CASE STUDY

A Smarter, Safer Community: Simoco partners with Telstra to provide Toowoomba Regional Council with mission critical digital communications

simoco
wireless solutions

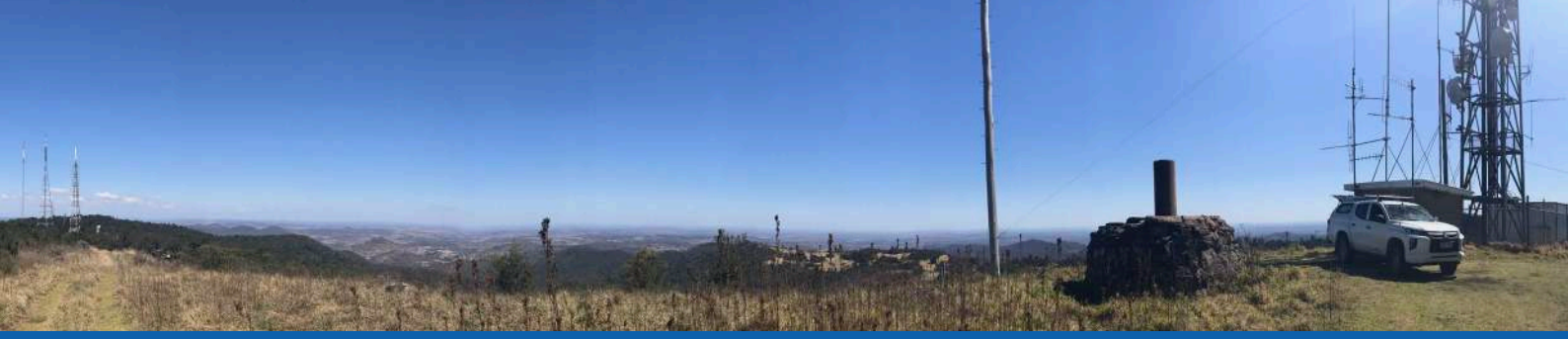
OVERVIEW

In the wake of devastating floods in 2011, Toowoomba Regional Council (TRC) in Queensland, Australia commissioned its Telecommunications provider, Telstra to replace eight disparate legacy analogue radio networks with a single digital critical communications system. The new network delivered near total coverage of the region, improving resilience to disasters, enhancing worker health and safety, and supporting the local community.

Telstra's chosen partner for the project, Simoco Wireless Solutions designed, installed, and provided maintenance for a 10 site DMR Tier III digital radio network with over 700 terminals. As a result, radio coverage for mission critical voice was increased from around 60% to over 90% with the added benefit of automatic vehicle location (AVL) to track the Council's fleet of vehicles.

As with all council projects, cost was a consideration and savings of up to 90% were made by the decision to opt for mobile radio over a full LTE upgrade, while a further $300k saving was made by removing the need for additional telematics for AVL, as this was included in the solution.

A significant factor in selection of the system was because of its future design capability for migration to LTE. Simoco Velocity allows integration with the existing Telstra 4G/5G LTE network for applications like video, workflow management software, push-to-talk over cellular and other high bandwidth applications.



THE CHALLENGE

If there are three words that sum up the spirit of Toowoomba Region they are: resilience, determination, and ambition. This vast area of the Queensland interior has suffered everything that nature can throw at it, from bush fires to prolonged drought to the flash floods of 2011. And as for determination and ambition, just think about a 50-year campaign to build the recently completed second range crossing to connect Toowoomba Regional Council, that sits high on a 700m plateau, with the port of Brisbane. To date, this is the largest inland road infrastructure project in Australia's history. And all three attributes were displayed when the region bounced back from disaster and decided on a whole range of flood mitigation and protection measures, part of which was a complete overhaul of the region's mission critical communications.

The Local Disaster Management Group (LDMG) concluded that the existing legacy analogue radio network infrastructure was just not up to the task of either managing the next major incident or indeed, handling day-to-day critical communications across the vast and geographically diverse landscape of the 13,000 Km2 Toowoomba Region.

As a result of a 2008 local government re-organisation, the City of Toowoomba and seven regional councils were amalgamated. Each council had its own analogue radio system. Being analogue, this was never going to be a long-term solution. It was going to get more and more expensive to maintain and there was no option to integrate new communications technologies like 4G/5G LTE and IoT applications. However the single biggest problem with the patchwork of legacy systems was coverage, or lack of it, to be more precise.

TRC Information and Communications Manager Shane Hinchliffe commented: "With only about 60% coverage across the region we had a lot of staff traversing remote areas with no radio or mobile phone coverage. It wasn't a question of an upgrade. This was a wholesale rip out and replace situation." There needed to be a step up to the latest digital mobile radio technology from the point of view of coverage, performance, cost, and future digital transformation plans.

As well as responding to the pressing needs of disaster management, TRC wanted a network that would serve the needs of the wider community and business. This meant a system that could help with safety and co-ordination of public events like the Toowoomba Carnival of Flowers, as well as a means to monitor and track its fleet of vehicles, including construction vehicles working on a range of infrastructure projects.

"We were looking to deliver a safer, smarter community network to match the needs and ambitions of Toowoomba. But mission critical voice communication across the whole region was our starting point. That's what had been lacking in 2011 and that was our priority." - Rex Buckley, Simoco Queensland director

Whatever mission critical voice solution was agreed upon, it was seen as desirable to have a path in the future to high bandwidth LTE applications like video, workforce scheduling and push-to-talk over cellular. The new radio system needed to be the foundation for a new critical communications ecosystem, not just a shinier version of what was already in place.

SOLUTION

First and foremost in the minds of TRC was that never again should council workers and first responders be placed in danger or suffer poor communication in the event of another emergency. And that meant there could be less black spots across the urban and regional areas of the Toowoomba Regional Council.

After an open competitive tender process Telstra was chosen to deliver the new network. Although Telstra has wide experience of providing LTE networks in the region it quickly became apparent that, to achieve the required levels of coverage for such a wide geographical area, LTE would not be a cost-effective solution for the Council and that a digital mobile radio was the only realistic option.

Telstra also recognised that radio was a specialist area that required an experienced and expert partner to design, install and operate. Telstra chose Simoco Wireless Solutions as its radio partner for the bid. The solution of choice was a digital radio solution based on the international DMR standard.

The Simoco Xd is a Tier III DMR system that provides mission critical voice, cost-effectively over wide areas. Being digital, Xd provides high quality full duplex voice communications and uses a unique fully distributed architecture. What this means in practice is that there is no need for a central switch, which avoids the problem of the single point of failure but also, each base station can route calls via the rest of the network in the event of an outage at one location. Being a switchless network, this means a cost saving on expensive central switches as well as higher levels of network availability, making it more resilient and also more easily scalable than other solutions on the market.

The system was deployed over 10 sites within the Toowoomba Region with over 700 terminals. Simoco DMR mobile radios are all fitted with GPS which meant that that all council vehicles could be tracked and located, wherever they might be across the region, not only helping with worker safety and co-ordination but also to help cut down on vehicle theft.

Key to the success of the deployment was the network design. The terrain presented some major challenges, not just in terms of distance but also topography. Masts had to be sited to deliver coverage in mountainous areas with river gorges and valleys as well as in open farmlands and forested areas North, West and South of the City. Within the City itself the network faced all the challenges of providing radio coverage in an urban area. In planning the system, Simoco, Telstra and TRC worked closely together to find the right sites that would deliver on the mantra "coverage is king."

> **"A lot of the competing providers planned on using existing radio mast sites, but we knew this just wasn't going to deliver. So we looked at where the optimum sites were and set about getting them. The problem was, not all the sites we needed were owned by the council, so we had to negotiate deals with a range of other stakeholders. We also had to build some new sites to get the coverage we needed. A lot of this work in selecting and provisioning the new sites with Telstra and Simoco was outside the original tender so this was a true joint venture arrangement."**
> **- Shane Hinchliffe**

With the diversity of the landscape it was clear that fixed base stations alone would not always be able to reach outlying areas and Simoco was able to allow for this with their DMR coverage extender (DCE) development. This is a special device that uses the higher power available on a mobile radio within a vehicle to extend the range of portables back to the core DMR network. This has particular relevance in remote rural parts of the Toowoomba Region such as in the forest areas where 'prescribed burning' operations are a regular occurrence, as part of the bush fire mitigation measures. During such operations it is vital that council staff can communicate within their workgroup as well as with the dispatch operator.

As well as ensuring coverage, another benefit of the switch from analogue to DMR is enhanced worker safety features such as duress alarms and targeted workforce location for improved rapid response and disaster management. These kinds of features can only be delivered cost-effectively in remote locations by a mission critical digital radio system, especially in areas where contiguous cellular coverage is difficult to achieve.

FUTURE DEVELOPMENTS

While coverage and performance for mission critical voice was the priority for TRC, the design of the DMR system provides lots of scope for future expansion and development as well as integration with other communications technologies and services. TRC is well aware of the need to integrate higher bandwidth technologies such as fibre, 4G/5G LTE and Wi-Fi into the mix to take advantage of more advanced applications like video, workforce management, navigation software and push-to-talk over cellular. With this in mind, TRC is trialling Simoco's Velocity product which brings narrowband radio and broadband LTE together in a single platform. Using a Velocity hub, broadband applications can be extended within service vehicles or in the immediate vicinity to deliver these applications across the region.

In common with other councils in Australia and around the world Toowoomba is looking to deploy IoT technology to improve local services such as transportation and technologies like DMR and LTE can play a vital part in this. Ian Hurley (Senior business development executive – ICT and security at Telstra) commented: **"We're looking at everything from 5G to smart parking. Once you have the right network infrastructure in place, all these things are possible."**

With the benefit of radio coverage across over 90% of the region TRC is able to look at remote monitoring technologies using the DMR radio as a low-cost carrier for telemetry data. Simoco Pulse is a SCADA device already widely used to monitor utility assets around the world like electricity substations and water supply infrastructure. TRC now has the option in the future to integrate Pulse to monitor water levels and ground temperatures to give early warning of flooding and fires wherever they may occur across the region, without having to send people out to site.

KEY TAKEAWAYS

The success of the TRC implementation was in listening to the needs of the council and all the key stakeholders like the emergency services, the business community, and the team at Telstra. And the overwhelming need was mission critical voice across the whole region. This meant a no-compromise approach to ensuring radio coverage, by careful planning and smart use of technologies like the DCE coverage extender for hard-to-reach zones to ensure safety of workers on the front line.

> **"It means that we are well prepared for the kind of events that we had in 2011 in a way that we were never prepared before." - Paul Antonio, Mayor of the City of Toowoomba**

The decision to opt for a mobile radio network rather than a full upgrade to LTE resulted in huge savings for the council. DMR worked out a fraction of the cost of LTE for the same level of coverage. Further cost savings were made by removing the need for an additional telematics solution. Simoco DMR units come with built in GPS tracking, allowing the council to know where all their vehicles are at any one time.

> **"Simoco and Telstra have built a platform for future development of digital services for the council. By choosing a digital radio platform that had the ability to integrate with 4G/5G LTE and other high bandwidth technologies, TRC has not only created the backbone of a digital transformation of council services from transportation to asset tracking and remote telemetry, but it has also paved the way for a whole range of 'smart city' applications that will underpin Toowoomba's bold and ambitious plans for development." - Mike Norfield, Group CEO**

Partnership was also critical to success. Simoco, TRC and Telstra were prepared to work as a team to deliver the solution. As well as working closely to find and equip the best locations for base stations and radio masts, both Simoco and Telstra were keen to work with local people and local contractors wherever possible. Telstra has a huge investment in the region and is involved with the LDMG as well as the business community with over 150 employees located in Toowoomba Region.

> **"We have a strong community focus,"** said Telstra's Ian Hurley, **"With such an investment in the region we wanted a long-term partner that was prepared to 'win or lose' with us. And that focuses the mind. They listened to us and not only used local contractors on the install but trained local people to operate and maintain the system and those highly skilled staff can now provide ongoing support for the lifetime of the network. Thanks to the success with Toowoomba, Telstra and Simoco have partnered and continue to collaborate on other regional council projects both in Queensland and throughout Australia."**

Contact Us

UK HQ

Field House
Uttoxeter Old Road
Derby
DE1 1NH
Tel UK: 08717 411 050
Tel International: +44 (0) 1332 375 500
info@simocowireless.com

AUS HQ

1270 Ferntree Gully Rd
Scoresby, VIC 3179
Tel: +61 (0) 3 9730 3999
Fax: +61 (0) 3 9730 3964
inquiry.aus@simocowireless.com

www.simocowirelesssolutions.com

simoco
wireless solutions