Designed for Small Explorer (SMEX) Class Missions, the BCP 600 provides a cost-effective solution when performance, high reliability and extended mission lifetime are important. The bus can operate in a wide range of orbits and can accept any type of instrumentation requiring precision pointing control and knowledge, with the flexibility for rapid target selection.

Mechanical

The BCP 600 configuration uses a simple, roughly cubical "Unibody" graphite epoxy/honeycomb structure. An internal 55 x 55 x 55-cm compartment can accommodate payload units and/or additional propellant tanks. The payload deck above the internal cavity provides a volume approximately 112 cm in diameter and 101 cm high, using the Pegasus XL launch vehicle fairing.

Electrical Power

The power subsystem employs a fully redundant power control and distribution unit, a 20 amp-hour NiH_2 battery with a spare cell, and four radially deployed solar array panels totaling about 2.4 m^2. A variety of alternate array configurations can be accommodated to

BCP 600 Mission Suitability

Item	BCP 600 Performance
Launch Vehicles	Pegasus XL or Taurus Multiple Manifest
Design Life	6 years; redundant architecture
Orbit Options	450 to 900 km altitude, 0 to sun-synch inclination
Geolocation	By ground system
Operations	Simultaneous data acquisition by payload(s) and data transmission capability
Onboard Data Storage Capability	2 Gbit payload data + 256 Mbit spacecraft housekeeping
ADCS Approach	3-axis zero net momentum, stellar-inertial referenced
Pointing Accuracy	<70 microradians/axis
Pointing Knowledge	<60 microradians/axis
Pointing Stability	<20 microradians per second
Agility	Slew rate to 1 deg/sec Angular acceleration to 0.01 deg/sec^2
Communications Payload Data Downlink Command Uplink	 Up to 2 Mbps S-band Up to 2 Kbps S-band
Propulsion	(Optional) monopropellant hydrazine; up to 28 kg propellant and 185 m/s (with 90 kg payload)
Spacecraft Mass	288 kg with maximum payload mass
Maximum Payload Mass	90 kg (structural limit)
Maximum Payload Power	125 W orbit average with array sun normal
Maximum Payload Volume External Internal	 111 cm diameter at base; tapers to 70 cm diameter at height of 101 cm 71 cm x 71 cm x 55 cm high
Delivery Time	32 months after receipt of order

support varying mission requirements and payload arrangements.

Command and Data Handling

All units of the command and data handling (C&DH) subsystem are redundant. The spacecraft computer can be reprogrammed on orbit through software updates during normal operations. Multiple levels of save modes protect the entire bus from errors including software errors. Command and telemetry processing is handled in a dedicated unit with storage for 256 Mbits of engineering data. The architecture provides real-time command and telemetry functions even when the spacecraft computer is off. A solid-state recorder (SSR) with a capacity of up to 2 Gbits provides storage for payload data. The SSR can handle input rates up to 17 Mbps while simultaneously outputting up to 1 Mbps to the transmitter.

RF Communication

The bus RF uplink/downlink uses a STDN-compatible S-band transponder and two omni antennas for data transmission and reception for all bus attitudes. Payload data is downlinked at up to 2 Mbps; commands can be received at up to 2 Kbps.

Attitude Control

The Attitude Determination and Control System (ADCS) uses redundant star trackers, inertial reference units, sun sensors and magnetometers for attitude determination. Four low-vibration reaction wheels and three torque rods with redundant windings and drivers are used for control, allowing the BCP 600 to handle all pointing orientations. Depending on payload inertial characteristics, the bus design provides a slew rate capability of up to 1 deg/s and angular acceleration capability of about 0.01 deg/s^2.

Propulsion

The optional mono propellant blowdown propulsion module uses two tanks that can store up to 28 kg of hydrazine and eight 4-N thrusters to provide roughly 185 m/s delta velocity (with a 90 kg payload). This delta-V is available for insertion error correction, drag make-up, attitude maneuvers, and emergency mode attitude control.

Thermal

Thermal control is primarily passive, supplemented with reliable heater controllers. The all-beta, all-aspect design allows any orbit or spacecraft orientation.

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