WISAN 2
Load Testing System

WISAN-based Load Testing System allows establishing loading profiles for various structures.

The Load Testing System employs high-precision wireless strains sensors in conjunction with user-friendly software for network configuration, and collection and processing of strain data.

Upon startup the user is presented with a choice to load data from a hard drive for review and analysis or to start a new experiment (Figure 1).

The network setup tab contains an indicator that displays the status of the network. The only user-selectable option is whether the strain sensor on the sensor nodes needs to be powered up.

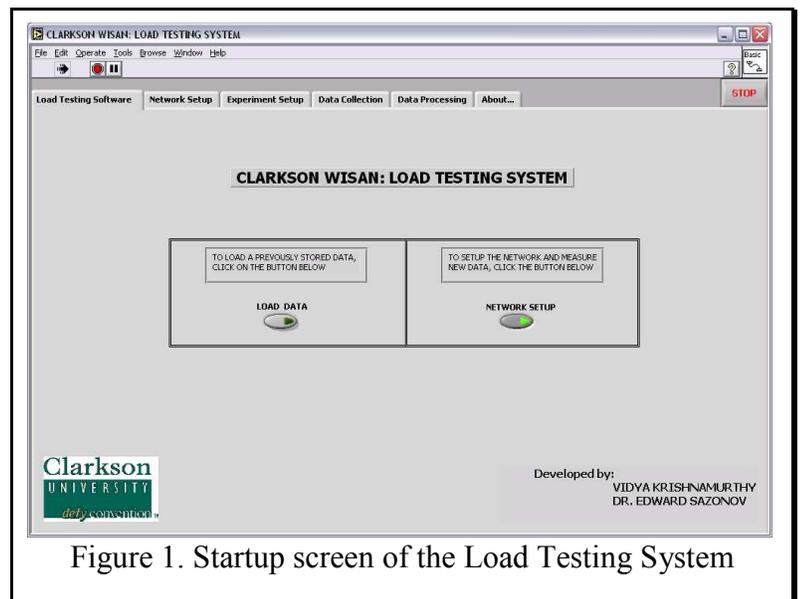The experimental setup screen contains parameters set for a given experiment (Figure 2):

- Title and Description
- Structural geometry and location of each sensor on the structure
- Calibration coefficients for each sensor
- Sampling frequency and duration of each data recording
- Selection of excitation voltage applied to strain sensors

Experimental setup screen also allows users to save and load experiments setting, so for given sensor hardware the calibration coefficients will need to entered only once and loaded from disk on subsequent uses.

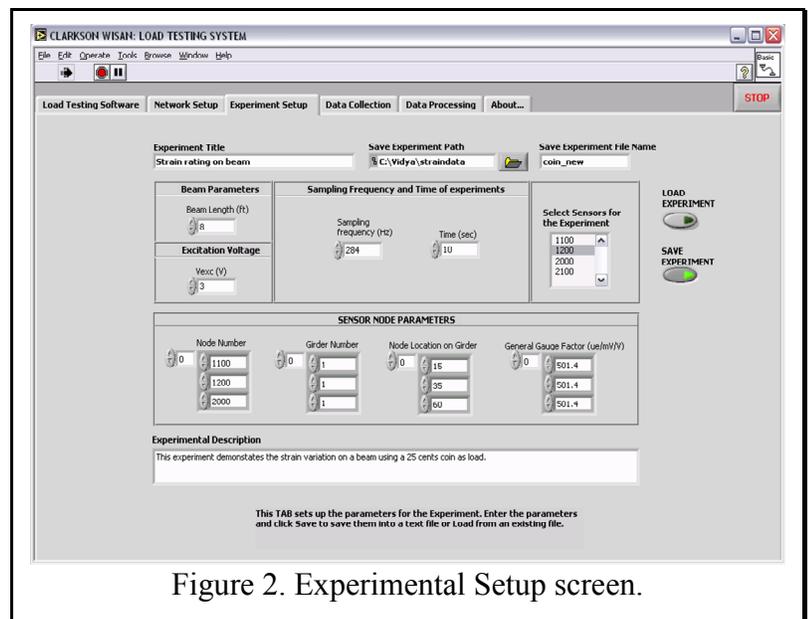Figure 1. Startup screen of the Load Testing System

Figure 2. Experimental Setup screen.

Data collection screen controls the wireless sensors and presents users with a plethora of options for establishing correctness of acquired data:

- Each data point is associated with a certain load value and load position on the structure
- Data is collected simultaneously and synchronously from all wireless sensors allowing utilization of strain data in modal analysis
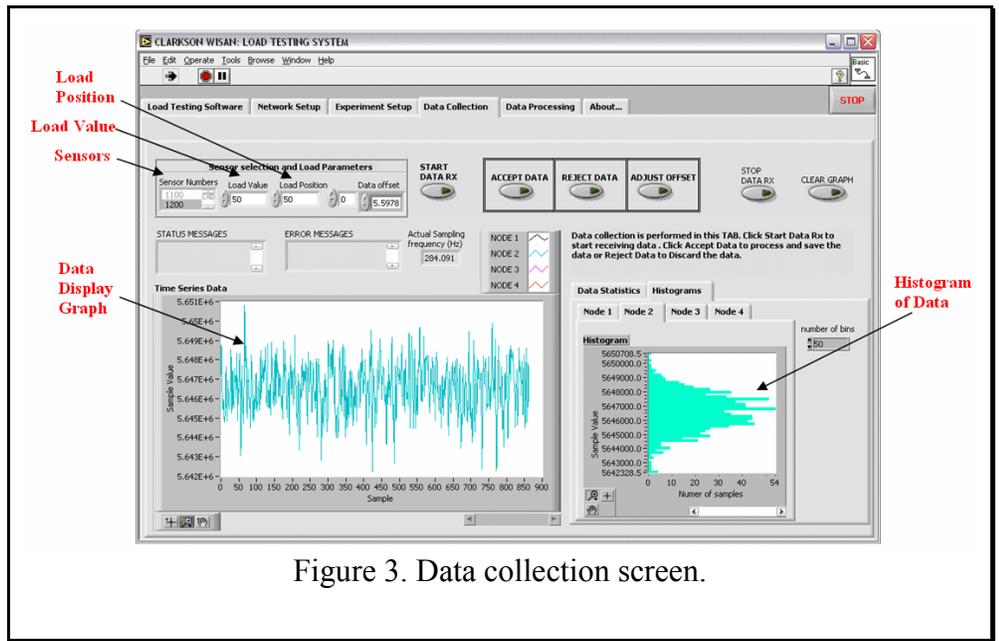

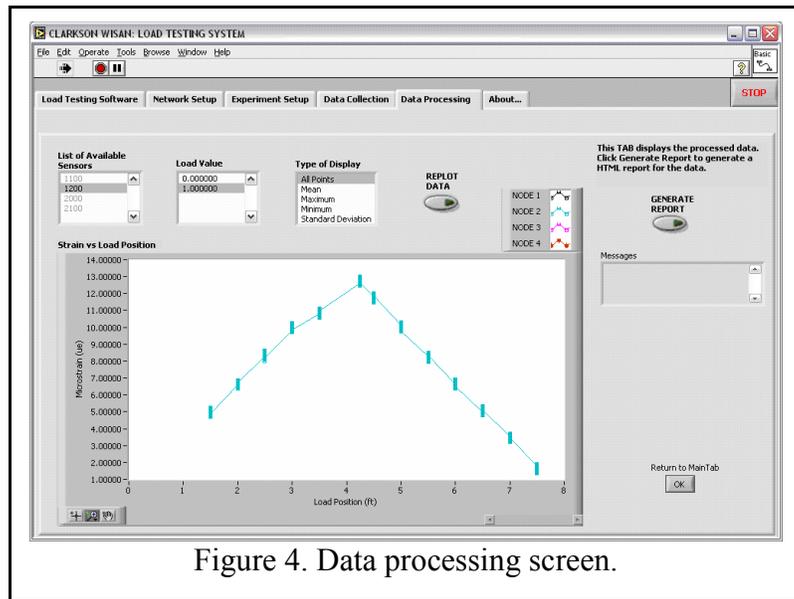Figure 3. Data collection screen.

Figure 4. Data processing screen.

- The time series data display and a histogram allow for visual control over the data quality for each sensor. Data statistics computes mean, standard deviation, variance, min and max values.
- Collected data can be either accepted and saved on hard drive as a data point for current experiment, rejected or used to adjust offset of the zero level (offset drift is common in strain sensors due to changes in ambient temperature, light and other conditions)

Data processing screen allows visualization of collected data points and generation of reports (Figure 4). Data visualization is possible for a set of certain sensors, load values, etc.

Report generation option saves the data in HTML format that can be imported into text editors such as Microsoft Word or viewed in any Internet browser (Figure 5).
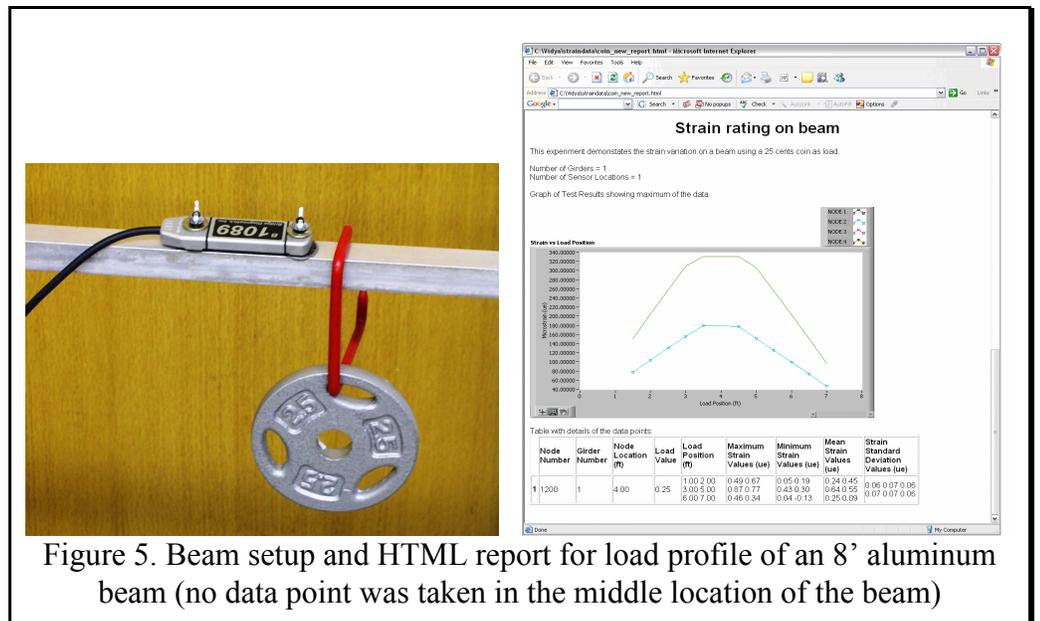
Figure 5. Beam setup and HTML report for load profile of an 8' aluminum beam (no data point was taken in the middle location of the beam)