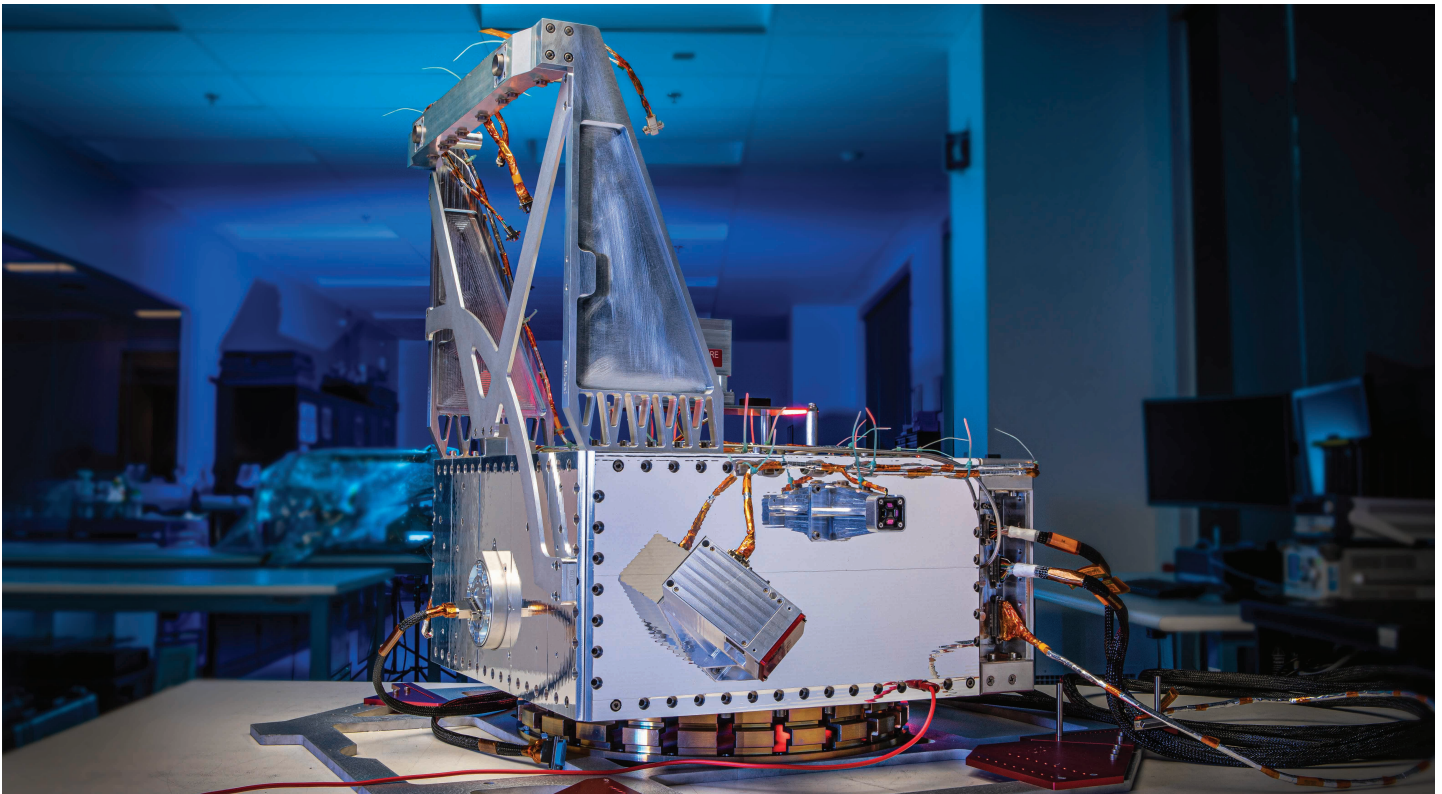


# Blue Canyon Technologies

## Venus-100



# VENUS-100



Offeror: **Blue Canyon Technologies, LLC**

Headquarters Address: **2550 Crescent Drive, Lafayette, CO 80026**

Headquarters CAGE Code: **54BU6**

Headquarters DUNS: **826940673**

Size Certification: **Large Business**

Business Type: **Non-Traditional Defense Contractor**

Facility Clearance Level: **TS Non-Possessing**

Ownership/FOCI Information: **U.S.-owned; not foreign-owned, controlled, or influenced**

Questions? Please Contact:

**Henry Martin**

CubeSat & Civil Business Development Lead

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## ABOUT US



Blue Canyon Technologies is a wholly owned subsidiary of RTX (historic Raytheon), specializing in small satellites, small satellites components, integration and test activities designed for a variety of spacecraft missions and mission operations.

An ISO-9001 certified business, we create high-performance, low-cost systems that leverage state-of-the-art design and manufacturing techniques from across aerospace and non-aerospace markets. These systems include satellites and components for classes of spacecraft ranging from a 3U CubeSat to an ESPA-Grande class minisatellite.

In addition, our customer-driven mission planning and on-orbit tasking allows the customer to focus on the mission while we manage the bus, leveraging our straightforward, agile interfaces. Our Mission Operations team has more than 24 years of cumulative on-orbit heritage and 50,000+ supported contacts.

*Our mission is to enable space missions to expand the frontiers of science and defense by creating reliable, flight-proven spacecraft with significantly higher performance, much smaller size and a fraction of the cost of traditional space systems. Blue Canyon hardware has flown on missions from low-Earth orbit to geostationary orbit, the Moon, near-earth asteroids, Mars and more. We have supported more than 70 satellite missions, including multiple missions for NASA across various science regimes and mission objectives.*

## VENUS-100 SPACECRAFT



## M-LINE OF SMALLSAT BUSES: VENUS-100

Blue Canyon offers reliable ESPA smallsat configurations through our Venus-100 product line. The Venus-100 bus platform inherits fundamental architecture, software trunk and core components from our catalog of TRL-9 flight-proven buses, subsystems and precision components produced through our vertically integrated supply chain. The standard bus architectures include many configurable items, allowing adaptability to a wide variety of payloads (up to 78 kg) and missions (LEO, GEO, cislunar and beyond).

More than just a collection of COTS units, the avionics suites and accompanying flight software have been designed and test-verified to work as an integrated system. Each suite includes:

- Complete command and data handling (C&DH)
- Guidance, navigation and control (GN&C) subsystems
- High speed data storage
- Energy storage (batteries)
- Power distribution and charge control
- Software-based thermal control with associated power switches and thermistor input channels
- A Blue Canyon Technologies S-band software-defined transceiver for mission data and telemetry, tracking and command (TT&C)
- Standard fault detection and protection

Blue Canyon's Venus-100 has been optimized to fly on all launch vehicles supporting ESPA form factors. A large range of vehicle environments, integrations and separation systems (including ring and four point) have been designed and tested for compatibility to ensure maximum compatibility with rideshare options. This validation ensures rapid and easy integration with all major launch providers for mission flexibility.

## VENUS-100 OPTIONS AND ENHANCEMENTS



Blue Canyon's Venus-100 spacecraft has several modular options. For RF, we baseline our TRL-9 S-band transceiver for mission data and TT&C. Customers that need higher data rates have the option to equip the spacecraft with our TRL-9 X-band transmitter or a variety of third-party radios to enable other RF bands, ranging or enhanced capabilities. For data security, AES-256 software encryption is standard. Additionally, Blue Canyon is experienced in integrating and can provide multiple options for hardware-based encryption setups.

For missions requiring extremely fine pointing or agility, the spacecraft can be outfitted with third generation nano star trackers (NST) of various baffle extensions, enhanced, flight-proven onboard GN&C algorithms, as well as fine-balanced reaction wheels of multiple sizes for tighter agility.

While Blue Canyon does not produce propulsion, its bus platforms have successfully interfaced with several different propulsion products, both chemical and electrical, and can be assessed on a case-by-case basis as to the feasibility of use and integration.

## BLUE CANYON TECHNOLOGIES FACILITIES

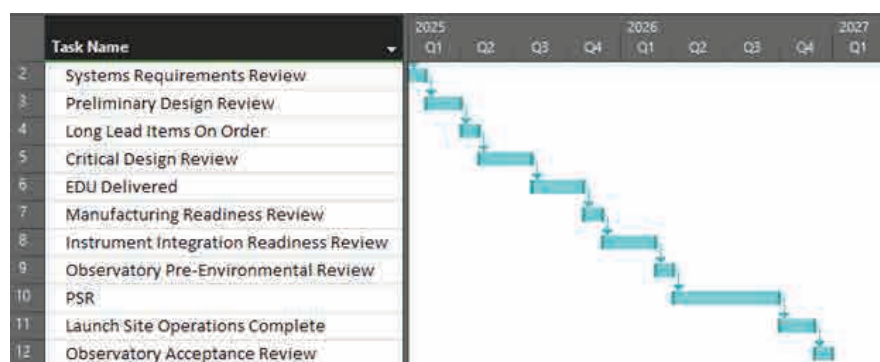
Blue Canyon prides itself in a vertically- integrated business approach to reduce costs and risk to the customer while also maximizing control over technology and program execution. Therefore, in addition to designing and developing all our spacecraft technology in-house, our state-of-the-art facilities are also equipped with the necessary laboratory, manufacturing and testing equipment and space to accommodate dozens of space mission at any given time.



Figure 2 – Blue Canyon's Lafayette Facility

Utilizing three separate facilities in Boulder and Lafayette, Colorado, Blue Canyon has two vibration test facilities, one shock tower, multiple thermal vacuum chambers that can accommodate two ESPA-Grande spacecraft at once, multiple thermal chambers for ambient pressure testing and more than 80,000 square feet of manufacturing space equipped with the necessary ground support equipment to test spacecraft.

## BASELINE SPACECRAFT DELIVERY SCHEDULE





## MISSION OPERATIONS



Our Mission Operations, based at our mission operations center in Lafayette Colorado, utilizes and maintains a cloud-based, service-oriented architecture hosted in AWS that provides a robust and scalable solution for satellite command and control, telemetry processing, mission management, payload tasking, data delivery and more for a wide variety of missions. A common backend platform offers consolidated access for all supported missions and is designed with an “Add-a-Sat” philosophy for easy addition and configuration of new missions.



Figure 4 – Blue Canyon Technologies Mission Operations Center (MOC)

# BLUE CANYON TECHNOLOGIES

COMPATIBILITY

SPECIFICATION	UNITS	VENUS-100
Orbit Average Payload Power (EOL)	W (EOL)	60
Maximum Payload Mass	kg	78
Bus Dry mass (w/o Payload)	kg	64
Science Data Downlink	kbps	S-Band - Up to 2 Mbps X-Band - [Additional Option] Up to 20 Mbps, Additional 3rd Party Options
Science Data Storage (Capacity)	Mbit	400000
Pointing Knowledge	arcsec	<5
Pointing Control	arcsec	<5
Pointing Stability (Jitter)	arcsec/sec	2
Slew Rate	deg/min	>1.5 deg/sec, Dependent on Final Mass Properties
Mission Design Life	years	5 in LEO
Compatible LVs	(names)	
Nominal Orbit	Altitude, Inclination, Type, Other	Mid-Inc, Sun Sync
Types of Orbits Available	as needed	LEO, GEO, CisLunar
External Payload Volume	meters LxWxH	.41m x .45m x .68m
Internal Payload Volume	meters	-

## DESCRIPTION

ACS	type	3-axis control with up to 4 reaction wheels
Star Trackers	number of STs	2
GPS	number of receivers	1
Batteries	cell type / capacity (Ah)	Li-ion/13.6
Solar Arrays	cell type / Area (m)	204x 60.26 cm <sup>2</sup> ZTJ-Omega cells
Main Bus Voltage Range	volts	28 V - 34 V
C&DH Bus Architecture	description	Linux Based OS
Downlink Formats	CCSDS, STDN, etc	CCSDS
Comm Up\Downlink Band	S, X, UHF, Ka, Ku, etc.	S-Band
Structure	description	Al panel
Propulsion	type, fuel	EP, Xenon
Propellant Capacity	kg	10
Max delta V	m/s	50

## PROGRAMMATIC & OTHER

Heritage mission(s)	name(s)	INCUS
Nominal schedule	months (ATP to ready for payload I&T)	18
Nominal schedule	months (ATP to launch)	24

## OPTIONS

Contract Option #1	Enhanced Data Rates with X-band Radio
Contract Option #2	Tighter pointing with fine-balanced reaction wheels
Contract Option #3	Different orbits (GEO, cislunar)