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The customer newsletter of ABB Network Management

network

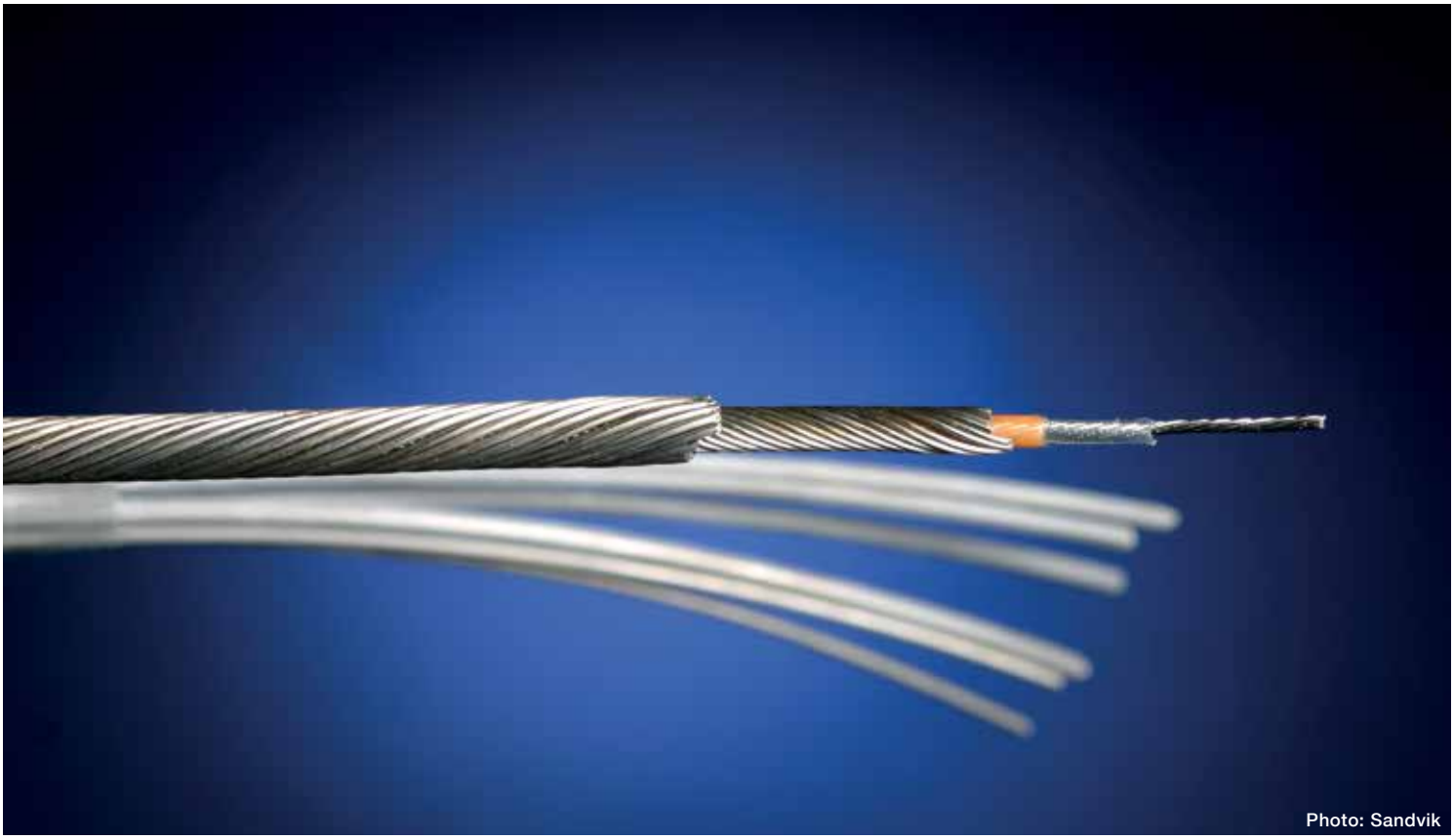
Photo: Sandvik

Sandvik learns from its own history

Managing precious resources in Turkey
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network

Jens Birgersson
Business Unit Manager Network Management

Dear readers,

Welcome to the first edition of the Network Manager customer newsletter for 2014.

In this edition, we bring you more news from the world of substation automation, communication and enterprise software, and an invitation to join us at one of our regional Ventyx World events in May and July. This year we will showcase our enterprise software portfolio for the mining and energy industries at three regional events, in Orlando, Florida, in the United States, in Barcelona, Spain, and on the Gold Coast, Queensland, in Australia. Find out more about the events and how to register on page 15.

The news section in this edition begins with an article by our new writer, Bill Ray. His piece on the Internet of Things (page 4) will be published on ABB's blogging platform "Conversations," to which he will be a regular contributor. Read contributions by Bill and other ABB authors by subscribing to the blog at www.abb.com/conversations.

This edition of 'network' also covers our substation automation product launches at Hannover Fair (page 7). These include hardware and software solutions to advance progress toward fully digital substations, whether through retrofits in existing installations or new-design, green-field projects. The latest additions to our portfolio will bring new levels of safety and reliability, helping operators to optimize performance and make best use of their installed assets.

From Ventyx, we bring you news of our process safety management software, to be installed at the Sadara chemical complex in Saudi Arabia (page 6), and an ABB Review article on Asset Health Center, our software solution for integrated asset management (page 8). The importance of software continues to grow in our data-driven world, with ABB businesses offering key solutions for asset-intensive industries.

Our MicroSCADA Pro software, which celebrated the installation of its 10,000 license key in February this year, is also advancing to make better use of data generated by intelligent infrastructure. Read the article on page 9 to see how its new historian functionality is being used at the Sandvik plant in Sweden, and how MicroSCADA is helping to manage water resources in Turkey on page 10.

On pages 11-13, we can see how wireless communication systems are enhancing productivity in the mining industry and worker safety for utilities. The versatility of our Tropos wireless mesh technology has been improved by the launch of a newly formatted router for DIN-rail mounting, shown on page 14 of this edition.

This small collection of stories gives you an idea of how broad out portfolio is, and how we help to address the challenges our customers face. Contact me or your local sales representative via our Web site (http://new.abb.com/network-management) to find out how our expertise could contribute to your business.

Best regards

Jens Birgersson

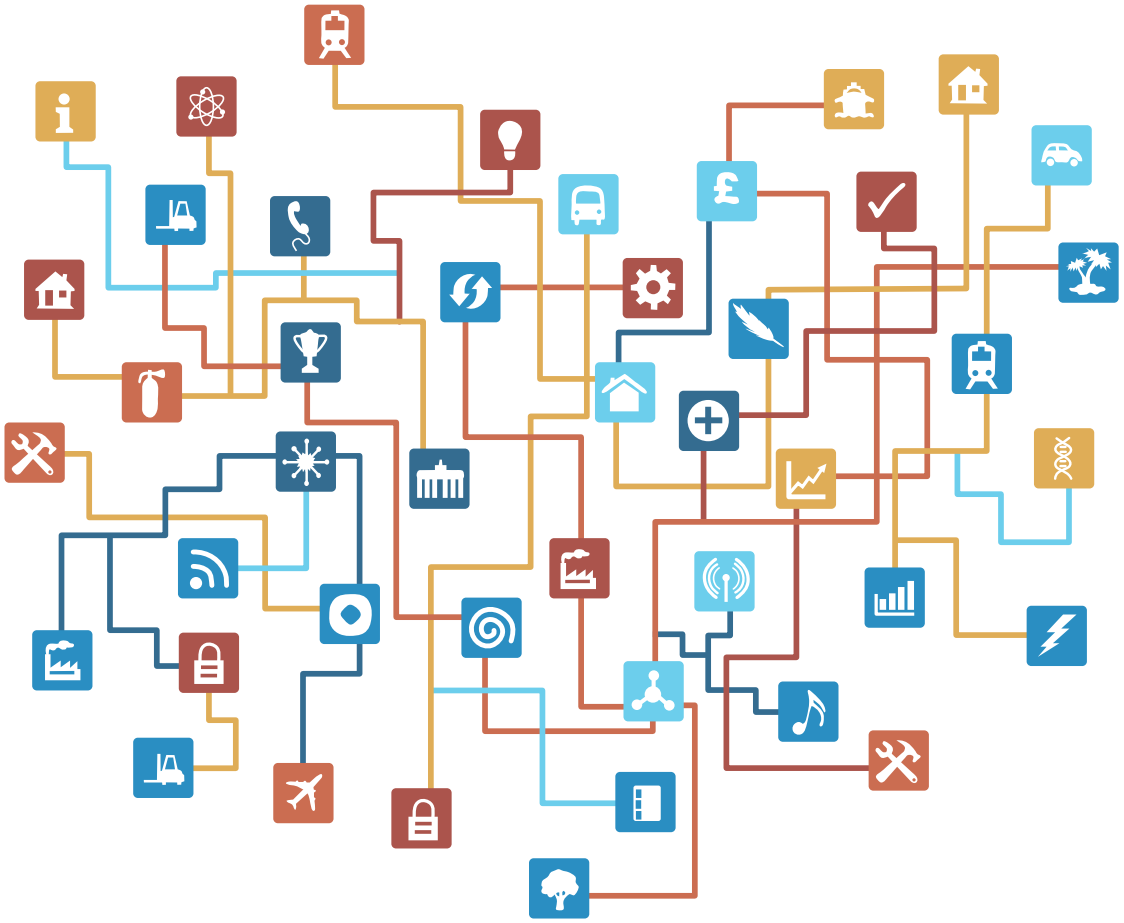
News

Projects

Technology

What can the Internet of Things learn from substation automation?

Connected devices responding to each other and the world around them is a lot like grid automation



The Internet of Things (IoT) is the buzzword of the moment, but the world it proposes, of connected devices responding autonomously to environmental changes, is already familiar to substation engineers.

A precise definition of the Internet of Things is hard to come by, but the hype around it is easy to spot. Governments around the world are spending serious money striving to attain a cultural lead in the field they are convinced is about to explode, while the energy industry is leading the way in the real work of gathering intelligence from things in and around their networks.

Intelligent Electronic Devices (IEDs), Remote Terminal Units (RTUs) and relays are all connected things, spewing fountains of data about the electrical network onto fiber-optic cables for aggregation in supervisory control and data acquisition (SCADA) systems. Many of those devices are using packet data too; not on the “Internet” as such, but certainly forming an “intranet of things,” showing the value of data collection, and learning some important lessons along the way:

Don't let the mundane swamp the essential.

The Internet was built on the principle of 'best effort' and 'lost' data is an acceptable price for ubiquitous access. Control networks aren't the same, so packet protocols used in substations prioritize certain kinds of data.

ABB's AFS range of Ethernet switches automatically suspend all other communications when a GOOSE message is detected – the GOOSE message may be throwing a breaker or sounding an alarm, and "best effort" isn't good enough. The Internet will need similar techniques if the flooding data isn't going to obscure what really matters.

Not every story is worth telling

Bluetooth socks (I kid you not) feed data on toe-and-heel pressure to a connected smartphone, to reveal the style of the runner. But most of that data is redundant as the runner is only interested in steps that fall outside the ideal. Bluetooth socks aren't smart enough to weed out that redundant data, but ABB IEDs are.

An IED, fitted in substation, can be programmed to send sensor readings only when they fall outside predetermined limits. That reduces network traffic to the interesting stuff. One day Bluetooth socks will be equally clever, but, for the moment, every step generates transmitted data, clogging up the network.

Data discarded can never be used

Storage space is cheap, but not unlimited. Facebook is fitting racks of Blu-Ray discs to archive our photographs and associated musings, but making sense of big data takes serious software as well as storage.

Facebook and Google are big enough to develop analysis tools in house, but for utilities there's ABB Historian, a new feature of MicroSCADA Pro 9.3 that archives gathered data for later analysis. That enables users to spot trends that might not be obvious when they're happening, but can matter once they've happened.

Intelligent things make for intelligent networks

An electricity grid is, arguably, the largest and most-complex mechanism created by man, so the fact that's it's also the most intelligent shouldn't be too surprising. The quantity of data sloshing around fiber-optic rings is astonishing, but equally impressive is the ability of devices to make decisions without it.

Last year, an unknown assailant cut communications to a 500kV substation and proceeded to sabotage its transformers and associated gear. Clearly the assailant believed that without a communications link to the central control-rooms the substation would be unable to act, but even as the temperature of the transformers began to rise, local systems were talking to each other and decided to shut off the current before more-serious damage could be done. The repair bill for the substation was significant, but without the intelligence of those local devices, it would have been a lot higher.

To realize its full value, the Internet of Things need to be more than a just sensors feeding data into massive control centers, it needs autonomous intelligence, shared between things capable of communicating with each other, as well as with a central, controlling database.

The IoT and the electrical industry are developing rapidly, but there remain many networked devices with limited intelligence and many industrialists trying to work out what to do with the gathered data. The future will see numerous devices flooding the Internet with their incessant chatter, we can only hope the end result will be as well run as a modern electrical grid, or at least learns some of the lessons the grid can teach it.

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ABB to provide operations management software for world-leading chemical complex

Solution to improve reliability, safety and consistency of information across the Sadara complex in Saudi Arabia

ABBhas been awarded a contract to provide an enterprise-wide mobile plant operations management solution for Sadara Chemical Company (Sadara), a joint venture developed by Saudi Arabian Oil Company (Saudi Aramco) and the Dow Chemical Company (Dow).

Under the scope of the contract, ABB will deliver its shift operations management software solution, eSOMS. The software, which is part of ABB's Ventyx portfolio, will be implemented across the entire Sadara complex. It will help to ensure the safe, efficient and reliable operation and maintenance of the facility's assets.

The solution will also enable plant personnel performing maintenance inspections, operator and quality rounds, to capture information in the field with mobile devices and synchronize it with the plant-status database.

"Software is playing an increasingly important role in the management of operations in a range of industries," said Jens Birgersson, Head of ABB's Network Management business unit, a part of the company's Power Systems division. "By automating complex processes and centralizing data facilities, the system for Sadara will help to improve both safety and productivity."

ABB was also selected as the Main Automation Contractor (MAC) at the beginning of the Sadara project in 2011.

The Sadara complex now being built in Jubail Industrial City, Saudi Arabia, will be one of the world's largest integrated chemical facilities, and the largest ever built in a single phase. Its first products are expected to come on line in 2015, with full operations in 2016.

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The petrochemical industry is key to the economy of Saudi Arabia. Once completed, the Sadara complex will represent the largest petrochemical facility ever built in a single phase

ABB technology to advance digital substations at Hanover Fair

At Europe's premier technology trade show, ABB announced the launch of the latest additions to its digital substation automation portfolio

The new offering, which comprises both hardware and software solutions, will advance the digitization of substation automation for improved security and grid reliability.

The SAM600, a stand-alone merging unit, and SDM600, a system data management software solution, were on show at the event, along with the Relion 670 series 2.0 IED, the newest inprovement to ABB's family of protection and control devices, and the RTU520, which joins the RTU500 family of network monitoring and control devices.

Built on the international substation automation standard IEC 61850 9-2, the solutions bring significant advantages in terms of interoperability and ease of configuration, as well as addressing the security requirements of multi-access substation automation systems.

"The new launches represent another step toward fully digital substations," said Jens Birgersson, head of ABB's Network Management business unit. "Having delivered the world's first commercial substation automation system using IEC 61850-9-2 process bus technology in 2012, ABB remains at the forefront of substation automation and communication."

SAM600 merging unit is an enabler for digital substations, bridging analog and digital technologies. It allows stepwise upgrades toward full-system digitization with minimal disruption to substation operations. As electrical signals are digitized at source, risks associated with service and maintenance activities are significantly reduced and operational safety is improved.

SDM600 data management software supports maintenance and service-related tasks in substation operations, while maintaining strict security standards. It provides automated data collection and visualization, as well as tracking the software versions and configuration settings of installed devices. Tailored account management and security-event logging ensures system-wide cyber security, while designated personnel avoid the time-consuming and error-prone task of manual data collection.

Part of ABB's established Relion family of protection and control devices, the Relion 670 series 2.0 provides faster performance with improved accuracy that it predecessors. In addition to its unique monitoring functions for protection and control in transmission systems, the product has been certified by independent laboratories and is fully compliant with both editions of the IEC 61850 standard.

The new RTU520 product line offers an easy and cost-efficient solution for distribution monitoring and control. The DIN rail input/output modules can be flexibly connected to meet a wide range of application requirements. ABB's RTU500 series also provides a comprehensive switch portfolio in the field of Ethernet communication, which enables customers to mix different types of media like fiber optic and two-wire copper cables (SHDSL) in one network.

To read more about these products and ABB's contribution to digital substations, visit **Network Management, energizing the digital grid**.

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The new offering, which comprises both hardware and software solutions, will advance the digitization of substation automation for improved, safety, security and grid reliability.

Picture of health

Asset Health Center: an integrated approach to asset management

ABB's Asset Health Center, part of the Ventyx portfolio of enterprise software, provides customers with the actionable insights they need to make and execute decisions on asset operations and maintenance that are optimal for their businesses.

Asset-intensive industries face increasing pressure to improve how well they utilize and maintain their equipment. Asset health management is emerging as a critical business process due to the potentially very significant bottom-line impact of asset decisions on profitability, compliance and customer satisfaction. To guide better-informed decisions and eliminate wasteful expenses, ABB's Asset Health Center (AHC) blends business intelligence and asset analytics, incorporating expert knowledge of industrial equipment and verticals. ABB is now leveraging its expertise in power transmission to help a large North American utility optimize capital expenditures, and operations and maintenance plans. A new Subject Matter Expert (SME) Workbench will further expand these analytics and extend asset health management capabilities to other areas.

This abstract is part of an article published in the first edition of ABB Review, 2014. To read the full text (written by Karen Smiley, Shakeel Mahate, Paul Wood, Paul Bower and Martin Naedele) and access articles on other ABB technologies, visit the **ABB Review portal**.

For more information on Asset Health Center, contact shawn.lyndon@ventyx.abb.com

Sandvik learns from its own history

MicroSCADA Pro, turning old news into new plans

Sandvik Materials Technology is the steel-manufacturing arm of the Sandvik conglomerate, making everything from razor blades to deep-water drill bits. All that takes a good deal of power; power that is managed by ABB equipment and now monitored by ABB Historian to provide a context for current conditions.

Sandvik already had an ABB MicroSCADA Pro SYS600 system reporting on existing conditions, but sometimes it's not enough to know what's happening now. Sometimes one also needs to know what happened in the past, if only to establish why it happened and what it means for the operational future of the network. These are the questions ABB's Historian was designed to answer.

Historian was delivered as part of an upgrade to MicroSCADA Pro, which had been in use at the Sandvik factory since 1998. The Historian comprises a single server, with an associated workstation or two, which archives data gathered by the MicroSCADA Pro system. The company then uses that data to spot trends in energy consumption, transformer temperature, breaker activity and many other aspects of their operations. Historian is so flexible that after a year of use Sandvik is still finding new value in the accumulated information.

"The Historian allows us to see more things we can do with the system; how we can change our way of working" explains Lars Skoglund, Manager Electrical Distribution at the factory. "You see the loads for each [point], the currents and measurements. We get the current from a transformer, it's in the interface, so the value is easier to understand".

History is important, both in seeing trends as they develop and also in predicting future loading to work out what can be safely changed. Not only can Historian, for example, provide a quick view of the top ten alarms over the last year, it can also show the varying temperature of a transformer, the flow of current throughout the day, and even the overall consumption of power over time – all vital in enabling Sandvik to make informed decisions about maintenance and extension of their systems.

Prior to the February 2013 installation of Historian, the company kept paper records of alarm rates, but the events that *don't* happen can be just as important as those that do. A breaker that hasn't been used in years may need maintenance, or at least testing, and the Historian will spot that, while a paper system might neglect such "non-events".

At Sandvik, the system is checked every week. The numbers for the previous month are examined for anomalies, and the company is discovering new ways in which Historian can help their business, as they accumulate more data and discover new ways to analyze it.

The system came with a day's training, following two days of integration. Despite the Historian's deceptively-simple tool set, its real power lies in how historical analyses are applied, and in the confidence it brings to decision-making based on real data rather than subjective expectations.

For Sandvik, that means using historical data to plan new feeders and network reconfiguration, and monitoring energy consumption, every time new equipment is installed in the factory, as Skoglund explains "we have so much information now … we are trying to figure out how to use [it]".

In 2012 Sandvik, like most SCADA users, was discarding historical information. Now, thanks to ABB's MicroSCADA Pro Historian, the company has a valuable resource to help plan for the future, while making the best of the present.

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Photo: Sandvik

Sandvik is a global industrial group with advanced products and unique expertise in materials technology. It has about 47,000 employees and representation in 130 countries.

Managing precious resources in Turkey

ABB devices help a Turkish utility to manage its water distribution system

Bingöl, in eastern Turkey, is famous for its lakes and mountains. ABB worked with FOKS Automation to provide a reliable water distribution system to the provincial capital, Bignöl, and its surrounding area.

The city of Bingöl, capital of Bingöl province in eastern Turkey, is home to around 87,000 people. Its water distribution system is a critical part of the infrastructure serving the city and its surroundings.

To improve the performance and reliability of this network, ABB recently partnered with the Turkish company, FOKS automation, to deliver an automated monitoring and control system for the local utility's metering and flow control stations.

The system includes water flow meters and control valves which, in combination with pressure transmitters, enable water requirements to be predicted and leaks detected. This helps system operators to plan more effectively and ensure that the right amount of water is delivered to the right city areas, 24 hours a day, every day of the year.

The utility's metering stations are controlled remotely via installed devices that are linked to the control room via a secure wireless Internet connection. ABB delivered 24 units of its compact RTU511 with customized PLC (programmable logic control) functions for the system. These compact and cost-effective devices provide an interface between the systems sensors and control equipment, collecting data from water flow meters and pressure sensors, and adjusting valves and pumps according to predicted water requirements.

System data are collected, stored and displayed, delivering an easy-to-use overview of the network, which helps to forecast requirements and enable proactive, rather than reactive, operations. ABB's delivery complements the customer's own infrastructure and gives operators full control over the entire water distribution system. That means more satisfied customers and more effective use of available resources. As water becomes an ever-more precious commodity, this is a far-reaching benefit.

RTU511 product page
RTU511 product flyer
Substation Automation Products

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Tropos wireless mesh network for PotashCorp phosphate mines

High-performance wireless broadband networks at two PotashCorp North American mine locations

The networks provide near real-time access to data and video from the mine pit and mobile mining equipment, improving operational efficiency and safety. In addition, video cameras are connected to the network and monitored centrally, enhancing perimeter security.

PotashCorp is the world's largest crop-nutrient company with operations around the globe. Two of the company's phosphate mines in the United States are located in Aurora, North Carolina and White Springs, Florida. Mining operations continue around the clock, seven days per week. At both mine sites, the plant managers need real-time, remote visibility (data and video) into pit operations from that mine's control center and processing plant. As the location of actively mined pits changes several times a year, the communication network needed to be not just reliable but also flexible enough to be easily relocated with minimal disruption to service.

To meet the customer's needs, ABB deployed fixed wireless mesh routers in and around each mine pit. Additional fixed wireless routers were used to extend the network to each site's mine control center and chemical processing plant. At these points, wireless mesh routers configured as gateways connect to the facility's core fiber network. Video cameras in the pit connect to the wireless mesh network, enabling operators to monitor activities in the pit and record how much material each dragline excavator picks up. In addition, digital cameras at each facility's entry gates enable centralized monitoring and recording of people entering and leaving the area, eliminating the need for a guard at each gate.

Mobile routers were mounted on draglines. They serve to transport telemetry data from multiple sensors, whose data is used monitor the health of these key pieces of equipment in the pits. This provides operators with a clear picture of their assets, allowing them to schedule preventative maintenance, which is more efficient and less disruptive to productivity than unscheduled or time-based maintenance.

ABB's Tropos network delivers an effective combination of fixed and mobile routers to provide high-bandwidth communications for PotashCorp's mining operations.

Today, the Tropos network enables centralized tracing and analysis of mining equipment telemetry, helping reduce unscheduled downtime, thereby increasing productivity and safety.
Fast access to process data provides early visibility into trends that may affect product and quality enabling early resolution of issues. Plant operations have visibility into mining pit activity in near real-time, improving operational efficiency and safety. Video security reduces costs and provides centralized monitoring of multiple locations concurrently.
The PotashCorp phosphate mines take advantage of some key differentiators of Tropos technology. They mix mobile and fixed nodes in a single network; they run multiple applications, including video surveillance, concurrently; and they relocate radios with ease as the location of mine operations shifts from place to place within the facility.

ABB is the market leader in wireless broadband networks that provide reliable, secure and scalable wireless IP networks for field applications in a broad range of industries, including utilities, oil and gas, mining, smart grids and smart cities.

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The PotashCorp phosphate mines take advantage of some key differentiators of Tropos technology. They mix mobile and fixed nodes in a single network; they run multiple applications concurrently; and they relocate radios with ease as the location of mine operations shifts.

Wireless networks to enhance worker safety

Corpus Christi, Texas, deploys automated meter reading for water and gas

Sometimes, it's a little thing such as a dog biting a meter reader. It results in a workers' compensation claim or a lawsuit. And it gets people thinking that there's a better, safer way to get the job done.

This was much the story in Corpus Christi, Texas, which deployed an automated meter reading (AMR) system for its municipal water and gas utility. The city had experienced meter reader injuries, workers' compensation claims and staff turnover. Technology offered a better way. The AMR system improved the efficiency and accuracy of meter reading and eliminated the need for meter readers to undertake dangerous tasks such as scaling fences with locked gates and confronting unpredictable animals.

A key component of any modern AMR system is a wireless communication network that covers the service territory. However, wireless networking can improve utility employee safety by enabling applications beyond AMR. For example, remotely monitoring and controlling devices such as switches in electrical-utility substations and pumps in water-utility lift stations can reduce or even eliminate the need for workers to travel to remote facilities. Less driving and less time spent at remote sites translates into less chance of accidents. Further, when dispatch is required, wireless access for field workers using laptops, tablets and handheld devices enables on-site access to schematics and manuals, supporting safe, successful repair efforts.

Corpus Christi made the forward-looking decision to install a private broadband wireless network that would serve the needs of not just the municipal utility but other city departments as well. As a result, public safety officers, public works employees, building inspectors and even members of the public can use the city's wireless network.

With a multi-use network such as Corpus Christi's, employee safety benefits extend to other city departments. Transit worker safety, for instance, can be enhanced by combining in-vehicle video monitoring with an automated vehicle location (AVL) system. A vehicle operator hitting a panic button can alert a supervisor that an incident has occurred, enabling the supervisor to remotely assess the situation and dispatch assistance to the correct location.

A wireless communication network can enhance worker safety in industry as well as government. For example, many oil and gas fields are sited in remote locations that lack cellular telephone and data coverage. A seemingly innocent event, such as a truck failing to start, can quickly turn life-threatening, especially if the location is situated in a region of extreme hot or cold, as is often the case in the oil patch.

While the initial impetus for installing a wireless network at an oil or gas well site might be an operational factor, such as communicating SCADA information, companies with the foresight to implement a wireless network that can support multiple applications can reap employee safety benefits as well. For example, when employees are deployed to remote facilities, video surveillance cameras – installed primarily for site security and connected to a central monitoring location via a broadband wireless network – can double as a remote set of eyes to monitor worker well-being. Facilities in areas lacking cell coverage take this a step further – a private broadband wireless network enabling a voice over IP (VoIP) application on a laptop, tablet or handheld device can serve as a lifeline when other options for voice communications are not available.

But enabling safety-enhancing applications – especially those relying on real-time video – can't be done with just any wireless network. Key requirements for such a network include:

- High reliability
- Economically scalable from small areas to entire cities and even counties
- Performance, both high throughput and low latency
- Security
- Seamless mobility

To meet these requirements, many government and industrial entities are opting to build, own and operate their own private wireless network. Private wireless networks meet or exceed the requirements for supporting safety-enhancing applications, especially when implemented using broadband wireless mesh networking technology. Broadband mesh networks particularly shine when deployed to run many applications, especially bandwidth intensive ones (eg, video surveillance and monitoring, GIS, large image downloads) over the network simultaneously.

In short, with a broadband wireless mesh network, the more applications, the better the return on the networking investment.

Wireless communication networks can improve worker safety. They enable a diverse set of safety-enhancing applications. Successful deployment requires a network infrastructure that meets the widely varying requirements of all these applications simultaneously. A private broadband wireless network based on mesh networking technology provides the required communication foundation.

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Corpus Christi, Texas, which deployed an automated meter reading (AMR) system for its municipal water and gas utility.

ABB introduces Tropos 1410-DIN wireless bridge and mesh router

This month, the communication networks business launched a newly formatted router for DIN-rail mounting

Developed for industrial automation applications, the new router is a version of the existing Tropos 1410, adapted for installation in enclosures using a standard DIN rail mounting.

Suitable for a wide variety of process control, energy and industrial automation systems, the Tropos 1410-DIN extends the functionality of Tropos mesh networks to devices where stand-alone routers cannot be installed.

”As demand for wireless mesh networks in industrial applications grows, we’ve responded to the market by offering the Tropos 1410 in a form factor used by standard enclosures for process control systems,” said Mike Bailey of ABB’s Communication Networks business. “The Tropos 1410-DIN will enable more industrial facilities and applications to reap the benefits of broadband wireless mesh networks.”

Tropos mesh networks deliver reliable, secure, low latency, broadband wireless connectivity for machine-to-machine (M2M) communications. The newly adapted router can be conveniently installed in devices such as programmable logic controllers (PLCs), remote terminal units (RTUs) and electrical distribution relay cabinets, as well as pad-mounted transformers. It enables automation devices to communicate with other devices and with central computing applications such as SCADA systems. It also allows workers with Wi-Fi equipped laptops or tablets to communicate wirelessly with automation devices, rather than needing to plug in with a cable.

For more information about this and other wireless communication technologies in the Tropos product line, visit abb.tropos.com or contact tropos.marketing@nam.abb.com. The full product announcement can be found **here**.

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Tropos 1410-DIN wireless mesh routers and bridges enable cost-effective and highly secure IP communications for utility, oil and gas, mining and industrial applications.

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Orlando Keynote Speakers

John Tish, Director of IT and OT, Mining Services (Cliffs Natural Resources)

John Tish has been involved with many different aspects of IT during his 28 year career at Cliffs National Resources in both mining operations and the corporate office. At Cliffs' IT/OT Competency Center, he is taking a holistic approach to technology acquisition, implementation, and use in pursuit of greater operational efficiencies.

David P. Walton, Vice President of IT Business Solutions & Operations (PPL)

David P. Walton's career at PPL spans nearly four decades and includes a combination of business and IT positions. He is currently responsible for the IT strategy and management for all major business groups at PPL.

Barcelona Keynote Speakers

Evgeny Charkin, Chief Information Officer (Rosatom)

Evgeny Charkin is responsible for the coordination and development of the State Corporation's information technologies. Prior to Rosatom, he worked in the financial sector and also held several senior information technology positions within the mining industry. In 2012, Mr. Charkin was ranked "Best CIO in Metallurgy" by Russian business daily "Kommersant".

Marie Fossum, VP for New Business (Fortum)

Marie Fossum is a renewable energy and smart grid expert at Fortum, a provider of sustainable energy solutions in Nordic countries, Russia and the Baltic Rim. Ms. Fossum leads utility projects that accommodate an increased share of renewables and enable active consumption. She will share details about the Stockholm Royal Seaport, one of 18 urban development projects within the Clinton Climate Initiative's global Climate Positive Development Program.

Network
The newsletter of ABB's Network Management business unit

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Published by
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