

Oil and Gas Drilling Wireless DAQ system

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Category:

Manufacturing

Products Used

LabVIEW 8.2

Compact FieldPoint 2120

AI-111

The Challenge:

The client needed to have an application written to provide data a wireless network integrated into an existing application. This new application would be required to allow the use of the existing centralized DAQ system as well as the new wireless DAQ nodes or a combination of both systems.

The Solution:

The data would be collected using Compact FieldPoint units and AI-111 modules. The application would automatically connect to any in range systems and start providing real-time data to the main application. The operator would be permitted to select any data that was relevant to the well site operation.

Abstract

The drilling service had several requests about how the application should work on the job site. The numerous trucks arriving on the job site would need to be connected to the wireless network automatically. Each truck would have its own node consisting of a Compact FieldPoint with backplane, one or two AI-111 modules, a wireless hub, and a complement of sensors to provide critical information to the centralized application. Regardless of the specific truck configuration all of the data needed to be handled by the main application in the same manner.

Introduction

Data Science Automation (DSA) was selected to develop software and hardware to wirelessly communicate the data to the well sight monitoring application that provides accurate accounting of the well casing and fracturing process to their engineers and customers. The wireless approach was requested to help provide the data from sensors installed on the trucks that perform the pumping and metering of different chemicals and fluids into the well for the purpose of fracturing or lining the well. Previously, each truck needed to be 'wired' to the central system providing for challenging field operations.

Figure 1 shows a sixteen channel unit ready to be installed on a truck. A second AI-111 can be added to the setup allowing thirty-two channels of data to be returned to the main application. Each truck if equipped with a datNODE unit that is connected to a host of sensors pertaining to different aspects of the operation. Each truck is assigned its own number and IP address that are stored on the compact field point. This allowing for thousands of channels to be utilized and each has its own unique identity yet retaining the standard format for each type of truck. As each truck enters or leaves the job sight it is connected to the wireless network and its data is provided to the main application where the job manager can select the appropriate data to be used in the main application.



Figure 1 – This is a picture of the inside a truck mounted DAQ unit.

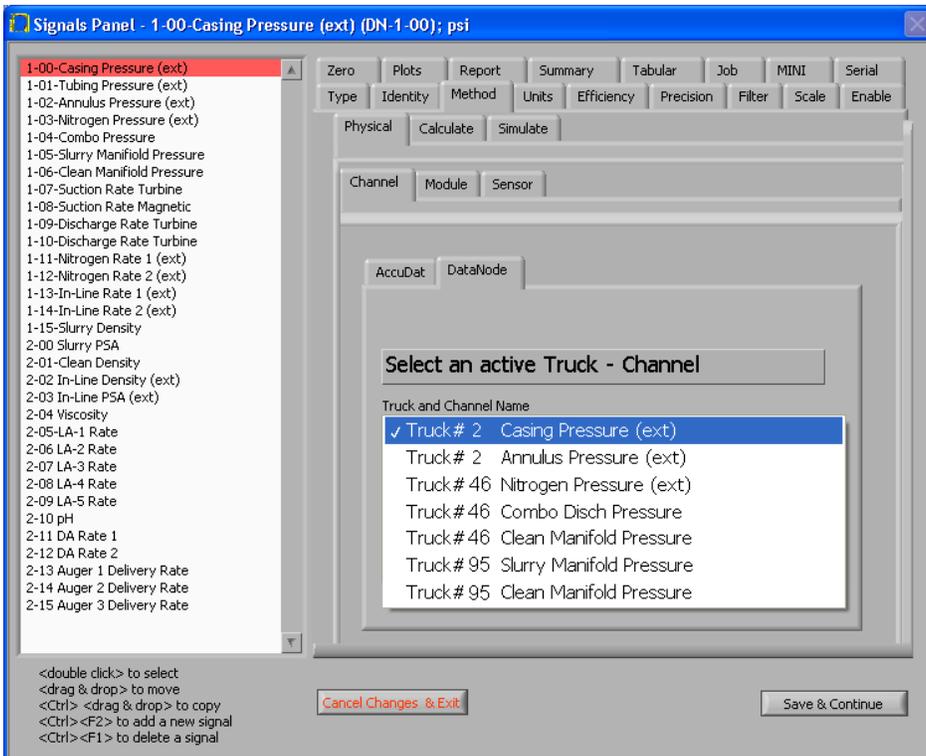


Figure 2 - Signal Panel

Figure 2 shows the signal panel that the operator uses to select the channel to provide data to the application. The list is automatically updated with available channels as additional trucks arrive on sight. The datNODE also has a barcode reader that is connected to the box that allows the truck operator to send commands to the main application when the truck operator performs specific operations. These barcode commands are logged by the main application to indicate when an event has taken place. The job manager can even use the reader off of one of the trucks to control the main applications major functions such as Record, Pause, Zero job, Zero Stage, Average Vales, and other process commands. The datNODEs can also be connected via wired connection in areas that the wireless connection should not be used. When a wire is used the application will continue to automatically add the truck and channels to the list of available channels when the truck is plugged into the network. If the connection is lost the application will return a specific negative value to the main application as an indicator that the data is not being received. The datNODEs program continually sends out a signal to allow the main application to add the datNODE's information to a list of available trucks weather in a wireless or wired connection mode. This also is the manner that the trucks will automatically connect to the main application when a new truck arrives onsite and a wireless mode of operation is being used.

The Result

Data Science Automation, Inc. using LabView software and compact field point hardware was able to provide the customer with a cost effective manner to which a drilling team and engineers could collect the data in a better manner than having each sensor hard wired to the main control van using many cords laying across the ground in a harsh environment. This also reduced the amount of lost data due to connections being severed by vehicles or personal traveling over the wires on the ground providing a more complete data representation of the process.