

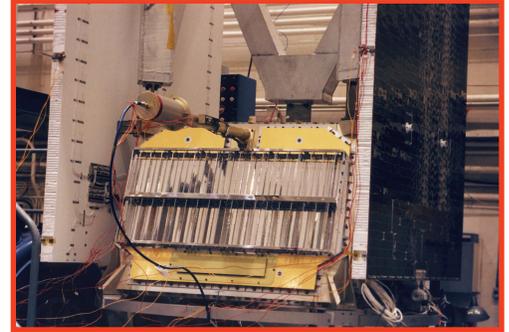
FUSE Satellite Platform



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 producible on a challenging schedule. The FUSE bus is the result. Compatible with the Delta launch vehicle, but adaptable to other Med-Lite vehicles, the compact spacecraft supports the much larger payload through a thermally isolated three-point stable interface mount and provides clear fields of view for the instrument.



PAYLOAD SUPPORT

The simple electrical interface provides standard 28V power and a standard MIL-STD-1553 bus with CCSDS protocols. For precision pointing control and knowledge, the attitude control system accepts a fine error signal from the payload.

HERITAGE

The FUSE 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 FUSE bus can be readily adapted for solar observation and Earth observation remote sensing missions by adding heritage attitude sensors and flight software. 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, FUSE features a fully redundant architecture achieving 0.93 reliability at 3 years. If desired, redundancy can be reduced to achieve cost and weight reductions.

DATA SERVICES

Customers can purchase the FUSE spacecraft itself, or the spacecraft, launch, operations and data delivery as a turn-key service. For the OrbView-1 and OrbView-2 programs, Orbital provided end-to-end services and is paid for delivery of data. The company produced the satellite bus, integrated the payload, and launched 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.

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Technical Specifications

Core Bus Features

Bus Dry Mass.....	580 kg
Payload Mass.....	≤ 757 kg
Reliability.....	0.93 @ 3 years
Orbit.....	800 km, 25°
Launch Vehicle.....	Delta
Typical Mission Life.....	3-5 years
Delivery.....	36 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

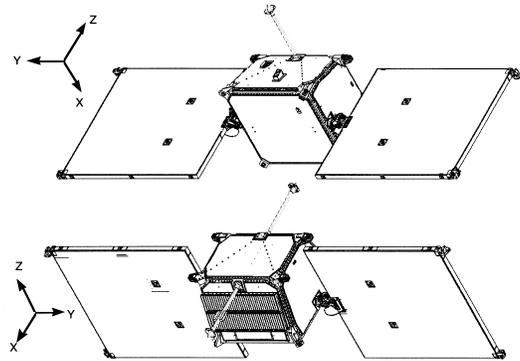
Stability Mode.....	Three Axis, Zero Momentum Inertially Pointed
Pointing Control.....	< 0.5 arcsec (with fine payload-provided error sensor, FES)
Pointing Knowledge.....	< 0.3arcsec (with FES)
Position Knowledge.....	Derived from ground tracking data

Command & Data Handling

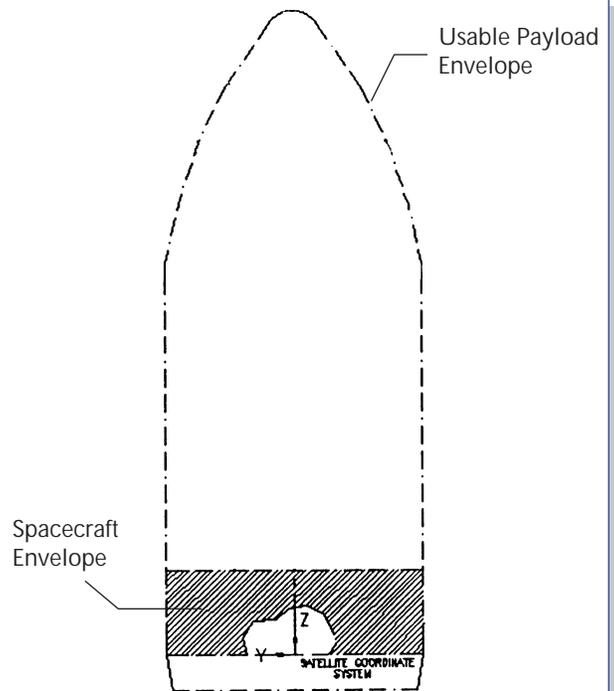
Flight Processor.....	80386 with 80387 coprocessor
Radiation Tolerance.....	Yes
Data Storage Capacity.....	2 Gbits
Interface.....	MIL-STD 1553

Communication Subsystem

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



FUSE Bus Flight Configuration



Payload Envelope (Delta 7320)

OPTIONS

- **Redundant Star Trackers** support pointing of <10 arcsec independent of instrument
- **GPS Receivers** provide onboard position knowledge to within 100m
- **Earth Sensors** provide <0.1° pointing for earth-observing missions
- **Digital Fine Sun Sensor** provides <0.01° pointing for solar observation missions
- **Wheel Isolation System** reduces instrument pointing jitter from reaction wheels by approximately an order of magnitude
- **Increased Data Storage** doubles mass memory storage capability from 2 Gbits to 4 Gbits
- **X-Band Downlink** increases downlink data rate from 1 Mbps to 8 Mbps
- **Redundancy Reduction** lowers spacecraft price for shorter duration or higher-risk missions