

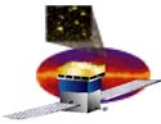
# GLAST Large Area Telescope

## LAT Science Working Group Review

### Introduction

**Bill Atwood**

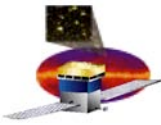
*for the GLAST-LAT Collaboration*



# Context

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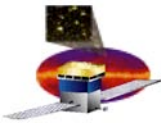
- ❑ **The LAT was delivered to NASA in September 2006, following the PreShip Review (PSR)**
  - acceptance for shipment to the spacecraft vendor for integration on the GLAST observatory
  - PSR was conducted at NRL and covered all aspects of the LAT performance (thermal, mechanical, electrical, environmental, operational, and compliance with science requirements)
- ❑ **PSR was primarily an engineering review, with not much time spent on the science requirements compliance. The project scientist, Steve Ritz, asked the SWG to review the science performance of the as built instrument.**
  - Better inform the science community
  - Critique the performance analysis, in preparation for launch



## Program for the LAT Portion of the SWG Review

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- **Overview of Analysis** - *Leon Rochester*
  - Overview of the components
  - Background Model & Space Environment
  - LAT Detector Simulation
  - Reconstruction
  
- **Event Analysis & Performance** - *Bill Atwood*
  - Energy Resolution Control
  - PSF (Image) Control
  - Backgrounds and their rejection
  - Basic results: Performance DC2 / PSR Status
  - Irreducible vs Reducible discussion
  - Background subtraction method & systematic errors



## Program for the LAT Portion (cont'd)

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- ❑ **Simulation Checks** - *Philippe Bruel*
  - Data/Simulation agreement
  - LAT ground muon test results
  - CERN Beam Tests
  - GSI Beam Test
  - Conclusions
- ❑ **GRB Detection and Localization Onboard** - *Jay Norris*
- ❑ **Plan forward and Summary** - *Bill Atwood*
  - Pass 5 Background Development
  - Reassessment of Event Classes optimized for science topics
  - Simulation of early on-orbit activities
  - First year operations



## Key Level 2 Science Performance Requirements Summary

Parameter	SRD Value	Current Best Estimate
Peak Effective Area (in range 1-10 GeV)	>8000 cm <sup>2</sup>	~ 9000 cm <sup>2</sup>
Energy Resolution 100 MeV on-axis	<10%	~ 10%
Energy Resolution 10 GeV on-axis	<10%	< 6%
Energy Resolution 10-300 GeV on-axis	<20%	< 8%
Energy Resolution 10-300 GeV off-axis (>60°)	<6%	~ 5%
PSF 68% 100 MeV on-axis	<3.5°	< 3.2°
PSF 68% 10 GeV on-axis	<0.15°	< .1°
PSF 95/68 ratio	<3	< 3
PSF 55°/normal ratio	<1.7	< 1.5
Field of View	>2sr	>2sr
Background rejection (E>100 MeV)	<10% diffuse	See Discussion
Point Source Sensitivity(>100MeV)	<6x10 <sup>-9</sup> cm <sup>-2</sup> s <sup>-1</sup>	<4 x 10 <sup>-9</sup>
Source Location Determination	<0.5 arcmin	<0.5 arcmin
GRB localization	<10 arcmin	<5 arcmin
Instrument Time Accuracy	<10 μsec	<<10 μsec (current 1σ = .7μs)
Dead Time	<100 μsec/evt	26.5 μsec/evt nominal
GRB notification time to spacecraft	<5 seconds	Design meets requirement