

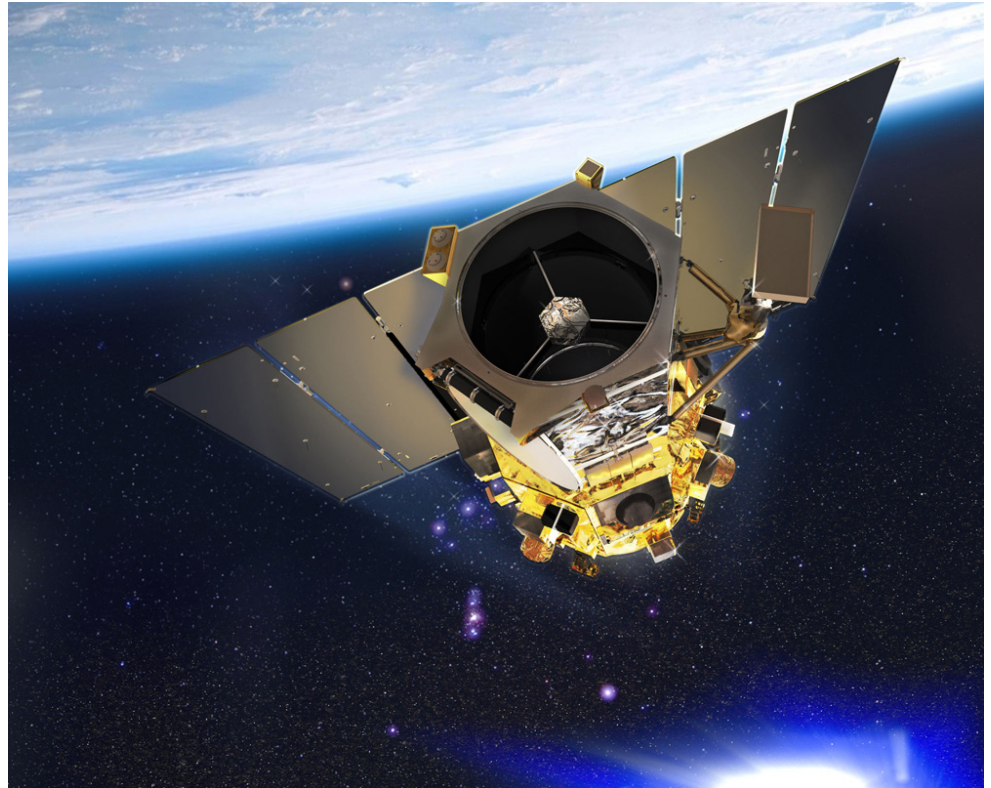
GeoEye-1

Earth Imaging Satellite

world's highest resolution commercial imager

Features

- Simple, easily integrated design based on our flight-proven SA-200HP modular spacecraft architecture that reduces assembly and test cycle times
- Launch: September 2008 on ULA Delta II 7420-10 from Vandenberg AFB
- Launch Mass: 1955 kg (4310 lbm)
- 3862 W EOL solar array
- Orbit: 681 km (367 naut mi) polar, sun synchronous
- Data Downlink: User selectable to 150 or 740 Mbps, X-Band
- Revisit Time: < 3 Days
- Design Life: 7 years (15-yr fuel supply)
- Maximum Pointing Knowledge Error: 0.133 arcseconds RMS (0.4 at 3σ)
- Maximum Attitude Jitter: 7 milli-arcsec/sec RMS, 25 - 2000 Hz
- Slewing: to 2.4 deg/sec with acceleration to 0.16 deg/sec²
- Image Resolution:
 - 0.41 meter panchromatic
 - 1.65 meter multispectral
- Satellite Daily Collection Capacity (nadir to 40°):
 - 700,000 sq km panchromatic
 - 350,000 sq km multispectral



A next-generation earth-imaging platform with the highest resolution and most advanced collection capabilities of any commercial imaging satellite developed to date.

Modular spacecraft developed from proven core designs

General Dynamics is the prime contractor for design, build, integration, and test of the satellite. The camera and optical telescope assembly were subcontracted to ITT Corporation (Rochester, NY). Our spacecraft design is based on General Dynamics' SA-200HP standard modular bus, with additional design heritage from our Coriolis (USAF/USN), Swift (NASA), and Fermi Gamma-ray Space Telescope (NASA) spacecraft developments. The fully redundant GeoEye-1 spacecraft has a design life of seven years and a sophisticated attitude control system to provide a highly stable, while also highly agile imaging platform.

GeoEye-1

Earth imaging satellite

Detailed Information*

General

Dimensions, Stowed: 14.27 x 8.86 ft dia
(4.35 x 2.7 m)

Orbit: 681 km (367 naut mi) @ 98° inclination

Reliability/Life (predicted): 0.75 @ 7 years

Launch Date and Vehicle: September 2008 on a
United Launch Alliance Delta II 7420-10

Mass & Power

Launch Mass: 1955 kg (4310 lbm)

Bus Mass: 1260 kg (2778 lbm)

Solar Array: Deployable, 7-panel, GaAs,
3862 W EOL

Battery: 160 amp-hr NiH₂ CPV

Structure & Mechanisms

Eight-sided aluminum honeycomb with frame

An optical bench, attached to the spacecraft
through kinematic mounts, provides precise
thermally controlled alignment of the
instruments

Compatible with standard Delta model 6306
payload attach fitting

ADCS

3-axis stabilized, (8) high-performance RWAs,
ZMB

Slewing to 2.4 deg/sec with acceleration to
0.16 deg/sec²

Dual-head star tracker, scaleable space IRU,
10-cell coarse sun sensor, (2) GPS receivers,
(3) EM torque rods, and a TAM

Bi-axial gimbal drive for antenna pointing

Pointing Accuracy (3 σ): ≤ 75 arcsec

Pointing Knowledge (3 σ): ≤ 0.4 arcsec

Attitude Jitter: ≤ 0.007 arcsec/sec RMS
(25 - 2000 Hz)

Geolocation: 5m CE90 Mono; 4m CE90
Horizontal Stereo; 6m LE90 Vert Stereo

C&DH

Standard cPCI backplane/bus, RAD750 CPU, block
redundant with automated handover to backup

MIL-STD-1553B data bus

1000 Gbit (1 Tbit) bulk storage for image data,
ancillary data, and stored SOH data

Thermal Control

Passive, cold-biased, heat pipes

Thermostatically-controlled heaters

Multi-layer insulation on spacecraft and payload
as required

Comm Links

X-band imagery downlink; rate selectable to
740 Mbps or 150 Mbps

S-band command uplink at 64.0 kbps

X-band telemetry/SOH downlink at 59.7 kbps

Propulsion

Thrusters: 8 @ 5 lbf (22.2 N) each

Maximum $\Delta V = 232$ mps

Propellant Onboard: 144.5 kg (318.6 lbm);
a 15 yr supply

Camera/Imaging

Line scan imaging system with time delay
integration

Three-mirror anastigmat telescope with two fold
mirrors

1.1 m clear aperture; 13.3 m focal length

Field of View: $> 1.28^\circ$

Resolution at Nadir: 0.41 meter panchromatic;
1.65 meter multispectral

Satellite Daily Collection Capacity (nadir to 40°):

- 700,000 km² panchromatic
- 350,000 km² multispectral

Revisit Time: < 3 days



GeoEye-1 in final integration

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