The Contributions of the GLAST Science Support Center to the Science Tools

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GSSC-LAT Science Tools Coordination

- **Underlying roles:**
  - **The GSSC and instrument team jointly define the suite of science tools.**
  - **The instrument team manages the development.**
  - **The GSSC provides resources.**
  - **The GSSC supplies these tools to the community.**
- **Communication:**
  - **The science tool suite is defined by the GSSC-LAT software working group.**
  - **Details of the suite are worked out by the science tools working group.**
  - **Software development infrastructure are handled by the science tools core working group.**
  - **Algorithms and implementation worked out by a number of other working groups (e.g., for databases) and ad hoc communication.**

GSSC Tools Activity

- Design: common classes are identified through use cases
- Infrastructure:
  - Software packages chosen:
    - Graphics—WIP for internal GSSC use. Package for tools?
    - Scripting—Python for tools. PERL for internal GSSC use.
  - GLAST Object Oriented Data Interface (GOODI) library: interface to data event objects
  - C++ wrapper for PIL (HOOPS)
  - C++ wrapper for CFITSIO (part of GOODI)
- FITS definitions: working group has been working on keywords, structure of main file types (e.g., event list). They are coordinating keywords with HEA Fits Committee.
- EGRET Conversion:
  - Software to access EGRET IRFs
  - EGRET version of pointing/livetime
  - EGRET photon database

Tools Activity, Cont.

- Databases:
  - Events will be distributed over a Beowulf cluster; database structure easily simplified to single node
  - Under development:
    - Queue manager
    - Web interfaces to databases
    - Access to databases
- Prototype CALDB developed
- Tools:
  - EventBinning—written and revised
  - Likelihood Tool—prototype developed
  - IRF⇒DRM for GRBs (and other uses) under development
  - XSPEC—discussions with developers about saving model parameters and spectra. Scripts for fitting series of burst spectra need to be written.

GSSC Members Involved in Science Tools

- **Scientists:**
  - David Band—GRB tools
  - Jerry Bonnell—data file formats
  - Dave Davis—databases, CALDB
  - Masaharu Hirayama—pulsar tools, FITS definitions
  - Yasushi Ikebe—EGRET IRFs, CALDB, alternatives to likelihood
  - Dirk Petry—EGRET pointing, exposure tool, web interface
  - Jim Chiang—likelihood, observation simulation
  - Valerie Connaughton—GBM tools
- **Software:**
  - Bob Schaefer—design, databases
  - Sandhia Bansal—design, class library, CFITSIO wrapper
  - Chunhui Pan—queue manager
  - Tom Stephens—access to databases
  - James Peachey (part time)—software infrastructure
  - Zvi Band (summer)—web interface to databases

Tools-Related Activities

- Tool will produce and post exposure maps on the GSSC website.
- DTS is baseline package for data transfer from IOCs to GSSC. Minor security issues need to be worked out.
- Design of database ingest in progress; we may be able to use HEASARC tools.

Non-Tools GSSC Software

- The GSSC will also develop operational software—not all programmer resources can be devoted to science tools
  - Timeline tools—may use existing scheduling tool, but schedules need to be transferred within ground system
  - Commands—commands from the IOCs to the MOC pass through the GSSC; GSSC will evaluate impact on timeline
  - TOOs—requests will be submitted through the GSSC website; once approved, the GSSC will generate the TOO order
- The GSSC will maintain databases of IOC and GSSC data products that are not relevant to the science tools.
- The GSSC will participate in ground system tests in addition to the Data Challenges.