LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY
- LIGO -

CALIFORNIA INSTITUTE OF TECHNOLOGY
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**PRELIMINARY DESIGN REVIEW
LIGO Data Analysis System
(LDAS)**

Title

Review Board: B. Allen, M. Coles, S. Finn, D. Reitze,
D. Shoemaker (chair), D. Sigg, J. Zweizig

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*This is an internal working note
of the LIGO Project*

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REPORT ON THE PRELIMINARY DESIGN REVIEW OF THE LIGO DATA ANALYSIS SYSTEM
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REPORT ON THE PRELIMINARY DESIGN REVIEW OF THE LIGO DATA ANALYSIS SYSTEM

PARTICIPANTS

Presenters

- A. Lazzarini, K. Blackburn, S. Anderson

Review Board

- B. Allen, M. Coles, S. Finn, D. Reitze, D. Shoemaker (chair), D. Sigg, J. Zweizig

DOCUMENTS PRESENTED AND DISCUSSED

Reviewed Documents

- LIGO Data Analysis System [LDAS] Preliminary Design Document, T990001-06-E

Viewgraph Handouts

- LIGO G-990014-00-E

REVIEW BOARD REPORT

The review was conducted on 11 March 1999. The presenters summarized the design requirements and preliminary design, illustrated by the viewgraph handouts, and the Board discussed the documents, the presentations, and the Requests for Action. The Review Board charge and its response is as follows:

1. **Charge:** Determine whether the requirements identified in the Preliminary Design Documents are complete; advise whether proposed requirement values are appropriate; if needed, recommend additional requirements to be specified; and recommend other appropriate actions.
   Response: The Requirements were complete and appropriate except for questions to be resolved through Action Items below. It is possible that the response to some of the Action Items will add to or change the Requirements, but the Review Board believes that they are substantially correct.

2. **Charge:** Evaluate the conceptual design of the LIGO Data Analysis System to determine if it is consistent with the DRD, and sufficiently developed to proceed with the Preliminary Design.
   Response: The conceptual design is appropriate and complete at the current stage of design, except for questions to be resolved through the Action Items below.

3. **Charge:** Evaluate the preliminary design phase plans and schedule.
   Response: The plans and schedule appear to be on target.

General comments

The review was a success, and the review board appreciates the effort and enthusiasm evident in the documentation and presentation. Preliminary design should commence. A number of questions from the review board are outside of the purview of the LDAS but are related and meritorious of attention.

- An effort (mechanism) should be made to allow and encourage interferometer scientists to work on data analysis efforts as early as possible and to have an increased role in the development of LDAS in general.
- More discussion in the Lab/LSC of the trades possible and necessary are needed addressing how (both the organizational mechanisms and the scientific arguments) the production environment will be partitioned between different kinds of searches. It is striking that the inspiral computation could, for some parameter (e.g., mass cutoff) values, consume the entire system; yet we will certainly want to have time/flops left for other kinds of searches.
- The availability of LDAS/CACR hardware and the associated software/operator support for prototyping of algorithms by the LSC at large should be clarified.
- An LDAS 'help desk' will be needed either in the Lab or in the LSC at large. Because it is not within the current scope of the data & computing group under the operations budget through 2001, this need should be identified for the follow-on operations budget for the LIGO I science run. Planning for this should start soon whichever solution is chosen. This could be combined with librarian and bug-tracking services.

RECOMMENDED ACTION ITEMS

1. Integrate the Detector commissioning plan dates into the LDAS plans to aid in supporting commissioning; consider ways in which the LDAS development effort can be modulated without impacting LDAS but which increases intersection with Detector commissioning

2. Define on-line more carefully; perhaps on-site and off-site form a better 'basis'

3. Better definition of the nature of the user interface for LDAS is needed. A clarification of the frequency and character of user interaction may also be rquired.

4. A clarification of the interaction between algorithm development ('sandbox' activities) and the production environment should be clarified. Some sketches of code evolution (e.g., Matlab to Root to LDAS production) would be helpful.

5. Study the optimal place to reduce/refine data: sites vs. Caltech LDAS. Show clearly where it is anticipated the the full data stream flows, and where a reduced set is anticipated; where it is in frames, and where it is anticipated to be 'lightweight'

6. Please use a more complete description of data in documentation, e.g., raw frame data; raw/10 frame data; raw/100 lw data, etc.

7. It should be indicated how PEM and other auxiliary data can be used early in the analysis process to guide the analysis to be performed. An example is changing the expectation for the system noise based on seismometer measurements of the input ground noise spectrum.

8. It appears important to test the network connection of the arangement where the data server is not on the same backplane as the frame builder.

9. Would like to have some introduction to TclTk and some examples of its use as a steering language available to the community.

10. Clarify via flowcharts or equivalent the roles of the manager/assistant manager; some concern that these functions could limit the data flow through the entire system.

11. The role of the metadatabase is unclear. Is it necessary to access DB2 to analyze data, or will there be other paths to the database? Will it be of a size that allows local copies, or will all access be to a central server at CACR? Some clarification in the documentation is desired.

12. The minimum hardware required for running LDAS should be explored for other LSC applications; trades of runinng LDAS remotely (at Caltech) with a remote display vs. a separate complete software installation would be helpful for groups planning their approach to data anlaysis.

13. Check the targeted computer rooms at LLO and LHO for the presently planned equipement -- space, power, cooling.

14. A fall-back plan in the event the HPSS is not continued as a product by IBM should be in place; either maintenance of the running version, or an alternative solution.

15. MPI 2, or the equivalent in an improvement in the robustness of MPI against failures in the system, appears to be important to maintaining a 7x24 system. Early attention to reliability of the existing systems, and tracking of MPI 2 development, are recommended.

16. A User's Manual will be needed, and an early version may help users help LDAS define the most useful system.