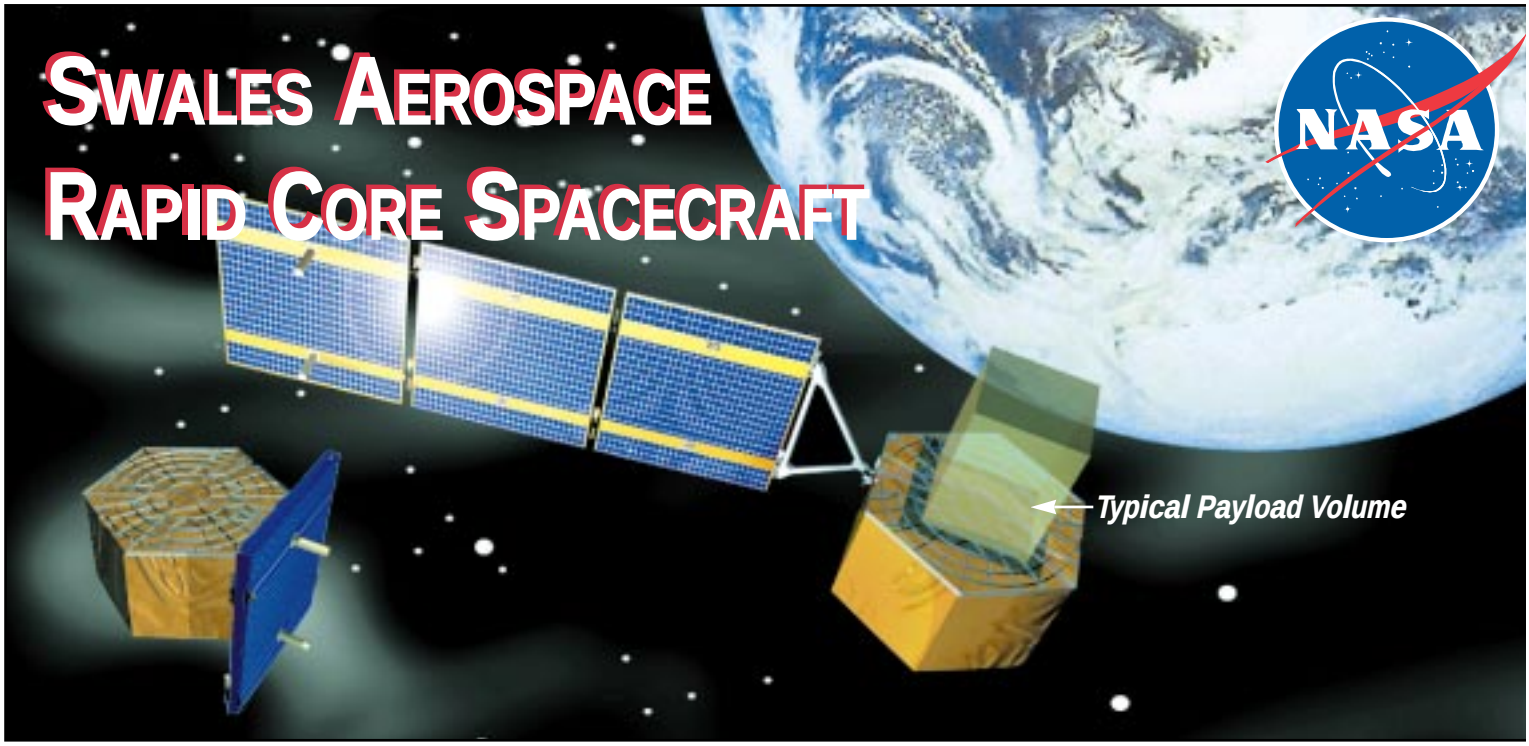
Swales Aerospace
Rapid Core Spacecraft



Payload Accommodation

Volume
When mounted to the nadir deck the payload footprint can be as large as 1x.75m. When mounted internally, the payload may be as large as 0.4 m in diameter. In either case, the Z dimensions of the payload are determined by the launch vehicle fairing. The Z dimension is typically 1.5m but could be greater depending on the launch vehicle fairing.

Mass
100kg, up to 200 kg with minor modifications

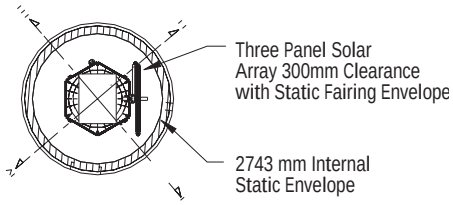
Power
Average experiment power: 80 to 300 watts depending on orbit, 28 ± 7 V DC bus

Thermal
No restrictions, instrument may be coupled or isolated as required

Alignment
Instrument may be aligned to the spacecraft axes up to 20 arcseconds

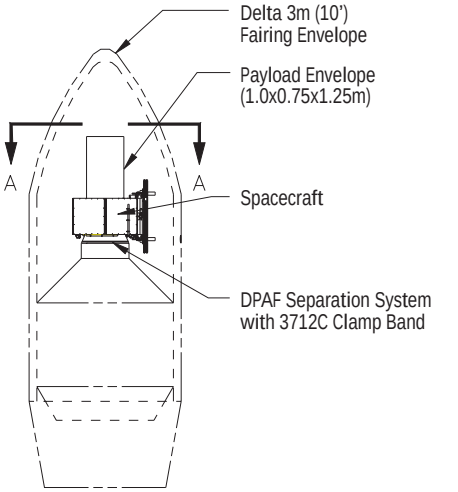
Launch Vehicle

The spacecraft is designed to be compatible with either a Delta or Taurus launch; however, with a small redesign it can be made compatible with a wide range of vehicles.

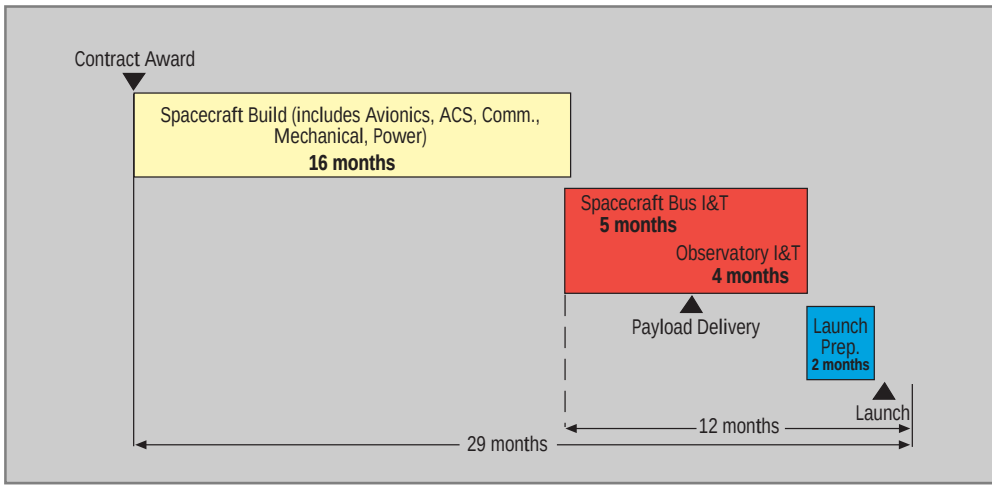


Orbits

- LEO 706 km sunsynchronous (current mission), 10 AM descending node (dual payload)
- Maximum altitude with Delta II is 9,500 km circular, 28.5° from Eastern Test Range (dedicated)
- Minimum altitude: 450 km for one year (2σ sun 1999)
- Compatible with all inclinations



Baseline Schedule



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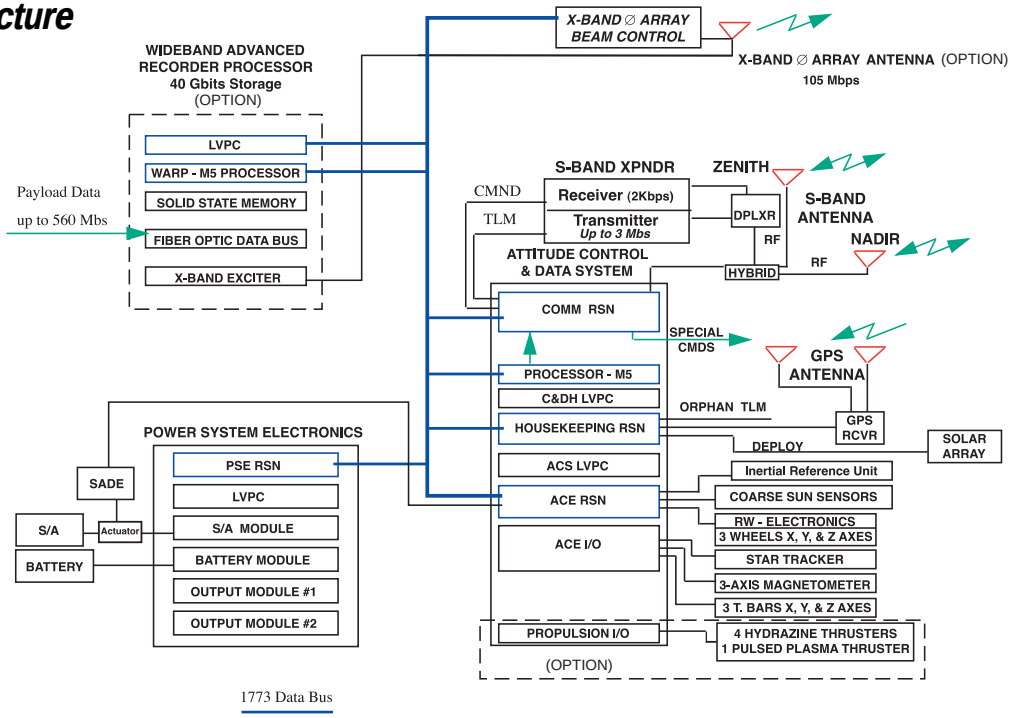
Avionics Architecture



C&DH Hardware

- MIDEX architecture, also used on GSFC's MAP mission
- Mongoose V processor, 12 MHz
- 1.8 Gbits of telemetry and command storage
- 1773 Fiber Optic Data Bus
- Stores 40 Gbits science data with optional Wideband Advanced Recorder Processor (GSFC)
- Telemetry housekeeping and science data downlink via S-Band selectable: 2 Kb/sec to 1 Mb/sec

C&DH Software

- EO-1 uses a proven software system with SAMPEX and XTE heritage
- Uses the CCSDS standard for telecommand packets
- Uses Standard hardware interfaces via a 1773 fiber optic bus
- Commercial standard and COTS tools enable PI-developed low cost software
- Supports on-orbit software modifications to maximize science return
- Software permits autonomous Sciencecraft operation
- Implements standard software protocol compatible with the World Wide Web
- All flight and ground system software can be made to be compatible with commercially available software

Guidance, Navigation and Attitude Control Performance

- Three axis stabilized for inertial and nadir pointing
- Pointing accuracy to 0.03°, 3σ in all three axes
- ACS Knowledge accuracy to 20 arcseconds, control to 23 arcseconds, stability to <0.5 arcseconds/second
- GPS receiver for onboard navigation and timing accurate to 1μsec
- Independent safehold processor

Guidance, Navigation and Attitude Control Hardware

- Litton SIRN gyro
- Adcole Coarse Sun Sensor
- Lockheed Autonomous Star Tracker
- SAIC Magnetometer
- Ithaco Type A wheels
- Ithaco Torquer Bar

Guidance, Navigation and Attitude Control Software

- Mongoose V processor implements control algorithms and ACS software
- Versatile ACS Flight software permits slewing to celestial objects

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