMMARY

	XB3	XB6	XB12	XB16
CLASS	3U	6U	12U	16U
AVAILABLE PAYLOAD VOLUME	1.5U (typical)	4U (typical)	8U (typical)	12U (typical)
POINTING ACCURACY	±0.003 deg (1-sigma) for 2 axes; ±0.007 deg (1-sigma) for 3rd axis	±0.002 deg (1-sigma) 3 axes, 2 Trackers	±0.002 deg (1-sigma) 3 axes, 2 Trackers	±0.002 deg (1-sigma) 3 axes, 2 Trackers
POINTING STABILITY	1 arc-sec over 1 sec			
ORBIT KNOWLEDGE	4m, 0.05m/s			
DATA INTERFACES	UART (3.3V, 2.5V LVDS, RS422, RS485), SpaceWire, 3.3V In/Out			
ONBOARD DATA STORAGE	4GB with expandable beyond for the 6U and 12U (by adding the high speed data recorder)			
ENERGY STORAGE	6.8 Ah	6.8 – 20.4 Ah	6.8 – 20.4 Ah	6.8 – 20.4 Ah
SOLAR ARRAY POWER	27W	92W - 108W	92W - 108W	92W - 108W
PROPULSION	Multiple electric and chemical propulsion systems available			
PAYLOAD POWER	3.3V, 5.0V, Unregulated Battery 12V			
LEO UPLINK	Nominal 100 Kbps, CCSDS formatting			
LEO DOWNLINK	S-Band up to 2Mbps	S-Band up to 2Mbps X-Band up to 10Mbps	S-Band up to 2Mbps X-Band up to 10Mbps	S-Band up to 2Mbps X-Band up to 10Mbps
ORBIT ALTITUDE / ORBIT LIFETIME	LEO > 5 years | GEO > 2 years			
SCALE				

X-SAT

MERCURY CLASS



CLASS
11.732” Light Band

ENERGY STORAGE
20.4 Ah

POINTING ACCURACY
±0.002° (1-sigma), 3 axes, 2 Trackers

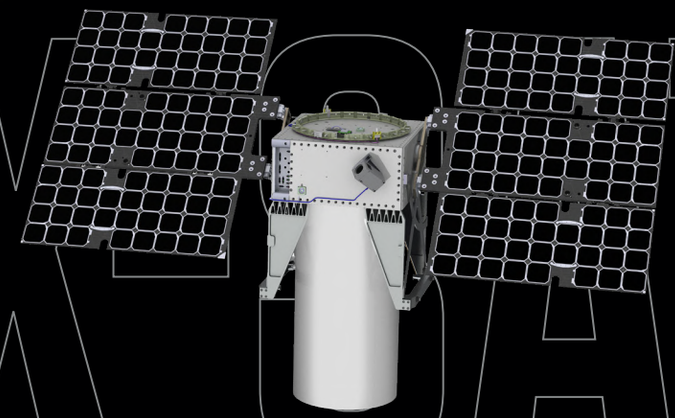
ORBIT ALTITUDE / ORBIT LIFETIME
LEO(> 5 years), GEO (> 2 years), Deep Space (> 2 years)

SOLAR ARRAY POWER
SADA articulated Arrays 108W

PAYLOAD VOLUME
14.0” X 17.0” X 17.0” (launch dependent)

X-SAT

VENUS CLASS



CLASS
ESPA-Standard or larger
15” launch vehicle interface

ENERGY STORAGE
10.2 Ah

POINTING ACCURACY
±0.002° (1-sigma), 3 axes, 2 Trackers

ORBIT ALTITUDE / ORBIT LIFETIME
LEO (> 5 years), GEO (> 2 years), Deep Space (> 2 years)

SOLAR ARRAY POWER
Two wing: 444W
One wing: 222W

PAYLOAD VOLUME
20.5” X 16.4” X 27.0” (1 array)
17.0” X 16.4” X 27.0” (2 array)
Larger volume available depending on launch vehicle

PAYLOAD MASS CAPABILITY
70 kg

X-SAT

SATURN CLASS

CLASS
ESPA-Grande or equivalent
24” launch vehicle interface

ENERGY STORAGE
1 wing: 27.2 Ah
2 wing: 54.4 Ah

POINTING ACCURACY
±0.002° (1-sigma), 3 axes, 2 Trackers

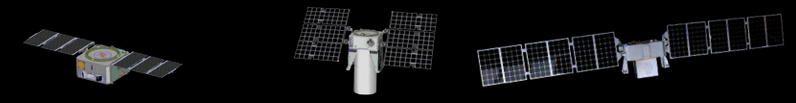
ORBIT ALTITUDE / ORBIT LIFETIME
LEO (> 5 years), GEO (> 2 years), Deep Space (> 2 years)

SOLAR ARRAY POWER
Two wing: 1082W
One wing: 541W

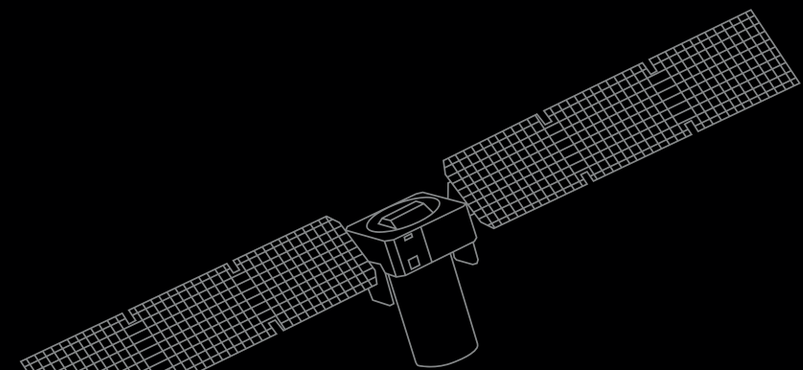
PAYLOAD VOLUME
30.0” X 30.0” X 40.0” (typical)
Larger volume available within rideshare envelope and in dedicated launch vehicle fairings

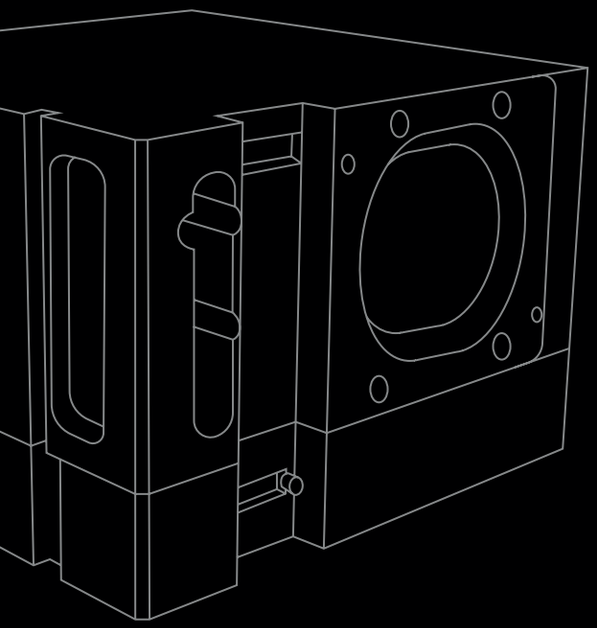
PAYLOAD MASS CAPABILITY
200 kg

MICROSAT SPACECRAFT SUMMARY



	X-SAT MERCURY CLASS	X-SAT VENUS CLASS	X-SAT SATURN CLASS
CLASS	11.732” Light Band	ESPA-Standard or larger 15” launch vehicle interface	ESPA-Grande or equivalent 24” launch vehicle interface
POINTING ACCURACY	±0.002° (1-sigma), 3 axes, 2 Trackers		
SOLAR ARRAY POWER	SADA articulated Arrays 108W	One wing: 222W Two wing: 444W	One wing: 541W Two wing: 1082W
PAYLOAD MASS CAPABILITY	40 kg	70 kg	200 kg
ENERGY STORAGE	20.4 Ah	10.2 Ah	1 wing: 27.2 Ah 2 wing: 54.4 Ah
ORBIT ALTITUDE / ORBIT LIFETIME	LEO (> 5 years), GEO (> 2 years), Deep Space (> 2 years)		
PAYLOAD VOLUME	14.0” X 17.0” X 17.0” (launch dependent)	20.5” X 16.4” X 27.0” (1 array) 17.0” X 16.4” X 27.0” (2 array) Larger volume available depending on launch vehicle	30.0” X 30.0” X 40.0” (typical) Larger volume available within rideshare envelope and in dedicated launch vehicle fairings
PROPULSION	Multiple electric and chemical propulsion systems available		





COMPONENTS

We offer a wide range of high-performance, low-recurring cost, and rapid-response spacecraft systems and components.

Through our star tracker-based attitude control system, the BCT XACT and FleXcore has achieved the absolute highest-possible pointing accuracy across CubeSats, and microsats alike.

ATTITUDE

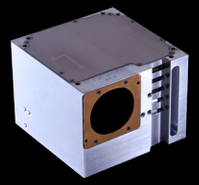
ATTITUDE CONTROL SYSTEMS

Our XACT and FleXcore products are currently operating on-orbit, supporting numerous successful customer missions.

Get reliable, high-performance design compatible with a wide range of satellite configurations, all from the most accurate stellar-based attitude solutions. A powerful processing core, coupled with our reaction wheel assemblies, enable a new generation of peak-performance, cost-efficient miniaturized spacecraft.

XACT-15

No matter the mission, the XACT is up to the task. Our integrated attitude control solution enables CubeSats to point with the absolute highest accuracy — much higher than that of previously available models.



XACT-50

Larger reaction wheels and torque rods give your mission the same high-end tech from the XACT-15, with improved capability.

XACT-100

XACT-100 gives the largest CubeSats the ability to use our biggest reaction wheels, while still maintaining a minimal form-factor.

FLEXCORE

It's all the advantage of CubeSats now inside microsats. With out XACT-based electronics and control software, multiple external sensors, and larger actuators, your team has access to a high- performance, cost efficient modular ADCS system that's scalable to wide range of bus sizes and mission requirements.

XACT ATTITUDE CONTROL SCALABLE TO SMALL SATELLITES

For a highly capable, cost-efficient attitude control system compatible with microsatellite-sized spacecraft, look no further than the BCT FleXcore. Boasting our integrated XACT-based architecture, and leveraging a powerful processing core with BCT's nano star trackers and reaction wheel assemblies, the BCT FleXcore is an extremely reliable and modular attitude control system compatible with all manner of configurations and missions.

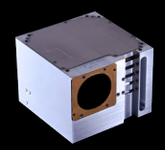
FleXcore features 3-axis stellar attitude determination in a modular package. Built-in, flexible commanding allows for multiple pointing reference frames: Inertial, LVLH, Earth-Fixed, and Solar. Precise 3-axis control is provided by low jitter reaction wheels, torque rods and integrated control algorithms. Software is available to support simulation, system integration, and customization of the ACS functionality.

FEATURES INCLUDE:

- XACT-based electronics and control software with external sensors and actuators
- Low-cost and high-performance attitude control solution
- Modular system fits multiple missions
- Supports multiple star trackers
- Scalable to a wide range of bus sizes
- Compatible with BCT family of reaction wheels and torque rods
- Supports LEO, GEO, and Deep Space missions

ATTITUDE CONTROL SYSTEMS SUMMARY

XACT-15



XACT-50

XACT-100

FLEXCORE

	XACT-15	XACT-50	XACT-100	FLEXCORE
POINTING ACCURACY (1-SIGMA)	±10.8 arcsec for 2 axes; ± 25.2 arcsec for 3rd axis	±10.8 arcsec for 2 axes; ± 25.2 arcsec for 3rd axis	±10.8 arcsec for 2 axes; ± 25.2 arcsec for 3rd axis	±7.2 for 3 axes, 2 Trackers
MASS	0.885 kg	1.23 kg	0.520 kg + 1 kg (wheels)	Configuration Dependent
DIMENSIONS	10 x 10 x 5 cm (0.5U)	10 x 10 x 7.54 cm (0.75U)	10 x 10 x 5 cm (0.5U) (not incl. external components)	< 12.1 x 11.4 x 4.9 cm (not incl. external components)
SUPPLY VOLTAGE	12V	12V	12V	5V and 28V
INTERFACE	RS-422			
SLEW RATE	Up to 10 deg/sec (4kg, 3U CubeSat)	Up to 10 deg/sec (14kg, 6U CubeSat)	Up to 10 deg/sec (25kg, 12U CubeSat)	Application Dependent
DESIGN LIFE	> 10 years (LEO), > 5 years (GEO)			
MOMENTUM STORAGE	15 mNms	50 mNms	100 mNms	RWp500: 500 mNms RW1: 1 Nms RW4: 4 Nms RW8: 8 Nms

KEY ADVANTAGES:

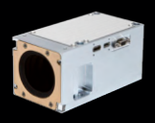
- Precise attitude knowledge & control
- Complete ACS in a micro-package
- Low jitter micro-reaction wheel design
- User-friendly software supports simulation, integration, and customization

STAR TRACKERS

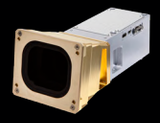
Our star trackers are currently operating on-orbit, supporting successful missions in LEO, GEO, and beyond.

The industry-trusted Blue Canyon Technologies Nano Star Tracker (NST) is compatible across spacecraft platforms and suited for even the most challenging and sensitive missions. Extensive flight heritage and proven, best-in-class performance make our star tracker the ideal fit for standalone missions or constellations.

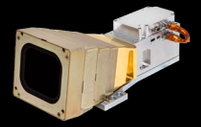
Our star tracker is qualified beyond GEVS level environments, giving our customers a low SWaP-C solution with stunning capabilities. The turnkey starlight-in, quaternion-out system integrates easily and comes with user-friendly documentation.



STANDARD NST



MID EXTENSION NST



FULL EXTENSION NST

	STANDARD NST	MID EXTENSION NST	FULL EXTENSION NST
ATTITUDE KNOWLEDGE	Gen3: 1 asec (cross boresight); 10 asec (around boresight) Gen2: 6 asec (cross boresight); 40 asec (around boresight)		
TEMPERATURE	-20°C to +50°C (full performance)		
SOLUTION RATE	5 Hz		
SKY COVERAGE	> 99%		
LOST-IN-SPACE STAR IDENTIFICATION	<4 sec (up to 1.5 deg/s)		
FIELD OF VIEW	10 x 12 deg		
SUPPLY VOLTAGE	5V or 28V		
PEAK POWER CONSUMPTION	<1.5W (5V) or <3.5W (28V)		
MASS	0.35kg	0.45 kg	0.85 kg
DIMENSIONS	10 x 5.5 x 5 cm	17 x 8.5 x 7 cm	25 x 10 x 10 cm
BAFFLE SUN EXCLUSION ANGLE	45 deg	22 deg	17.5 deg
DESIGN LIFE	>10 years (LEO) >5 years (GEO)		

FEATURES INCLUDE:

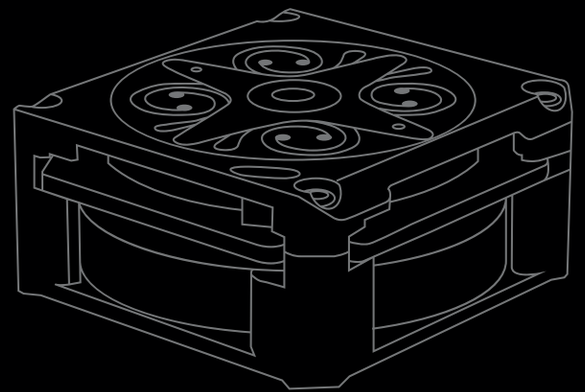
- Heritage exceeding 150 trackers
- Low SWaP-C
- Tracks stars down to 7.5 magnitude
- On-board star catalog (>20,000 stars)
- Lost-in-space star identification
- Shock test qualified
- EMI/EMC tested to MIL-STD-461
- User friendly RS-422 or RS-485 interface

REACTION WHEELS

REACTION WHEELS

Our reaction wheels are currently operating on-orbit, supporting numerous successful customer missions.

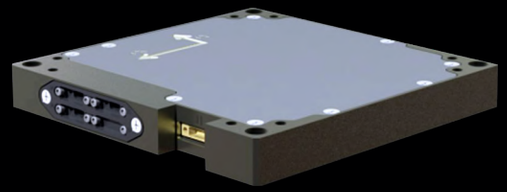
BCT Reaction Wheels feature an advanced lubrication system for long life and vibration isolation that ensures a low-jitter. Heritage is from low-Earth orbit to Mars and beyond.

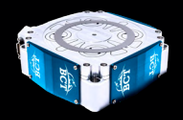


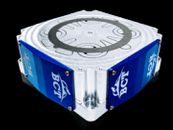
	RWP015	RWP050	RWP100
MAX MOMENTUM	0.015 Nms	0.050 Nms	0.100 Nms
MAX TORQUE	0.004 Nm	0.007 Nm	0.007 Nm
MASS	0.13 kg	0.24 kg	0.33 kg
DIMENSIONS	42 x 42 x 19 mm	58 x 58 x 25 mm	70 x 70 x 25 mm
SUPPLY VOLTAGE	10 - 14 VDC	10 - 14 VDC	10 - 14 VDC
POWER @ MAX MOMENTUM	.85 W	.81 W	.89 W
DESIGN LIFE	> 5 years	> 5 years	> 5 years

DRIVE CONTROL ELECTRONICS

Blue Canyon Technologies Drive Control Electronics (DCE) is a reaction wheel drive electronics assembly. The sensor/actuator suite includes the electronics to drive BCT reaction wheels and optionally BCT manufactured torque rods. The DCE is typically used with the RWp015, RWp050, and RWp100 reaction wheels (for other wheel options, contact BCT). These components are brought together by robust, configurable, and high-performance software.







	RWP500	RW1	RW4	RW8
MAX MOMENTUM	0.50 Nms	1.0 Nms	4.0 Nms	8.0 Nms
MAX TORQUE	0.025 Nm	0.06 Nm	0.25 Nm	0.25 Nm
MASS	0.86 kg	1.1 kg	3.2 kg	4.4 kg
DIMENSIONS	110 x 110 x 38 mm	110 x 110 x 54 mm	170 x 170 x 70 mm	190 x 190 x 90 mm
SUPPLY VOLTAGE	22 - 34 VDC 28 - 34 VDC (full performance)	22 - 34 VDC	22 - 34 VDC	22 - 34 VDC
POWER @ MAX MOMENTUM	5.5 W	14 W	9.7 W	9.7 W
DESIGN LIFE	> 10 years	> 10 years	> 10 years	> 10 years
PROTOCOL	RS-422			

CMG

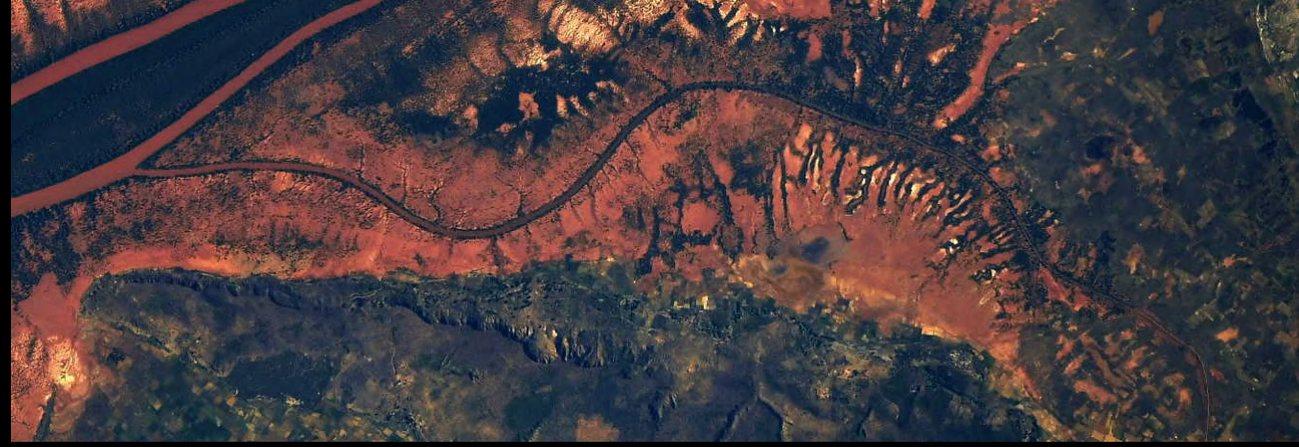
CONTROL MOMENT GYROSCOPES

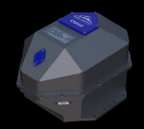
The Blue Canyon Technologies range of Control Moment Gyroscopes (CMGs) are built to provide your spacecraft with expanded agility necessary to navigate a successful mission.

BCT CMGs offer improved torque performance at lower power consumption versus reaction wheels. Leveraging BCT Reaction Wheel technology, the CMGs provide low-jitter and long-life performance for your mission.

DRIVE CONTROL ELECTRONICS

Flexible interface options include discrete CMG torque and momentum control to fully integrated spacecraft attitude control systems using up to 4 CMGs.

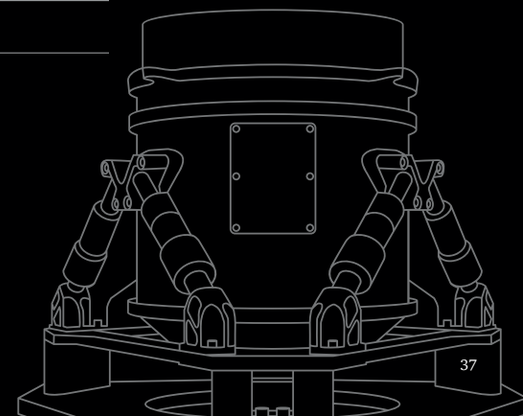




CMG8

CMG12

MOMENTUM	8 Nms	12 Nms
TORQUE	8 Nm	12 Nm
GIMBAL AXIS ANGULAR RANGE	Unlimited	Unlimited
MASS (KG)	< 13	< 18
VOLUME (CM)	22 x 22 x 30	34 x 43 x 38
VOLTAGE	22-36 VDC	22-36 VDC
POWER, FULL MOMENTUM	25W	20W
POWER, MANEUVER	30W	35W
COMMUNICATION	RS-422	
GIMBAL MANUEVERS	>2 million	
DESIGN LIFE	>10 years	

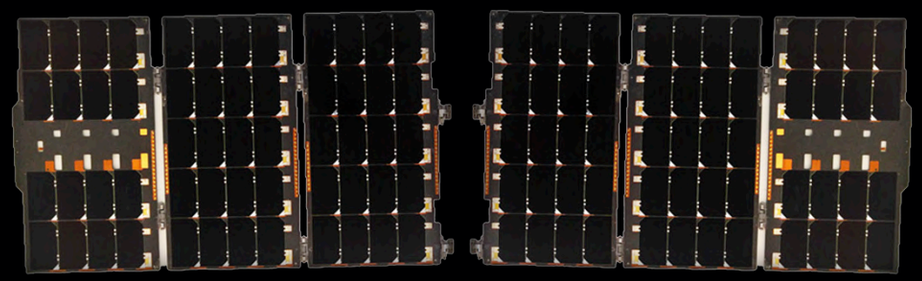


POWER

POWER SYSTEM CAPABILITIES

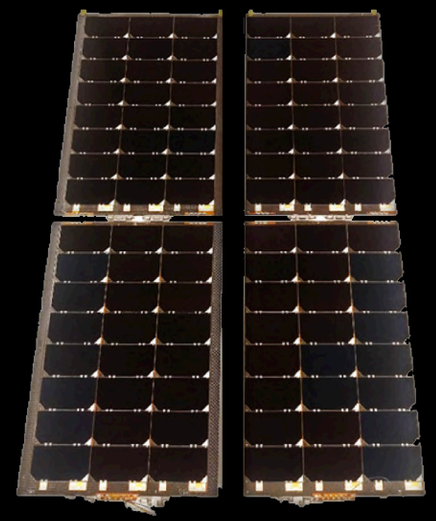
SOLAR ARRAYS

We offer configurations ranging from simple body mounted wings to multi-panel to multi-wing deployed arrays with the option to gimbal up to two arrays. Our standard arrays include 30% efficient cells and carbon fiber substrates.



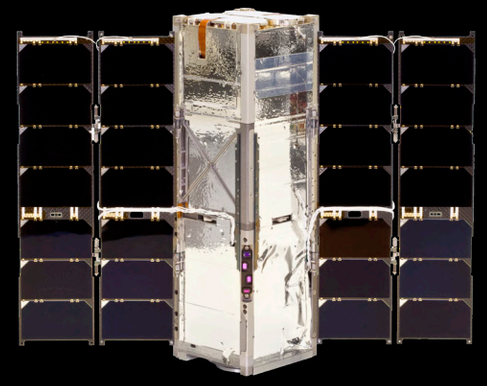
Triple Panel Solar Array

54W - 118W



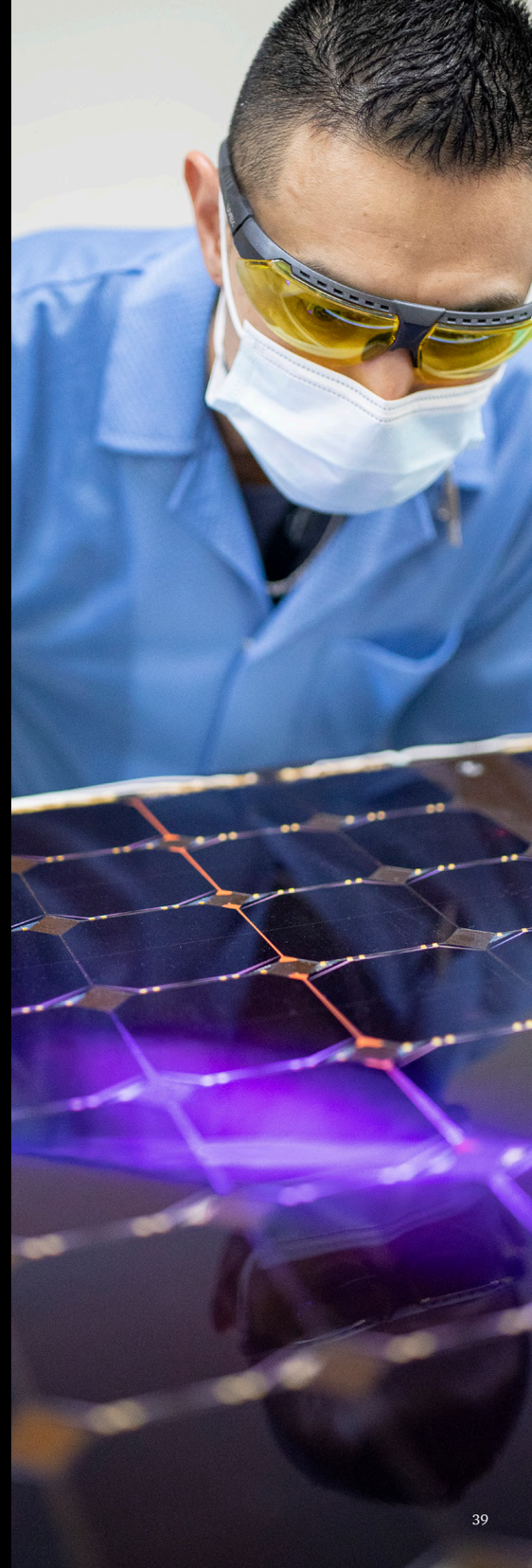
BCT 6U-V Double Panel Solar Array

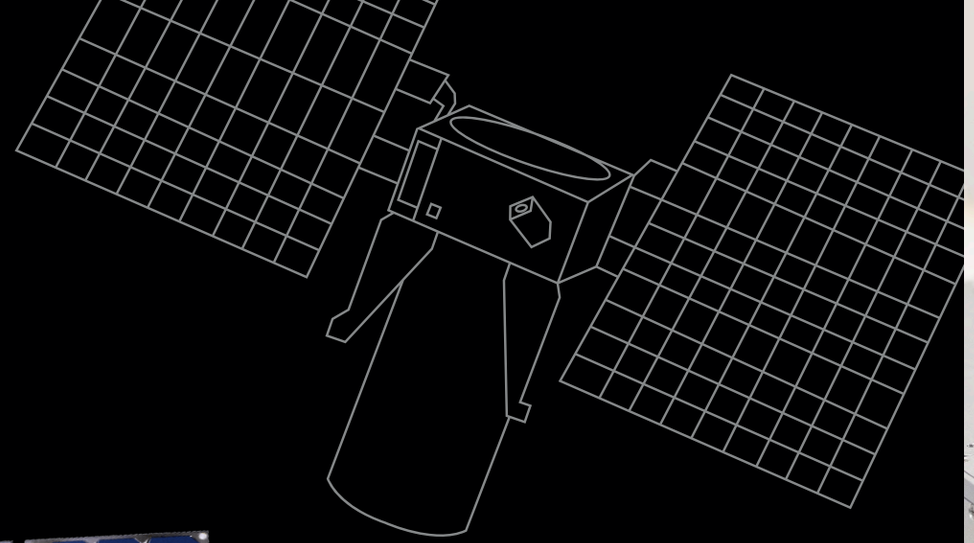
46W - 96W

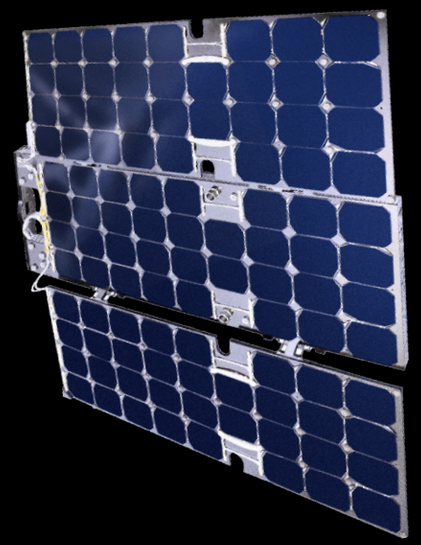


Double Panel Solar Array

27W - 34W







ESPA-Class
Solar Array
222W - 444W

POWER SYSTEMS CAPABILITIES

Solar panels generate power with high-efficiency solar cells. Optional release mechanisms and solar array drive assemblies (SADA) are available for optimum sun-pointing operations. High-capacity battery packs come with fault protection and heaters for spacecraft use.

NOMINAL PARAMETERS	3U	6U/12U	VENUS-CLASS MICROSAT	SATURN-CLASS MICROSAT
SOLAR ARRAY POWER (W)	27 - 34	46 - 118	222 - 444	588 - 1175
ARRAY VOLTAGE, VMP (VDC)	14.9	17 or 34.1	36.2	38.4

FEATURES:

- Industry-leading 30% efficient solar cells
- Carbon fiber and honeycomb structures
- Panels pair with GNC for maximum performance

OPTIONS:

- Linear, rotary, and micro release mechanisms
- Solar array drive assemblies (SADA)

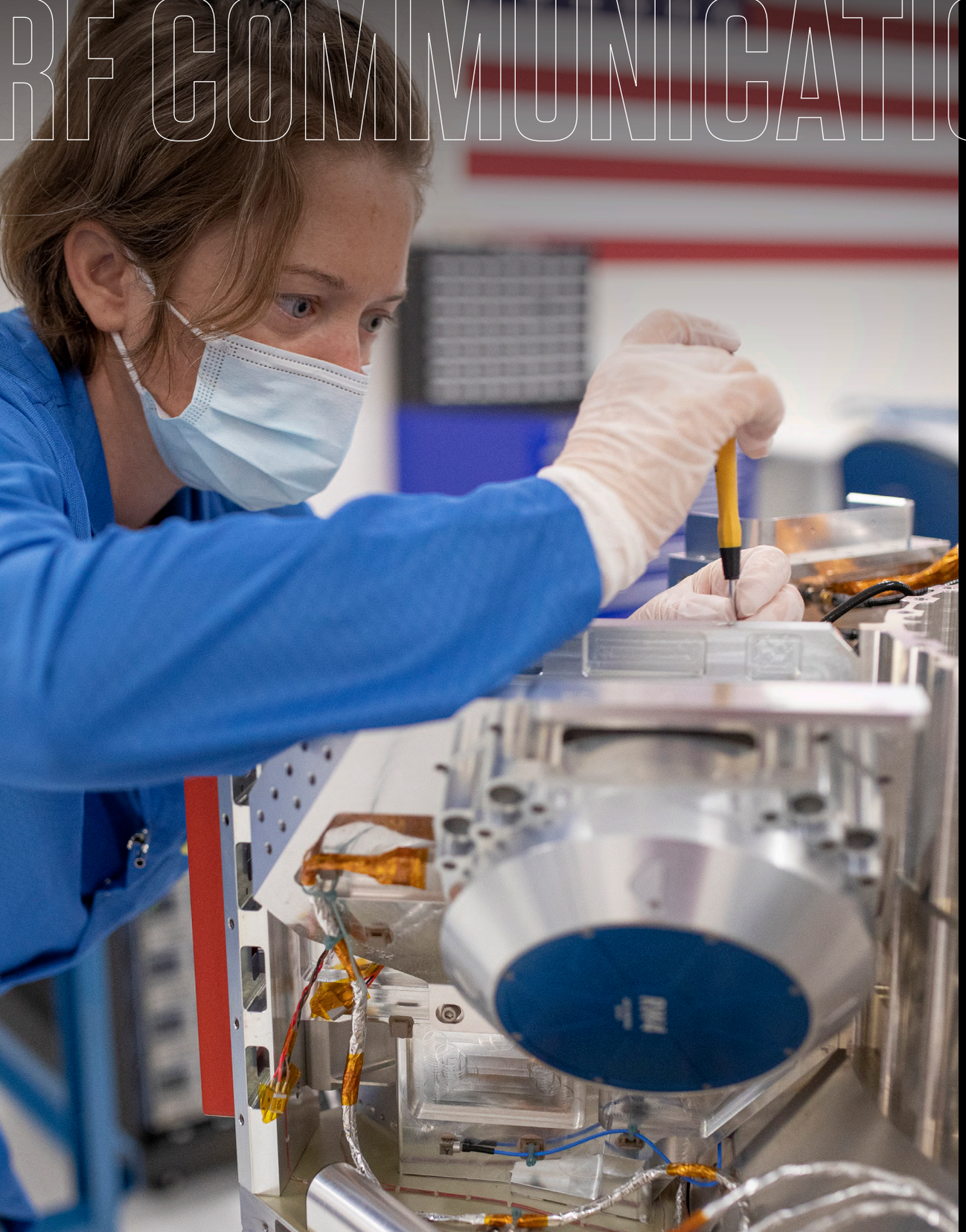
BATTERIES

28V BATTERIES

CONFIGURATION	1P8S	2P8S
NAMEPLATE CAPACITY	3.4Ah	6.8Ah
ENERGY	99Wh	198Wh
MASS	<650g	<1200g
FOOTPRINT	1.8” x 4.2”	1.8” x 7.2”
HEIGHT	3.5”	3.5”
NOMINAL VOLTAGE	28V	28V
VOLTAGE RANGE	24V - 33.6V	24V - 33.6V

FEATURES INCLUDE:

- Under Voltage Protection
- Over Current Protection
- Cell Balancing



RF COMMUNICATIONS

Flexible software defined radio (SDR) solutions are designed in-house. The radios combine tunable transmitter and receiver functionality into one compact design. The radios are perfect for small satellites looking for flexibility and data rates up to 20 Mbps. Transmit rates up to 100 Mbps using DVB-S2 will be available mid-2023.

The SDRs are compatible with Type-1 encryption modules such as the KI-55 and can support AES-256 GCM software encryption natively. Their form factor support CubeSats and microsats.

BCT SDR products are designed for interoperability with industry standard ground networks such as KSAT, SSC, AFSCN, and NEN. Full product lines include L-band, S-band and X-band radios.

MICROSAT FORM FACTOR MODEL

FEATURES INCLUDE:

- Flexible software defined radio - uplink / downlink / crosslink applications
- Flight proven full duplex radio integrated with BCT avionics
- Maximizes payload volume
- Supports configurations from 3U to ESPA
- High downlink data rate (up to 100 Mbps) available mid-2023

DOWNLINK FREQUENCY	S-Band (2.2-2.3GHz), X-band (8-8.5 GHz)
UPLINK FREQUENCY	L-band (1.76 – 1.84 GHz), S-band (2.025 – 2.110 GHz)
MAX BANDWIDTH	50 MHz
POWER CONSUMPTION	2 Watts RX only, 18 Watts RX + TX (S-band), 26 Watts RX + TX (X-band)
RF OUTPUT POWER	Adjustable with nominal 2 Watts RF output
DOWNLINK MODULATION SCHEMES	BPSK / OQPSK / DVB-S2 (mid-2023)
UPLINK MODULATION SCHEMES	BPSK
SUPPORTED STANDARDS	CCSDS-TC (uplink), CCSDS-TM (downlink)
OVERALL SIZE	3.2 x 3.15 x 0.63 in (S-band), 3.2 x 3.15 x 0.88 in (X-band)
ELECTRICAL INTERFACE	LVDS
DOWNLINK FORWARD ERROR CORRECTION	Convolutional (K=7, R=1/2), DVB-S2 LDPC (mid-2023)
OPERATING VOLTAGE	9-34V

INTEGRATION & TEST

Prepare for your mission with our advanced testing facilities. As part of our standard suite of environmental tests, we perform random vibration and thermal vacuum testing. Additional test capabilities include: star simulators, wheel balance apparatus, solar array deployment support hardware, thermal cycle chambers, and a Helmholtz cage. To deliver the most reliable method of testing and operating for your mission, we use the same software to test our spacecraft as we do to operate the spacecraft on-orbit. This cohesion ensures the interfaces and ground databases are the same throughout the lifecycle of the mission.

SIMULATION PRODUCTS

Blue Canyon Technologies offers two spacecraft simulation products to serve a variety of mission analysis to hardware-in-the-loop needs: the GN&C Software Simulator and the Real-time Dynamics Processor (RDP). The GN&C Software Simulator is a desktop executable that meshes the GN&C flight code and high-fidelity simulations into a tool that runs up to 150x faster than real-time to support rapid mission planning and software behavior testing. The RDP is both a real-time spacecraft simulator and a command & telemetry ground test interface to the BCT avionics systems; this combination of features enables test-like-you-fly capability at both the unit and spacecraft level. The RDP features an Ethernet port for communication with a test PC and a connection to the unit under test for command and telemetry interfacing.

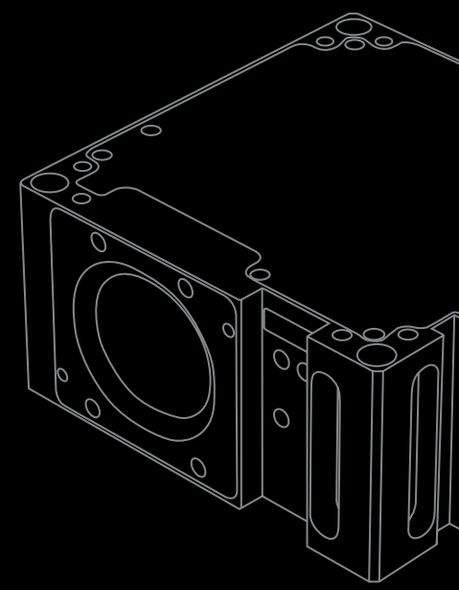
The common simulation present in both the GN&C Software Simulator and the RDP allows the user to initialize the simulated spacecraft to mission-specific conditions to create orbit-like scenarios. This customization offers users insight into the performance and behavior of the spacecraft under various expected and test cases that the real spacecraft may experience.

RDP

TEST/GSE INTERFACE	Ethernet
FLIGHT INTERFACE	RS-422 or RS-458, LVDS for simulation

BCT SIMULATORS CONTAIN CAPABILITY TO MODEL:

- High-fidelity spacecraft dynamics
- Orbital dynamics and celestial bodies
- Actuator and sensor outputs
- Various fault injection cases



MISSION OPERATIONS

FEATURES

- Provides pre-launch ops architecture development, testing & support
- Provides scripts, C&T, and tools used throughout system test & operations
- Supports multiple missions and constellations
- Supports multiple ground stations and radios
- Automated and accessible

SCHEDULING

- Quickly and easily schedule tasks
- Autonomously schedule repeating tasks
- Autonomous constraint and resource de-confliction

AUTOMATED EXECUTION

- Task execution without the need of a full time operations team
- Automated notification of warnings and errors
- Automated response recovery, maximizing system uptime

MONITORING AND VISUALIZATION

- Access to telemetry anytime, anywhere, and from approved devices by approved operators
- Automated analysis and quick access to spacecraft attitude, position, and health

CUSTOMER DATA DELIVERY

- Customizable packages of payload and telemetry data for delivery to customers
- On-demand export of telemetry via API
- Industry-standard secure delivery

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