

GLAST

Gamma-Ray Large Area Space Telescope

Features

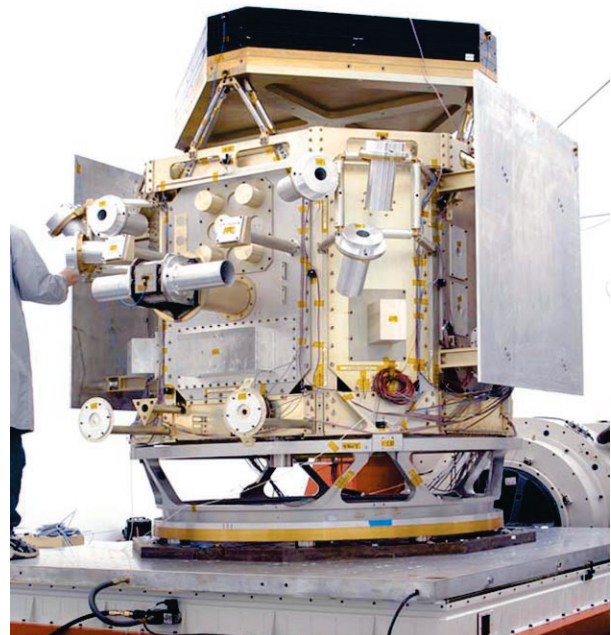
- A NASA-Sponsored, International Collaboration
- 4277 kg (9429 lb) Launch Mass
- 1534 W OAP (3122 W EOL Array)
- 565 km (305 naut mi) Circular Orbit @ 28.5° Incl
- Extremely Broad Energy Range: 10 keV - 300 GeV
- Sensitivity to 100X Over Previous Missions
- Telescope Attitude Jitter < 0.26 arcsec/sec (400 ms)
- 2007 Launch with Five-Year Design Life

GLAST is a next generation, high-energy gamma-ray observatory designed to probe black hole particle jets, gamma-ray bursts, dark matter, and other energetic phenomena by observing gamma rays. GLAST will make observations of celestial gamma-ray sources in the energy band extending from 10 keV to more than 300 GeV – the broadest energy coverage ever provided by a single spacecraft for gamma-ray studies. It follows in the footsteps of the Compton Gamma Ray Observatory (CGRO) and the Swift Gamma-Ray Observatory.

The GLAST mission is a flagship mission in NASA's Science Mission Directorate. For this unique endeavor, NASA is teamed with the U.S. Department of Energy and academic institutions in the United States, France, Germany, Japan, Italy, and Sweden.

The primary instrument is the Large Area Telescope (LAT), an imaging gamma-ray telescope employing detectors that convert incoming gamma rays into electrons and their antimatter partners, called positrons. This technique, called pair conversion, enables scientists to track the direction of gamma rays and measure their energy. The LAT is being assembled and tested at the Stanford University Linear Accelerator Center with significant contributions from the U.S. Department of Energy, and from collaborators at UC Santa Cruz, the U.S. Naval Research Laboratory, and institutes in France, Italy, Japan and Sweden. Compared to previous gamma-ray missions, the LAT is superior in imaging area, angular resolution, field of view, and deadtime, which together provides a sensitivity improvement of up to 100 times.

The secondary instrument is the GLAST Burst Monitor (GBM) that augments the study of gamma-ray bursts. The GBM is being developed at NASA's Marshall Space



Flight Center in Huntsville, Alabama, and the Max Planck Institute for Extraterrestrial Physics in Germany.

General Dynamics C4 Systems is the observatory system integrator, responsible for the design and manufacture of the spacecraft bus as we were for the Swift Gamma-Ray Observatory. Pictured above is the GLAST flight structure, with mass models, undergoing strength testing at General Dynamics.

GLAST is scheduled for launch in 2007 aboard a Delta 2920H-10 from the Cape Canaveral Air Force Station. The NASA Goddard Space Flight Center competitively awarded the contract and continues as the managing agency.

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Performance Characteristics*

General	<p>Dimensions, Stowed w/o PL: 2.8 m x 2.5 m dia (9.2 x 8.2 ft) Orbit: 565 km (305 naut mi) @ 28.5° inclination Propellant On Board: 358 kg (789 lb) Max ΔV: 171 mps (561 fps) Reliability/Life (predicted): 0.87 @ 5 years Launch Date and Vehicle: Summer 2007 on a Delta 2920H-10 Mission Burst Coordinates Reporting Time: ≤ 9 seconds</p>
Mass & Power	<p>Launch Mass: 4277 kg (9429 lb) Bus Mass (dry): 1047 kg (2308 lb) Power Load (OAP): 820 W bus; 719 W PL Solar Array: Two, 3-panel, deployed, 3-jct GaAs/Ge; 3122 W EOL Battery: 125 amp-hr NiH₂ IPV</p>
C&DH	<p>RAD750 CPU, cPCI interface MIL-STD-1553B instrument Data Bus 129.7 Gbit solid state recorder for science data storage Instrument data loss (typ): $\leq 0.001\%$ (10 ppm)</p>
ADCS	<p>3-Axis Stabilized, 4 Reaction Wheel Assemblies, ZMB On-Board Attitude Determination with Star Trackers, IMU, and GPS Attitude Control Error (3σ): ≤ 0.3 degrees Attitude Knowledge Error (3σ): ≤ 11.7 arcsec at LAT interface Attitude Jitter: ≤ 0.26 arcsec/sec RMS (400 ms interval) at LAT interface</p>
Structure & Thermal	<p>Aluminum primary bus structure Riveted aluminum frame with honeycomb panels and flexure mounts External mounted components enhance accessibility Separate GNC optical bench provides robust and stable pointing reference Passive, cold-biased thermal system using local radiators, and thermostatically controlled heaters</p>
Comm Links	<p>40 Mbps Ku-band DL for stored science, SSOH, and real time data 4.0 kbps S-band TDRSS telecom UL 2.0 kbps S-band GN commands UL 2.5 Mbps S-band GN telemetry DL</p>
Instrument Info	<p>Large Area Telescope (LAT): Energy Range: 20 MeV to > 300 GeV 5.4 cm² radiator area Peak Effective Area: 8000 cm² Field of View (FOV): > 2.5 sr Point Source Sensitivity: $< 6 \times 10^{-9}$ cm⁻²s⁻¹ (>100 MeV) GLAST Burst Module (GBM): Energy Range: 10 keV to 30 MeV 14 distributed sensors Field of View (FOV): $> 3\pi$ sr Burst Sensitivity: < 0.5 cm⁻²s⁻¹ peak (50 - 300 keV)</p>

*Data reflects actual performance or current best estimates
as of the release or revision date shown below

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0000-PR-U44613-000 (Rev B1 - 8/13/05)