RTI's Compressor Control System for Oil and Gas Uses Xycom HMI

GLC APPLICATION STORY *001*

REM Technology, Inc. (RTI) develops control solutions for large, reciprocating engines. **REM*Vue*®−500**, *their new controller, uses the Xycom GLC2400 to achieve better performance, easier configuration, and greater reliability.*

CUSTOMER PROFILE

REM Technology Inc.

Company Name:
REM Technology, Inc.
Headquarters:
Calgary, Alberta Canada
Industry:
Reciprocating machinery controls
Size:
Medium organization

Business Objectives:
To enable customers to optimize and manage their reciprocating assets
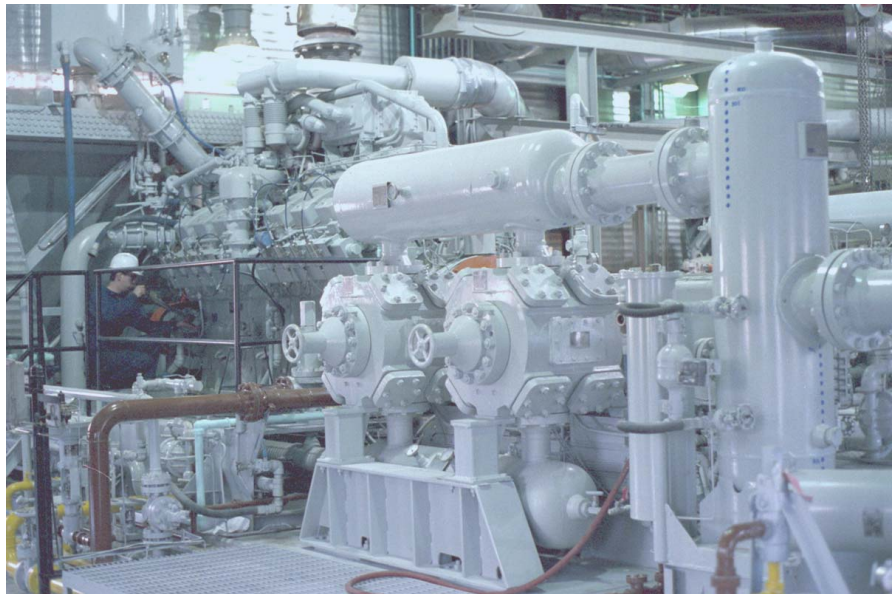
Situation:
REM*Vue*®, the new control solution, needed 1/3 more performance for 1/3 less cost

Solution:
Xycom GLC2400 Graphic Logic Controller for HMI, and a completely new control panel with proprietary embedded controller

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Giant engine-compressor for natural gas facility
(engine at left, compressor at center/right)

NATURAL gas fields provide energy to millions of homes and factories. Although the nearest gas field is likely far from your city or town, miles of pipelines make the connection. Of course, gas doesn't just flow by itself. Enter: the engine/compressor, the equipment that puts the gas under pressure to cause it to flow.

According to Cam Dowler, "These engines are profit-making machines." Dowler is General Manager at RTI in Calgary, Alberta. He explains: "A natural gas operation must get the gas out of the ground as quickly as possible. That's because competitors often have drilled into the same

natural gas field. Production is not limited by consumption, because we can also put the gas in storage caverns. So, the operation that has the most productive and efficient engines wins. A compressor can

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When asked whether price, programming, reliability, or screen appearance is the most important criteria, Dowler says: "All of these are important. Price is the (competitive) differentiator. But the unit must be rugged and reliable. The touch screen must work with our operators' big, greasy fingers. And some of these engines are two stories tall— you can feel the ground shaking 200 feet away. And of course, the vibration reaches the HMI. The temperature is essentially the same as it is outdoors, and Canada's winters can get extremely cold. For moisture resistance, Xycom's panels are rated NEMA 4 (Class 1 Division 2)."

RTI develops engine/compressor control solutions for their parent company also in Canada, Spartan Controls Ltd., serving the process controls industry for more than 35 years. REM Technology's focus is revealed in the name: "REM" is an abbreviation for "Reciprocating Equipment Management."

The term "engine controller," for many folks, might conjure up the modern automobile engine's ECU. We consume and then discard a car's engine and controller as a matched pair. But the economics of natural gas field engines are much different. Says Dowler: "Engines range in cost from 1/2 to 7 million dollars. The engines can last for 30 to 50 years or more! But the old controls do not get as much production from each engine as we can get today. And now we monitor exhaust temperature, oil pressure, and

so on—and shut down the engine automatically when necessary."

The HMI Performance/Value

The new engine controller from RTI is called "REM*Vue*®," with "*Vue*" being a tribute to the screens on its Xycom HMI. The design goals for REM*Vue*® were aggressive. Dowler notes, "We wanted an engine controller that was 30% more powerful for 30% less cost. We needed at least a high-performance 4-line x 80-character display. But the Xycom GLC lets us do so much more."

"We noticed that our competitors required the use of a laptop PC to configure their controllers," Dowler continues. "So with the GLC's screen capacity, we included all the configuration screens—no laptop needed! Of the 350 screens, the operator only uses about 15 of them; the rest are for configuration and diagnostics. With built-in 3-level

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password protection, the operators and technicians access just what they need."

A rather novel aspect of the gas field engine/compressor is that it is often powered by the very gas it is compressing! Using the HMI screens, a system integrator can configure the cylinder count, fuel type, air-fuel mixture, ignition timing, precombustion, and so on, accommodating many engine types. The controller automatically compensates for the energy content in the fuel. After upgrading to REM*Vue*®, end users report annual fuel savings in the tens of thousands of dollars per engine. Where just one facility can have a fleet of up to 25 engines, the combined savings are enormous.

System Programming Environment

The Xycom GLC series can do control functions via ladder logic programming. However, REM*Vue*® uses an embedded controller in order to implement and protect RTI's patented fuel-air control methods, and for a dozen or more high-speed PID loops. So, the controller and the HMI communicate via ModBus
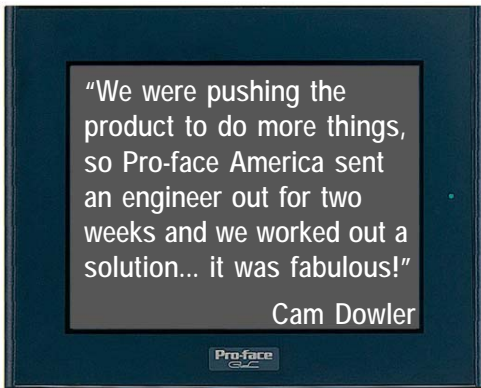
Old engine controller (left), and new REM*Vue*® *controller (right)*

protocol on a 115kb serial link; the GLC is the master.

For a closer look at the Xycom GLC, meet John Demuth, Engineering and Operations Manager at RTI. As a "hands-on" manager, he knows a lot about programming the GLC. Says Demuth: "We are using GP-Pro software, Xycom's Windows®-based development environment. It's easy to use, very flexible, and affordable. You can select any screen object and modify anything about it, including orientation and tags. The GLC can run D-scripts that are similar to BASIC. Local D-scripts run upon entry to a screen, and global D-scripts run in the back-

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> Cam Dowler

ground. We use scripts to do data collection and trending—it's quite powerful in that sense."

And how does the GLC handle variables and tagnames? Demuth explains, "We had multiple floating point variables per screen. After exporting the tagnames to ModBus variable names, then we put them in CSV (comma-separated value) format and imported to the symbol table in GP-Pro. This gave us a one-to-one mapping. So, after placing a screen element, we just used the drop-down menu and chose the symbol name. After that, we could change the ModBus mapping by updating only the symbol table. We really like the symbol table feature."

"Data logging is also a nice feature," Demuth continues. "It is a historical data keeper, and the operator and field technicians like to go back in time when they are troubleshooting an engine. The data log often helps them diagnose the problem. We needed some trending capability, and the GLC had some nice graphs built right in."

Cutting Edge Application Tests Customer Support

During the development of REM*Vue*®, it initially pushed the GLC up to its performance limits. This brought RTI's engineers in contact with Xycom's customer support. Cam Dowler sums up the experience: "The level of local support and factory support were extremely important to us. We had been in this business for 40 years, and we needed to partner with a company like Pro-face America (parent company of Xycom). We were pushing the product to do more things, so Pro-face America sent an engineer out for two weeks and we worked out a solution... it was fabulous!"

Demuth recalls the details: "When we were doing trending and a power loss occurred, we wanted the trend to appear on-screen after power returned. So, Xycom changed the GLC so it saves the trend to internal memory upon power loss; it was a very good addition."

"The GP-Pro package was also enhanced,"
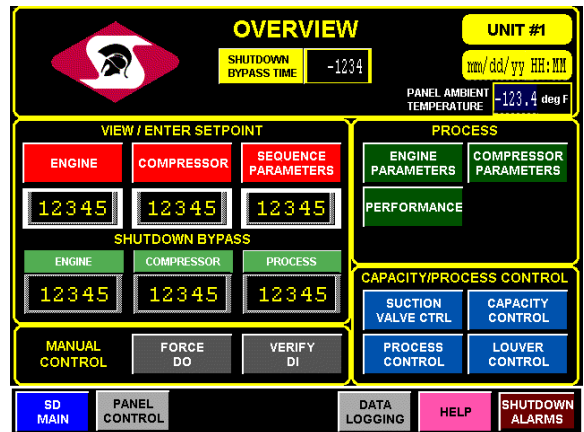
Main operator screen on the GLC2400 display

Demuth adds. "We needed to do some floating point operations. It was a bit tricky at the time, but with the new version it works well. Pro-face America Customer Support has been absolutely stellar."

Plant Network Connectivity

Each REM*Vue*® system operates as a stand-alone engine controller. However, end users often have a fleet of engine-compressors in one building. For these facilities, plant managers need help in managing all those machines. Demuth describes RTI's solution: "Each REM*Vue*® can connect to the plant network via either the embedded controller or the Xycom GLC. A network server then communicates with each REM*Vue*®.
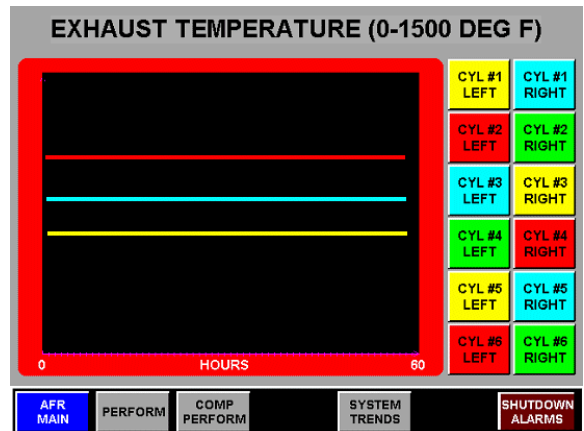
Trend display for engine exhaust temperature

We can even start and stop an engine remotely in this way, as well as monitor all the data available at the HMI."

Xycom's server-based GP-Web application monitors GLC operator panels via the plant network, and then makes the data available to a PC client with just a Web browser. No special programming is needed— just an initial, menu-driven configuration. Whether on an intranet or the Internet, users can access production data from virtually any-where.

REM*Vue*® and Beyond

RTI's customers include gas and oil giants such as ChevronTexaco, BP, Exxon, EnCana, and Conoco. After achieving a solution with "1/3 more performance for 1/3 less cost," REM*Vue*® is ready to satisfy many more RTI customers, indeed. Xycom's products continue to offer more, as well. Notes Demuth, "We're looking forward to Xycom's new ProDesigner programming tool. It has more communications options and other features. But, for now, all of our needs are met with GP-Pro and the GLC2400."
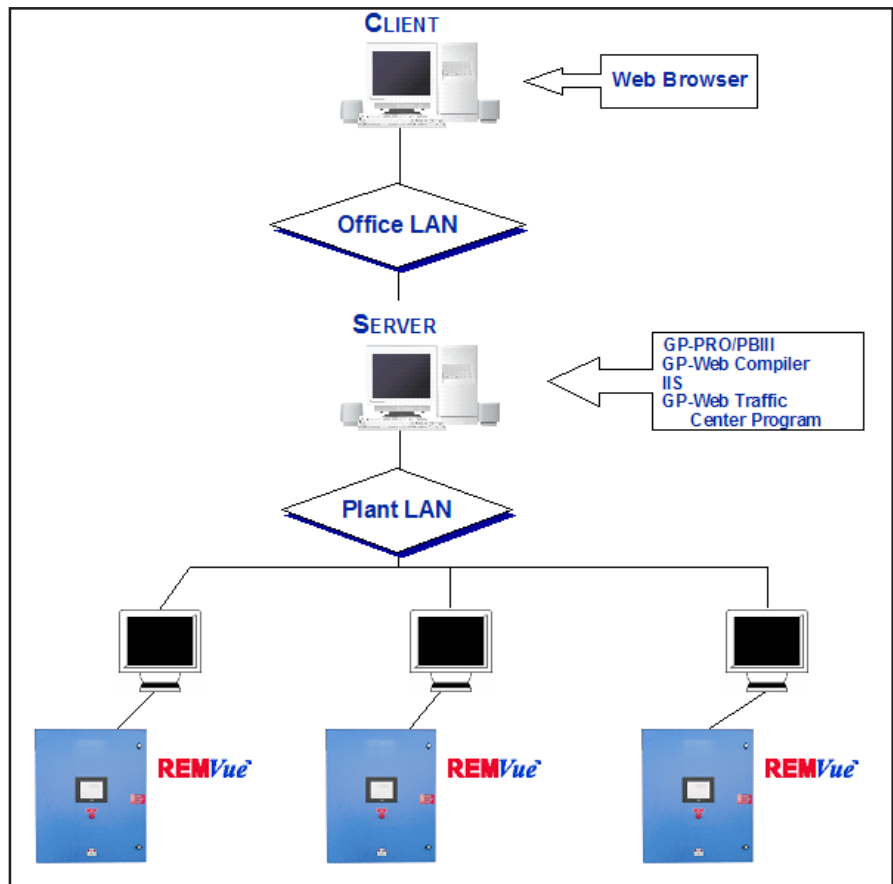
For more information about Xycom and Pro-face America products, visit www.xycom.com.

REMVue® installed at a natural gas storage facility

*Pro-face GLC2400
Graphic Logic Controller*

Remote control and monitoring of GLCs using GP-Web server application