

Update on Performance Characterization

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University of Michigan & LIGO Hanford Observatory

LIGO Scientific Collaboration Meeting
(Detector Characterization W.G. Session)

Stanford University

July 20, 1999

Tasks & People

Tasks From Giant Table

- Violin, mirror, line modes
B. Allen*, E. Chassande-Mottin, S. Dhurandar, S. Finn*,
D. Gustafson, W. Johnson*, S. Mukherjee*, A. Ottewill*,
A. Sintes, B. Svoboda*
- Seismic Noise
B. Allen, G. Gonzalez, D. Greenwood, S. Penn
- Stack Vibration
S. Penn, K. Riles
- Total Non-Gaussian Noise
B. Coldwell, W. Majid, K. Riles, S. Scott, B. Whiting
- Gravity Gradients
G. Gonzalez, D. Greenwood
- Operational State
K. Riles

*Represents task commitment with completion date

Tasks & People

Tasks From Giant Table (cont)

- Bilinear Cross-Couplings
- Summary Metrics (astrophysics)
S. Finn*
- Bandlimited RMS
A. Lazzarini, W. Majid, D. Petrovich
- Time/Frequency Plots
R. Adhikari*
- Inter-channel correlations (linear effects)
B. Allen*, E. Chassande-Mottin, S. Dhurandhar,
A. Ottewill*, A. Sintes
- Time-Domain System ID
S. Finn
- 2km-4km Correlation
- Inter-site Correlation

(More info available in minutes of June teleconference)

Discussion Points

- New volunteers?
- Specific commitments?
- New or broader tasks needed?
- Problems encountered in work so far?

Transient Working Group Status

Fred Raab
July 20, 1999

- Purpose: Detect, characterize, understand transient artifacts in detectors so we can recognize unanticipated gw events as they occur
- Web pages express current group interests
- Little detectable activity so far
- Will request activity updates again in September for posting by 30Sep99
- e-mail: raab_f@ligo-wa.caltech.edu to update

Needs & Opportunities

- Data collection/conversion malfunction detectors
 - ›› discontinuities, missing data, missing bits, stuck bits, duplicated data
- Non-stationarity detection in data
 - ›› large-amplitude excursions in time series or frequency bands
 - ›› wavelet/template techniques for more subtle changes
- Discriminators - separate transient artifacts from expected signals.
- Automated event recognition/classification
- Event statistics/correlations

How to Get Going

- Need real commitments on deliverables!
 - ›› get listed, get style sheet and start coding
- Test software on available data streams
 - ›› old 40-meter data still available
 - ›› LHO PSL on since mid-December
 - ›› LHO Mode Cleaner turned on in mid-99
 - ›› LHO PEM coming on-line
 - ›› simulated data sets available in ????
 - ›› new 40-meter data available in ????
- Develop & test software on LHO 2K data by early 2000

Report from the Data Set Reduction Working Group

Near-term goals:

1. **Data Export** Exercise and develop tools to export data to LSC labs and institutes.
2. **Examples** Provide *working* examples of tools used to look at data.
3. **Software Modules** Contribute to software modules to the LIGO/LSC Algorithm Library (LLAL).

Software Modules

Develop (or collect) a library of software modules to compress data:

Lossy:

- Decimation
- Heterodyne (select band of interest)
- Fourier transforms
- mean, rms, maximum and minimum values
- ...

Non-lossy:

- Can we do better than gzip (\simeq 50% reduction for most some channels)?
- What works best for Gaussian noise?

Examples

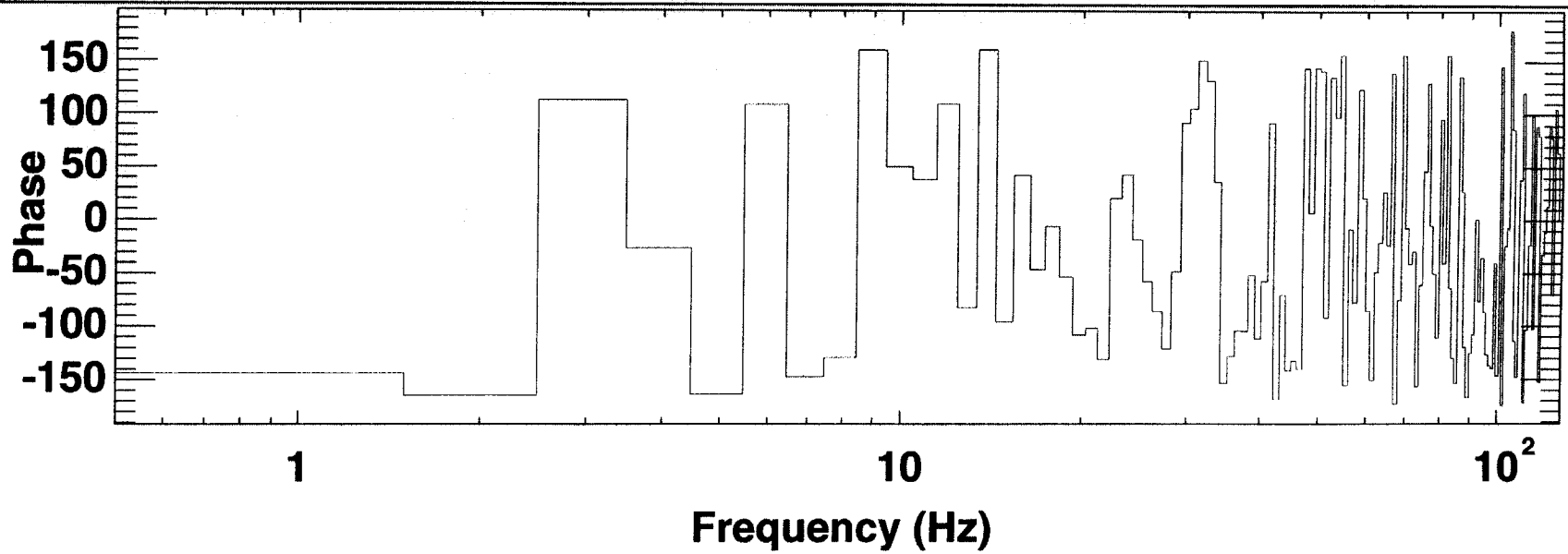
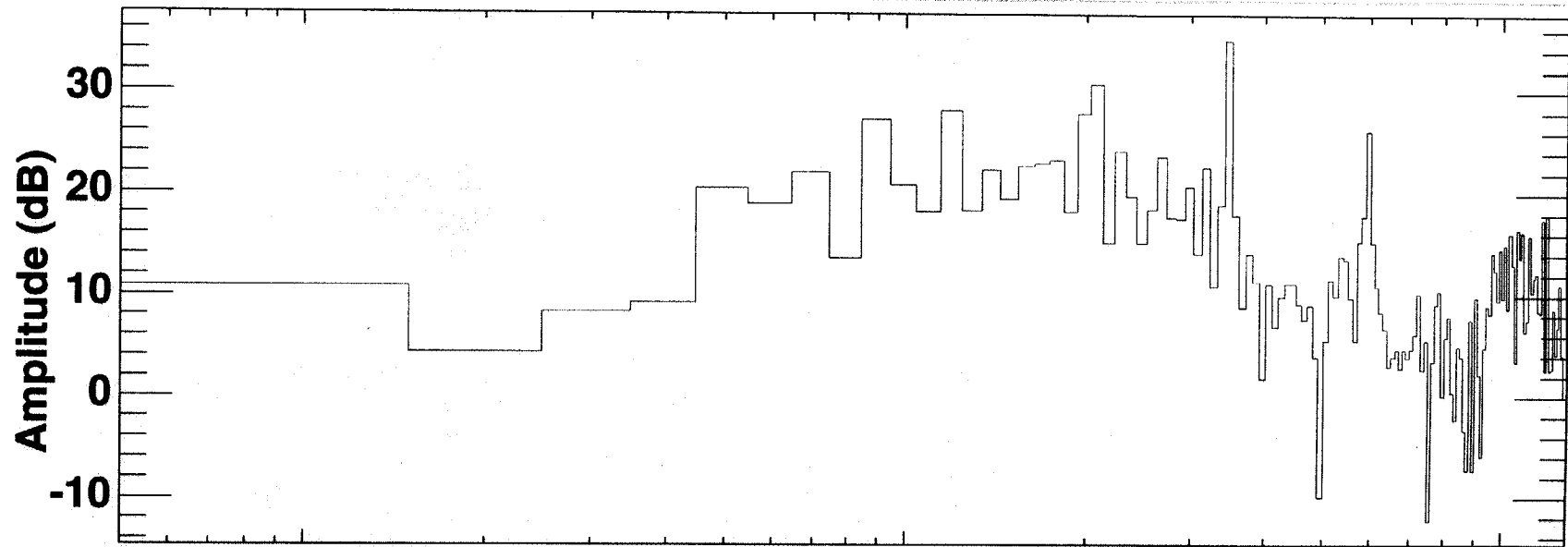
Once I have the data at my home institute, how can I look at it?

Possibilities include:

- Frame c-library
- DMT (Data Monitoring Tool) – See John Zweizig's talk.
- Grasp (Bruce Allen)
- Mathlab
- LDAS (currently for Hanford only).

Volunteers needed to write and maintain examples.

H0:PEM-LVEA_SEISZ



Data Export

Now

JDClinet (web based) extracts requested channels in frame format for a specified time period:

⇒ Access limited by LIGO-Hanford network connections (1.55mbps (T1)).
Upgrade is foreseen for later this year.

⇒ Size restricted to 10's of Mbytes.

Near Term

Transfer files of $\simeq 10$ GB size (e.g. several day of fast channels, uncompressed). Requires either tape or Internet II connection.

Future

Export Level 2 or Level 3 data to LSC Labs and institutions.

Level 3 data – Whitened GW Strain Data.

1 TB/year, 32 kB/sec (Could be distributed to 10 institutes over the network).

20 × 50 GB tapes/year.

Level 2 data – IFO Strain plus Data Quality Channels.

10TB/year, 320 kb/Sec. 200 × 50 GB tapes/year.

Designer data sets – needed to perfect Level 1 Archived Reduced Data Set and Level 2 data sets, e.g. IFO + magnetometer.

Note 1, Linda Turner, 08/17/99 08:48:50 PM
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