

# Powering Airport Comms

## Chloride UPS keeps Heathrow connected

*BAA recently completed an ambitious five-year programme to integrate Heathrow airport's voice and data infrastructure and applications into a single Internet Protocol (IP) network. At Heathrow, 471,000 aircraft movements are co-ordinated with the movement of 1.25 million tonnes of cargo and 67.3 million people annually, helped on their way by 70,000 staff. Critical to the safe operation of virtually every aspect of this vast logistical operation, from aircraft movements to retail and emergency response, is Heathrow's data and voice infrastructure.*

*Reported by Cliff Keys, Editor in Chief, Power Systems Design Europe*

Andrew Clarke, BAA's Network Projects Project Manager, and Will Barrell, BAA's Infrastructure Project Manager, were in charge of the installation of the new data networks and voice solutions at Heathrow and, critically, to ensure that the new IP Telephony (IPT) networks were not vulnerable to power failures or any single point of failure. This necessitated the selection, design and integration of a robust Uninterruptible Power Supply (UPS) to support new IPT hardware in Heathrow's communications rooms, which is designed to permit the interface of 2,000 legacy handsets and devices with the new network.

"The new voice solution for Heathrow covers not just BAA locations but all the airlines, retailers, government agencies and anyone that uses any of about 600 airport phone handsets at Heathrow," explains Clarke. "The challenge for BAA was to design and integrate an IPT system that would be fail-safe in the event of power failures and could be rolled out without interrupting any services within the time and practical constraints of an airport environment."

Heathrow's existing voice infrastructure comprised of a telephone system



that ran on copper wires going back to switches, which was supported by its own battery backup system. In addition, data cabling went back to data communications rooms which provided the physical infrastructure for the LAN, all the PCs and applications on the network. Explains Clarke, "In order to dispense with a lot of the copper infrastructure we needed to turn all of the airport's telephony into another application that would sit on our network."

### Powering communications: the design challenge

The equipment installed to run the new IPT system is Cisco's VG 224 voice solution, a 24-way switchport, which must be protected in the event of power failure. The system is vital to BAA as it allows existing endpoint telephone architecture such as handsets, fax and modem based devices, EPOS and emergency networks, to be integrated into the IP network. The complete system had to be free from any single point of failure, able to switch seamlessly between two redundant power supplies and be capable of running at full capacity on battery power for three hours.

"BAA's in-house design team conducted a rigorous and objective technical evaluation of various products across the market," explains Barrell. "We found that Chloride's Active single-phase UPS was the best fit UPS solution. In addition to meeting our requirements in terms of power rating and reliability, it is rack mountable and supportable by dual power supplies - so if we lose one or

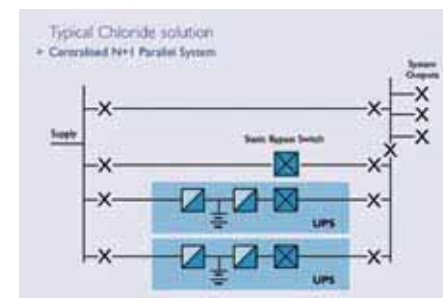
both power distribution boards the IPT network will stay up regardless and can be remotely monitored so we know the power availability at all times."

It was an added bonus that the supply and service of the UPS could be integrated within existing contracts, with a supplier that was both familiar with and responsive to the particular demands of the airport environment. This factor proved to be critical to the eventual success of the project.

"Chloride is currently a member of the airport community, and is by far the largest UPS provider at Heathrow," comments Barrell. "We already had Chloride batteries, maintenance and warranty agreements. Despite this, we took an exhaustive look at the best-fit technical solutions available to us, and of these, Chloride's 3000VA Active single-phase UPS gave us both the best performance and the capabilities we needed."

### The solution

Chloride's new single-phase Active 3000VA UPS system has been installed in phases as each stage of the IPT network has been rolled out. The UPS



systems now provide backup power and surge protection at ten critical points on site. These are located in communications rooms where 2000 analogue inputs, including Heathrow's emergency telephones, fax, modems and EPOS systems, interface with the IP network. In addition, Chloride's Automatic Transfer Switches have been installed at each point, so the UPS system will be able to switch seamlessly between two redundant 16 Amp electrical supplies, providing three hours of backup, should all external power be cut off. At each location, two Active 3000VA single-phase UPS systems are installed in a parallel 'N+1' configuration, a setup that was subject to rigorous testing and evaluation by BAA during the procurement and design phases.

### Rigorous testing

It was essential that the correct equipment and designs were selected. Accordingly, a rigorous and objective process was adopted to ensure that the equipment was the best technical fit for the application and that it was in practice both up to the job and free from single points of failure.

Testing was undertaken at Heathrow's own facility and comprised the simulation of a variety of load scenarios, up to and including that of a full emergency, with the network at full capacity. At various stages power failures of different kinds were introduced, and the equipment was required to switch seamlessly between each of the redundant power supplies, in addition to the battery backup.

"We were particularly pleased both with the input from Chloride at this stage, and with the capabilities of the UPS system, which significantly outperformed its advertised capability," notes Clarke. "Chloride's batteries, for example, delivered the required level of backup power for a full half an hour longer than the three hours specified by BAA."

"This level of insight into the real world capabilities of our systems was crucial to the success of the project," he continues. "BAA and its deployment partner (2e2) confirmed that Chloride's design was the most efficient way to achieve high density analogue connectivity with resilient power backup. Chloride helped



*Andrew Clarke and William Barrell, Infrastructure Project manager, pictured with Chloride's Active UPS. Deployed across ten communications rooms to support the IPT deployment, Chloride's Active 3000VA is installed in standard cabinets with MODBUS and SNMP cards, to ensure that voice communications are not lost in the event of power failures. Testing showed that the Chloride batteries will support the system at full load for 30% longer than the designed specification.*

us to identify and eliminate single points of failure and, when we needed it, always provided a senior engineer to assist us."

A Chloride SNMP UPS controller card is also installed and currently on trial following testing and evaluation. Integrated alongside MODBUS systems, the controller card enables the full integration of the UPS equipment with the network, and allows the remote interrogation and management of the UPS system on all aspects of its function.

### Project design: the right partner

Due to the complexity and unique demands of the project, it was important that Chloride could provide BAA with the necessary design, technical and project management input at each stage. At the testing stage, for example, limited laboratory time was a major challenge, and Chloride was able to provide answers to BAA's questions as soon as they arose.

Barrell explains, "We had a tight testing window of just a month to work with the solution in our laboratories. Fortunately, we were able to complete all testing with the aid of Paul Lyons, Chloride's Low-Power Technical Manager,

who came on site at short notice whenever he was needed, at various times in the morning, afternoon and evening."

The IPT and UPS rollout was particularly demanding from a project management point of view. It had to be designed and implemented in such a way that it would go live in phases without any downtime across the communications network. Not only was laboratory time limited, but time windows for work on the data rooms were also constrained, and contractors had to work around time-consuming airside security procedures, often at short notice.

"Chloride brought additional value to this project through its responsiveness and ability to turn things round very quickly. It sent us engineers at short notice, all of whom had the right level of knowledge and resources," says Barrell.

### Flying high

The final phase of the migration project has now been completed. Clarke and Barrell are pleased - both with the integration of the IPT project and with the level of its power protection. BAA has secured direct savings of over two million pounds per year and, as well as providing more handsets, will in future be able to benefit from a full range of third generation telephony services, such as the integration of email and voice mail and diversion to mobile devices. Critically these services now enjoy robust power protection.

"It was a seamless transition that went very well," concludes Clarke. "Chloride helped us to achieve this on time and on budget. We haven't turned off any services or disrupted our users. We were responsible for pulling the final design together, testing, authorisation and installation, and we have received excellent feedback from the operational teams who support and maintain it. Our operational engineers have been very appreciative of the professionalism of the Chloride UPS solution and the rigorous design. It has proved to be the ideal solution for meeting all our requirements within the technical constraints of the airport environment and has been a great success."

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