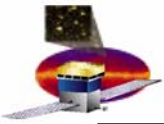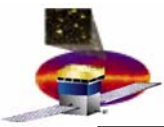# Data Analysis Projects

Eduardo do Couto e Silva/ William B Atwood

September 27 , 2004
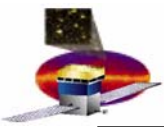
Data Anaylsis Projects

- **We will present a preliminary list of projects in the next slides**

- **THINK about them throughout the Workshop**
  - **Do they make sense?**
  - **Did we forget something important?**

- **EXPLORE the subject you are interested in**
  - **Discuss with other people**
  - **Ask questions (we are here to learn!)**

- **COMMIT to a given subject**
  - **Do not need to work alone get your institution involved**
  - **Plan to work with other groups if you find it more effective**

Data Analysis Projects (1)
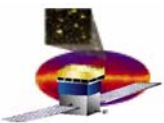
Preliminary

- **TKR**
    - **Internal Tower metrology**
        - **How precise were the trays manufactured?**
            - » **Distribution of residuals of center of every SSD w.r.t nominal positions**
            - » **Systematic effects with respect to ladder orientation**
            - » **Intra-tray alignment (e.g. are trays twisted w.r.t. each other?)**
    - **Inter tower alignment issues**
        - **How are they related to the metrology survey?**
            - » **Compare numbers from alignment procedure to those from metrology at SLAC**
            - » **Being worked out by I&T & mechanical Systems**
        - **Does the track fit matches where it was supposed to start?**
            - » **See Leon's talk**
    - **System Performance**
        - **Subsystem Performance**
            - » **Calculate the tracking efficiency of each tower using track segments**
            - » **Calculate residuals by comparing CAL and TKR locations See Benoit's talk**
        - **Imaging**
            - » **Make positive and negative images of the ACD tile (to explore ACD efficiency AND the tracking inefficiency and check the coordinate system oriented correctly)**
            - » **Make positive and negative images of the CAL layers (to expose uniformity of response of the CAL) See Benoit's talk**
            - » **Make image of TKR layers to identify location of shorted strips and broken wirebonds**

Data Analysis Projects (2)
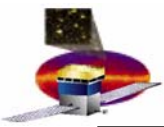
Preliminary list

- **Trigger/TKR**
  - **Hardware related and/or need real data**
    - TKR: Count the number of latched triggers corresponding to the number of trigger requests issued
      - » **Part of data reports (see Xin's talk)**
    - TKR: Trigger combination biases
      - » **TKR Studies with TriggerAlg (see Luis's talk)**
    - TKR: Effects from high rate CPU triggers on subsequent muon triggers
      - » **Trigger group**
    - TKR: Measure hit inefficiencies from high noise level
    - TKR: Study the TOT behavior (resolution, uniformity, linearity, saturation)
    - TKR: Study how time delays affect pattern recognition
    - TKR: Study how GTRC splits affect pattern recognition
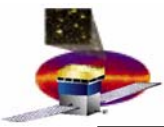
Data Analysis Projects (3)

- **CAL**
  - **Performance**
    - **Can we image the CAL layer by layer (using TKR)?**
      - » **See Benoit's talk**
    - **How do log Ends of a given layer compare (TKR used for muon peak location, how accurate is it)?**
      - » **See Sasha/Andrey's talk**
    - **What is the Light output of tracks crossing diodes?**
    - **How well do we find MIPs (e.g. at several angles, within a tower, across towers)?**
    - **What is the tracking efficiency?**

  - **Hardware related and/or need real data**
    - **How do cross talk and nonlinearities affect the data analyses?**
      - » **See Sasha's talk**
    - **What is the correlation between first two lower gain ranges?**
    - **What is the effect on the data analyses from hit inefficiencies, high noise level and large gain variations?**
    - **What is the effect the data analyses from zero suppression?**

Data Analysis Projects (4)

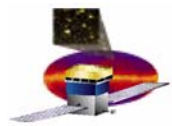<div style="text-align:center">**Preliminary**</div>

- **EVT – not details of a subsystem but gluing it all together**

  - **Performance**
    - **How do we define a muon using ACD, TKR and CAL?**
      - » **See Dario and Sara's talk**
    - **Can we improve muon selection by changing the minimum energy that a track uses for pattern recognition?**
    - **What are the Zoo events in MC ? (high multiplicity hit and track, Vees in cosmic rays?)**

  - **Hardware related and/or need real data**
    - » **Can we find gamma rays from showers?**
    - » **Can we find Pizeroes?**
    - » **What are the Zoo events in data ?(high multiplicity hit and track, Vees in cosmic rays, neutron events)**
    - » **Can we find Z>1 tracks in the Ground?**

Data Analysis Projects (5)

Preliminary list

- **VDG – Low energy Photons**

  – **Performance**
    - » **Can we tell 1 from 2 MIP events?**
    - » **How well can we measure energy for TKR events with and without CAL?**
    - » **Is the deadtime different between photon and cosmic ray events?**

  – **Hardware related and/or need real data**
    - » **Same as CAL and TKR lists**

Additional Projects