GLAST Large Area Telescope:

Project Status

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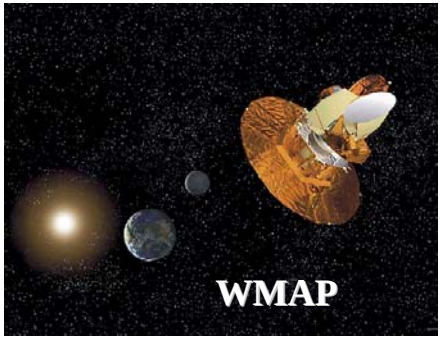
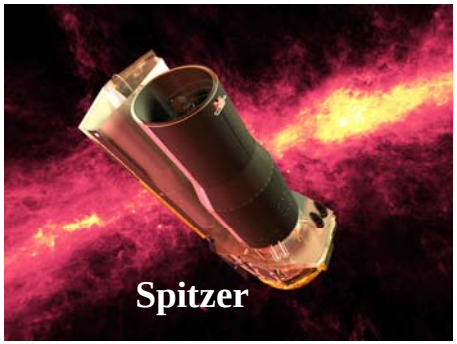
Gamma Ray Large Area Telescope

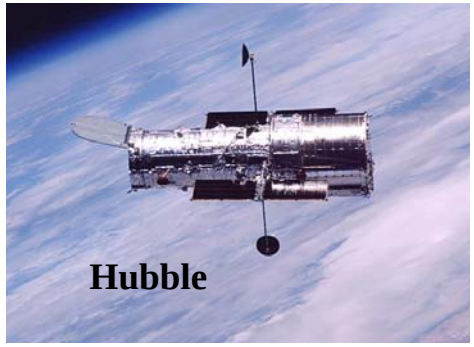
- Next observatory to be Launched by NASA
  - Fall of 2007
- Extends the scientific reach in the gamma ray spectrum
  - Higher energy
  - Greater sensitivity
  - Better resolution

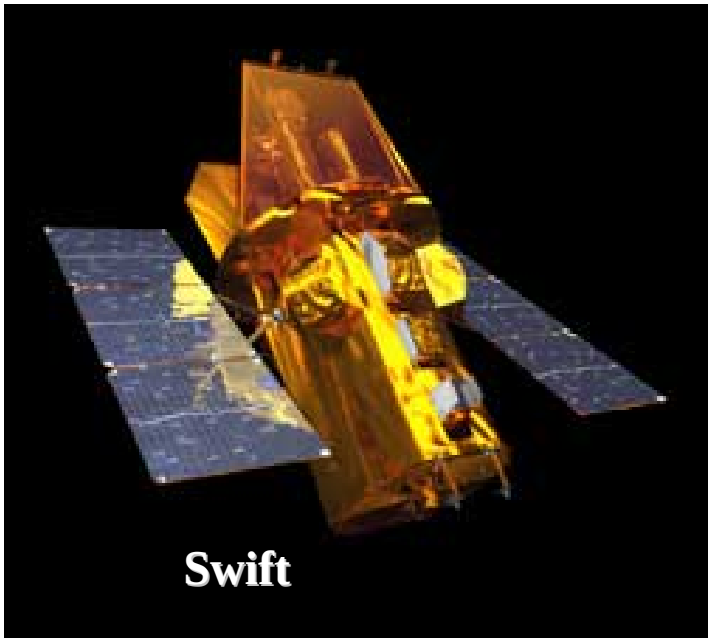
- Next in a set of space-based observatories that cover the spectrum from microwaves through gamma rays
- Windows on the Universe
  - Improved capability to study the time evolution of the energy spectrum of transient phenomenon

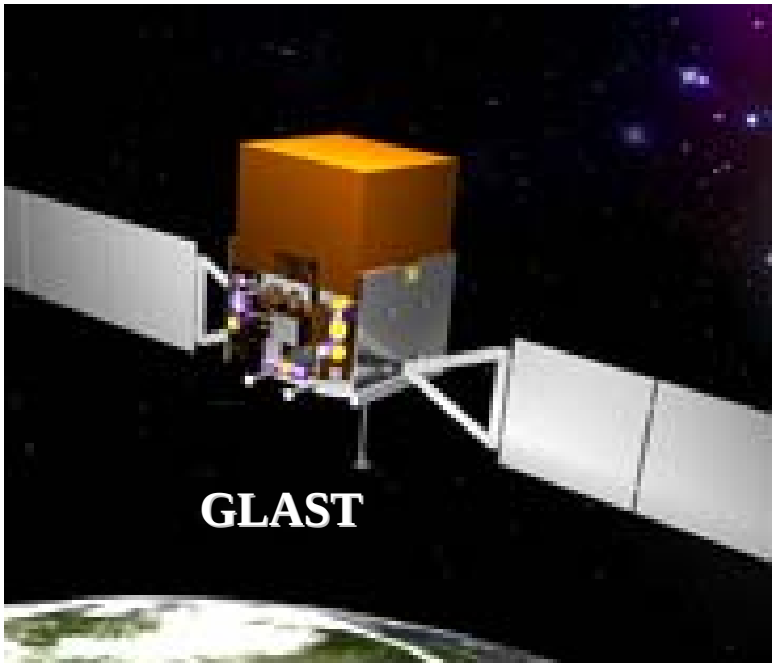
NASA Space Observatories





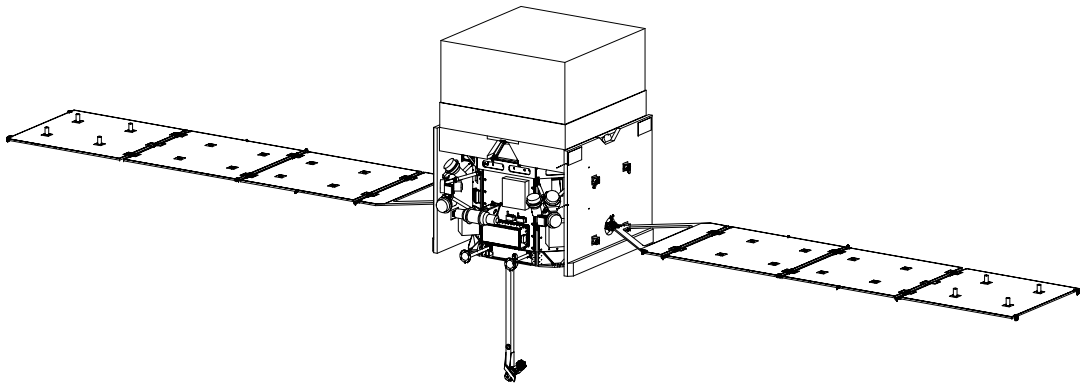






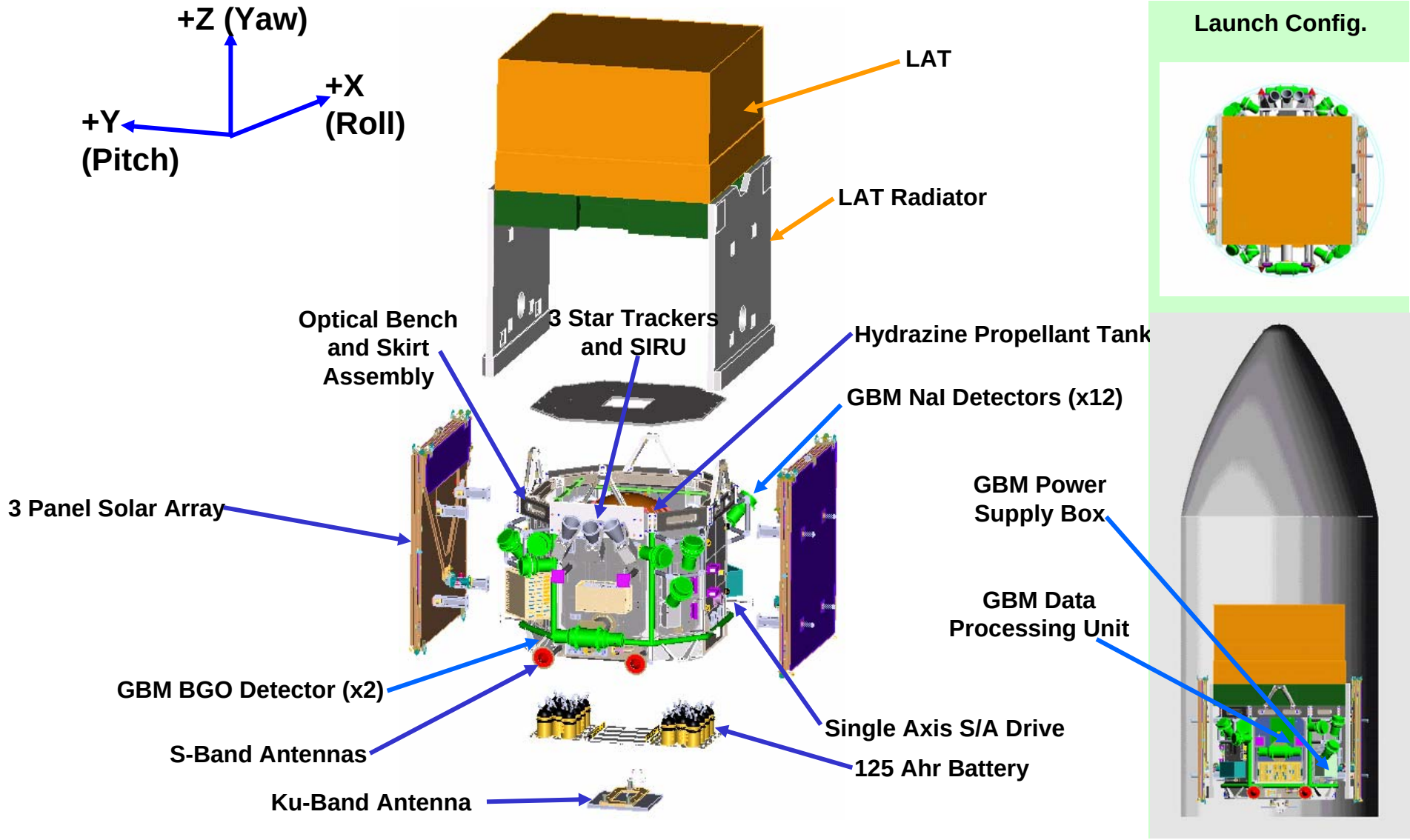
GLAST Mission Summary

•Objective: Larger field of view (FOV), higher sensitivity, and broader energy detection range than any previously flown gamma-ray mission.

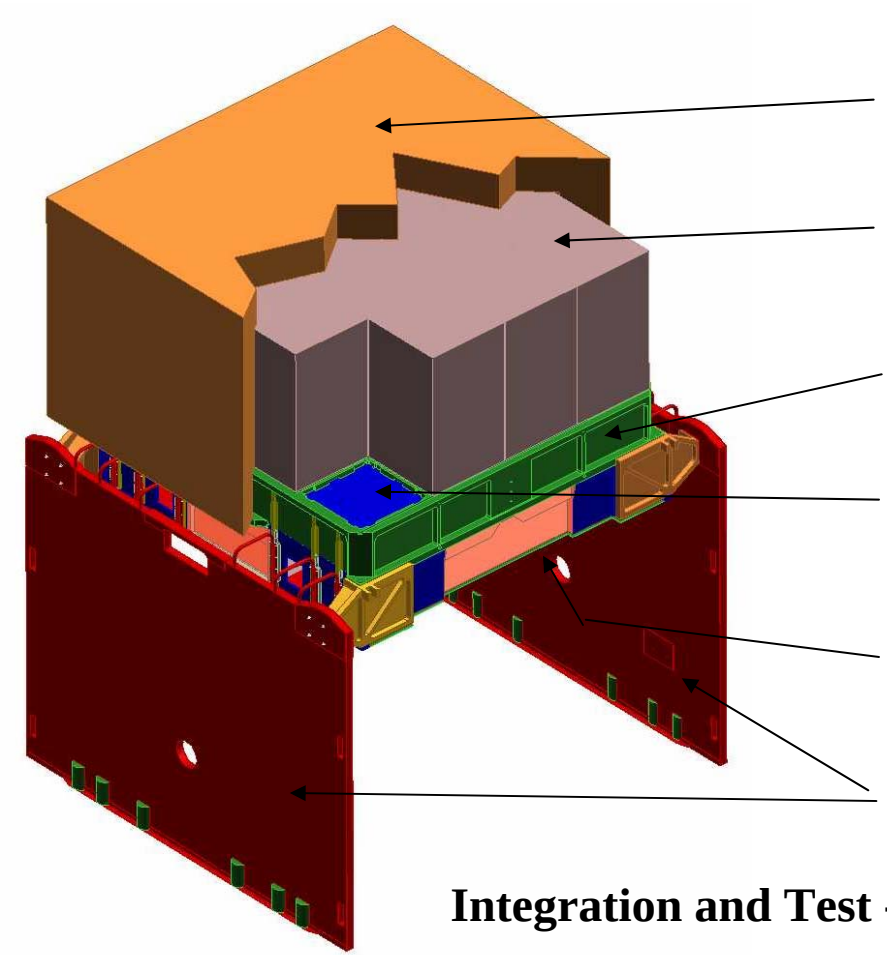


•Mission Duration:	5 yrs (10 yr Goal)
•Orbit:	565 km Circular, 28.5° Inclination
•Launch Date:	Fall 2007
•Launch Vehicle:	Delta 2920H-10
•Launch Site:	Kennedy Space Center

Observatory Layout



Instrument Structure



Anti Coincidence Detector -- GSFC

16 Tracker Modules – UCSC, Italy & Japan

Grid -- SLAC

16 Calorimeter Modules – NRL & France and Sweden

Electronics Modules -- SLAC

Radiators -- SLAC

Integration and Test -- SLAC

Mass	3000 Kg
Power	650 Watts

Master Schedule

- **LAT complete and tested** **March 2006**
  - **To Naval Research Laboratory for environmental testing**
- **Delivery to Observatory Integration** **June 2006**
  - **Mate with spacecraft and GBM and test**
- **Launch** **Fall 2007**
  - **Kennedy Space Center**

Spitzer Launch on a Delta II

Status

- All flight hardware in building 33
  - All but 3 Event Processing Units installed
    - EPUs installed next week
  - All the detectors have been tested
- Installing flight software and associated ground support systems
- System test at SLAC
- Environmental test at Naval Research Laboratory, Washington, D.C.
- Hand off to NASA at GA/SASS in Phoenix, AZ
- NASA Budget for LAT through Launch
  - FY06 $18.2M
  - FY07 $11.6M
- DOE supports the Instrument Science Operating Center through SLAC operating funds
  - Capped by OMB at $5M per year
  - Support for GLAST related scientists at approximately $2.5M per year

Tracker

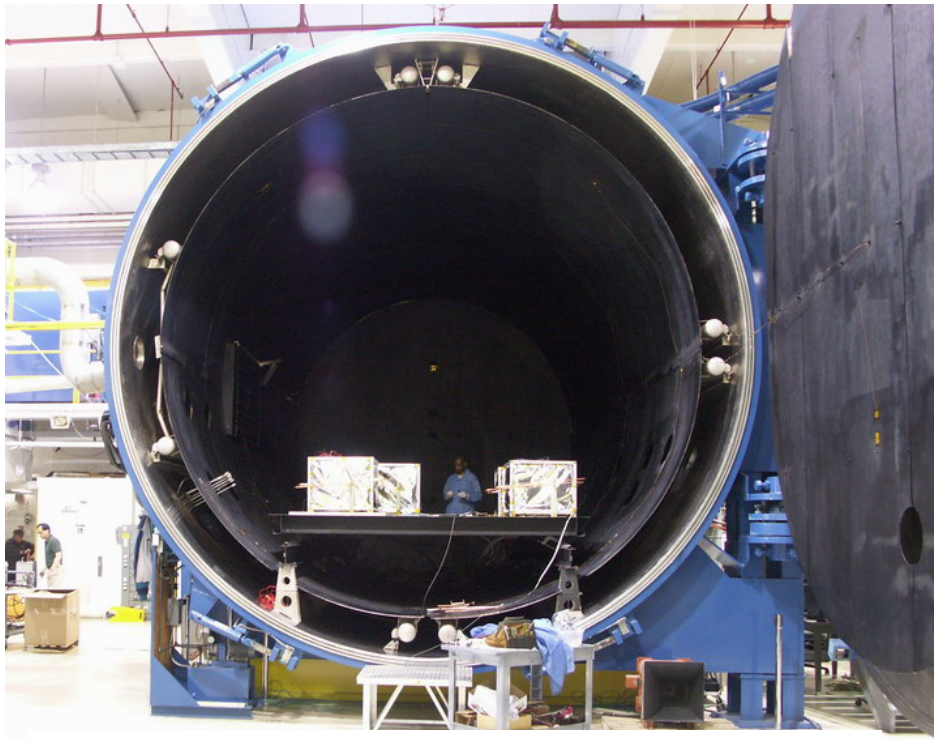
- **Eighteen flight tracker modules completed by the team at INFN Pisa, Italy**

INFN Team with the 16th flight module

Calorimeter

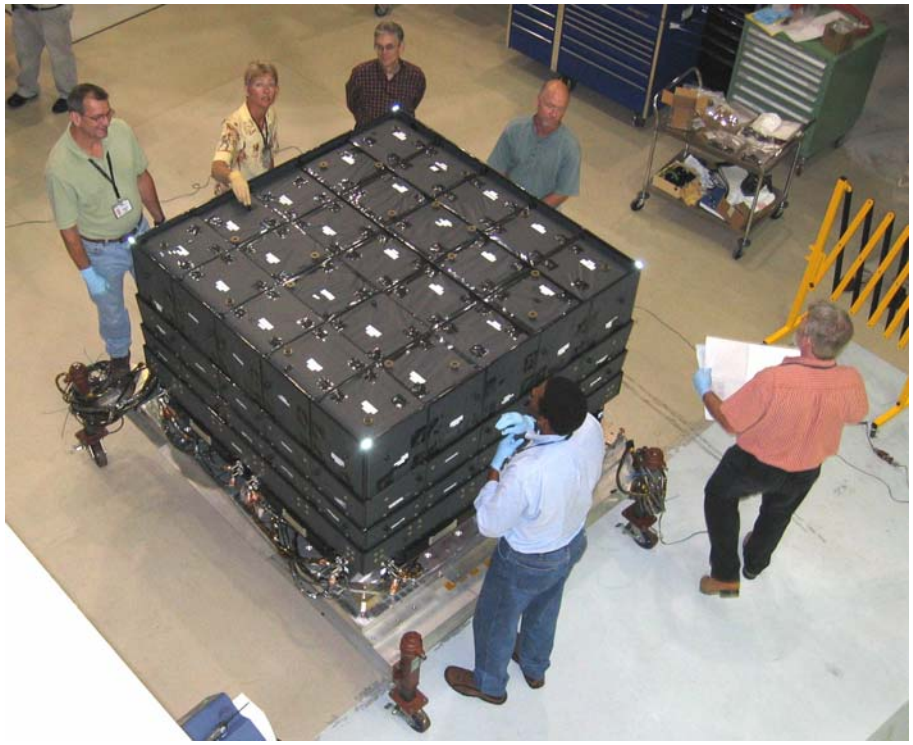
Completed environmental testing on last 4 CAL modules (FM 115 – FM 118) in April, 2005

Preparing CAL #18 and flight qual TEM/TPS for thermal vacuum testing



Last 4 CALs (in thermal shields) installed in “Big Blue” TVAC at NRL.

Anti-Coincidence Detector



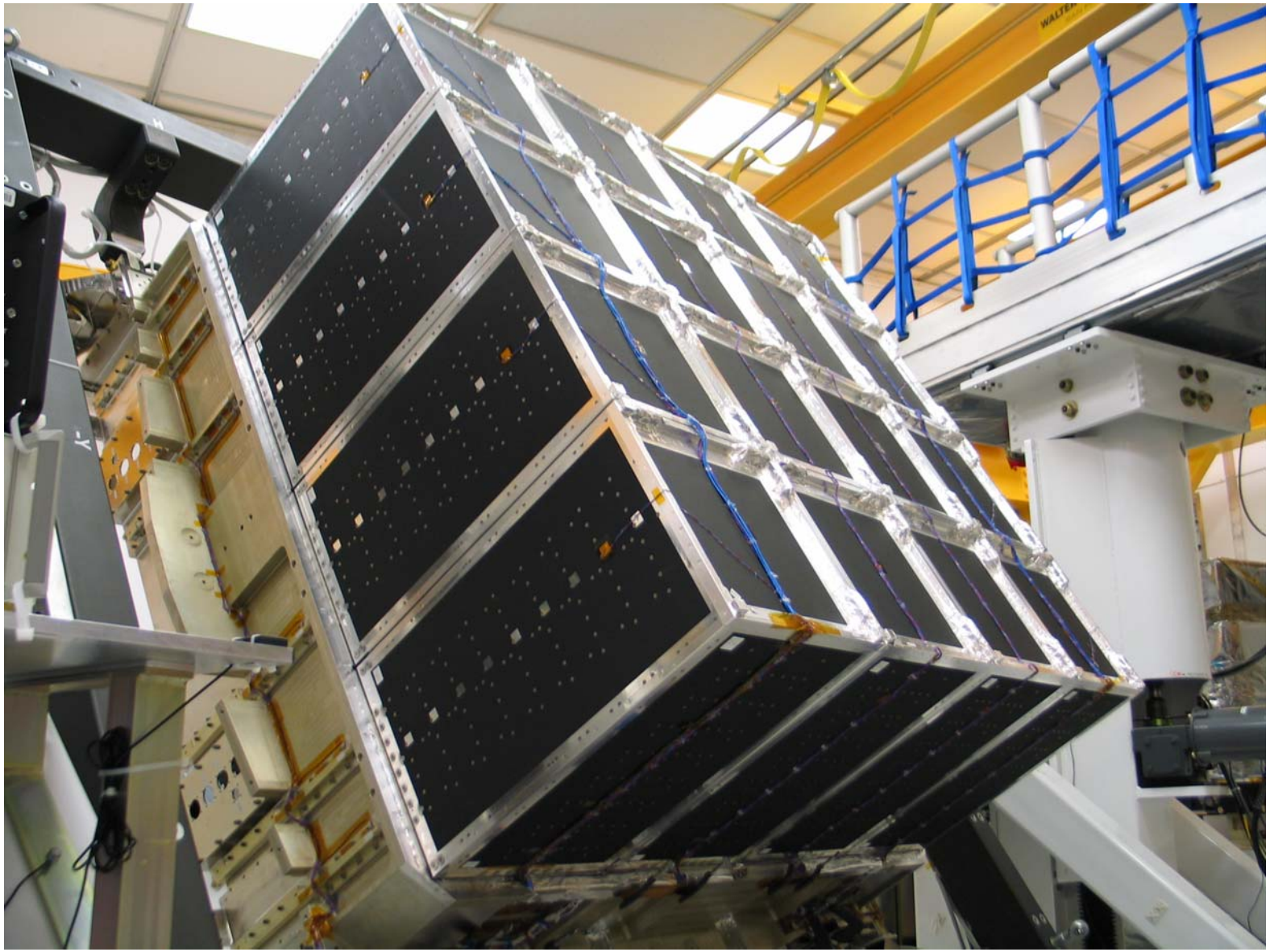
ACD before installation of Micrometeoroid Shield

ACD with Micrometeoroid Shield and Multi-Layer Insulation (but without Germanium Kapton outer layer)

+Y Radiator ready for edge taping

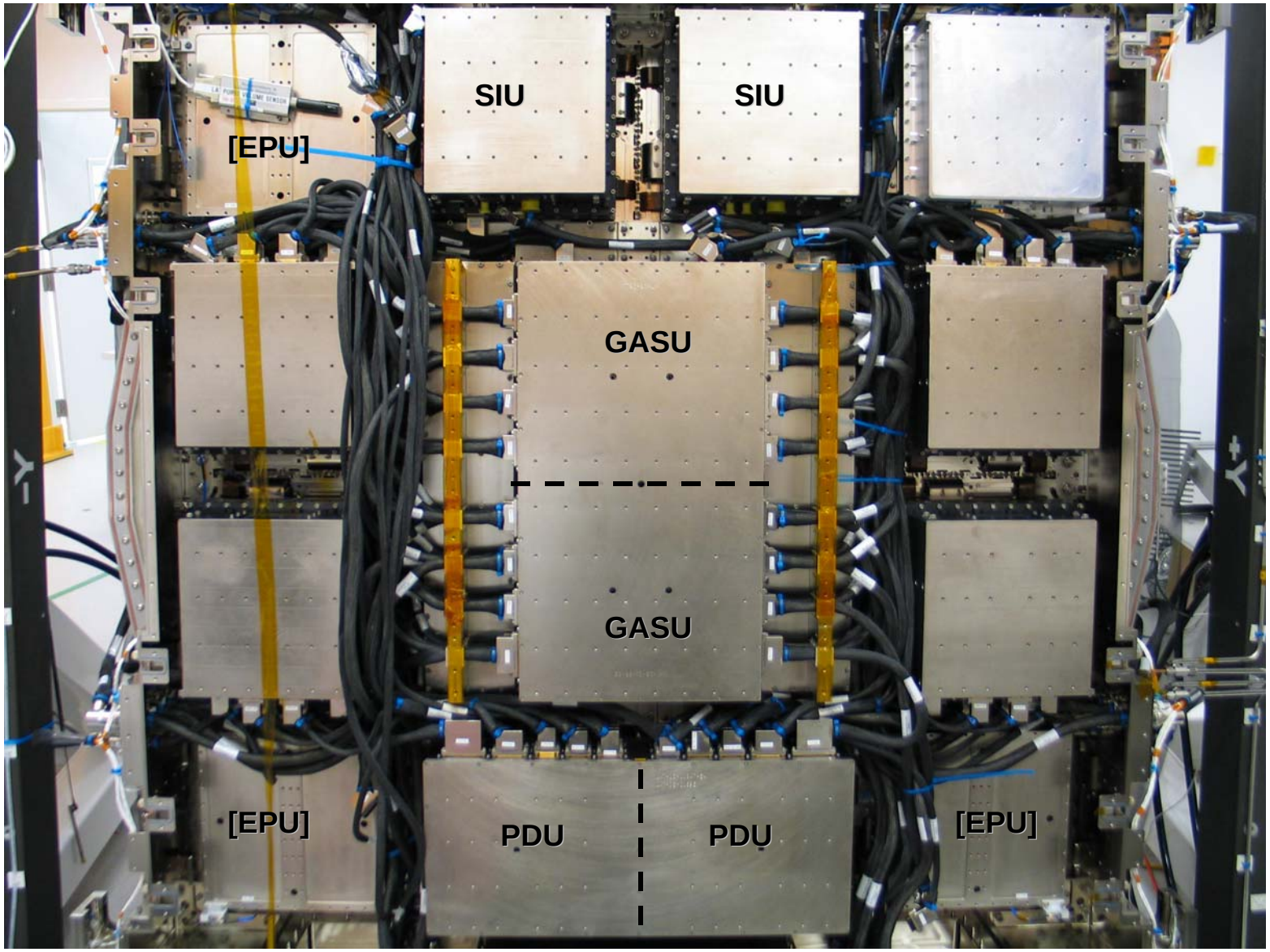
2nd Grid mounted on Spacecraft Flexures

LAT Prior to Installing the Anti Coincidence Detector

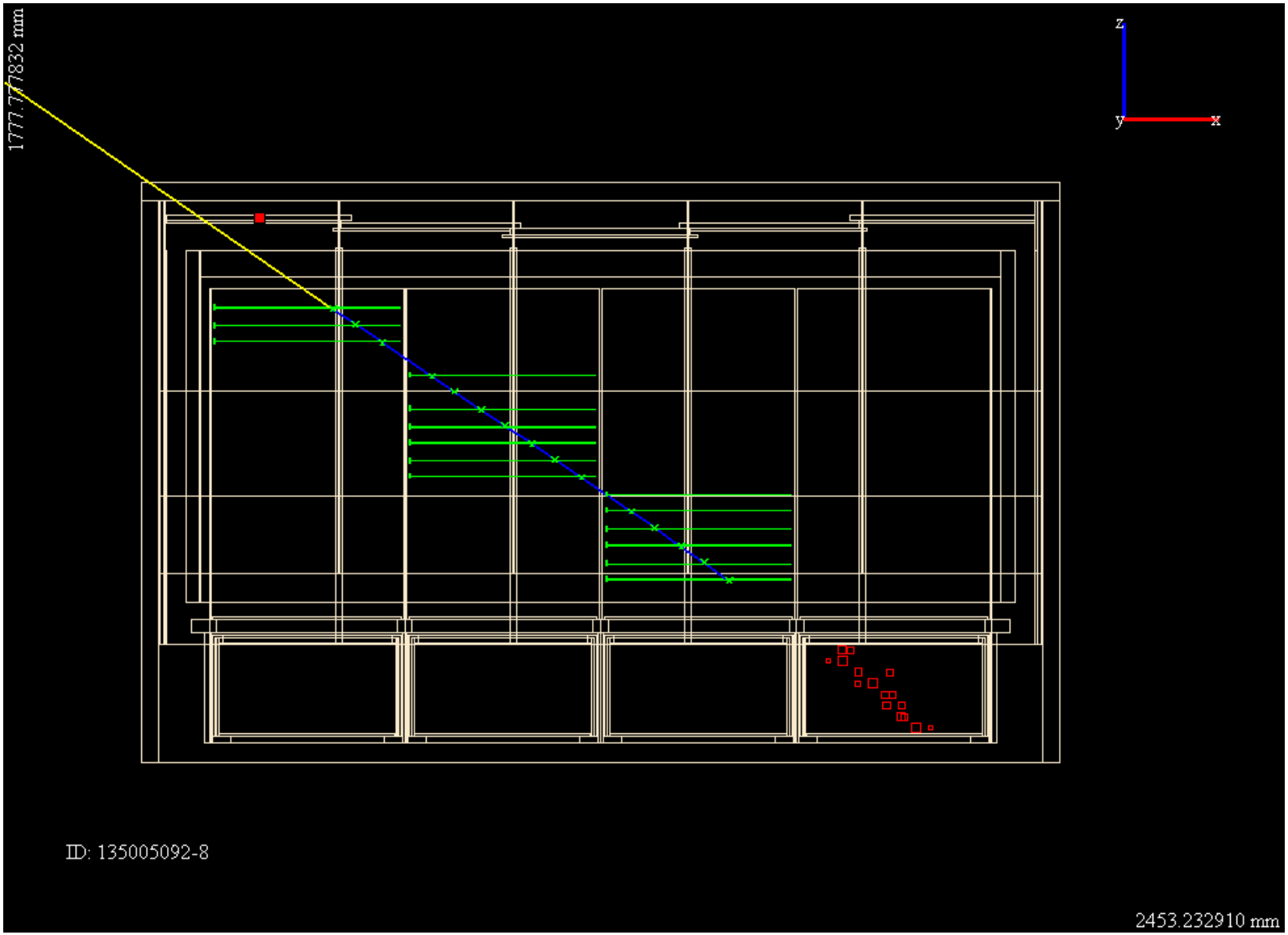


ACD on the LAT

Data Acquisition System



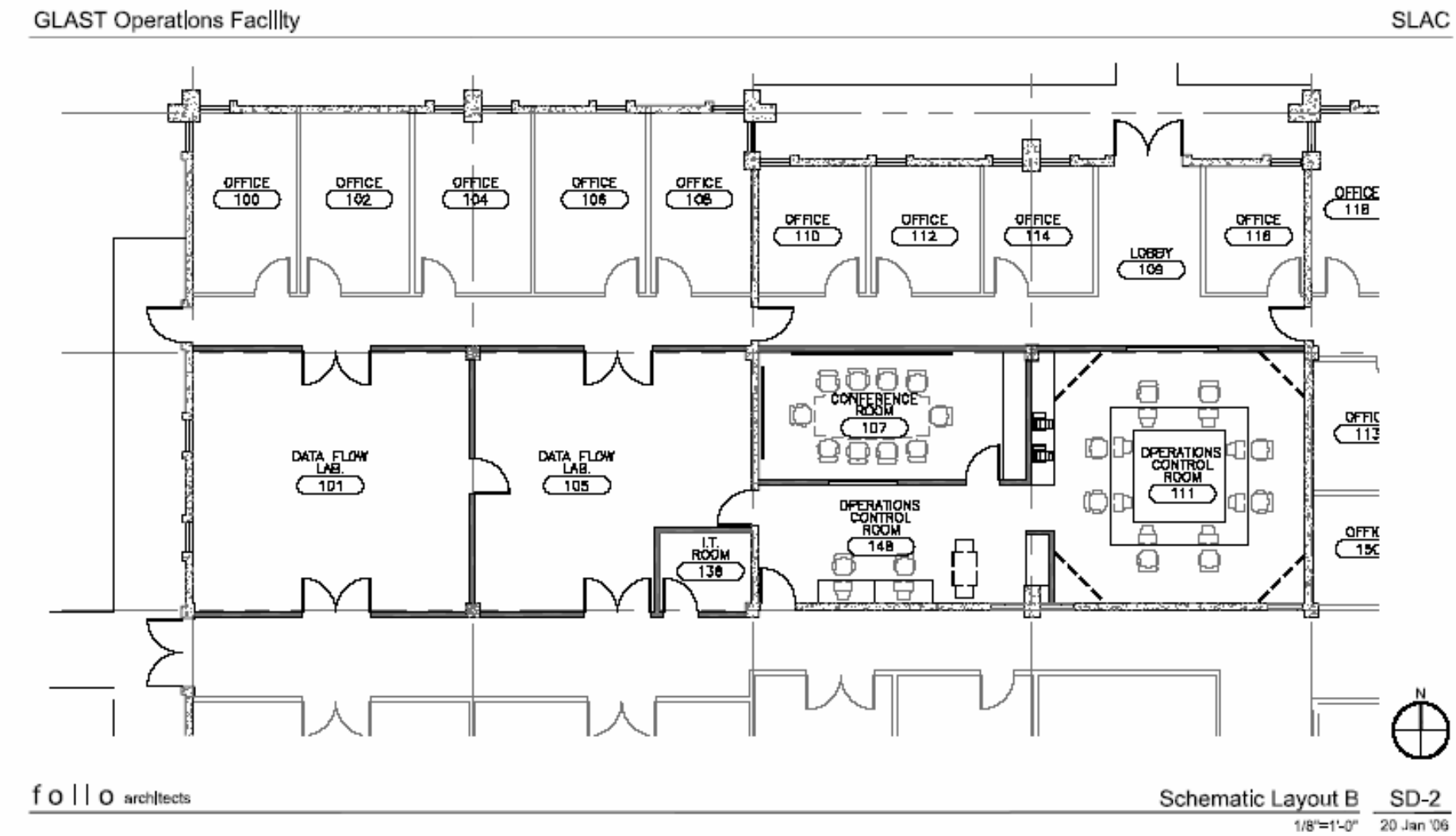
16 Towers with ACD



Instrument Science Operating Center

- ISOC Operations Facility at SLAC
  - Will be located at SLAC in Bldg 84 (Central Lab Annex)
- Operations systems
  - Operations procedures
- Science systems
  - Science Analysis Software
  - Science tools development
  - Data Challenges
    - March to May this year – 30 day simulation
- Other ISOC support facilities
  - Support testing at Spectrum Astro Space Systems
  - Support early orbit operations at Mission Operating Center
  - Support ground system development and testing
  - Beam Test Support
    - Data taking at CERN, Summer/Autumn 2006: data archiving and transfer to SLAC

ISOC floor plan building 84



Next Steps

- FY06 – Complete and test instrument and hand off to NASA
- FY07 – Support observatory testing and establish instrument ground systems including the ISOC at SLAC
- FY08 – Begin science with an all sky survey
- FY09 through FY17 – Continue discovery-based science

Conclusion

"But if we look beyond our current fiscal circumstances, there is reason to be hopeful. First, we have some amazing astronomical capabilities in space, and we will soon add to them. We are looking forward to the next major high-energy astrophysics mission, the Gamma-ray Large Area Space Telescope, scheduled for launch in late 2007. GLAST will be a tremendous new facility for the astronomy, astrophysics, and particle physics communities. In addition to making observations of the highest-energy behavior of gamma-ray bursts – following on the breakthrough work of the Compton Gamma-ray Observatory – GLAST will open a wide new window on the gamma-ray sky. Cosmic gamma rays characterize the highest-energy phenomena in the Universe, they allow us to probe the history of star formation through their interactions with ultraviolet light, and, with GLAST's significant leap in capabilities they may also be messengers of as yet to be discovered laws of physics."

Remarks at American Astronomical Society
Washington, D.C.
Michael D. Griffin
Administrator
National Aeronautics and Space Administration
10 January 2006