Report of GLAST Balloon Flight

October 2001 @ Annual meeting of Astronomical Society of Japan
T. Mizuno and other GLAST Balloon Team
mizuno@hirax6.hepl.hiroshima-u.ac.jp
mizuno@SLAC.Stanford.EDU
GLAST (Gamma-ray large Area Space Telescope)

20MeV-300GeV

- **Tracker (Si-Strip Detector)**
  - Wide FOV. (2sr)
  - Large area (~10000cm^2)
  - High spatial resolution 10’ (>10GeV)

- **Calorimeter (CsI Scintillator)**

- **Anti Coincidence Detector (ACD)**
  - High Sensitivity

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Number of Detected sources

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Detected Objects</th>
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<tbody>
<tr>
<td>1960</td>
<td>10^1</td>
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<tr>
<td>1980</td>
<td>10^3</td>
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<tr>
<td>2000</td>
<td>10^5</td>
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Some Dimensions are Distorted for Clarity of Presentation
Balloon Flight for GLAST

Objectives

a. Validate the basic LAT design at the **single tower** level

b. Show ability to take data in **high background environment**

c. Recording all or partial particle incidences that can be used as a **background event data base**.

d. Find an efficient **data analysis chain**

August 04, 2001
@Palestine, Texas
Flight Operation

Leak of PV (~0.14atm)
Turn off the disk (telemetry data only)
during ascent level flight

- Telemetry efficiency is low (~2.5%), but BFEM showed ability to take data in high background environment (objective a and b)
- Total number of events = $10^5$(ascent) + $10^5$(level flight)
Development of Cosmic-ray generator (objective c)

Cosmic-ray: proton, electron and positron, gamma, (muon)

Comparison between real data and simulation data

- Trigger rate
  (data: 500Hz, simulation: 460Hz)
- neutral (no ACD hit) event rate
  (data: 50Hz, simulation: 65Hz)
- hit distribution in TKR

brush up the simulator
(Cosmic-Ray model, detector geometry)

We need to adjust gamma-ray flux

Hit Distribution (neutral events)

real data
Candidates of “gamma-ray event” (objective d)

Background filter is developed by Bob Hartman and Taro Kotani @ GSFC

Gamma-ray is converted at TKR and absorbed in CAL

Gamma-ray from XGT?
Summary

• GLAST Balloon experiment was performed on August 04, 2001 at Palestine, Texas
• We achieved three hours level flight and collected telemetry data
  Total number of events = $10^5$(ascent)+$10^5$(level flight)
• BFEM successfully collected data in high background environment
• Developments of Cosmic-ray model and background filter are under progress