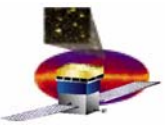**Gamma-ray Large Area Space Telescope**

Discussion: To Where From Here?

DC1 Closeout Meeting
February 13, 2004

S. Ritz

Outline

- **Data challenge progression – original ideas**
- **Some thoughts about adjustments based on DC1 lessons**
- **Discussion**
- **Next steps**

Data Challenge Planning Approach

- **Walk before running: design a progression of studies.**

  - **DC1. Modest goals.   Contains most essential features of a data challenge.**

  - **DC2. More ambitious science goals. Encourage further development, based on lessons from DC1.**

  - **DC3. Support for flight science production.**

Original DC2 Concept

- ## DC2 (preliminary!)
  - ### more sophisticated goals:
    - 1 simulated month all-sky survey simulation (100M bkgd+gamma events post-filter. Method TBD) PLUS 1 simulated year of gammas
    - find AGN, bursts, pulsars
    - produce a toy 1-month catalog
    - detailed point source sensitivity and localization analyses
    - recognize more subtle hardware problems
    - a few more physics surprises
    - exercise:
      - exposure, data processing pipeline, analysis tools, quicklook. benchmark processing times, data volume, etc. connect to SSC.
    - use updated recon, bkgd rejection and instrument response to show the problem areas that need work. encourage improvements

Strawperson Updated Plan for DC2

- **DC2, based on lessons from DC1**
  - **1 simulated month of all-sky survey gammas (backgrounds: see next slide)**
  - **key sky addition: source variability**
    - **AGN variability, including bright flares, quiescent periods**
    - **expand burst variety (and include GBM? see later slides)**
    - **pulsars, including Gemingas, w/ orbit position effects.**
  - **more realistic all-sky attitude profile**
  - **background rate varies with orbit position**
  - **more physics surprises, and add nominal hardware problems (and misalignments?), add deadtime effects and corrections**

  - **Analysis Goals:**
    - **produce toy 1-month catalog and transient releases**
    - **detailed point source sensitivity and localization studies**
    - **first systematic pulsar searches (timing!); detailed diffuse analyses**
    - **recognize simple hardware problems (connect with ISOC/SOG)**
  - **benchmark:**
    - **processing times, data volume, data transfers.**

Backgrounds in DC2

- **Reference numbers: per 1kHz of orbit average rate over one month amounts to 2.5B triggers, or O(10B) generated events.**

- **Let the science drive it!**
  - **the main need is presumably high-latitude diffuse spectral analysis (except for earth albedo gammas, bkgd is ~sky-uniform? verify!)**
  - **requirement is <10% of high-latitude diffuse in each energy decade.**
    - **In one day, this is ~10^3 events (must generate ~10^8 events, which we can do). For single distributions without detailed features, e.g., a simple spectrum plot, this could be sufficient statistics.**

- <u>**Proposal**</u>**: generate 1 (few?) day of background (~500M events)**
  - **include onboard filter and full background rejection analysis for all generated events (gammas+backgrounds)**
  - **Replay those few thousand residual background events randomly throughout the full one-month gamma set.**
  - **Most analyses should not notice. If it turns out to be very significant, we may have a few spiky distributions!**
 - **Think this through: will it work for the high-latitude diffuse analysis?**
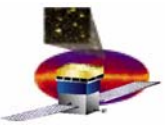
Partners

- **Pass data to GSSC**
- **First try: bring in GBM?**

When?

- **This is the year we build!**
  - **All of us should help as needed**
  - **SAS must support the integration and test. Try to minimize interference.**

- **Plan: release DC2 data one year from now**

- **Proposed duration: 2 full months.**
  - **DC1 lasted 2 months, but included the holidays!**
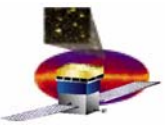
Discussion

Finally…

Congratulations, again, to everyone for a successful DC1!!

Thanks to the local organizers, Debbie, and Diana!