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Electro Standards Laboratories
ADVANCED SYSTEMS DESIGN & SERVICES

aei *testing and simulation*

ESL's Web-enabled data acquistion

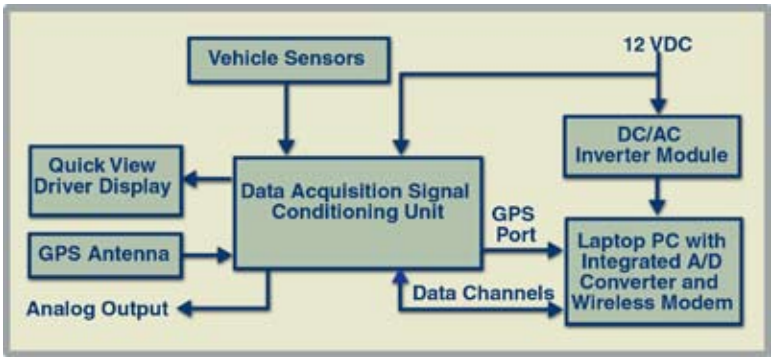
Despite advances in automotive development simulation software, there is still a critical need for on-road development.

On-road developmental tests evaluate the effects of weather and road conditions on ride, handling, steering, braking, noise, vibration, and other vehicle characteristics. These tests are run virtually everywhere in the world, such as Michigan race tracks, on Germany's Nurburgring race course, in the snow and cold of Alaska, and in Arizona desert proving grounds.

Electro Standards Laboratories, in conjunction with Dana's Engine and Fluid Managment Group, has developed an interactive, in-vehicle, Web-enabled data acquisition system with GPS to supply real-time data on vehicle systems.

Development engineers in laboratories need to know exactly how their vehicle systems are functioning on a particular curve in a remote site at a particular instant of time. Electro Standards Laboratories (ESL), in conjunction with Dana Corp.'s Engine and Fluid Management Group, has developed an interactive, in-vehicle, Web-enabled data-acquisition system (WEDAQ) with GPS (global positioning system) to supply the real-time data needed. In particular, Dana is using the WEDAQ-system in the development of its advanced steering systems to carefully monitor vehicle performance in real-time.

The vehicle sensors send inputs to the data-acquisition (DAQ) signal-conditioning unit that monitors the desired vehicle parameters or performance. Setup parameters are incorporated into the local (in-vehicle) side of the system, but can be modified by either local- or remote-side users.



The GPS magnetic-mount antenna, positioned on the vehicle roof, gathers satellite signal information for the global positioning DAQ subsystem. These signals are processed, digitized, and stored for analysis.

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The DAQ unit accepts 16 channels of analog input. It provides gain, filtering, and signal buffering of the analog voltages and passes them to the laptop PC. An analog output is provided for general usage.

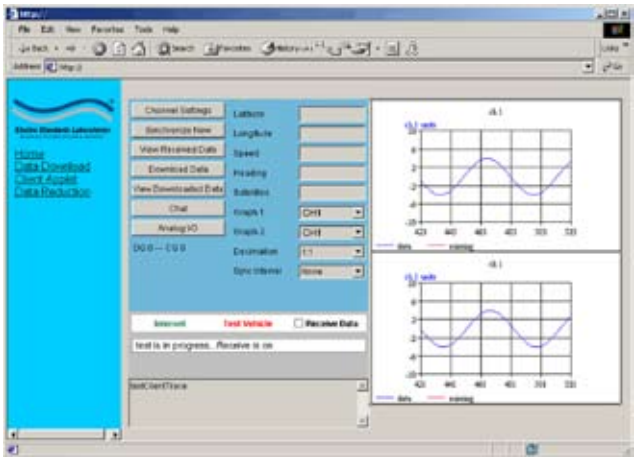
The laptop PC, serving as the host platform for the system, provides data digitization and local data storage of all sensed channels. It also acts as the conduit for remote internet access to streaming data and archived test data. Internet access is accomplished with a wireless modem integrated into the laptop PC. The dc/ac inverter module uses 12-V dc vehicle voltage to generate a standard ac voltage for powering the laptop PC.

The compact instrument panel mounted liquid-crystal Quick View driver display is cabled to the DAQ unit. The display can be set to show the current value of any sensed signal during a test.

The local side in the data flow architecture is an enhanced in-vehicle acquisition system that stores all data to a local file on the computer hard drive. The real-time plots allow the local user to monitor graphically the evolution of any signal channels. Similarly, the IP display unit allows the user to monitor numerically any combination of input signals. Selected data are also processed and routed to the Internet communications channel for remote users.

Using a web browser, the remote user receives a real-time data stream from the test in progress. Real-time streaming data are automatically saved on the remote computer's hard drive. Previously stored test results on the local-side computer can also be retrieved and viewed by the remote computer for immediate analysis. Data viewing selections do not affect local data acquistion and file creation.

With this WEDAQ technology, users can test the "real thing" in real time, generating savings in time, personnel, and money.



Dana is using the WEDAQ system in the development of its advanced steering systems to carefully monitor vehicle performance in real time.

This article was written for AEI by Dr. Raymond B. Sepe Jr. of Electro Standards Laboratories

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