GLAST Large Area Telescope

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Status – Transition from Design to Flight Hardware

- Design is mature – Instrument Architecture frozen
  - Some open engineering and manufacturing issues
- Costs reviewed
  - US budget for the Fabrication Phase is $133 M
  - DOE/NASA Joint Oversight Group approval
  - International Finance Committee
- Infrastructure is in place
  - Staff with experience in space instrumentation and experience in HEP detectors
  - New integration and test facility at SLAC
  - Working relationships between the NASA Mission Office, the LAT Project Office, Collaborators and foreign partners in place
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: February 2007
Launch Vehicle: Delta 2920H-10
Launch Site: Kennedy Space Center
Instrument Structure

- Anti Coincidence Detector
- 16 Tracker Modules
- Grid
- 16 Calorimeter Modules
- Electronics Modules
- Radiators

Mass: 3000 Kg
Power: 650 Watts
GLAST LAT Project

Overall Schedule

Calendar Years

Level 1 Milestones

- CD-0 Approval
- CD-1 Approval
- CD-2 Approval
- CD-3 Approval
- Grid Complete
- CD-4 Approval
- Schedule Float
- Launch
- Prelim. & Sys. Design
- Final Design Engr'g Models
- Build & Test Flight Units
- LAT I&T
- Enviro Test
- Observatory I&T
- FABRICATION PHASE
- COMMISSIONING PHASE
- OPERATIONS PHASE

GLAST planned for launch in February 2007
LAT Rebaseline for US Funds

Budget vs Actuals vs Performance
DOE + NASA Project Expenditures
4.1 LAT
Anti-Coincidence Detector - David Thompson, GSFC

- ACD design is essentially complete
  - Some mechanical interference issues are being resolved
- Detector/Electronics End-to-End testing
  - Required performance confirmed with flight-type scintillator Tile Detector Assembly (TDA), phototubes (PMT), High Voltage Bias Supply (HVBS), Front End Electronics (FREE) card
- Fabrication of mechanical structure is underway
  - Composite shell and aluminum base frame are in fabrication
Tracker – Robert Johnson, UCSC

- Tower Structure: Italy, SLAC
- SSD Procurement, Testing: Japan, Italy, SLAC
- Tower Assembly and Test (18): Italy
- SSD Ladder Assembly: Italy
- Tray Assembly and Test: Italy
- Electronics Design, Fabrication & Test: UCSC, SLAC
- Composite Panel & Converters: Italy, SLAC
- 16 flight modules + 2 spares

Cable Plant: UCSC
Calorimeter – Neil Johnson, NRL

- Csl Crystals
  - Sweden (KTH)
- CDE Assembly
  - NRL
- Optical Wrap
- PIN Diode (each end)
- Twisted Pair Wires
- CsI Crystal

Mechanical Structure
- France (IN2P3/Ecole Polytechnique)

Front-End Electronics
- NRL, SLAC

Module Assembly and Test
- NRL+collab

1728
18
18

16 flight modules + 2 spares

PEM Assembly
- NRL
Data Acquisition – Gunther Haller, SLAC
Mechanical – Marc Campell, SLAC

- Radiator
- Grid
- Cut-outs for solar array launch locks
- Hole to accommodate solar array mast
- VCHP reservoirs
- Radiator Mount Bracket at 4 corners of Grid
1X4 Engineering Model under test
Flight Grid after rough machining
LAT I&T – Elliott Bloom, SLAC

I&T Facility
SLAC Bldg 33
Engineering Models

1 X 4 Grid

Calorimeter EM

Tracker Minitower
LAT Engineering Model
Cosmic Ray Tracks in the EM

Preliminary data

GLAST Online Single Event Display

Preliminary Cosmic Ray Data taken on Sept 3 !!!

CAL
- Pedestal subtracted
- Zero suppress off
- 4 range off
Project Issues

1. Transition to flight hardware production
   a. Closing design issues
   b. Qualification testing

2. Aggressive cost and schedule plan
   a. 9 weeks of schedule float and 25% cost contingency

3. Communications
   a. Multi-disciplines
   b. Work spread around the world

4. End to end performance assessment
   a. Assuring that the instrument will meet science requirements
   b. PI has established a task force
Status

• Project cost and schedule reviewed
  – Strong sponsor support
  – Cost and schedule is still tight
• LAT Design is mature
  – Instrument configuration is well understood
  – Details need to be closed
• Transition to manufacture of flight hardware
  – Complete detailed design and analysis
  – Thorough testing
    • Subsystem modules tests
    • System tests
    • Engineering model tests
    • Hardware qualification testing
• Next 6 months critical to closing issues and beginning fabrication
Summary

- A new capability is in place at SLAC
  - Managing, fabricating and operating a space instrument
    - Draws on previous experience in particle detectors and space instruments
    - New facility at SLAC for instrument integration and test
    - Specialists in space technology added to the staff
    - Working relationships in place
      - NASA and DOE
      - NRL, GSFC, UCSC and collaborators
      - US, Italy, Sweden, Japan and France
  - This staff and these facilities are an important resource for supporting further Astro-Physics projects

- GLAST will provide important opportunities for scientific discovery through 2017