

Wireless Networks Solve Gas Chromatograph Communications Challenges

Gas chromatographs play a key role in determining the precise components in a gaseous or liquid stream and maintaining profitability across a gas distribution network. Onsite installation and commissioning the analyser to communicate critical data back to the central control room can be costly and challenging. Greg Latch, project pursuit manager for Emerson Process Management, explains how Emerson is using wireless technology to reduce installation costs and integrate communications across a gas distribution network for a pipeline company in Asia.

Q. How did Emerson install gas chromatographs at the site and overcome the communications challenges to get data to the control room?

A. In a word, wirelessly. But the solution is more complex than this one word suggests. In this case, the customer is a gas distribution and pipeline company that offers its customers a seamless service capability across 30 receipt points and over 100 delivery points. Each of these points either have existing gas quality metering stations, the potential for upgrading stations, or the potential for new additional measuring points to manage gas quality and transfer measurement.

A challenge they faced was to monitor the gas composition in order to manage the downstream feed to LNG plants. They needed to offset the risk of trace heavy hydrocarbons (that freeze in the liquefaction process) and/or unacceptable trace sulphur levels that would severely impact the downstream processes to improve overall plant efficiency and avoid penalties caused by no or low non-LNG products (NGLs, condensates).

Q. What kind of detection limits did the customer require? That will give our readers an idea if this solution could work for them.

A. Very stringent. To achieve the low detection limits of gas composition the customer required, we had to conduct comprehensive laboratory pre-testing/pre-work just to prove to the customer that we could measure the ppb trace levels of heavier hydrocarbons and trace sulfur components flowing through the pipelines. Meeting detection limits was our first obstacle, and we realised then we were just getting started.

Q. So what was next?

A. Once we successfully achieved the low detection limits and gained the customer's trust, we then began to consider the best communications options to meet their needs. Standard RS485 Serial Modbus communications are generally used for control and measurement readings of gas composition — normally easily achieved for long plant distances of more than 100 meters. However, the rich diagnostics from the gas

chromatograph requires management and interpretation to be performed over higher-speed Ethernet connections — communications not reliable for distances greater than 100 meters. To facilitate the long-distance communications necessary, we implemented two different solutions for the customer.

The 700XA gas chromatograph uses MON2020™ software that requires an Ethernet connection to fully utilise the data-rich configuration and diagnostic capabilities. First we solved the challenge of having long distances between each measurement point communicating back to the control room and into the GC shelter by engineering a local wifi-Ethernet solution for the plant.

Additionally, a cellular-Ethernet network access point from the plant control room to offsite/remote clients and Emerson offices was created for future support if required. With the availability of remote access via wireless configuration, the user can troubleshoot the GC remotely.

The customer can now analyze and monitor the GC remotely, communicate to it remotely regardless of weather conditions, and troubleshoot certain common tasks as needed. This eliminates the need to have technicians traveling long distances for basic service calls and use their time on other more critical areas of the plant to increase productivity.

Q. The possibility of using both wifi and cellular connections certainly broadens the application of wireless in oil and gas installations. What are the advantages of wireless?


A. This case history is a prime example of the benefits of wireless. The alternative to wireless for this customer was to run fiber optics for communications into each gas chromatograph shelter for remote diagnostic and maintenance access from the MCC/control room. This method would have increased implementation time and financial impact dramatically, so the former option was chosen.

This substantial reduction is easy to understand when you realise that many areas have strict installation requirements due to the electrically classified nature of the plant or pipeline (presence of flammable and explosive hydrocarbon gases). As a result, companies will usually use



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Engineering Support – Remote Ethernet

HAZARDOUS AREA

Gas Chromatograph Sheds



Gas Chromatograph Shed



Control Room



Location A
(Field Site Location with Wi-Fi access)

Remote Site Support Specialist Centre



Emerson Technical Support Centres

GC Chromatogram Interpretation /Support Diagnostics & Calibration Data

Optional Field Laptop Mobile Field Specialist On-Call Engineer, Emerson GC Specialist

Optional Dual radio engine laptop combining cellular and WiFi modems.

Location B
(Remote with cellular access)

only costly skilled labor and adopt strict hot work permits for installations.

Most plants also have stringent installation procedures for laying the cables, digging trenches, and using steel-wired cables (to prevent accidental cutting of these communication cables). All these regulations and procedures can become very costly.

In addition, site locations are often in remote locations, which means long travel times and increased safety risks for the operators. It's no wonder that the projected average savings for this project alone will exceed \$100,000 USD.

Q. How was the customer's network configured?

A. The figure on the right shows the remote wifi-Ethernet and cellular-Ethernet solutions the plant implemented. We chose to install the Emerson 700XA gas chromatograph because it offered the following features:

- Precise detection of gas composition with minimum field site exposure time in hazardous areas
- Easy maintenance through local and remote access via Ethernet
- Highly flexible and expandable communications network that can scale to customer growth

Q. Do you see wireless solutions being used extensively in Asia Pacific?

A. Definitely. Customers need to take precautions such as password protection, granting access via strict application/screening and changes when needed to ensure cybersecurity, but that's true for any network, wired or wireless. With these kinds of cost savings and the remarkable flexibility wireless solutions provide to oil and gas installations, employing wireless for complex installations such as gas chromatographs is a logical move for many enterprises.

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