

C-Bus accommodates airport growth

Wellington International Airport is one of New Zealand's busiest airports and a central hub for domestic air commuters travelling between North and South Island destinations.

The airport is licensed to operate 24 hours a day, 7 days a week and has operational staff on site between the hours of 4am to 2am.

The airport has recently undergone major expansion to both its runway and passenger terminal facilities, including construction of a new architecturally-designed international passenger terminal called 'The Rock'.

The regulatory environment pertaining to airport operations requires minimum light levels to be maintained at all times in flight operational areas and automated lighting control and light scheduling are essential requirements.

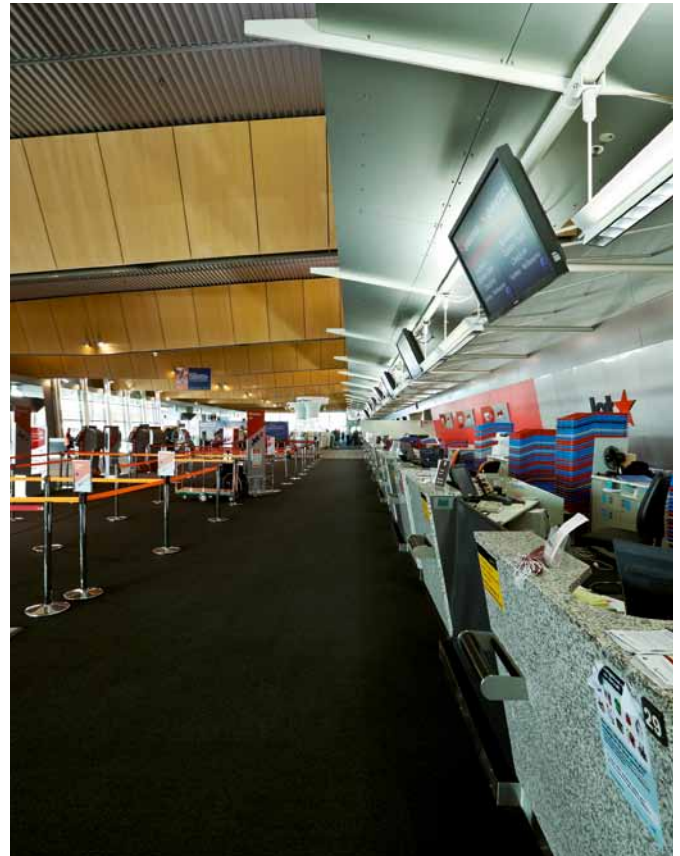
The airport lighting base is very broad and utilises a mix of high intensity discharge high bays and low bays, high pressure sodium flood and area lighting, along with a mix of compact fluorescent, linear fluorescent and LED lamp solutions.

Lighting accounts for approximately 20 percent of the airport's total energy use.

Wellington Airport consultants specified one of the first commercial C-Bus installations in New Zealand to more effectively manage apron and terminal lighting and this was commissioned and installed in 1997 by Associated Electrical.

The C-Bus solution installed back then is still fully operational today and forms an integral part of an expanded C-Bus platform installed in 2007. This expanded platform has added systems functionality and extended scheduled lighting control to include new terminal facilities such as 'The Rock.'

The C-Bus solution from Schneider Electric NZ was specified by energy consultants SKM (Sinclair Knight Merz) with systems and software engineering from Wellington-based systems integrators ECOsystems.



Backwards compatibility

ECOsystems General Manager Frans Plugge says "the backwards compatibility of C-Bus solutions meant the upgrade could be seamlessly integrated into the existing C-Bus platform, without any additional hardware requirements."

This, he says, "meant no disruption to existing scheduling or intrusive site works impacting on the operational capability of airport staff or passengers."

The primary function of the initial C-Bus solution was automated time scheduled lighting commands, distributed from a central location over multiple switchboards.

In assessing an upgrade solution, ECOsystems re-configured the initial topology of in-line network bridges to provide for further systems expansion by splitting the C-Bus networks over the clients Local Area Network (LAN). This method of topology allows the C-Bus network to reach into every area of the airport that is currently accessible by the client LAN.

A critical component of any airport is the lighting control and essential to this is the ability to manually override scheduled command switching in case of systems faults. Any lighting failure can impact on operational capability and passenger safety.



C-Bus allows hardware overrides to be distributed over entire networks as well as local channel overrides at network distribution boards, so users can manually switch lights at multiple locations.

As part of the terminal upgrade, DALI light fittings were also installed in appropriate areas to facilitate daylight harvesting and reduce light output levels at non-operational times. Existing areas within the main terminal building were also integrated into the daylight harvesting control solution.

Plugge says “algorithms programmed into the Schedule Plus front end allow HID fittings to cycle in response to available daylight without causing excessive wear and damage to the electronic control equipment. This not only saves energy but prolongs lamp life and re-lamping intervals.”

Incremental switching solutions

Central to the upgrade solution was increased flexibility of automated scheduling operations, allowing staff to extend the lighting schedule in 60-minute increments. This for example, permits staff to extend terminal lighting by one hour for a late arrival knowing the schedule will automatically reset to the normal time sequence afterwards.

Similar timing functions allow for temporary overrides in non-operating areas and function rooms. These overrides reset automatically, eliminating the need for manual switching by busy operations staff.

As part of the systems upgrade, C-Bus scheduling was extended to the new ‘Rocks’ international passenger terminal with lighting controlled over the same C-Bus network that was installed several years prior.

Plugge says “this level of backwards compatibility is unique to C-Bus solutions.”

“Having components that can communicate on the same C-Bus network, regardless of their generation, or age makes systems integration fast, reliable and extremely cost effective for end-users”. Today’s modern gateways and devices can communicate with the

simple relays and wall switches produced in first-generation C-Bus solutions. Many control systems are unable to network older hardware with new product developments requiring hardware upgrades to benefit from new technology. The ability for C-Bus to do this adds tremendous value to the longevity and sustainability of the control system.”

Simplicity by design

Wellington International Airport Facilities Manager Brian Stirton says “the C-Bus solution specified has proven highly effective both in terms of functionality and reducing total energy load.”

He says “it is difficult to quantify energy savings because energy demand is continually rising as new facilities are commissioned, but estimates energy cost savings in the region of \$150,000 per annum.”

“I can confidently say I’m looking at savings of 10 to 15 per cent on our lighting costs alone which is significant given that we are a 24-hour, 7-day operation.

From an operational perspective, the C-Bus solution has removed the requirement for manual switching in all but fault situations and these are rare. Manual switching is however vital and having the ability to switch manually from different operational zones gives us much greater flexibility. Simplicity is another key factor. Emergency services must be able to manually override scheduling and the push-button simplicity of the installation addresses this requirement.”

Stirton says “splitting the C-Bus networks over the airport’s Local Area Network has allowed it to extend scheduling to over 90 percent of terminal and apron locations, and utilise a mix of lux level and occupancy sensors over a DALI platform for additional energy savings.”

“As an energy-saving solution C-Bus has exceeded initial expectations and greatly enhanced our systems functionality. Its backwards compatibility allows us to integrate advanced features easily and cost effectively. Moreover the colour-coded wiring plan adopted for both C-Bus installations means faster fault finding in the cable network and repair. This has huge benefits in an operational environment that is constantly expanding.”

