Presentation on GLAST Data Policies to Users Working Group October 22, 2003 GSFC

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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 current DRAFT policy for review and comment by the GLAST Users Group

- 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.***

GLAST Mission Profile

- Mission Lifetime 5 years, Goal 10 years
- Observatory checkout 30-60 days
- First year is devoted to a sky survey (Phase 1)
  - Plan subject to *infrequent* interruption for extraordinary transients
- Second year and beyond- scanning and/or pointing as driven by competitive proposals (Phase 2)
  - 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 science requires broad band (radio to gamma-rays) study of celestial sources. This requires a robust Guest Investigator Program.**
  - **Survey period: Some Guest Investigators (~12) will be selected to study previously known or suspected gamma-ray sources.**
    - **Early and rapid communication of scientific results**
    - **Multi-wavelength data to be archived with the GLAST data,associated theory, etc.**
    - **GIs are "encouraged" to work directly with the LAT and GBM teams for data access and analysis.**
    - **Data is available only through the Instrument Operations Centers (IOCs).**
    - **Investigations to be selected based on enhancement to the scientific return of the mission, i.e. multi-wavelength data to be archived with the GLAST data, theory, etc.**
  - **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.**
    - **NASA to fund ~100 Guest Investigations each year.**
- **Community involvement is essential to an extended mission (>5years)**
  - **The community will interface to the GLAST data through the GLAST Science Support Center (GSSC).**
    - **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 selected 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 (1-2 per week).
- 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.

Tentative List of sources to be "posted"

Variable LAT sources to be monitored and posted on the web			
Source type	Source name	other name	
Detected by EGRET			
Blazar	3C 273	3EGJ1229+0210	
	3C 279	3EGJ1255-0549	
	PKS 0528+134	3EGJ0530+1323	
	PKS 1622-297	3EGJ1625-2955	
	0336-019	3EGJ0340-0201	CTA 026
	1156+295	3EGJ1200+2847	4C +29.45
	1759-396	3EGJ1800-3955	
	0208-512	3EGJ0210-5055	
	1406-076	3EGJ1409-0745	
	3C 454.3	3EGJ2254+1601	
	0827+243	3EGJ0829+2413	
	0446+112	3EGJ0450+1105	
	1633+383	3EGJ1635+3813	
	1730-130	3EGJ1733-1313	NRAO 530
	Mrk 421	3EGJ1104+3809	
Ms pulsar	PSR J0218+4232		
Plerion	Crab Nebula (DC)		
HMXB	2CG135+01		
After confirmed detection by LAT			
Radiogalaxy	Cen A	3EG J1324-4314	NGC 5128
	GRS 1734-292	3EG J1736-2908	
	NGC 6251	3EG J1621+8203	
	NGC 4151		
Blazar	Mrk 501		
	W Com	3EG J1222+2841	1219+285
	1ES 1959+650		
	1ES 2344+514		
	H 1426+428		
Galactic Center	Sag A*		
Micro-quasar	Cyg X-1		
	Any other detected		
LMXB	Sco X-1		
HMXB	SAX J0635+0533	3EG0634+0521	
	Cen X-3		
	Cyg X-3		
	PSR B1259-63		

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
  - NRA release 4-6 months after mission becomes operational.
  - Data open and available from the Science Support Center
  - No restricted access or "proprietary" data period
  - Level 1 data are sent to the SSC and placed in databases
    - Latency specification is 48 hours (1 day at LAT/GBM-IOC and 1 day at the SSC)
  - 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

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

- **DRAFT DRAFT It is expected and understood that scientists will behave honorably in their dealings with GLAST data and with other GLAST investigators. Because of the wide FOVs of the LAT and GBM, and because optimum analysis often involves modeling background over broad patches of sky, the best scientific return from the mission is obtained by granting all investigators access to all data. In this situation it is particularly important for scientists to respect ideas and analysis methods that are known to have originated with other scientists and are being actively pursued. DRAFT DRAFT**
- The list of selected investigations will be maintained on the GLAST SSC 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?**