Purposes of the Data Challenges

• “End-to-end” testing of analysis software.
  – define the ends
  – define the tests (what is success?)
• Familiarize team with data content, formats, tools and realistic details of analysis issues (both instrumental and astrophysical).
• Develop additional methods for analyzing GLAST data, encouraging alternatives that fit within the existing framework.
• Provide feedback to the SAS group on what works and what is missing from the data formats and tools.
• Re-evaluate sensitivities
  – Uncover systematic effects in reconstruction and analysis.
• Grow the team. Learn how we work together.

Support readiness by launch time to do all first-year science.
Data Challenge Planning

- Discussions thus far with Richard, Seth, and Bill. What is shown is a DRAFT.
- Develop proposal, take to Peter and SSAC within the next two weeks.
- => Need Analysis Group input.
Realities

• Still much to do on GLEAM to be ready:
  – geometry review
  – underlying physics review
  – embed onboard filters
  – other infrastructure (move to .NET, etc. \textit{don’t dismiss this!})
  – finish implementing gamma source fluxes

• Still much work to do on analysis to be ready:
  – background rejection
  – performance evaluation and parameterization
  – analysis platform recommendation and validation

• Lots of other work demanding attention:
  – CDR and fallout. Other reviews.
  – EM support
  – Other calibration planning and development
  – Integration!
• Use the September collaboration meeting as a major milestone. We need deadline pressure.
• Walk before running: design a progression of studies.
  – Preparation complete by September collaboration meeting:
    • complete geometry review: June 15
    • recon meeting: late June/early July?
    • complete embedding, verification of filter, evaluate: July 1
    • .NET cutover date? Simulation hard freeze date?
    • first new background rejection/performance analysis July & August
    • sky model fluxes implementation complete September 1
  – At Collaboration meeting:
    • first instrument response functions presented
    • DC1 kickoff (see following slide)
    • workshop on using tools
Data Challenge Progression

• DC1
  – modest goals:
    • 1 simulated day all-sky survey simulation (3M bkgd+gamma events to ground, => 400M generated events)
    • find flaring AGN, a GRB
    • demonstrate single-day point source sensitivity
    • recognize simple hardware problem(s)
    • a few physics surprises
    • exercise:
      – exposure, data processing pipeline, analysis tools, daily quicklook analysis
    • use existing recon, bkgd rejection and instrument response to show the problem areas that need improvement. secondary goal (not required) is to prototype improvements
  – schedule:
    • Sept-Oct startup problems resolution.
    • Nov-Dec high-level tools beta testing. Finalize irfs.
    • Dec 15 high-level tools release, workshop.
    • mid-January: interim reports
    • Feb 2004 closeout, and plan for DC2 (see following slide).
    • Then, break for I&T prep. Use the time for fixing problems learned in DC1, software advances, etc.
DC Progression

- DC2
  - 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 flaring AGN, pulsars (geminga’s)
    - produce a 1-month catalog
    - demonstrate point source sensitivity and localization
    - recognize more subtle hardware problem(s)
    - a few more physics surprises
    - exercise:
      - exposure, data processing pipeline, analysis tools. benchmark processing times, data volume, etc. connect to SSC?
      - use updated recon, bkgd rejection and instrument response to show the problem areas that need improvement. encourage improvements
  - schedule:
    - freeze software version July 04. start generation in September
    - start DC2 October 2004 (beam test analysis ~complete)
    - Dec 15 2004 midterm reports milestone
    - Feb 2005 closeout, and plan for DC3 (see following slide).
DC Progression

• “DC3” – Flight Data Challenge!
  – main goal is realism to support running experiment analysis:
    • 1 full simulated year of data (methods TBD)
      – exercise everything: format data as it comes into the IOC. also confirm data storage, backup, processing speed. will be the reference sample for 1\textsuperscript{st} year data analysis.
    • connect to SSC
    • demonstrate point source sensitivity and localization
    • recognize a few very subtle hardware problems. recognize a few realistic daily hardware problems -> feed to IOC and FSW.
    • physics surprises
    • use updated recon, bkgd rejection and instrument response. this will be our initial science performance. by this time, physics analysis groups should be up and running.
  – schedule (start after completion of beam test and MC tuning):
    • freeze software version Feb 06. This is the first year flight version! start generation in May.
    • physics groups working
    • launch.