

Enabling a response to disasters in Australia





Australia encompasses over 7.5 million square kilometres and boasts diverse biomes and terrains. Because of its vastness, providing reliable digital communications across Australia is challenging, especially due to the concentration of residents in major coastal cities. While mobile phone networks cover 99% of the population, over two-thirds of the landmass lacks cellular coverage, resulting in massive communication blackspots in regions inhabited by a quarter-million people that also host important infrastructure and vulnerable bushland. The unreliability of digital communications across these areas poses a significant challenge during emergencies.

While two-way radio has historically served as a reliable communication tool, recent experiences have highlighted the invaluable role that digital communication services can play in emergencies, such as through facilitating the sharing of crucial data like images and maps. The Royal Commission into Victoria's Black Saturday bushfires recommended a prioritised review of communication strategies and the development of programs to address radio coverage blackspots.

While the expense of providing nationwide cellular coverage would be prohibitive, a solution is required to ensure emergency crews and managers have access to vital information.

Delivering cellular coverage on demand

An alternative digital communication solution is needed that delivers reliable connectivity in remote locations – one that also has the mobility needed to accompany fire crews while providing sufficient coverage.

Fujitsu's team believes they have resolved this challenge by integrating various technologies into a new service that swiftly delivers small cell network coverage to remote areas.

According to Julian Fox, Chief Technology Officer for Government and Healthcare at Fujitsu Asia Pacific, the Vehicle-as-a-Node (VaaN) solution can be deployed on mobile platforms like trucks or fire appliances. It provides digital voice and data coverage within cells up to 2.5 kilometres in diameter. Crucially, up to 11 VaaN network nodes can be meshed or 'daisy-chained' together, significantly expanding coverage areas.

Fox explains, *"This enables activities such as sharing images, maps, and even video communication, which are immensely valuable for emergency crews. Visual information sharing, such as images depicting fire front progress or on-site conditions, greatly aids crews. Even the ability to share digital maps with annotated overlays can be incredibly beneficial, providing swift information on fire movement or escape routes for endangered crews."*

Built on experience

The VaaN concept developed by Fujitsu and its partners stems from extensive discussions with rural fire services and builds on Fujitsu's experience collaborating with emergency service organisations across Australia. The VaaN model offers the flexibility to provide coverage to individual locations or to be interconnected for broader coverage. This linking feature allows VaaNs positioned near permanent cell towers or satellite uplink sites to connect directly to the mainstream mobile network, facilitating connectivity to control rooms and other essential services.

With the ability to link up to 11 VaaNs, digital communications can be extended for distances exceeding 20 kilometres from the point of interconnection, although actual achievable distances may vary depending on local conditions. Even in situations where internet connectivity is unavailable, enabling in-field emergency crews to exchange digital information offers significant advantages.

According to Fox, this goes beyond just internet connectivity.

"It enables seamless communication between various vehicles involved in emergency responses, facilitating the efficient dissemination and utilisation of information. Additionally, the technology can integrate with aerial vehicles like helicopters and drones, allowing features such as live streaming of camera footage to ground crews, enhancing their situational awareness."

On-ground advantages

The VaaN model offers significant advantages over alternative solutions such as satellites, primarily due to the widespread availability and reliability of cellular technology. Fox explains that systems such as low-earth orbit (LEO) satellites often falter in emergency scenarios due to issues including atmospheric interference from smoke or cloud cover and challenges posed by hilly terrain or dense forest canopies. Additionally, the high energy demands of satellite connectivity can strain equipment beyond realistic capacities.

Fujitsu's VaaN proposal harnesses technologies from various providers which have been chosen for their reliability in emergency contexts. Serving as the integrator, Fujitsu has developed a unified management platform enabling swift deployment and operational management of VaaN setups for both ground crews and control rooms. Moreover, the incorporation of diverse technologies in the VaaN proposal offers a level of redundancy surpassing that of single-technology solutions.

Successful trials in rural NSW have demonstrated the efficacy of the VaaN system, providing temporary connectivity to traditionally inaccessible areas.

Fox envisions widespread adoption of this technology could revolutionise remote communication for emergency services, fostering the development of applications and services to enhance crew safety and effectiveness. This could include dynamic mapping applications, integration of body-worn cameras, or utilising GPS and back-to-base communications for real-time crew location awareness.

Enhancing field connectivity also holds promise for improving communications with other stakeholders such as property owners. Fox highlights that poor communication can lead to confusion among parties receiving information from various sources, or worse, receiving no information at all. By bolstering in-field connectivity, it becomes feasible to establish a single, authoritative source of information for all parties involved.





Conclusion

Bushfires, floods, and storms cause billions of dollars damage in Australia each year along with the loss of life, and these events are predicted to become both more frequent and more intense as the nation's climate changes.

While there is little that Fujitsu can do to lessen the occurrence of natural disasters, by improving digital connectivity for emergency crews, it can help emergency services respond more effect and safely and work to lessen a disaster's impact.

"We want to do things that put the right people in the right place at the right time, and as long as we can help make that happen, then maybe those people will be able to directly save lives," Fox says.

About the authors

Brad Howarth

Brad Howarth is a researcher, writer, speaker, and facilitator, based in Melbourne, Australia. For 25 years he's been researching and writing on a range of topics for publications in Australia and overseas with a focus on the technology, digital media and marketing industries.



Julian Fox

Julian Fox is a visionary technology leader with a proven track record of driving innovation and transformation in the world of information technology. As the Industry CTO - Government and Healthcare at Fujitsu, he plays a pivotal role in shaping the future of technology solutions for Fujitsu customers.



**Contact the Fujitsu Safety, Justice
and Corrections Team to find out more**

www.fujitsu.com/au/solutions/industry/public-safety/getintouch