Case Study

Qatar Aluminium Metal & Minerals

Working with one of the world’s leading aluminum smelter companies, Belden successfully applied Hirschmann™ Ethernet technology and Industrial HiVision NMS to develop a robust and reliable plant-wide process control network.

Qatalum, one of the largest aluminum smelters ever built in a single phase, is an equal-share joint venture between Qatar Petroleum and Hydro Aluminum of Norway. The environmentally-friendly smelter has a capacity to produce 585,000 tons of high-quality primary aluminum products per annum from twin 1.2 kilometer pot lines. Qatalum’s complex facilities include a carbon plant, casthouse, port and storage facilities, as well as a dedicated power plant with an installed capacity of 1350 MW.

Qatalum’s state-of-the-art cast house products are value-added extrusion ingots and foundry alloys that meet the stringent quality standards of its global customer base. Qatalum’s customer reach is vast and includes accounts in a variety of industries including the automotive, construction, and engineering industries. By the end of its journey, Qatalum’s aluminum spans throughout the entire global community.

The Installation’s Key Benefits

The engineering companies responsible for designing and scoping the control system project chose to work with Hirschmann™ network components and Industrial HiVision Network Management System, as Hirschmann™ was able to deliver – and guarantee – the following key benefits:

- Cost-savings through optimized network design
- Maximum up-time thanks to redundant Ethernet ring topology
- Continuous operation, as no single point of failure can interrupt the data communication
- Highest flexibility thanks to future-proof network infrastructure and update options
- Powerful Industrial HiVision NMS tool with Auto-topology and MultiConfig™ functionality to ensure rapid network deployment and highest operational availability
- Reduced installation time due to Industrial HiVision MultiConfig™ multiple simultaneous device configuration
- Maximized network availability through Industrial HiVision network status and threshold functionality
- Continuous and efficient operation of the plant via Industrial HiVision fault prediction, detection and diagnosis functionality
- Comprehensive technology and product training courses

Highest possible quality and reliability were the key reasons why Hirschmann™ switches, Industrial HiVision Network Management System and network technical support were chosen to produce 585,000 tons of high grade aluminum per year at Qatalum, one of the most environment-friendly smelters ever built.
The right solution could only be supplied by a manufacturer with a thorough understanding of both control system applications and industrial network infrastructures – as well as the ability to offer a comprehensive package that included all the relevant hardware, software and services.

It is vital that the Qatalum Process Industrial network system is robust and constantly available. With a manufacturing production rate of 585,000 tons of high grade aluminum per annum, network efficiency is of the highest priority. Based on the above facts, only products with the highest reliability and quality were chosen for this project.

For the network design, key elements demanded fast redundant switching, data communication and network monitoring and a control system based on Fast Ethernet. Gigabit Ethernet speed was required in the backbone ring, in addition to hot swappable media modules with high port density. All products were required to have a high predictive hardware lifetime, as well as a long Mean Time Between Failures (MTBF).

Finally, networking devices needed to be both robust and resistant to dramatic temperature fluctuation and foreign body intrusion. User-friendly and comprehensive network management software for the efficient configuration and effective status monitoring of this network provides a seamless solution from a single manufacturer.

The network structure needed to ensure that no single point of failure could interrupt the communication within the Qatalum Plant. All the nodes are monitored from a centralized Industrial HiVision NMS Server. This ensures system continuity and supports productivity optimization of the entire aluminum plant operation.

Mark Cooksley, Product Manager for Hirschmann™ Industrial HiVision, states: "Large projects like Qatalum really benefit from the Industrial HiVision MultiConfig™ functionality. Configuring and managing hundreds of devices with a few clicks saves time and effort, leading to a low total cost of ownership.”

Typical Hirschmann™ Industrial Network Topology

Least effort required for network administration and maintenance using Industrial HiVision guarantees highest network availability with minimized operational risk.
Precise knowledge of the network topology is absolutely essential for the reliable monitoring of industrial networks. The network administrator must know how and where components are connected in order to manage complex networks and perform maintenance work as necessary.

Even industrial networks evolve over time, and documentation can easily become out of date. The advanced Industrial HiVision auto-topology discovery function ensures that you always know what is connected where in your network.

Throughout a network’s operational lifetime, it is necessary to carry out repetitive but essential maintenance tasks. For example, the threat of cyber attacks means that responsible network administrators will change device passwords regularly.

Of course, for a small network, this can all be done by accessing each device individually. But for both small and large industrial networks, network security and high availability are the ultimate goals. Hirschmann™ Industrial HiVision MultiConfig™ can fulfill all the above requirements with a few clicks of a mouse.

For mission critical industrial networks, operators need a real-time display of all network components. Industrial HiVision provides user friendly topology maps, so an operator can see the status of the entire network at a glance.

With Industrial HiVision, Automation Network Administrators can meet their daily objectives with the least effort and minimal risk.

“The introduction/upgrade of Hirschmann™ Industrial HiVision NMS to version 4.0 with the new MultiConfig™ tool has simplified our daily activities. This has resulted in more valuable resources being available for other networking tasks.”

– Graham Patton
Senior Network Engineer, Qatar Aluminium
As a specialist for automation and networking technology, Hirschmann™ develops innovative solutions, which are tailored to its customers’ requirements in terms of performance, efficiency and investment reliability.

Hirschmann™ not only offers a complete range of products for company-wide data networks but also a broad support package direct from the product manufacturer. Customers receive support while their tailor-made communications solutions are being designed, and also throughout the subsequent planning, process, commissioning and maintenance of their networks.

Comprehensive seminars and workshop offerings, in which trends are evaluated and technical subjects are put into practice, complete the vast range of available services.

**Hirschmann™ Product Range**

**Industrial HiVision**
- Network Management System for Hirschmann™ managed products and other third party devices
- Automatic topology discovery
- Graphical topology display
- Real-time status display
- Alarms and events
- Asset management
- MultiConfig™ multiple device simultaneous configuration
- Long-term reporting

**RS20/RS30/RS40**
- Compact Fast Ethernet switch
- Fully managed switch (web, SNMP and CLI)
- VLAN, IGMP Snooping/Querier
- DIN-rail mountable
- Industrial fanless design
- With copper and optional fiber ports (multimode or singlemode)
- Dual power inputs
- Signal contact
- 0°C up to +60°C operating temperature
  (optional -40°C up to +70°C operating temperature and conformal coating)

**MACH4000**
- Gigabit Backbone Layer 2/3 switches
- Highest availability
- High port density
- 19” rack-mount
- Continuous operation due to hot swapable media modules
- HIPER Ring, Redundant Ring Coupling and link aggregation capable
- Flexible power supply options: 100-240 V AC, 24 V DC and 48 V DC
- 0°C up to +60°C operating temperature