Presentation on GLAST Data Policies to Science Working Group September 18, 2003 Rome, Italy

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http://glast.gsfc.nasa.gov

Revised and updated

- We have not yet reached consensus on proprietary data rights, public access to GLAST data and how the GI program would work

- This presentation is the revised policy for review by the SWG

- GOAL: ***This policy should result in optimizing the scientific return from the mission rather than the particular needs of any set of users or investigator teams. We believe this is facilitated by the rapid release of any discoveries by the GLAST teams and by full release of the data in a timely manner.***

Objective: Rapid Communication of Science

Now	Proposed
1 yr. Validation and verification	1 yr. restricted access period
Honor system for GI's	No restricted access for GIs
List of LAT targets? (Not exclusive) What can the LAT team publish?	Assess restricted during year 1 LAT team can publish anything it finds
Immediate release of transients (light curves and spectral etc.) Issue –who can publish on this data?	Immediate release of transients (light curves and spectral data) Anyone can publish.
GI's in 1st yr. (~12) can propose any target or complimentary theory or multi observations	GI's in 1st yr. (~12) can propose any target, complimentary theory or multi observations Access restricted until end of survey
No data releases during year 1	Publish and release results asap (practical)
Key Projects	Key projects

GLAST Mission Profile

- Mission Lifetime 5 years, Goal 10 years
- Observatory checkout 30-60 days
- First year is devoted to a sky survey
  - Plan subject to infrequent interruption for extraordinary transients
- Second year and beyond- scanning and/or pointing as driven by competitively selected proposals
  - Observatory is designed to “point anywhere, anytime”
    - Operate without pointing at the Earth
    - Reorient quickly to follow a transient
  - 3 normal operational modes
    - Scan (baseline)
    - Inertial pointing
    - Scan pointing - takes advantage of the wide field of view to optimize time on sky

Guest Investigator Program

- **GLAST will have a robust Guest Investigator Program.**
  - **Survey period: Some Guest Investigators (~12) will be selected to study previously known or suspected gamma-ray sources.**
    - **Investigations to be selected based on enhancement to the scientific return of the mission**
    - **Early and rapid communication of sc ientific results**
    - **Multi-wavelength data to be archived with the GLAST data, theory, etc.**
  - **After the Survey: NASA to fund ~100 Guest Investigations each year.**
  - **Science requires broad band (radio to gamma-rays) study of these celestial sources. Therefore, following the survey, the observing program will be determined entirely by the high-energy physics and astrophysics communities based on proposals submitted.**
    - **Funded LAT and GBM team members can compete, but cannot win additional funding.**
    - **Investigators from non-US Institutions may apply (but cannot be funded)**
    - **Selection is based on peer reviewed proposals.**
- **Community involvement is essential to an extended mission (>5years)**
  - **The community will interface to the GLAST data through the GLAST Science Support Center.**
    - **GSSC or LAT-IOC will have a mirror site in Italy (LAT and GBM may have others)**

Phase 1: LAT sky survey

- All-sky survey during the first year.
  - Operations and data analysis procedures will be validated
  - LAT team to produce a point source catalog and an all sky map.
    - Calibrated sky survey data to be released no later than 30 days following the completion of the one year sky survey.
  - Operations to include following five to ten bright gamma-ray bursts.
  - Transient source locations are made public immediately (i.e. on time scales consistent with the rise times of the transient) with photon data (light curves, improved positions, photon data, etc.) to follow within a few days.
    - During first year photon data to include warning that the data may be unverified and uncalibrated
    - Release preliminary source catalogs in time for AOs on best effort basis.
      - The first few months of observations will be delivered at 6 months, again at 9-10 months
      - The full 12 months of observations will be delivered 1 month after the end of the sky survey
      - Release performance verification data on 2-3 specific well known sources to allow community to learn how to use the data taken during the 30-60 day checkout?????
      - List of sources on web

Phase 1: LAT sky survey, continued

- Guest investigators (~12) may propose for source studies, associated theory or key projects.
  - GIs using data need to work directly with the LAT (5-10) and GBM (1-2) teams for data access and analysis
  - Data from sources are made available as soon as practical to the GIs (with any necessary qualifying warnings) by the instrument teams.
  - Proposals may include request for support for learning how to use the data.
  - May not impact basic survey (no pointing proposals)
- Access to data restricted during year one to LAT and GBM teams, the IDS scientists and selected GIs.
  - These scientists have authority to use the data as described in their respective proposals.

Definition of "Transient" includes

- A transient will be defined as some source that appears suddenly above some adjustable flux and/or a rapid flux change of a known source for which the intensity of photons changes by a statistically significant amount.
  - The purpose is to have timely community follow up.
  - Thresholds will be adjustable so that the rate of occurrence can be reasonable.
- Time varying sources will be tracked and the light curves posted.
  - The time scale for this change may be from seconds to days.
- Examples:
  - 1) gamma-ray burst transients – notification time is seconds
  - 2) AGN seen doubling in a few hours to a day, we will notify other observers within a day or two.
  - 3) A flux decrease could be a "transient" event.
  - NB: Pulsars are not "transients" in this sense.

Transient policy

- The GLAST instrument teams have the duty to release data on transient gamma ray sources to the community as soon as practical. The decisions on which data are to be released will be based on advice from scientists analyzing the data and an evaluation of the scientific interest that the data might generate. They will follow the general guidelines suggested below:
- 1) Gamma-ray bursts: All data on gamma-ray bursts that trigger either the LAT or GBM will be released. The prompt data release will include direction, fluence estimate and other key information about the burst immediately on discovery. Individual photon data and technical information for their analysis will be released as soon as practical.
- 2) Blazars and some other sources of high interest: 10-20 pre-selected sources from the 3rd EGRET catalog will be monitored continuously and the fluxes and spectral characteristics will be posted on a publicly accessible web site. Another 10-20 scientifically interesting sources will be added to this list during the survey. The list will include some known or newly discovered AGN selected to be of special interest by the TeV and other communities as well as galactic sources of special interest discovered during the survey.
- 3) New transients: The community will be notified when a newly discovered source goes above an adjustable flux level of about (2-5) x 10^{-6} photons (> 100 MeV) per cm^2 s for the first time; the flux level is to be adjusted to set the release rate to about 1-2 per week. A source exhibiting unusual behavior that is detectable on sub-day timescales, such as a spectral state change or a large flux derivative while the source is at elevated flux levels, will also trigger an alert to the community.

Phase 2 Guest Investigator Program

- **Guest Investigator Program: NRA's are released by NASA**
  - Data open and available from the Science Support Center
  - No restricted access or "proprietary" data period
  - Level 1 data are sent to the GSSC and placed in databases
    - Latency specification is 48 hours (1 day at LAT/GBM-IOC and 1 day at the GSSC)
  - GI proposals are for funding, including support for learning how to use the data and plan an observation.
- **Observing program determined by proposed investigations**
  - Investigations are idea driven and may impact the observing plan of the observatory.
  - More than one investigator may have access to any given data.

Data Policy Enforcement

- **The honor system (a scientist's Hippocratic oath?)**

It is expected and understood as good scientific practice, that the scientists (who have access to data other than that for the investigation to which they are entitled) will not attempt to analyze or publish data pertaining to other GI sources/targets.

- The list of selected investigations will be maintained on the GLAST SSC (GSSC) web site for reference.
- During Phase 2, serendipitously discovered sources should be treated as transients and released immediately.

Adapted from the INTEGRAL policy:

It is expected and understood as good scientific practice, that the scientists (who will have gained knowledge on other sources in the course of their analysis) will not attempt to analyze or publish data pertaining to other proprietary sources/targets during the proprietary period.

INTEGRAL Science Data Rights, Version 2.5 dated 15 November 2000 Section 6.1 More than one approved target in the field of view

Key Projects

- **Key Projects**
  - **Key projects will be solicited and awarded through the GI process.**
    - **They are large and may involve new observations (pointed or scanning), large scale data mining or complimentary science driven observations (e.g. optical searches for counterparts, pulsar timing studies).**
    - **Phase 1 key project might involve working with the LAT or GBM team to produce a data product that benefits the community for future phases.**
  - **Key projects may be proposed for first year data, except for the development of the catalog of sources and the all-sky map being done by the LAT instrument team.**
    - **NRA issued prior to launch and open to all.**
- **Example key projects**
  - **Pointed survey of the galactic plane**
    - **Pulsar searches**
    - **Improved data on the galactic diffuse or high latitude diffuse emission**
  - **A deep study of a specific region**
  - **Other examples?**

Science Support Center

- The Science Support Center
  - Plan and schedule observations
    - Review all commands that affect the time line
    - Implement Targets of Opportunity selected by the Project Scientist
    - Produce and maintain exposure maps
  - Archive all data and data products, tools, and documentation
  - Outreach to the public and support EPO
  - Support the GLAST Guest Investigator Program
    - Support headquarters proposal evaluation and selection
    - Provide GIs access to all analysis resources
  - Assure that GLAST and OSS data policies are implemented
  - Collaborates with the IOCs to define and develop analysis tools

Phase 2 Data Access

- The LAT and GBM teams will access data from their own IOCs or team mirror sites.
- Other scientists will extract data from the databases through the GSSC website. Extracted data will be exported to the user's computer as FITS files.
- The GSSC will make available a suite of science analysis tools. This will include a model of the galactic diffuse background (supplied by the LAT team) and pulsar ephemerides. The science tools will also be able to remotely query the GLAST databases over the net.
- The GSSC will provide extensive user support through its website. A help desk that will respond to queries. The GSSC will NOT run a physical guest observer facility where investigators come to analyze their data.
- The GSSC will provide data to, and assist, both guest investigators whose proposals were selected, and scientists from the general community.

Phase 1 Data Access

- The LAT and GBM teams, and IDS scientists and selected GIs who proposed to work with these teams will access data from the IOCs or team mirror sites.
- Catalogs of transients and sources delivered at 6 and 9 months to the GSSC will be on "best effprt" basis.
- The GSSC will make available science analysis tools, but they may not be operationally verified (work or use at your own risk).
- The model of the galactic diffuse background (supplied by the LAT team) and pulsar ephemerides may not be available.
- Tools developed by GIs and IDS scientists should be made available for general use as requested by the GSSC.