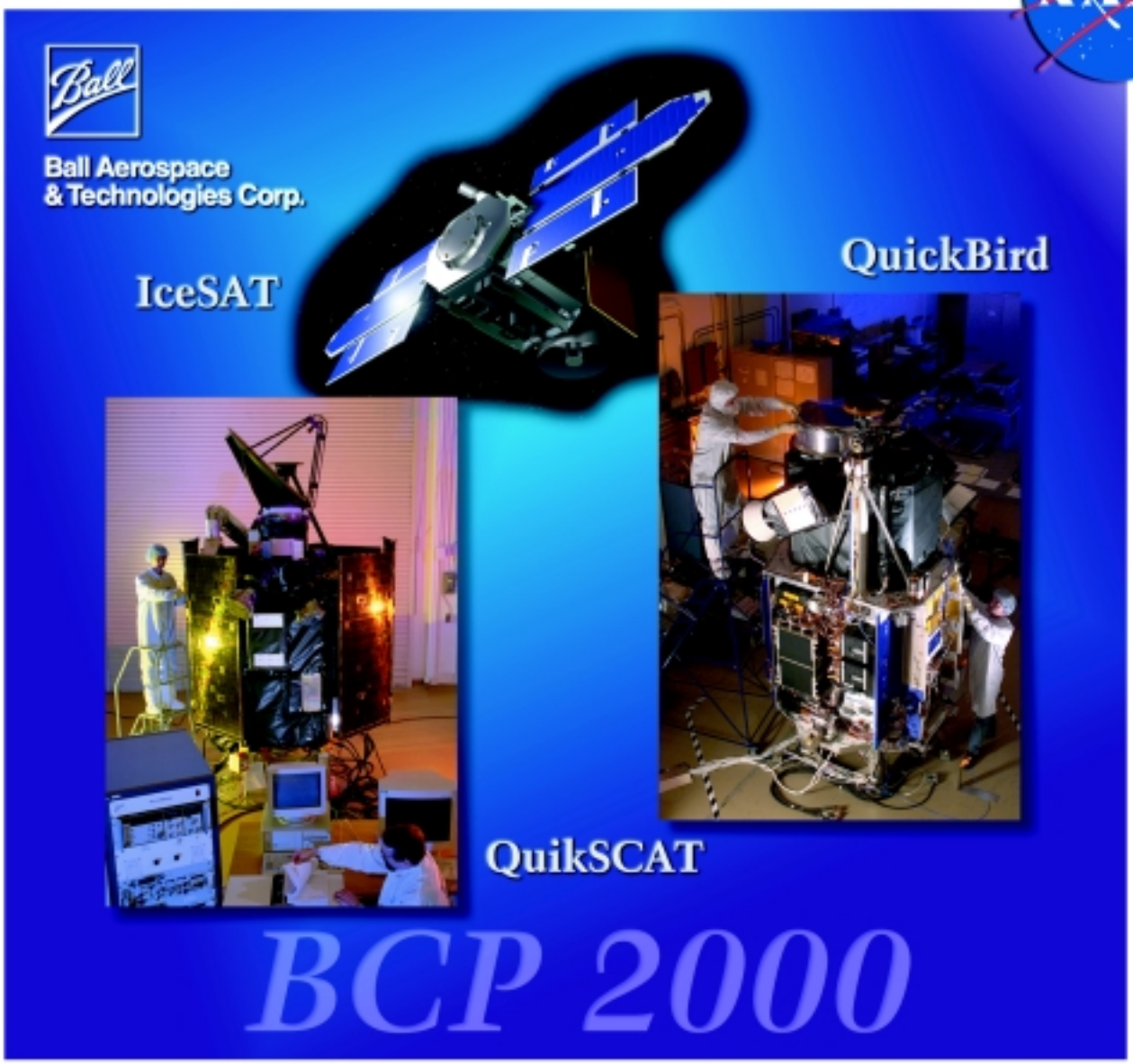

Designed for Earth remote-sensing applications, the BCP 2000 provides a cost-effective solution when performance, reliability and availability are important. The bus can accept any type of instrumentation requiring precision pointing control and knowledge, with the flexibility for rapid target selection.

Mechanical

The BCP 2000 configuration uses a simple panel-post aluminum honeycomb structure. A 91 x 120 x 101 cm-deep compartment can accommodate payload volume and/or additional propellant tanks. The payload deck above the internal cavity can accommodate a volume of 167-cm in diameter for a height of 37 cm, then expanding to the limits of the launch vehicle fairing. The QuikSCAT picture above depicts the launch configuration and the ICESat picture shows the in-orbit configuration. In addition, there are two standard areas to accommodate payload electronics on the bus: 71 x 71 cm and 96 x 101 cm. The height of the boxes is only constrained by the limits of the fairing.

Power

The power subsystem employs a fully redundant power control and distribution unit, a 40 amp-hour NiH_2 battery with a spare cell and two single-axis drive solar array panels.

BCP 2000 Mission Suitability

Item	BCP 2000 Performance
Launch Vehicles	Taurus, Athena, Titan II, Delta II, COSMOS SL-8, Long March
Design Life	>5 years achieved with redundant architecture
Orbit Options	400 to 900 km, 0 degrees to sun synchronous
Geolocation	<10 to 23 m (3-sigma) after ground processing
Operations	Simultaneous data acquisition by payload(s) and data transmission capability
Onboard Storage Capacity	Scalable up to 200 Gbits
ADCS Approach	3-axis stabilized, star tracker/IRU/ reaction wheels, C/A Code GPS
Pointing Accuracy	25 microradians per axis
Pointing Knowledge	<15 microradians per axis
Pointing Stability	<10 microradians per second
Agility (along and track)	Time to re-point and stabilize the cross spacecraft for data acquisition: Maneuver of 10 degrees in 20 seconds Maneuver of 50 degrees in 45 seconds
Communications Payload Data Housekeeping	 320 Mbps X-band S- or X-band from 4 to 256 Kbps 2 Kbps S-band uplink
Propulsion	Anhydrous Hydrazine (N_2H_4) blowdown
Spacecraft Mass	642 kg (wet)
Maximum Payload Mass	380 kg (nominal orbit)
Maximum Payload Power	<730 W continuous, <952 W sunlit, <285 W eclipse (orbital average)
Maximum Payload Volume	82x115x218 cm excluding accommodation for payload electronics
Delivery Time	<24 months depending on amount of customization required and inventory status; additional systems can be delivered every 4 months after the first unit.

Note: Numerical ranges reflect orbit altitude options (400 km to 900 km)

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. Solid-state recorders (SSR) with a capacity of up to 200 Gbits provide storage for payload data. The SSR can handle input rates up to 576 Mbps while simultaneously outputting 320 Mbps to the transmitter.

RF Communication

The BCP 2000 RF uplink/downlink uses a STDN-compatible S-band transponder for narrow band data transmission and reception for all bus attitudes. X-band downlink provides a 320 Mbps link for downlinking payload data.

Attitude Control

The Attitude Determination and Control System (ADCS) uses two star trackers, redundant 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. Thus the BCP 2000 can handle all pointing orientations. The bus design is highly agile with slew rate capability of 4 deg/s and angular acceleration capability of about 0.1 deg/s^2. Redundant GPS receivers and antennas allow precision orbit determination, timing and geolocation.

Propulsion

The mono propellant blowdown system uses a single tank to provide roughly 72 m/s delta velocity for insertion error correction, drag make-up, attitude maneuvers and emergency mode contingency.

Thermal

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

For more information contact:
Rapid Spacecraft Development Office
NASA Goddard Space Flight Center
Mail Code 456
Greenbelt, MD 20771 USA

Phone: 301/286-1289
Web: http://rsdo.gsfc.nasa.gov