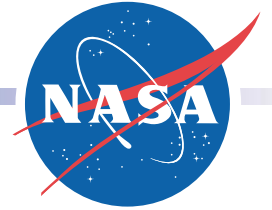


MicroStar™ Satellite Platform



An affordable, flight-proven, commercially-produced spacecraft bus suitable for medium-sized payloads and designed for Pegasus and Taurus ride sharing.

DESIGN

Designed to be launched in multiple or “piggyback” units, Orbital’s innovative MicroStar satellite platform supports payloads up to 68 kg and provides a three- to five-year mission life. The baseline bus is comprised of three rings stacked together vertically—a core ring housing all primary spacecraft bus systems and a payload support module consisting of two rings and a payload mounting shelf. Payloads requiring different depths can be easily accommodated by using fewer rings, or by creating a custom ring. The open avionics architecture, stackable mechanical design and scalable spacecraft design maximize payload performance and flexibility.



OrbView-1 (MicroLab) during integration and test

PAYLOAD SUPPORT

The MicroStar configuration is applicable for a variety of missions, from technology demonstrations to space science programs such as QuikToms. MicroStar is also an ideal bus for science missions that require simultaneous deployment of multiple spacecraft, as in certain magnetospheric and ionospheric investigations.

HERITAGE

The MicroStar platform was originally developed to support the ORBCOMMsm wireless data communications system, which provides real-time, mobile, two-way data and messaging communications services worldwide. The first three MicroStar units, ORBCOMM FM-1&-2 and the OrbView-1 remote sensing satellite, were launched on a single Pegasus[®] in April 1995. Entering their fifth year of operation, these satellites continue to operate reliably.

COMMERCIAL PRODUCTION APPROACH

Using a production line approach for assembly and testing, Orbital has delivered 38 MicroStar spacecraft, including 26 ORBCOMM satellites launched in 10 months. This approach provides cost and schedule advantages through the use of mature designs, familiar manufacturing and test equipment, dedicated and experienced personnel, and established vendor sources. The production line has remained in place to support ORBCOMM spares and individual MicroStar missions such as T1 and MUBLCOM. NASA's QuikTOMS spacecraft is also taking advantage of this production line.



Eight ORBCOMM satellites mounted to Pegasus

SHARED LAUNCH OPPORTUNITIES

MicroStar’s unique, stackable design offers frequent, cost-effective launch-sharing opportunities. For example, eight ORBCOMM satellites are launched at one time on a Pegasus. While MicroStar is optimized for Orbital’s Pegasus and Taurus[®] launch vehicles, it can fly on other vehicles as well.

DATA SERVICES

Customers can purchase the MicroStar spacecraft alone, or as part of a turn-key service that includes operations and data delivery as well. For the OrbView-1 and OrbView-2 programs, Orbital provided end-to-end payload services. The company produced the satellite bus, integrated two payloads, and launched the satellite on Pegasus. Orbital currently conducts mission operations from its own ground station delivering data to principal investigators via direct downlink and the Internet.

MicroStar™ Satellite Platform

Technical Specifications

Core Bus Features

Bus Dry Mass.....	58.6 kg
Payload Mass Capability.....	68.0 kg
Redundancy.....	Single string
Orbit.....	700-1,000 km, all inclinations
Launch Vehicle Compatibility.....	Pegasus, Taurus, SELVS I and II
Typical Mission Lifetime.....	3-5 years
Delivery.....	24 Months ARO

Structure

Bus Dimensions (Δ x H).....	104 x 16.5 cm
Payload Support Module Dimensions (Δ x H).....	104 x 33 cm
Construction.....	AlBeMet/Al Honeycomb
Shape.....	Dual-faced cylinder

Power Subsystem

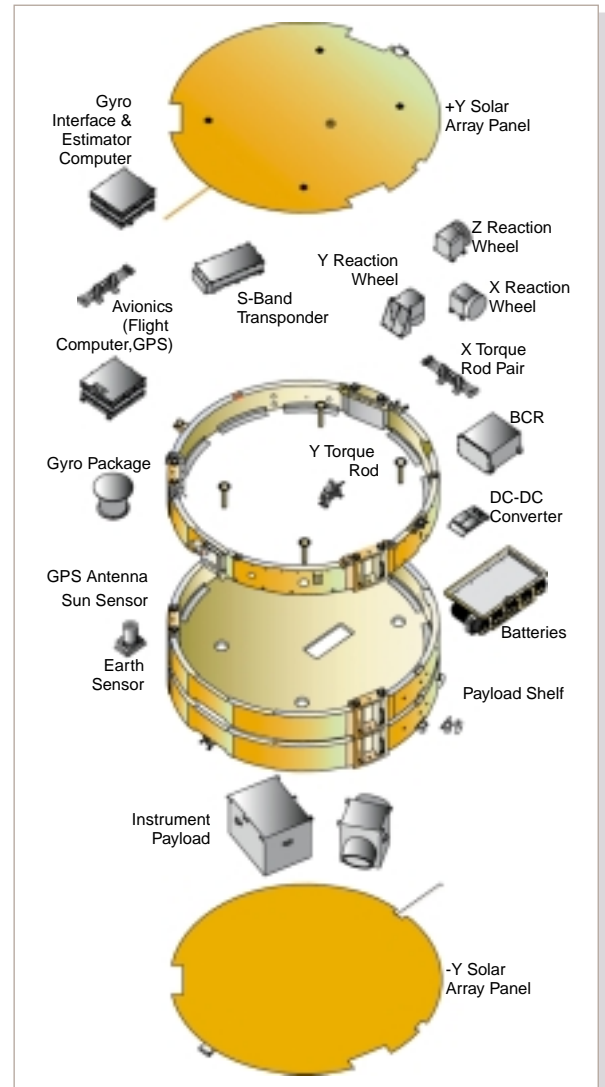
Payload Power.....	50 W orbit average
Bus Voltage.....	14 VDC unreg, 28 V reg
Solar Arrays.....	2 GaAs
Batteries.....	10 A*hr NiH ₂ CPVs

Attitude Control Subsystem

Stability Mode.....	3-axis
Pointing Capabilities:	
Control.....	± 0.6°
Knowledge.....	< 1°
Rate/Stability.....	< 0.01°/sec

Command & Data Handling Subsystem

Flight Processor.....	68302
Rad Tolerant	15 K rad
Data Storage Capacity.....	3 MB
Interface Architecture.....	RS-422/RS-485
S-Band Uplink/Downlink Rates.....	2 Kbps/2 Mbps



OPTIONS

- Custom structural ring configuration for flexible payload accommodations
- Increased power (up to 270W BOL) provided by second set of solar arrays for certain orbit/payload combinations
- 1553/1773 payload data interface to accommodate existing high-level interfaces
- Reduced pointing accuracy function (10° accuracy per axis) for missions requiring less precision
- Payload data storage enhancement (256 MB of storage)
- Propellant capacity of 26 kg hydrazine with 4 thrusters of 0.9 N each for orbit maintenance
- Mission operations and data delivery for two years

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