Response of the SSC-LAT working group to the ‘First-Stage Review’ report

Draft v2, 18 November 2002

2.1 Format of the Level 1 Data Base
The comments actually address the design of the database and seem to confuse ‘format’ with ‘contents’. We did not present any design plans, and the committee’s addressing design issues (which we will consider carefully) goes beyond the scope of the review. We are committed to providing access to the data in FITS format.

The committee may have missed the point that U2 is a ‘local’ U1.

2.2 Content of the Level 1 Data Base
We might well include some more information at the event summary level, although there’s already a lot more in there than really is used by the SAE tools. An issue is whether the average user needs the additional information. The reviewers may not have kept in mind that tuning the event selections is alright, but the cuts must be consistent with the cuts used for the response functions. We will consult with LAT experts and analysis experts about the completeness for higher-level analysis of the Level 1 database.

2.3 Access to the Level 1 Data Base
This concern seems to be based on a misunderstanding; perhaps the photon and event databases were confused and our distinction between large and small queries (in terms of minimum response times) was overlooked. Furthermore, our minimum requirements are the average response rates now being seen at the Chandra Data Center, which had more requests than any high energy mission served by HEASARC. Therefore we disagree that the requirements we specify for the performance of the Level 1 database are inadequate. In any event, our studies with prototypes indicate that interactive response times should be achievable.

2.4 Re-use of Existing Tools
We are actively pursuing this; we will not reinvent the wheel when a perfectly good, supported wheel already exists. In our report we were not specific about how existing software will be incorporated in the environment – beyond stating that the code could be ‘wrapped’ – and indeed we are still figuring out how integrated the environment will be.

2.5 Management, Schedule and Resources
Given the constraints that are built-in, i.e., the distribution of the LAT team membership across several institutions, the independence of the SSC from the instrument team, and
the role of the SSC in the development of the analysis software, appointing a single manager with authority for the analysis software development is problematic.

We will attempt to identify additional sources of labor, and to make MOU-level agreements with contributing institutions about their specific roles.

We will contact AIPS++ developers regarding lessons learned.

2.6 EGRET Data
We agree that the having the EGRET data available in the LAT analysis environment would be useful for many reasons. However, importing the data would be a lot of work on the response function side, especially as related to the exposure calculation. We are still trying to determine the relative priority to assign to this work and whether we can plan to undertake it.

2.7 Design and Details of the Data Flowchart
The chart in our report was intended to be just a schematic representation of the relationships between the components of the standard analysis environment. We do have a good idea about the specifics of the data flow, and the committee’s recommendations for producing the more detailed diagrams useful for software development are what we intend to follow next.

‘configuration’ files are a user interface option that we are investigating for the tools.

2.8 Private Software of the LAT Team
Software not part of the SAE that is developed by the LAT team for analysis tasks not covered by the SAE will be made publicly available, but not supported. The release schedule has not yet been determined; however, it will be consistent with allowing independent confirmation of results. Software that the SSC develops outside of the SAE will also be made publicly available.

Regarding the point source catalog, the fundamental tools (A1 for source detection and U5 for the interstellar emission model) will be publicly available and supported by the SSC for guest investigators.

2.9 Detailed Simulation Tool
The LAT team has developed ‘Gleam’ for detailed simulation of the instrument. It has been and will remain publicly available. It will not be useful for most guest investigators, and would require a great deal of support by the SSC for non-experts. Also, the development and build environment of Gleam may be different than for the tools in the SAE. For these reasons, a detailed simulation tool will not be part of the SAE.
3.1 Automatic scripting
This capability is certainly desirable. We feel that a suitable, and simpler to implement, approach, will be to provide session transcripts that a user can edit into a script.

3.2 Generating Point Spread Functions
The point-spread functions are not generated in the sense implied here; their dependence on energy, angle, etc. is included in the IRFs (D3), and an IRF visualization tool (U8) will also be provided.

3.3 Modeling the Galactic Background
Allowing a user to input an different model is a good idea, and we will provide this capability.

3.4 Source Analysis
Timing analysis for sources other than pulsars and GRBs will be quite different from the XTE-type timing analysis for X-ray sources, for example. Source confusion, diffuse background, scanning operation, and strongly varying response functions across a large field of view make the difference. Time profiles of fluxes, and time variation of spectra, will be interesting scientific questions for blazars, and they can be addressed with A1, possibly augmented with scripts to analyze successive time intervals. In the SAE, we treat GRBs and pulsars separately because their analysis is feasible with special tools for which the considerations mentioned above are irrelevant.

3.5 Table Formats
‘HEASARC data tables’ are apparently what is served up by the HEASARC’s W3Browse service. W3Browse can provide access to FITS tables of data once the corresponding metadata are defined for the Browse software. (The tables themselves are ingested into the Browse database.) We do not anticipate needing or using Browse as part of the standard analysis environment, but if the HEASARC wished to make the pulsar ephemerides database or the ‘other astronomical catalogs’ database accessible via Browse, it should not be difficult. The other astronomical catalogs that we access (for counterpart searches) may not actually be accessed from remote servers.

3.6 Standard Products
This sounds fine, although beyond the scope of the SAE, and the LAT point source catalog will not be simply a table. The SSC will create standard products on a routine basis for selected sources. There may be an issue of creating standard products for a source that is ‘owned’ by a GI.
3.7 High-Level Simulator
D2 is a database, not a tool. It should be small enough to load on users’ computers.

3.8 Pointing History
An interval of 30 s is more than adequate, based on the scanning rate of the LAT (maximum 7.5°/min), the breadth of the FOV, and the feasibility of interpolation between successive entries. We may end up having pointing direction/livetime updates available much more frequently (every 0.2 s), for reasons unrelated to the minimum acceptable time interval.

3.9 Source Identification
This is a good point, and we will be sure to allow for the option of external catalogs as the tools related to source identification become more completely defined.

3.10 Missing Utility
This would be a desirable utility if it would in fact speed up access to the data. Whether it does will depend on the implementation of the database D1. U1 will provide multiple coordinate system capability.

4. Responses to Questions from the SSC-LAT Team
1. Coadding images, such as for study of a class of sources, is beyond the scope of the SAE.

9. We are not sure what is meant by an object oriented FITS-based relational database. We will investigate use of the Integral source catalog as part of D6.