New Folder Name Data Type

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FACSIMILE COVER SHEET

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DATE January 3, 1994
FAX NUMBER
OFFICE NUMBER

NUMBER OF PAGES (including this cover sheet): 3

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Attached is a response to your request to the data format that we had used in our Beam Tube Demo Testing that I plan to officially send you. Actually, this was originated as suggestions of what you could do, but based on what we did, combined with improvements that we now recognize (state vector logs). This is sent "over the fence" in your direction this time, for your comments: is this the type of response you were looking for? Any surprises or things left out? If at all possible, I'd like to get your initial reactions soon.

Data Type and Formats for CBI Qualification Test

R. Weiss Oct. 20, 1993, modif. Dec. 22, 1993

1. Communications

All files related to the technical aspects of the qualification test should be accessible to LIGO personnel via internet with read only privileges. All files generated during the qualification test should remain on line. The CBI staff member responsible for the technical direction of the test should have an internet mail address. The internet addresses of the LIGO team members involved with the data analysis will be provided to CBI.

2. Test "logbook" files

All notes on apparatus state, procedures, anamolies etc., the type of information normally written in laboratory notebooks, should be kept in ASCII files indexed in such a way that the filename indicates the date, for example, 931020.log .

3. System state vector

All data files should have a time tagged system state vector at the beginning of the file and a new time tagged state vector written in the file when there is a change of state. The components of the state vector describe the state of each valve, trap, trap filler, gauge and pump in a binary format (0 if closed or off, 1 if open or on). It is worthwhile to leave some spare assignments of the vector components for future needs. The state vector should be preceeded and followed in the file by a unique ASCII character to separate it from the data, for example #.

The state vector is useful in many ways: it aids in communicating procedures to the people who are actually performing the work, is useful in avoiding mistakes and confusion in communications and enables an orderly search procedure through the data files.

4. Instrument state vector

The need for this vector depends on the type of instrumentation that is ultimately used in the qualification test. If the pressure sensing instruments are autoranging, have a NIST calibration heritage, provide outputs directly in torr and do not have operator adjustable gains or offsets, no instrument state vector needs to be written. The periodic calibration with known leaks suffice to maintain validity of the data. On the other hand, if the instruments have adjustable parameters under operator control, a time tagged instrument state vector listing the settings of the adjustments is necessary and must be included at the start of each data file and a new vector is to be written when a change has been made in the instrument state. The instrument state vector should be separated from the data by a unique ASCII character.

5. Continuous data files

A continuous record of the pressure and relevant environmental parameters should be kept. This record should be maintained even when special procedures such as diagnostic tests and other transient measurements are being carried out. (Note: this requirement may influence the choice of the computer system since several data logging tasks will need to be performed simultaneously.)

5.1 Housekeeping files

A new file should be started at the same time each day, the file name to include the date at the start of the data, for example, 931020.dat . The data part of the file should include, in ASCII format: the time (day,hrs,min,sec), the pressure on all gauges (torr, real 2 significant figures and exponent) and the temperature (C) at various locations on the system and of the room. The sampling rate, when parameters are changing in the system, should be at least one sample per 1/5 of a system time constant. Under quiescent conditions, the amount of redundant data logged may be reduced by sampling the entire data set only when one parameter has changed by more than 10% from a previous value. These files should include the data from initial pumpdown, system openings, leak hunts, etc.

5.2 Residual gas analyser files

A continuous time tagged record should be kept of the partial pressures in torr at specific amu values, once pressures are low enough to run the RGA safely. The suggested amu values are: 2,12,14,15,17,18,28,32,39,40,41,42,43,44,51,52,55,57. It would be useful to allow easy software reassignments of the the amu values to allow for contingencies that may arise once the system is under test. A flag in the data should indicate the state of the calibration leaks (whether open or closed); this in addition to the system state vector. The sampling and logging rates are the same as for item 5.1. A new file should be started at the same time each day, the file name to include the date at the start of the data, for example 931020.rga .

6. Periodic data files

6.1 RGA full spectrum amu sweeps

Once per day, at a regular time, a file of the entire mass spectrum should be written. The filename designed to identify the sweep, for example 931020.swe . The minimum amu range should be 1-100.

7. Transient data files

There will be some special purpose data sets associated with diagnostic and test procedures. Depending on the type of data required and the time scales associated with the measurement, it may be necessary to write files at higher sampling rates (max rate $\approx$ 1 sec/sample) and non-standard sensitivities. Examples of such procedures are: accumulation measurements, pump down after accumulation, pumping speed measurements. Although every effort should be made to maintain such files in the same formats as the continuous files, it may prove to be too cumbersome. The format and the content of such files should be described in the daily logs and a separate index of such files should be maintained giving the filename and a reference to the log file which describes it. The filenames should indicate the date and have a suffix indicating the type, for example, 931020.trx , where x is a number.