



GLAST GRB Observations & Capabilities

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see <http://www.nasa.gov/glast> and
links therein

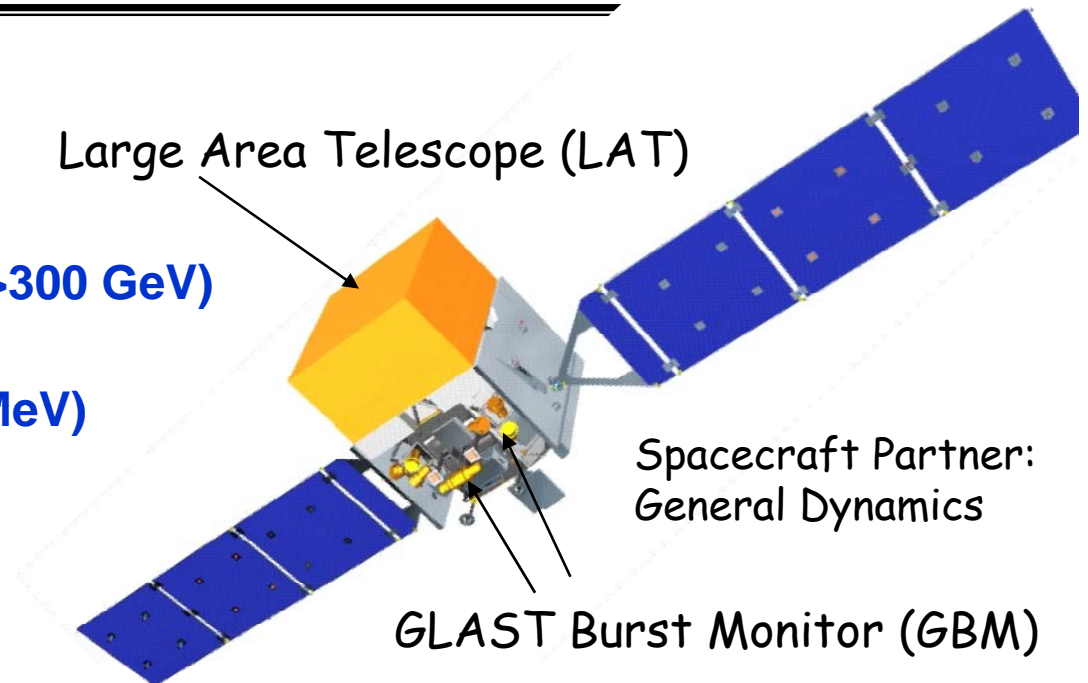




GLAST Key Features

- **Two GLAST instruments:**

- **LAT:**
 - high energy (20 MeV – >300 GeV)
- **GBM:**
 - low energy (8 keV – 30 MeV)



- **Huge field of view**

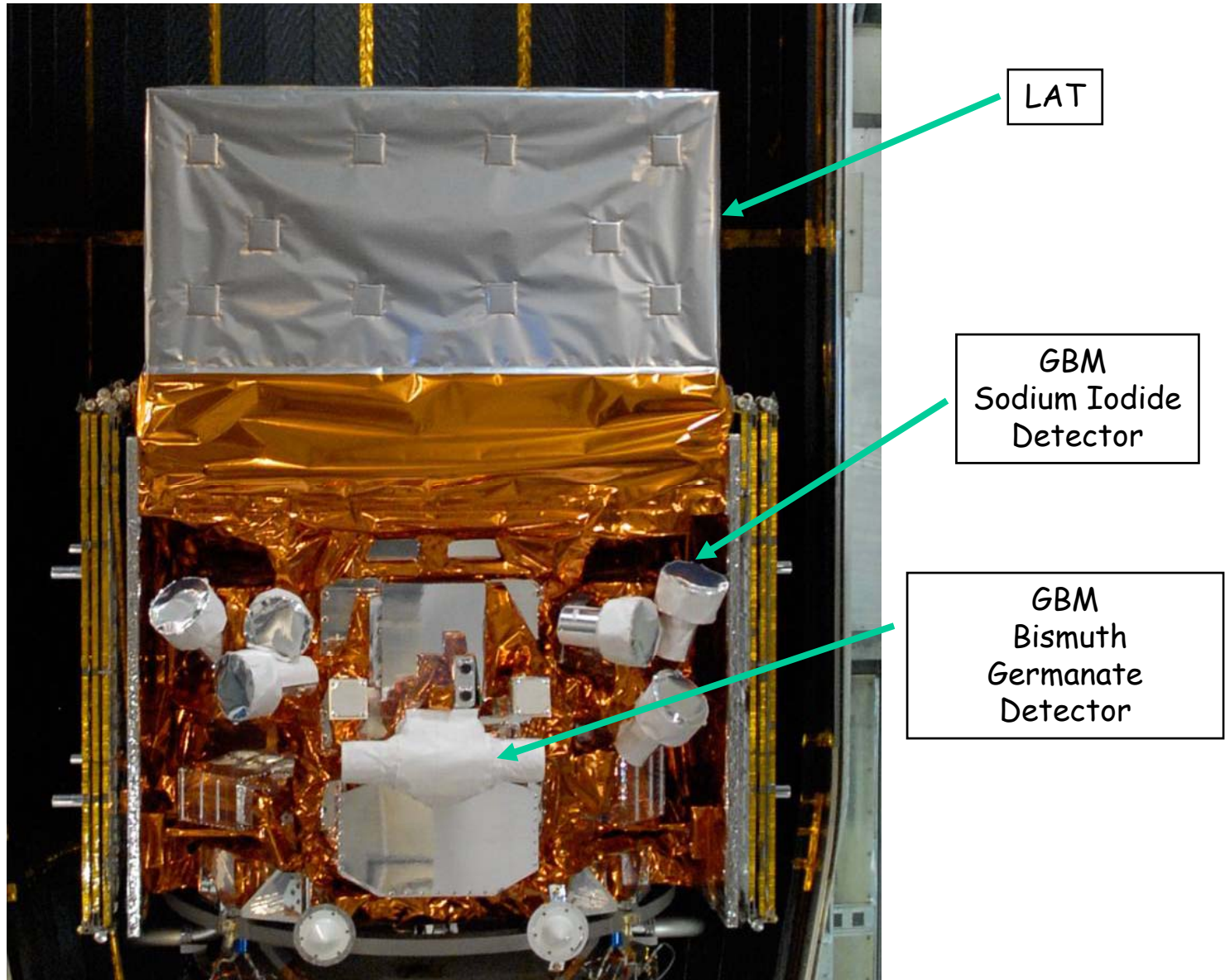
- **LAT: 20% of the sky at any instant; in sky survey mode, expose all parts of sky for ~30 minutes every 3 hours. GBM: whole unocculted sky at any time.**

- **Huge energy range, including largely unexplored band 10 GeV - 100 GeV**

- **Large leap in all key capabilities, transforming our knowledge of the gamma-ray universe. Great discovery potential.**



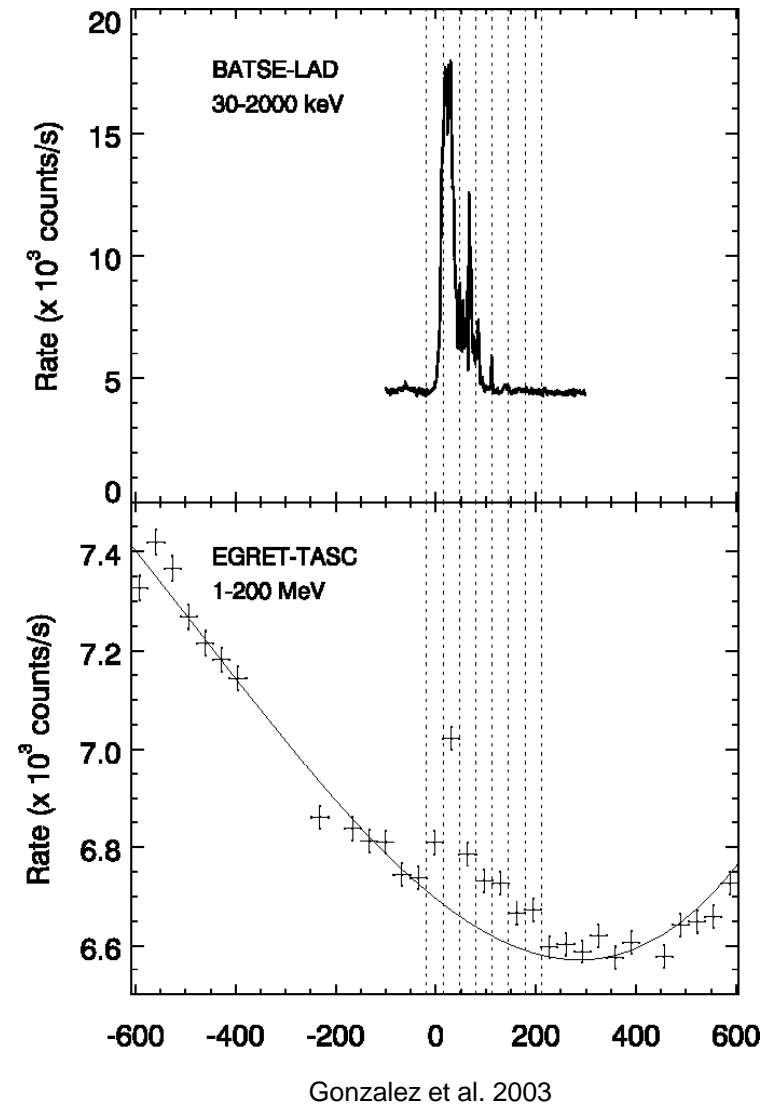
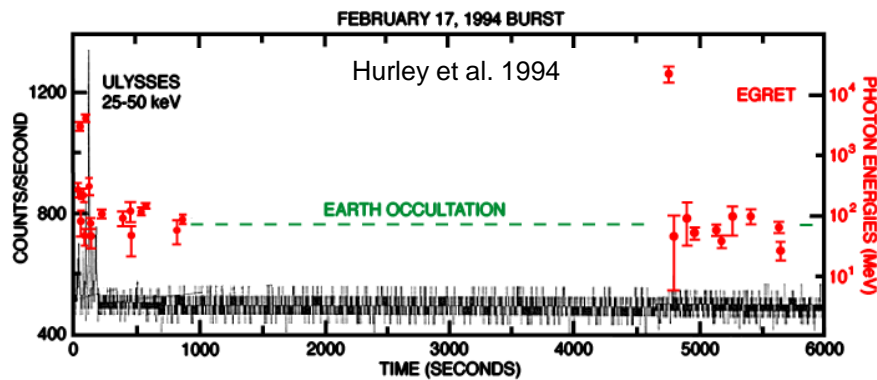
The GLAST Observatory





Motivations for High Energy Observations

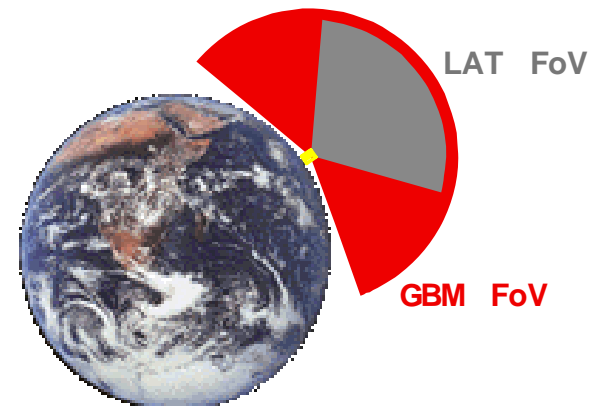
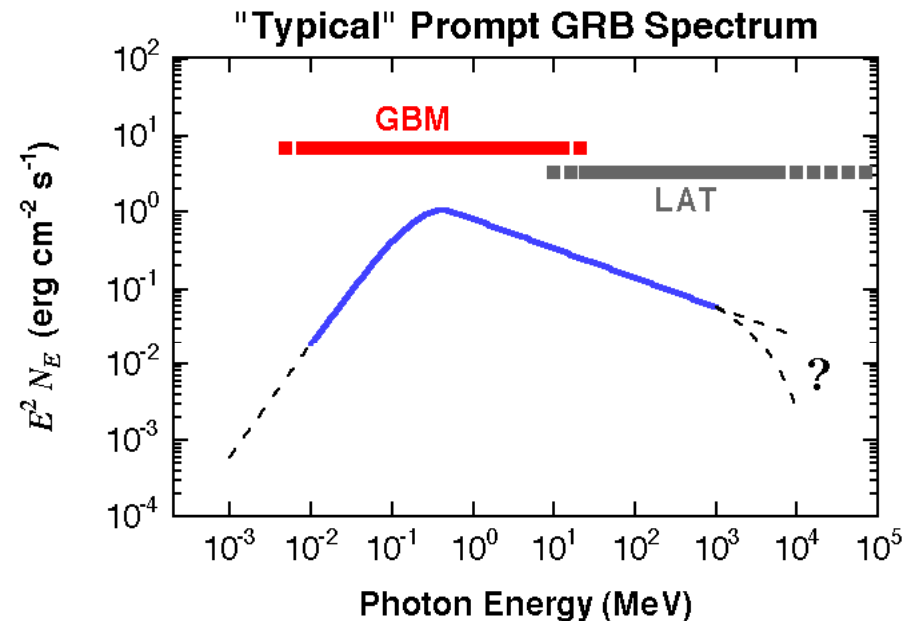
- Delayed emission
- SSC component
- Absorption
 - Internal
 - External
- Thermal + non-thermal spectra
- Quantum Gravity





GLAST and GRBs

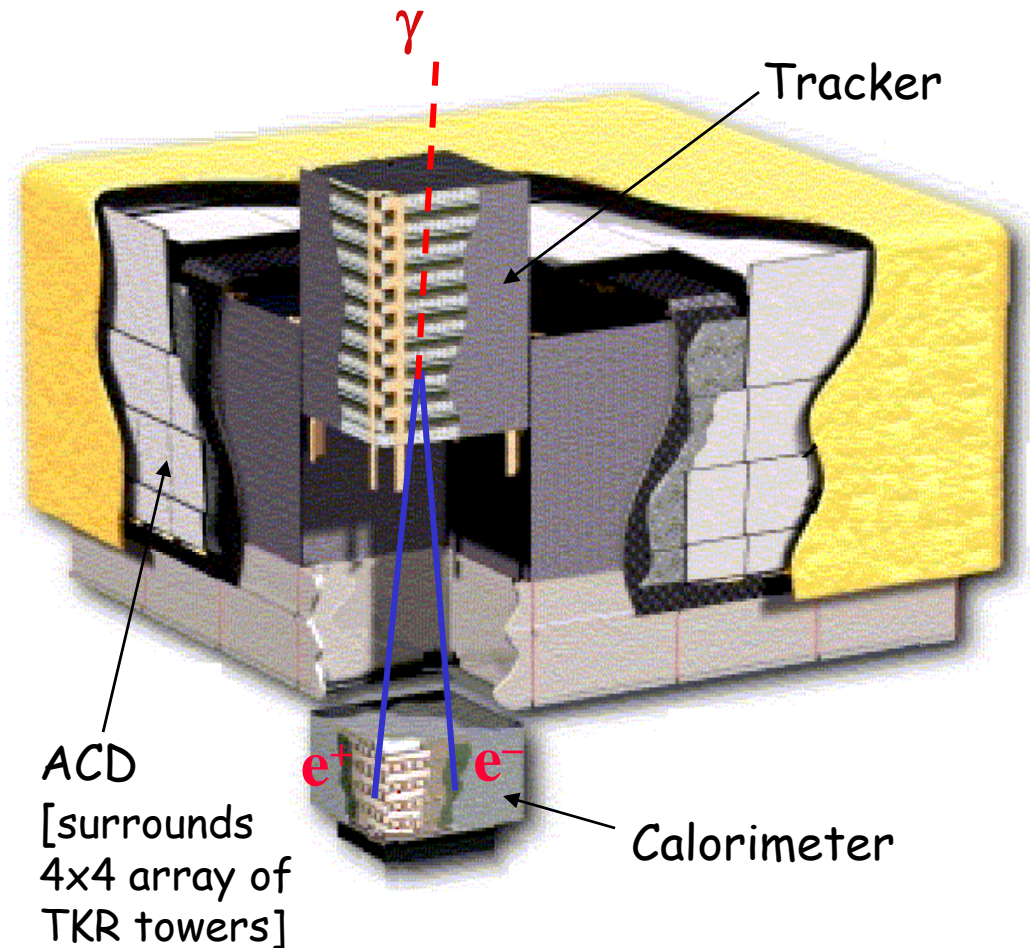
- **LAT + GBM cover 6 decades in energy**
- **GBM provides full sky coverage**
- **Autonomous repointing for strong bursts**
- **Synergy with Swift**





Large Area Telescope

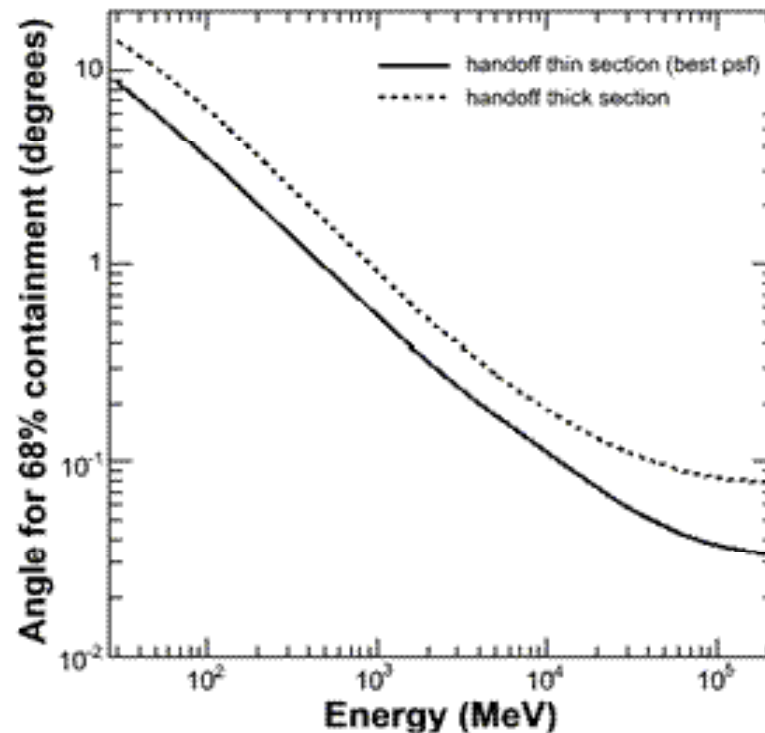
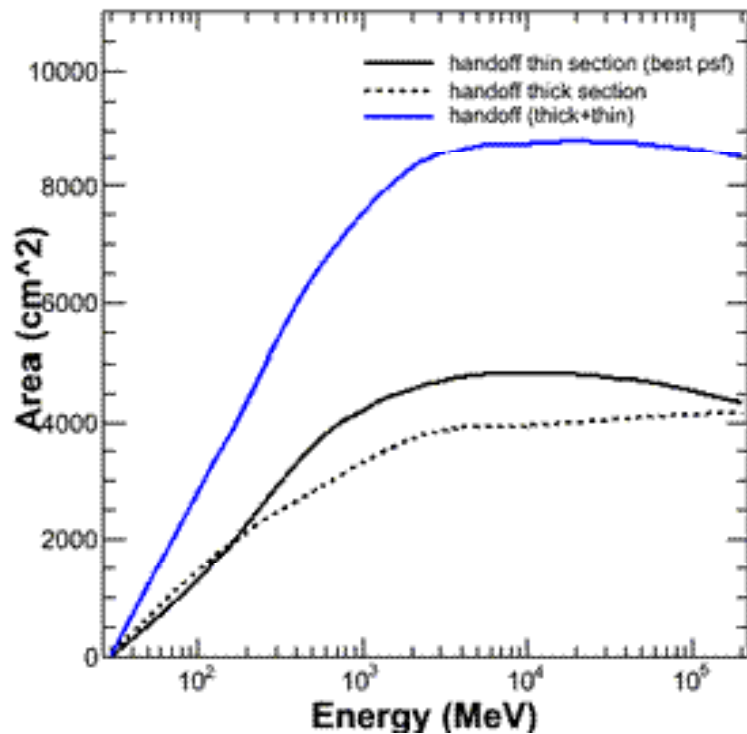
- Precision Si-strip Tracker (TKR)
70 m² of silicon detectors arranged in 36 planes. 880,000 channels.
- Hodoscopic CsI Calorimeter(CAL)
1536 CsI(Tl) crystals in 8 layers, total mass 1.5 tons.
- Segmented Anticoincidence Detector (ACD) 89 plastic scintillator tiles.
- Electronics System Includes flexible hardware trigger and onboard computing.





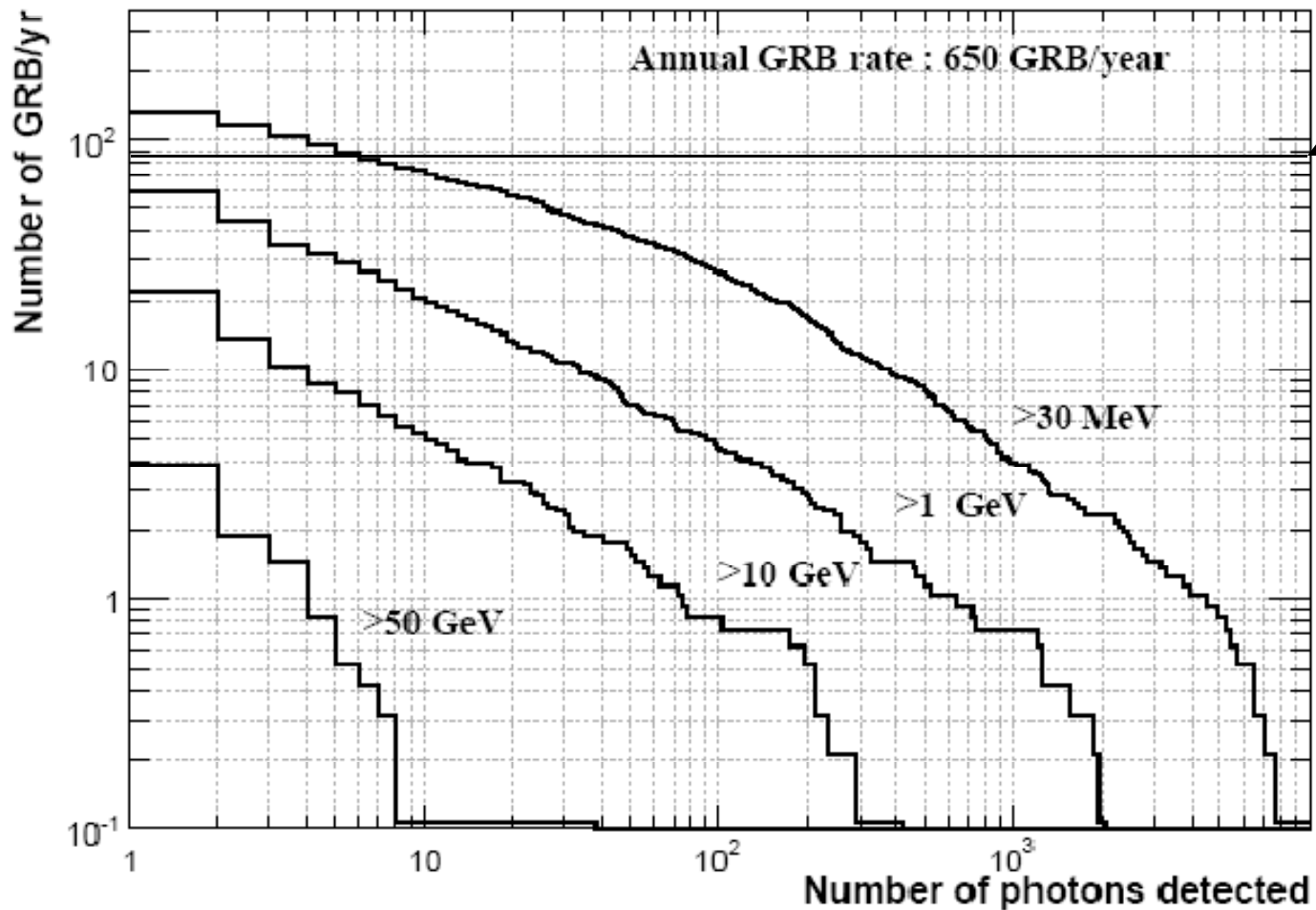
LAT Capabilities

- Effective Area $>8000 \text{ cm}^2$ above 10 GeV (10 x EGRET)
- Field of View: 2.4 sr
- PSF <10 arcmin above 10 GeV (5 times better than EGRET)
- Very low background for GRBs
- Deadtime per event $\sim 26 \mu\text{s}$ (10^4 better than EGRET)





LAT Burst Detection

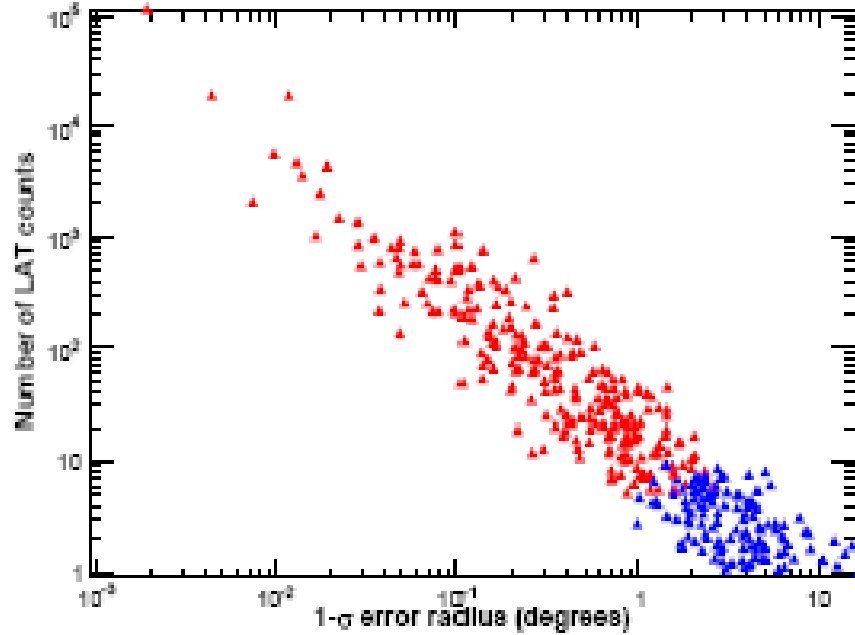


Expect
70 - 100
Bursts/year

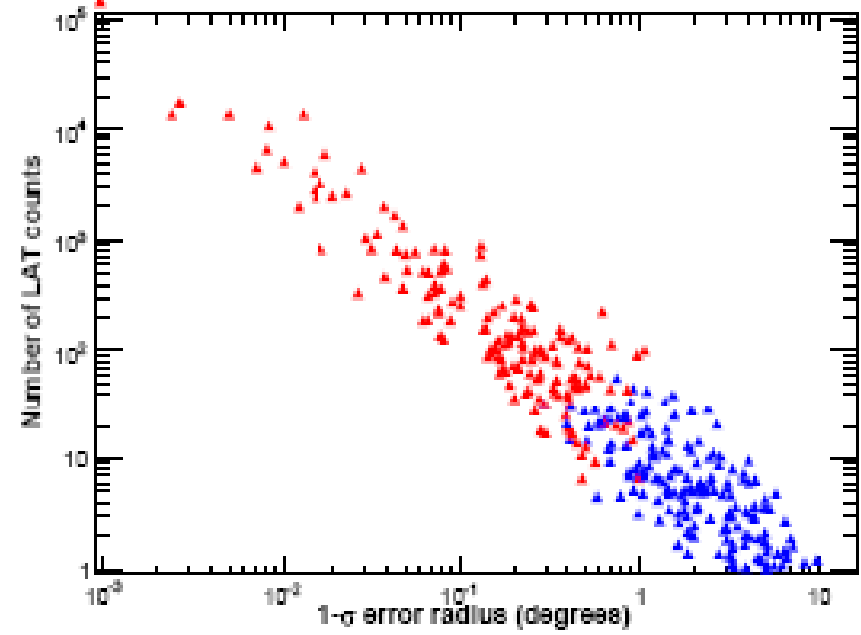


LAT Burst Localization

LAT will routinely localize GRBs to $<1^\circ$



Low background

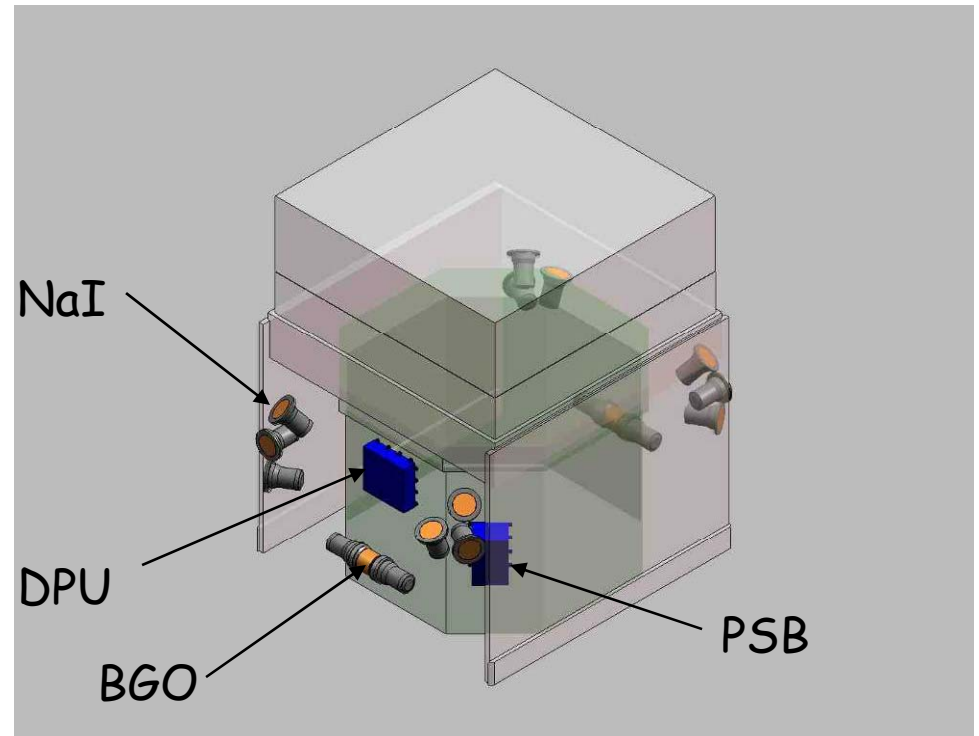


High background



GLAST Burst Monitor

- 12 Sodium Iodide Detectors (NaI)
 - 5" x 1/2", 8 keV – 1 MeV
- 2 Bismuth Germanate detectors (BGO)
 - 5" x 5", 150 keV – 30 MeV
- Data processing Unit (DPU)
 - Command, telemetry, flight software.
- Power Supply Box (PSB)
 - HV and LV to DPU and detectors



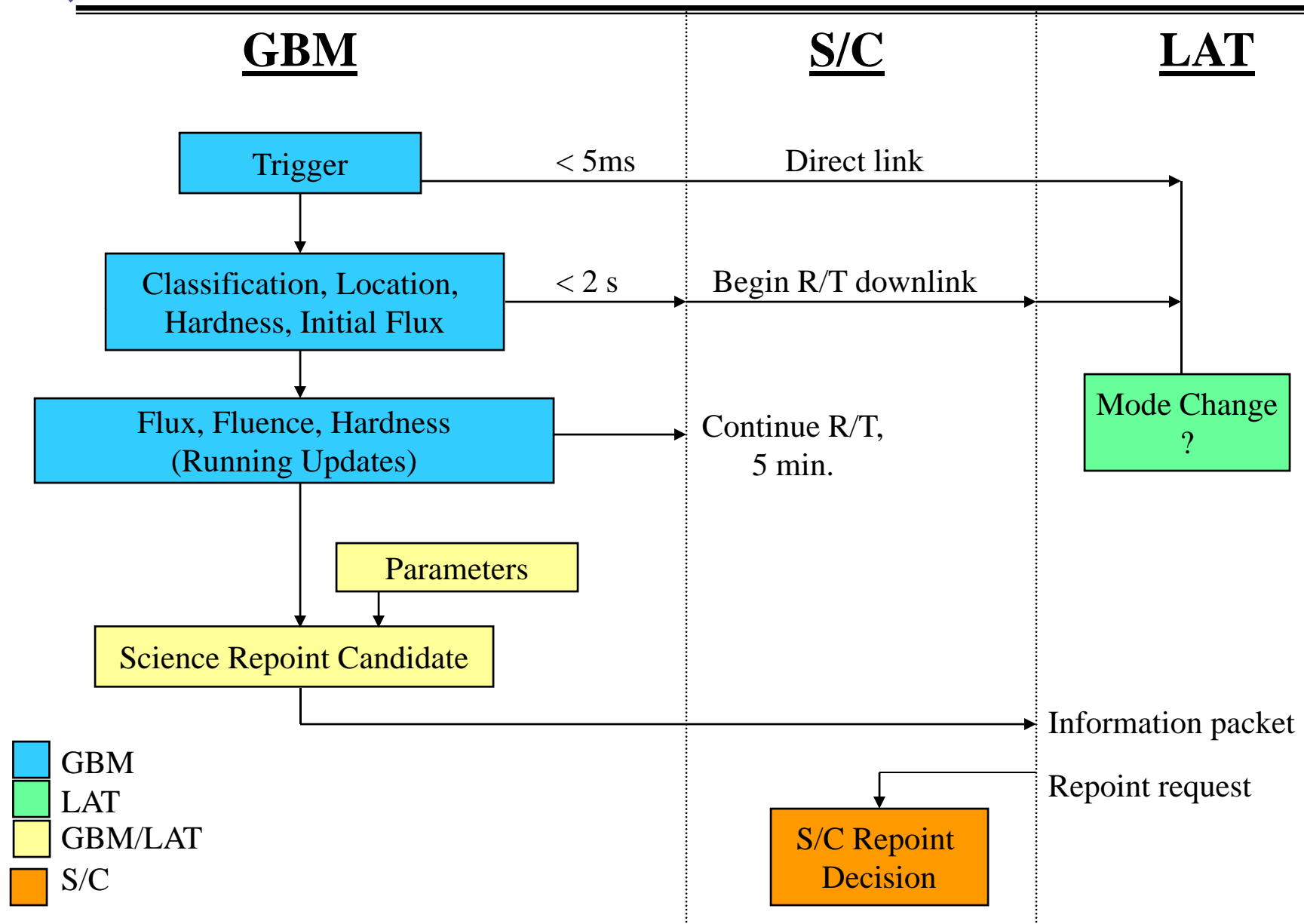


GLAST Burst Monitor Capabilities

- **Energy Range: 8 keV to 30 MeV**
- **On-Board Trigger**
 - Up to 5 energy ranges
 - Timescales 16 ms to 16 sec
 - Classification
 - Localizations to $<8^\circ$
- **Trigger sensitivity: $0.7 \text{ photons cm}^{-2} \text{ s}^{-1}$**
- **Expect ~200 GRB triggers/year**
- **Rapid GCN notifications**
- **Data:**
 - 8 channel spectra every 256 ms
 - 128 channel spectra every 8 s
 - Time-tagged events during bursts

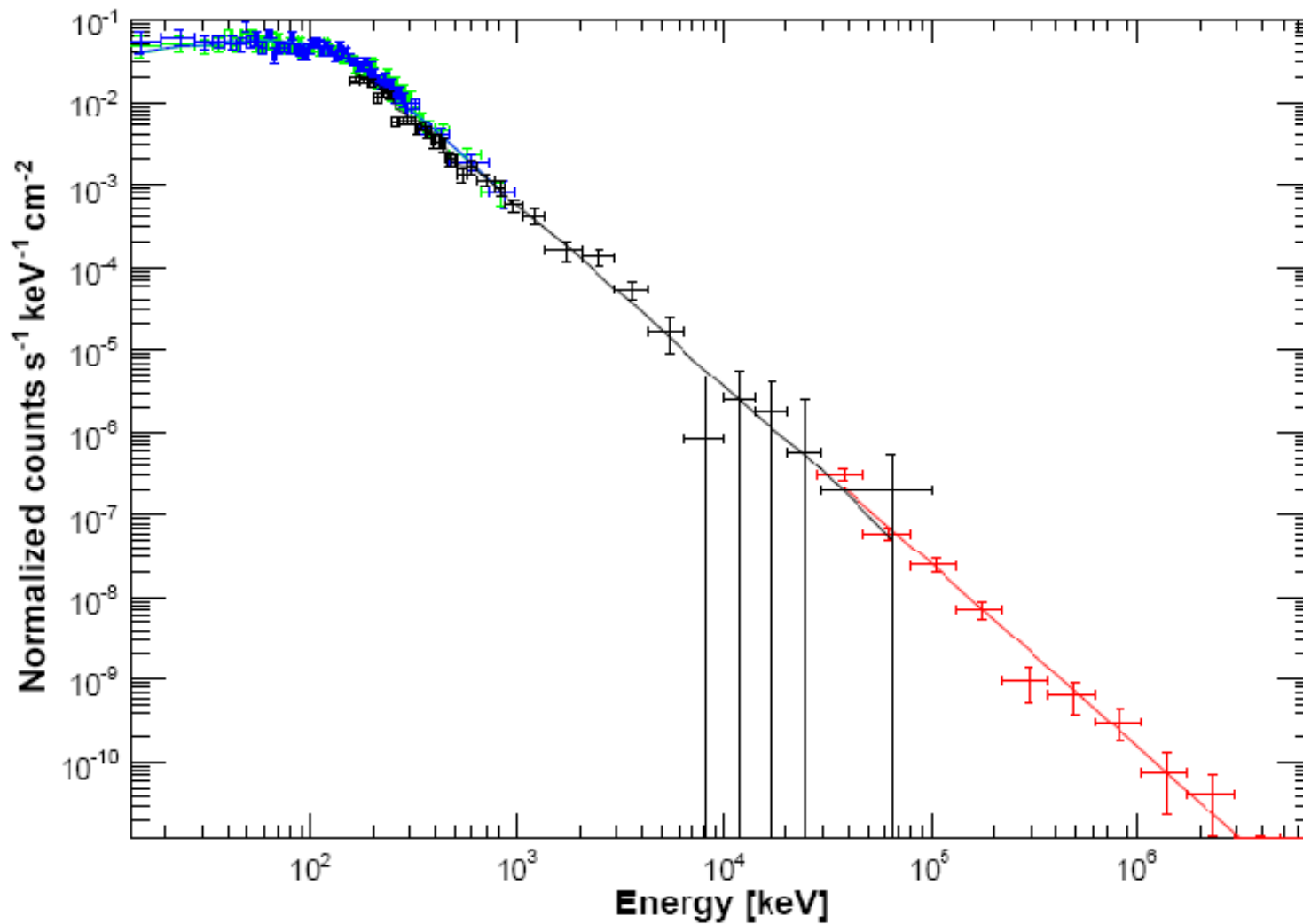


GBM Burst Alerts





Simulated Joint Fit Spectrum





Launch!

- **Launch from Cape Canaveral Air Station 11 June 2008 at 12:05PM EDT**
- **Circular orbit, 565 km altitude (96 min period), 25.6 deg inclination.**
- **Communications:**
 - **Science data link via TDRSS Ku-band, average data rate 1.2 Mbps.**
 - **S-band via TDRSS and ground stations**





Observatory Status

- **All systems checked out and functioning very well!**
- **All pointing modes tested:**
 - **Sky survey**
 - **Pointing**
 - **Automatic repoint & ToO**
- **Instruments still fine tuning**
- **Background rates look good**
- **Science data from both instruments meets expectations**
- **GBM burst triggering enabled on July 11**



GRB 080610B

