

NB POWER: FIRST NORTH AMERICAN UTILITY TO DEPLOY WIRELESS/ATM INFRASTRUCTURE

NB Power, located in the province of New Brunswick, Canada, operates in one of the most electricity-intensive areas of the world. The company provides energy services to 347,000 customers via 32,000 km of power lines and 360 substations and terminals.

NB Power also plays a key role in the economic activity of the province, employing 2,500 people, which injects as much as \$160 million yearly into the New Brunswick economy.

In this rapidly evolving energy marketplace, utilities need to continually develop and improve their services — and NB Power is no exception. Understanding that new products and customer-driven innovations are critical to maintaining a competitive advantage, NB Power turned to Marconi, a global supplier of advanced communications solutions, and Harris Corporation, a leading worldwide manufacturer of wireless solutions and microwave products, when it decided to deploy a combined wireless/asynchronous transfer mode (ATM) networking infrastructure for mission-critical operating systems in the southern region of the province.

The new wireless infrastructure, the first of its kind to be deployed by a utility in North America, enables NB Power to cost effectively enhance system reliability, customer service and emergency restoration capabilities.

WHY WIRELESS?

A utility is one example of a dynamic enterprise that can benefit from wireless networking. Using radio frequency (RF) technology, wireless networks transmit and receive data over the air, decreasing wired connections. In fact, a wireless network carries with it the potential to be an

extremely flexible and robust multiservice infrastructure.

For basic power system needs, the Marconi/Harris solution provides NB Power with broadband wireless transport and switching that carries mission-critical, real-time teleprotection.

In addition, the same telecommunications infrastructure is designed to support voice, video, Intranet/Internet data and digital trunked radio traffic over the system, allowing NB Power to share resources more efficiently.

“Given the critical nature of our business, NB Power was seeking a cost-effective solution that would enable us to deliver highly reliable, uninterrupted service for power system operations,” said Gregory Hickey, senior engineer, T&D Telecommunications, NB Power. “During the RFP evaluation, we found that Marconi and Harris offered the best solution to meet our stringent networking requirements. Their wireless SONET transport solution seamlessly transports high-quality power system and telecommunications traffic using an ATM networking layer, greatly reducing the amount of telecommunications infrastructure involved.”

TRANSFORMING A LEGACY WIRELESS SYSTEM

NB Power’s working knowledge of wireless technology was beneficial to the decision making process. The new network replaced a medium capacity microwave transport system with analog frequency division multiplexing (FDM) that “worked well for low channel count ‘drop and insert’ applications, but was becoming obsolete due to lack of spare parts and module repair support,” Hickey said.

In addition, he explained, “radio frequency spectrum inefficiencies meant that systems like ours were no longer manufactured — and they weren’t licensed by the regulatory authority (Industry Canada). The world had passed us by in terms of this 1970’s technology.”

Fortunately, the world of wireless transmission had moved forward, finding a powerful partner in ATM switching.

By the mid 1990s, ATM had established itself as the network infrastructure of the Internet Age, primarily because the multiservice technology was mature, established and designed to be transmission mode independent.

Largely recognized with commercializing ATM technology, Marconi continues to lead the industry in ATM-based enterprise solutions.

Harris Corporation’s Microwave Communications Division, the largest supplier of microwave and wireless local loop systems in North America, partnered with Marconi to offer NB Power a leading edge transport network. The solution features Marconi ASX-200BX and ASX-1200 ATM backbone switches interconnected with the Harris MegaStar 155 1:1 protected frequency diversity (2 x OC-3c capacity) microwave backbone.

Marconi’s advanced technology enables NB Power to meet its basic power system telecommunications needs with a high degree of robustness and failure mode adaptability, while at the same time allowing the utility to open up new avenues (intranet data, video, call center and PBX voice applications) with enhanced functionality and capacity.

BUILDING NB POWER’S BREAKTHROUGH NETWORK

Hickey explained that NB Power’s major project development concern was whether the Marconi/Harris solution would be able to properly facilitate critical teleprotection functions necessary for power system protection. He defined key issues as:

- Network latency
 - Security
 - Robustness
 - Route redundancy
 - Reliability
 - Dynamic adaptability to network congestion and failures
 - Management
 - Cost of ownership
- The Marconi/Harris team worked



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with NB Power to address most of those issues in proof-of-concept testing. In particular, the team proved that Marconi's ATM switches' QoS functions ensure that critical power system traffic is not impacted in any way by potential congestion of the network.

"QoS is an enhanced network function at which ATM technology excels," Hickey said. "In addition," he said, "with Marconi ATM switches, each and every port can be in operation at peak throughput capacity with no blockages or cell loss. Not all ATM switches are created equal in this aspect of operation."

"NB Power's close integration of ATM technology with 1:1 protected frequency diversity SONET microwave radio transport — along with high levels of hardware redundancy and functionality — are commensurate with best power system industry practices and represent a first in North America and the world," he added.

VALUE DELIVERED

Months after it was implemented, NB Power's wireless/ATM network provides

for very efficient low channel drop and insert functionality for normal power system applications, including: teleprotection, telecontrol, digital trunked radio and system control and data acquisition (SCADA) devices.

The technology also supports future implementations of digital mobile radio, as well as other administrative applications, including:

- High capacity Internet data, enabling Web-based interactive, bilingual customer service
- Video
- Call center and PBX voice applications
- Server farm connections

Hickey points out that all of these applications are supported with less hardware and fewer costs. "The advanced technology that we're using allows us to meet basic power system telecommunications needs with a high degree of robustness and failure mode adaptability," Hickey said. "At the same time," he continued, "the network's enhanced functionality and capacity have opened up new avenues for the corporation. It

gives us the opportunity to enhance our business telecommunications services, perpetuate our 'easy to do business with' customer service strategy, improve productivity through enhanced network management and control — and ultimately reduce costs of operation."

Specifically, NB Power estimates that operating and maintaining the network with an internal staff will save the company millions of dollars over a ten-year period. Extensions to the network are ongoing in the north of the province and expansions of the network to other regions of the province are planned over the next two years. The network is designed for the addition of fiber-optic interconnects "should they be necessary and economically viable," Hickey said.

All of which point to another of Hickey's goals: that the first wireless /ATM network deployed by a North American utility is also future proof.

"So far," he said, "I'm happy to tell you that, with this network, our priorities and concerns have been well-addressed and our critical performance targets are met." **ET**