StarBus™ Satellite Platform

A fully redundant, flight-proven, Delta-class spacecraft bus designed for geosynchronous missions.

DESIGN

Orbital's StarBus satellite platform, which is designed for 10-year missions in geosynchronous orbit, is compatible with the Delta II, Ariane, Proton and Long March launch vehicles. The structure consists of a rectangular body with a central composite thrust tube housing the apogee kick motor. Payload equipment is mounted on the north and south side panels and on the nadir-facing deck providing excellent fields of view for Earth-viewing instruments and for thermal radiators. Articulated sun tracking solar arrays are deployed in two wings from the north and south faces of the spacecraft.

Launch configuration of IndoStar 1

PAYLOAD SUPPORT

Originally designed for geosynchronous telecommunications applications, StarBus can be adapted to technology demonstrations and Earth and space science programs such as GOES. For ten-year missions launched on a Delta, payloads up to 200 kg and 555 W can be accommodated, with growth possible for shorter missions. Standard interfaces and protocols such as MIL-STD-1553, CCSDS and 28V power simplify integration.

HERITAGE

Designed and developed as a standard bus for commercial telecommunications and direct broadcast missions, StarBus fills a market niche for small, high power geosynchronous communications spacecraft. Orbital's first application of the StarBus design, IndoStar 1, was successfully launched in November 1997 along with another satellite on an Ariane rocket.

VERSATILITY

StarBus is ideal for geosynchronous missions since it is capable of withstanding the severe environments of high altitude orbits and providing the large impulse required to attain geosynchronous orbit. Several available options augment the basic bus to provide improved pointing, more payload power, secure communications, higher downlink data rates or enhanced payload computing power.

MISSION LIFE

StarBus is designed for missions up to 10 years in duration. The propulsion system is sized for ten years of stationkeeping in geosynchronous orbit. Built-in radiation hardness for the severe geosynchronous environment is achieved through conservative selection of electronic parts.

Flight Configuration of StarBus

SHARED LAUNCH OPPORTUNITIES

Designed to be compatible with vehicles such as Ariane, which commonly launch multiple payloads, the StarBus design offers frequent, cost-effective launch-sharing opportunities.

DATA SERVICES

Customers can purchase the StarBus spacecraft bus alone, or as part of a turn-key service that includes an integrated payload, operations and data delivery as well. For the Orbview-1 and OrbView-2 programs, which are based on other Orbital-built satellites, the company provided end-to-end services, producing the satellite bus, integrating the payload, and launching the satellite on a Pegasus. Orbital currently conducts missions operations from its own ground station, delivering data to principal investigators via direct downlink and the Internet.

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Technical Specifications

Core Bus Features

Bus Dry Mass	558 kg
Payload Mass Capability	≥200 kg
Redundancy	Full dual string
Orbit	Geosynchronous
Typical Mission Lifetime	10 years with P_S> 0.86
Delivery	30 Months ARO
Launch Vehicle	Delta II (shown), Ariane, Proton, Long March

Structure

Bus Dimensions (H x W x L)	1.75m x 1.7m x 1.8m
Payload Support Dimensions	1.0m x 1.8m x 1.2 m, plus north/south panels (see diagram)
Construction	Composite / Al

Power Subsystem

Payload Power	555 W orbit average @ 10 Yrs.
Bus Voltage	24-36 VDC (nominal)
Solar Arrays	4 Panel silicon, 2 solar tracking wings
Batteries	2 x 52 A*hr, NiH_2

Attitude Control Subsystem

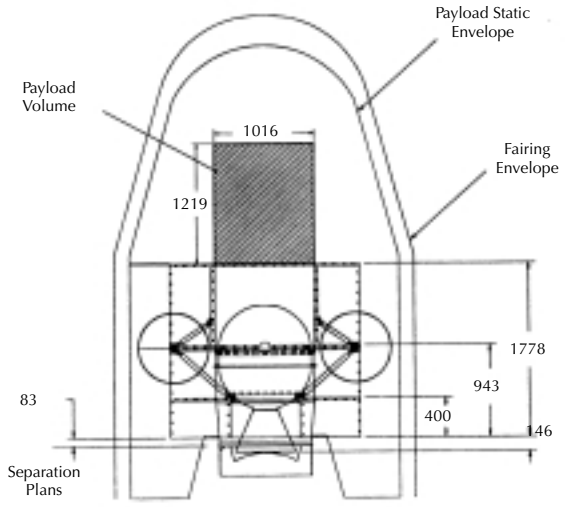
Stability Mode	3 axis momentum bias, nadir oriented
Pointing Capabilities:	
Control	±0.2° (R/P)
Knowledge	≤0.1° (R/P)
Rate/Stability	≤ 0.001°/sec

Propulsion Subsystem

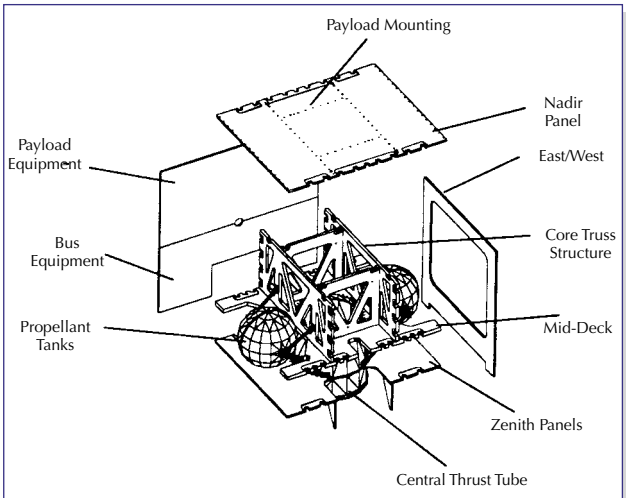
Hydrazine	6 x 10^5 N*sec
Solid Rocket Motor	2.5 x 10^5 N*sec

Command & Data Handling Subsystem

Flight Processor	MIL-STD-1750A
Rad Tolerant	100 K rad
Interface Architecture	MIL-STD 1553B, CCSDS
S-Band Uplink Rate	2 Kbps
S-Band Downlink Rate	1 Mbps



StarBus Payload Accommodation on Delta
(dimensions in mm)



StarBus Design

OPTIONS

- Zero momentum attitude control system improves pointing control to 0.04° and knowledge to 0.03°
- Larger solar arrays and batteries increase payload power to 1400 Watts @ 10 years
- R6000 payload processors enhance payload computing power
- X-Band transmitter increases downlink data rate to 50 Mbps
- Add a 32 Gbit SSR paylod data unit

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

Orbital
"Bringing the Benefits of Space Down to Earth®"