As part of DAA’s (Dublin Airport Authority) ‘Transforming Dublin Airport’ investment program to deliver new and improved customer facilities at Dublin Airport, Ireland DAA recently invested in a second international terminal, namely “Terminal 2” or more commonly known as “T2.”

ABB won the tender to engineer and deliver the mission-critical medium-voltage (MV) and low-voltage (LV) electrical network in T2, which comprises 11 interconnected substations at various locations across the T2 site. The new substations are equipped with ABB’s UniGear MV switchgear, including ABB REF543 protection relays for electrical protection, monitoring and control.

To ensure maximum availability of the network, which is essential for the airport’s operations, an ABB MicroSCADA (Supervisory Control and Data Acquisition) Pro software system has been installed. This system will facilitate remote monitoring and control of the entire network.

A major benefit of the MicroSCADA Pro system is that it allows the DAA to monitor its substations remotely. It automatically sends an alarm to system operators in the event of a fault. The software is able to send text messages to DAA staff, warning them of an event, current or even impending, which allows them to take prompt corrective and/or preemptive action, thereby reducing the probability of outages. This would simply not be possible without the MicroSCADA Pro system. Another huge advantage to the DAA is the safety it affords their staff by allowing them to operate switchgear from the safety of a workstation, well away from the switchgear itself. In addition to monitoring and control of switchgear, the MicroSCADA Pro system delivers a number of other benefits. The DAA operators can also use the MicroSCADA Pro to monitor and control a combined heat and power (CHP) plant, which is used by the Authority to generate its own power. This enables the airport to reduce the amount of energy it needs to purchase from the local utility, which results in cost savings. The savings are particularly important during periods of high electricity demand, when electricity from external sources is expensive. The MicroSCADA Pro system enables the CHP operations to be optimized, controlling the timing of start-ups and shutdowns, and regulating the amount of electricity it produces in line with the airport’s needs.

CHP operations and power sourced from the utility are monitored in real-time alongside the power demands of the airport facilities. A demand-response system balances supply and demand to achieve the most efficient use of resources. And, as its name implies the CHP plant also generates heat, which is used by new terminal, further reducing the DAA’s energy costs.

Terminal 2 at Dublin Airport, Ireland. Due to open in November 2010, the new terminal is equipped with a range of ABB substation equipment and a MicroSCADA Pro network control system to safeguard mission-critical power supplies to the terminal and its surrounding infrastructure.
The MicroSCADA Pro system is used to monitor and control T2’s emergency power equipment: two stand-by diesel generator sets, which can reduce the terminal’s peak electricity demands and to provide “black-start” capability, ie, the ability to restart T2’s power systems in the event of a complete loss of mains electricity. In the unlikely event of a complete power outage, the MicroSCADA Pro system is able to detect the loss of mains supply and automatically start, synchronize and load the diesel generators, providing emergency power to essential T2 services.

In the event of a partial loss of mains supply, egg, if one of the terminal’s two grid connections was to fail, the MicroSCADA Pro system would automatically reconfigure the T2 network to receive power from the remaining supply, coordinating the restoration of power to equipment as the system returns to normal. In total, the MicroSCADA Pro system can implement six automated sequences, each consisting of up to thirty discrete steps.

The building of T2, in conjunction with the extension of the existing Terminal 1, required the installation of a new on-site high-voltage to MV electrical substation, the Bardstown substation. The role of this substation, which is already in use, is to provide the airport campus with a more reliable and robust connection to the local electricity grid. Before this substation went into operation, the entire airport was supplied by a single 38 kV connection from the utility. It now has two independent 110 kV connections, fed by two separate utility substations, which hugely improve the reliability the airport’s power supply.

The airport improvement works also included upgrading the existing “Campus” electrical network, which serves Terminal 1 and its peripherals. This included upgrading all Campus MV switchgear and the replacement of a legacy SCADA system with a new MicroSCADA Pro system, relying on ABB’s REF543 protection relays, mentioned previously, and the RTU560, a remote terminal unit used as a communications gateway on the T1 network.

Again the DAA contracted ABB to deliver the switchgear and MicroSCADA Pro systems for use in both the Bardstown substation and the existing Campus network. The three MicroSCADA Pro systems provided for the upgrade collectively handle over 10,000 input and output signals.

In order to meet all of the DAA’s requirements, ABB established and led an integrated team comprising experienced project managers, low-, medium-, and high-voltage electrical-design engineers, commissioning engineers and software engineers. The project drew on expertise from both local operations and ABB’s centers of excellence around the world, enabling the customer to deal with a single supplier for all of the network and substation refurbishment work.

As the project nears completion, the customer has praised ABB of its performance and its ability to deliver such a complex system on time, while also proposing many enhancements. The new terminal is due to open in November 2010.