



ADVANCED ECLIPSE NETWORKING FOR FAILSAFE AIR TRAFFIC COMMUNICATION

AIRWAYS NEW ZEALAND

CHALLENGE

Airways, a New Zealand-based air traffic control solution provider, required a communication network for Auckland International Airport. Due to the mission-critical nature of air traffic control systems, the network has to be extremely reliable with an availability of 99.999%. Communications had to be configured around the irregular physical obstacles of an airport, including flight paths and ground movements. Further requirements included ample data capacity, and multiple layers of redundancy to ensure highest levels of availability.

SOLUTION

Aviat Networks designed and installed two parallel Eclipse ring networks to ensure continued availability under all perceived failure instances. Integral to this solution were advanced Eclipse capabilities of Ethernet ring protection, EOAM for real-time statistics and traffic management, XPIC to support co-path links on one antenna, encryption for strong security, and Layer 1 link aggregation for data aggregation and protection. ProVision, Aviat Networks' element management system, oversees this network, including all third party technology.



Airways chose Aviat Networks based on our superior products and support for advanced wireless data networks. The solution provided is a highly secure and expandable IP-based network designed to accommodate all services for the next 10 to 15 years.

AIR TRAFFIC CONTROL FOR NZ AND THE PACIFIC

Airways is a New Zealand provider of air traffic control, airspace design, flight inspection, and related training services. They required an upgrade and expansion of their Auckland International Airport network for air traffic control and airport communications. To span the runway area without communication disruptions from airplanes and ground vehicles they needed a fully secure wireless-based solution.

Airways required nothing less than the optimum for this mission critical network. They selected Aviat Networks as part of a tender process, based on our track record of delivering public and private communications networks for other customers in the region and worldwide. Airways sought our reliable equipment and advanced solutions for combining different technologies.

As a fully-owned subsidiary of the New Zealand government, Airways are responsible for all air movements within New Zealand's 30 million square kilometers of airspace. This includes managing air traffic control towers, radar centers for all airports and military bases, navigation, and further technical and engineering services. Airways also provides air traffic control consultancy throughout the Asia-Pacific region, the Middle East, and worldwide.



One of Airways' radar and communications stations at Auckland International Airport

Throughout New Zealand, Airways operates a sophisticated communications system incorporating terrestrial and satellite coverage, radar, remote sensors, and ground-based navigation devices. At Auckland International Airport, Airways manages the Oceanic Control Centre, providing en-route services to aircraft over the South Pacific Ocean and the Tasman Sea.

AVIAT NETWORKS' SECURE NETWORK SOLUTION

Aviat Networks proposed a high-security network based on two parallel rings incorporating radio, fiber and DSL.

The Eclipse sections include the INU with DAC GE3 Gigabit switches, and RAC 6XE/ODU 600 radio links to provide the advanced functionality listed in the sidebar. The two parallel rings deliver superior redundancy for seamless network coverage. They also enable network changes and upgrades on one ring while the other remains in service.



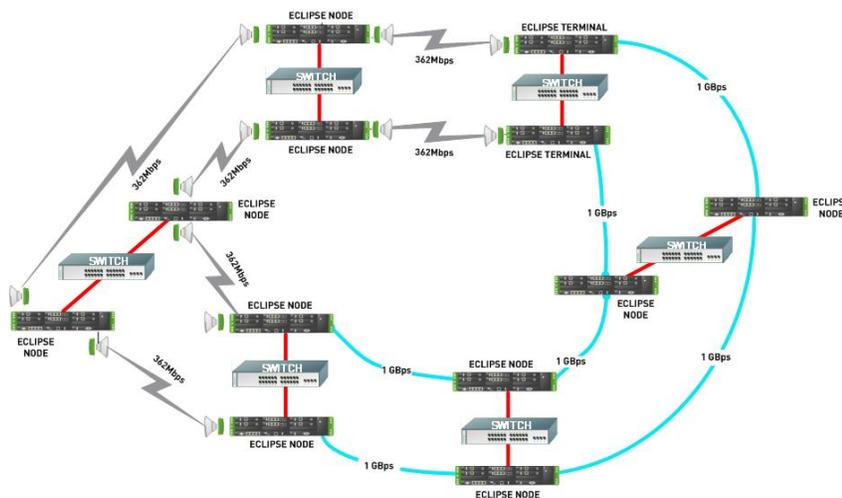
Auckland International Airport

The radio network includes a passive (reflector) antenna to help overcome the challenging layout of the airfield in relation to flight movements. The network employs routers to aggregate traffic and create multiple levels of network resilience through each Eclipse ring. WiMAX is also incorporated to access non-critical

sites and to provide another layer of transport for added redundancy.

Ethernet OAM is used to measure and check network performance, while Ethernet Ring Protection (G.8032v2 ERP) protects network traffic with carrier class 50ms switch times.

The Eclipse network was installed by Aviat Networks without disrupting air traffic, and the generous data capacity means the network can easily accommodate the expected growth in airport communications capacity.



Map of the parallel ring network for Airways. Connections between Eclipse devices and switches are red, fiber with in-band network management connections is blue. External switches provide local device interfaces.

ECLIPSE: THE MOST ADVANCED CHOICE

Eclipse capabilities deployed on this network include:

- Adaptive coding and modulation expanding network capacity and resilience.
- Payload Encryption for total over-air data security.
- Strong Security to secure management access, configuration, and control.
- Ethernet Ring Protection (ERP) for reliable, stable rings with a 50ms switch time.
- Ethernet Operations Administration and Maintenance (EOAM) for advanced traffic service monitoring and diagnostic tools.
- In-band Network Management to support Eclipse NMS access from all Ethernet devices within the network, Eclipse and third party.
- Layer 1 Link Aggregation to provide data aggregation and protection on co-path Eclipse links.
- XPIC on co-channel dual polarized (CCDP) links to facilitate single antenna working and elimination of co-channel interference.

For information on the many other advanced Eclipse capabilities contact Aviat Networks.

PROVISION EMS UNIFIES THE NETWORK

ProVision is Aviat Networks' comprehensive and feature-rich network management system. It is used by Airways to manage their entire Auckland International Airport network, both Aviat and third-party devices. The third-party devices include redundant power supplies, Ethernet to DSL converters, and Wimax BS and CPE devices.

ProVision visual cues and reports provide a complete overview of network health and performance. Targeted alert options include SMS and e-mail.

ETHERNET OAM AT A GLANCE

End-to-end Ethernet network performance is monitored using Ethernet Operations, Administration and Maintenance (EOAM). ProVision auto-discovers EOAM capable devices, manages their alarms, and provides automatic continuity checking and graphic views of each EOAM maintenance association. Where problems are identified, loopback and link trace controls enable fault isolation and resolution verification.

AVIAT SERVICES COMPLETE THE PROJECT

The Aviat Networks Services team worked closely with Airways, providing training, factory acceptance test support, and turn-key installation and commissioning services. Aviat Networks engineers configured the detailed redundancy and backup aspects, and provided guidelines for rapid disaster recovery – an urgent requirement in New Zealand after the Christchurch earthquakes in 2011.



AIRWAYS INTO THE FUTURE

As Auckland International Airport continues to grow, Airways will benefit from the built-in flexibility and capacity reserves. "Aviat Networks technology is key to our planned network expansion. Future-proofing and reliability are why we invested in Aviat Networks' high-quality networking technology," says Airways. With the successful launch of this mission-critical network, Aviat Networks and Airways anticipate future collaboration globally.

PROVISION NETWORK MANAGEMENT

ProVision is Aviat Networks' standards-compliant Element Management System. Capable of managing all Aviat Networks products, ProVision is a mature, reliable and future-proof system for large and small networks.

Features include:

- Management of all Aviat Networks products and approved third party devices.
- Advanced auto-discovery, circuit tracing and services provisioning.
- Management for up to 6,000 network elements per server and 50,000 circuits.
- Support for 25 simultaneous client sessions.
- Extensive fault management cues and statistics, including scoreboards and event browsers.
- An advanced graphical user interface with clear, detailed views to user interface levels.