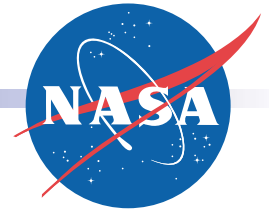


MidStar™ Satellite Platform



A fully redundant, flight-qualified MedLite-class spacecraft bus capable of supporting large, complex, high power payloads.

DESIGN

As the pathfinder for NASA's Mid-Class Explorer program (MIDEX), the Far Ultraviolet Spectroscopic Explorer (FUSE) mission required a reliable spacecraft capable of precision pointing and of being produced on a challenging schedule. The MidStar bus is the result. Compatible with the Delta launch vehicle but adaptable to other Med-Lite vehicles, the compact spacecraft supports large payloads through a thermally isolated three-point stable interface mount and provides clear fields of view for instruments.

PAYLOAD SUPPORT

The simple electrical interface provides standard 28V power and a standard MIL-STD-1553 bus with CCSDS protocols. The baseline attitude control system employs redundant Star Trackers, but can accept a fine error signal from the payload for more precise pointing.

HERITAGE

The MidStar subsystems have all been adapted from previous spacecraft programs and feature extensive heritage from other successful Explorer-class spacecraft such as EUVE and XTE. No technology development was required for any component, and no mission-unique qualification effort was necessary, thereby minimizing risk and cost.

VERSATILITY

Originally developed for space observation missions, the MidStar bus can be readily adapted for many mission types requiring high data handling capabilities with the addition of a large capacity SSR and an x-band downlink system. The structure can be adapted to the payload and the launch vehicle, and the power system sized to support the mission requirements.

REDUNDANCY

For high reliability, MidStar features a fully redundant architecture achieving 0.93 reliability at 3 years. If desired, redundancy can be reduced to meet lower cost and weight requirements.

DATA SERVICES

Customers can purchase the MidStar 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, 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 mission operations from its own ground station, delivering data to principal investigators via direct downlink and the Internet.



FUSE during integration & test



Artist's rendering of FUSE on Orbit

MidStar™ Satellite Platform

Technical Specifications

Core Bus Features

Bus Dry Mass.....	580 kg
Payload Mass.....	≤ 780 kg
Reliability.....	0.93 @ 3 years
Orbit.....	768 km, 25°
Launch Vehicle.....	Delta
Typical Mission Life.....	3-5 years
Delivery.....	27 Months ARO

Structure

Bus Dimensions.....	2.0m x 2.0m x 1.0m
Available Payload Volume.....	2.2m diam x 4.5m (Delta)
Construction.....	Al Honeycomb
Shape.....	Rectangular

Power Subsystem

Payload Power.....	323 W (orbit average)
Bus Voltage.....	22-35 V
Solar Arrays.....	2 GaAs
Batteries.....	2x40 A*hr NiCd

Attitude Control Subsystem

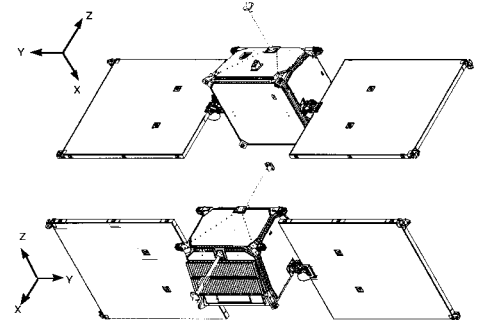
Stability Mode.....	Three axis, zero momentum inertially pointed
Pointing Control.....	< 0.5 arcsec (with fine payload- provided error sensor, FES)
Pointing Knowledge.....	< 0.3 arcsec (with FES)
Position Knowledge.....	Derived from ground tracking data

Command & Data Handling

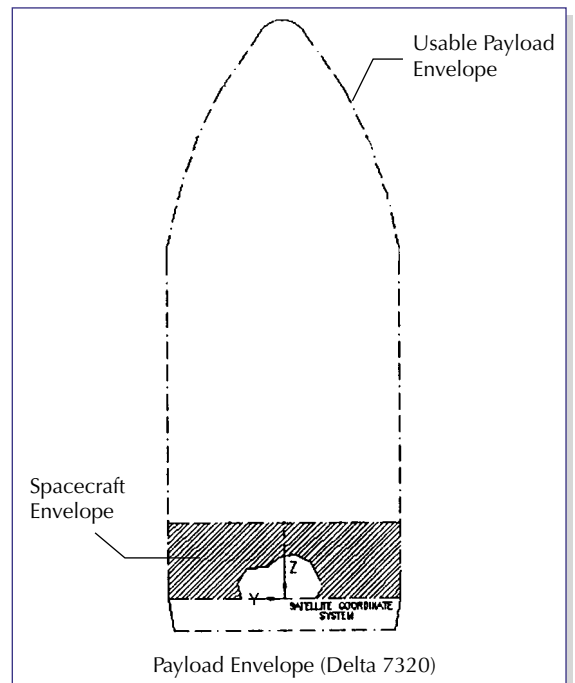
Flight Processor.....	80386 with 80387 coprocessor
Radiation Tolerance.....	7.5 K rad
Data Storage Capacity.....	2 Gbits
Interface.....	MIL-STD 1553

Communication Subsystem

S-Band Rx/Tx Rates.....	2kbps/1Mbps
Interface.....	DSN compatible, CCSDS



MidStar Bus Flight Configuration



Payload Envelope (Delta 7320)

OPTIONS

- GPS receivers provide onboard position knowledge to within 100m
- Enhanced structure to carry up to a 3,000 kg payload
- X-Band downlink increases downlink data rate from 1 Mbps to 150 Mbps and increased data storage provides up to 128 Gbits
- Add a propulsion system which provides 234 kg of propellant
- Mission operations

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