MAR/APR 2023 Vol.10 No.3

critical comms

PUBLIC SAFETY | UTILITIES | MINING | TRANSPORT | DEFENCE

PP100007393

BIG THINGS COME IN SMALL PACKAGES

THE KENWOOD 1000 SERIES PRODUCTS,
MORE THAN YOU'D EXPECT.

KENWOOD

Trusted, proven TETRA
Now in VHF band

- Extend coverage
- Reduce operational costs
- Full accessory portfolio

For further information visit
www.sepura.com

sepura
Going further in critical communications

comms critical

Inside

March/April 2023

READ ONLINE! *This issue is available to read and download at* www.criticalcomms.com.au/magazine

ON THE COVER

If you are thinking of harnessing the latest digital protocols — NXDN or DMR — to enhance business efficiency, Kenwood's NX-1000 series products have you covered. The company's 'One-K-Fits-All' solution offers a wide selection of two-way radio products for everyday use.

The NX-1700/1800 mobile radio supports multiple digital protocols as well as mixed FM analog operation. With a 6 W audio output, this little radio is not only easy to hear, but also easy to operate. The NX-1200/1300 portable radios include a particle keypad, high-contrast backlit LCD screen and 7-colour LED along with renowned Kenwood audio quality, making it a lot of radio in a small package. Both the portable and mobile radio are CB type approved to maximise their functions.

The NXR-1700/1800 is a compact, multi-mode software-defined conventional repeater. The repeater can operate in FM analog, and either NXDN or DMR with a simple licence application. The repeater has a 50 W power output and is light, compact and space efficient, allowing you to fit two repeaters in a 1RU space, 19″ rack. Multi-site network capability with voting and IP configuration make this little repeater a necessity when it comes to remote sites or remote support options.

JVCKENWOOD Australia Pty Ltd
www.kenwood.com.au

Do you read me?

This issue of ***Critical Comms*** is being put together just weeks after New Zealand was ravaged by Cyclone Gabrielle. With damages estimated to be at least NZ$10 billion, it is believed to be the costliest tropical cyclone on record in the Southern Hemisphere, and the most intense to hit New Zealand since Cyclone Giselle in 1968. From a comms perspective the event was particularly ruthless, causing a collapse in communication services in the Hawke's Bay region thanks to both power outages and broken fibre-optic cables.

Assistance came in many forms. The New Zealand Defence Force helped to establish civil communications for emergency services, while Australia's own Queensland Fire and Emergency Services used equipment including remotely piloted aircraft systems to undertake rapid damage assessments. But this issue we are shining a spotlight on the licensed amateur radio operators from New Zealand's Amateur Radio Emergency Communications (AREC), who selflessly stepped up to provide their services to the communities that were worst affected. Turn to page 6 to read their stories.

The cyclone landed mere months before the anticipated rollout of New Zealand's new Public Safety Network — a critical communications digital service for frontline responders consisting of cellular, land mobile radio and personal alerting. Designed to be a 'last resort' network for the emergency services, the PSN should be able to provide these services with local communications when connectivity is otherwise lost, thanks to features including the ability to move between the Spark and Vodafone networks if either network is down and priority access to cellular networks in times of congestion. We can but hope the PSN will have the resiliency to deal with future natural disasters that are similar in scale to Cyclone Gabrielle, and I'm sure this will be a talking point as we get closer to rollout.

Lauren Davis, Editor
cc@wfmedia.com.au

Calendar

April
EENA Conference & Exhibition 2023
19–21 April 2023
Ljubljana, Slovenia
https://eenaconference.org/

May
Critical Communications World
23–25 May 2023
Messukeskus Helsinki Expo and Convention Centre, Finland
https://www.critical-communications-world.com/

June
EMPA Australia 2023
7–9 June 2023
Hotel Grand Chancellor, Brisbane
https://empaaust.empa.org.au/
Comms Connect New Zealand
13–14 June 2023
Te Pae Christchurch Convention Centre, NZ
https://www.comms-connect.co.nz/
5x5: The Public Safety Innovation Summit
28–30 June 2023
The Westin San Diego Gaslamp Quarter, USA
https://www.nist.gov/news-events/events/2023/06/5x5-public-safety-innovation-summit

August
APCO 2023
6–9 August 2023
Music City Center, Nashville, USA
https://www.apco2023.org/
AFAC23 Conference & Exhibition
22–25 August 2023
Brisbane Convention & Exhibition Centre
https://www.afacconference.com.au/

October
Comms Connect Melbourne
18–19 October 2023
Melbourne Convention & Exhibition Centre
https://melbourne.comms-connect.com.au/

November
PMRExpo 2023
28–30 November 2023
Koelnmesse, Germany
https://www.pmrexpo.com/en/

For a full list of industry events, see criticalcomms.com.au/events

Westwick-Farrow Media
A.B.N. 22 152 305 336
www.wfmedia.com.au

Editor: Lauren Davis
cc@wfmedia.com.au

Publishing Director/MD: Geoff Hird

Art Director/Production Manager:
Julie Wright

Art/Production:
Linda Klobusiak, Marija Tutkovska

Circulation: Dianna Alberry
circulation@wfmedia.com.au

Copy Control: Mitchie Mullins
copy@wfmedia.com.au

Advertising Sales

Tim Thompson Ph 0421 623 958
tthompson@wfmedia.com.au

Liz Wilson Ph 0403 528 558
lwilson@wfmedia.com.au

Head Office
Unit 7, 6-8 Byfield Street, North Ryde
Locked Bag 2226, North Ryde BC NSW 1670
Ph: +61 2 9168 2500

Print Post Approved PP100007393
ISSN No. 2202-882X
Printed and bound by Blue Star Print

All material published in this magazine is published in good faith and every care is taken to accurately relay information provided to us. Readers are advised by the publishers to ensure that all necessary safety devices and precautions are installed and safe working procedures adopted before the use of any equipment found or purchased through the information we provide. Further, all performance criteria was provided by the representative company concerned and any dispute should be referred to them. Information indicating that products are made in Australia or New Zealand is supplied by the source company. Westwick-Farrow Pty Ltd does not quantify the amount of local content or the accuracy of the statement made by the source.

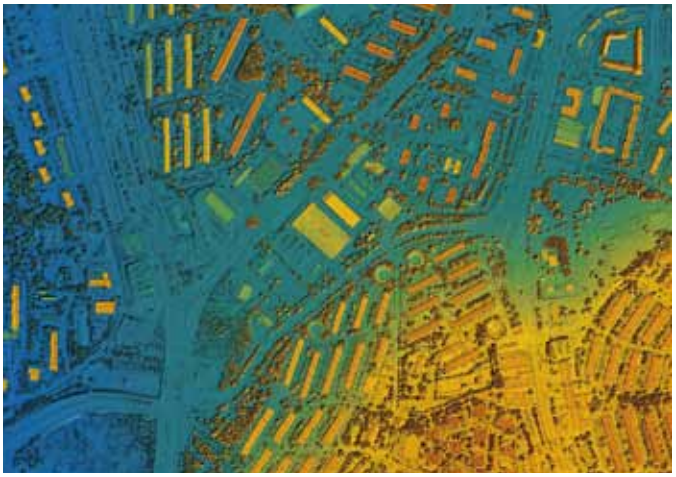
If you have any queries regarding our privacy policy please email privacy@wfmedia.com.au

Agreement to make NASA geospatial data more accessible

As the science community undertakes critical work researching solutions to the world's most pressing challenges — from natural disasters to climate change mitigation — the ability of scientists and researchers to make informed decisions relies heavily on accessible, authoritative geospatial data. To support these efforts, Esri, a global leader in location intelligence, has signed a Space Act Agreement with NASA.

The agreement focuses on extending access to the broader global community of NASA's geospatial content for continued research and exploration — including new datasets from nearly 100 spaceborne sensors, measuring atmospheric health, land-based phenomena and characteristics of the oceans. Partner efforts under this agreement will add to the existing NASA data in Esri's ArcGIS Living Atlas of the World — a comprehensive collection of geographic information and services, including maps and apps. NASA data will be increasingly available to more than 10 million users of geographic information system (GIS) software in ArcGIS and Open Geospatial Consortium (OGC)-based formats.

"We are at a critical crossroads for climate action, and it is imperative that the global community has access to authoritative data to do this vital work," said Esri President and founder Jack Dangermond. "We are honoured that this partnership with NASA will make its data accessible to the geospatial community so we can all do our part in working toward the health of the planet."



iStock.com/Ungrim

Historically, geospatial data has played a key role in NASA's Earth science research initiatives, which involve scientific efforts to monitor and study climate change. Additionally, GIS has been an essential tool for NASA in creating public resources such as NASA's Disasters Mapping Portal and the NASA Earthdata GIS — a centralised, cloud-native resource for distributing Earth observation data, services and resources.

"We want NASA data to be used by the broadest possible audience for good," said Gerald Guala, program scientist in NASA's Earth Science Division. "We appreciate Esri's vast community and are proud to take another step forward in making Earth science data more accessible."

An engineer overlooking a Challenge Networks private LTE deployment.

Vocus acquires private LTE/5G provider Challenge Networks

Vocus has signed a contract to acquire its long-time partner, Challenge Networks — a market leader in designing and deploying private mobile networks. The acquisition builds on Vocus's strategy to provide secure, high-capacity connectivity to Australian enterprise and government customers through its national fibre, satellite and now wireless network infrastructure.

As a provider of private LTE/5G networks, Challenge Networks designs, deploys and operates private 4G and 5G networks for customers that require secure, reliable, high-capacity wireless coverage to support operational technology (OT) use cases on their sites. These custom-built mobile networks can be deployed on sites such as mines, hospitals, universities, floating platforms at sea, vessels, ports, manufacturing and logistics sites, or any other special-purpose site.

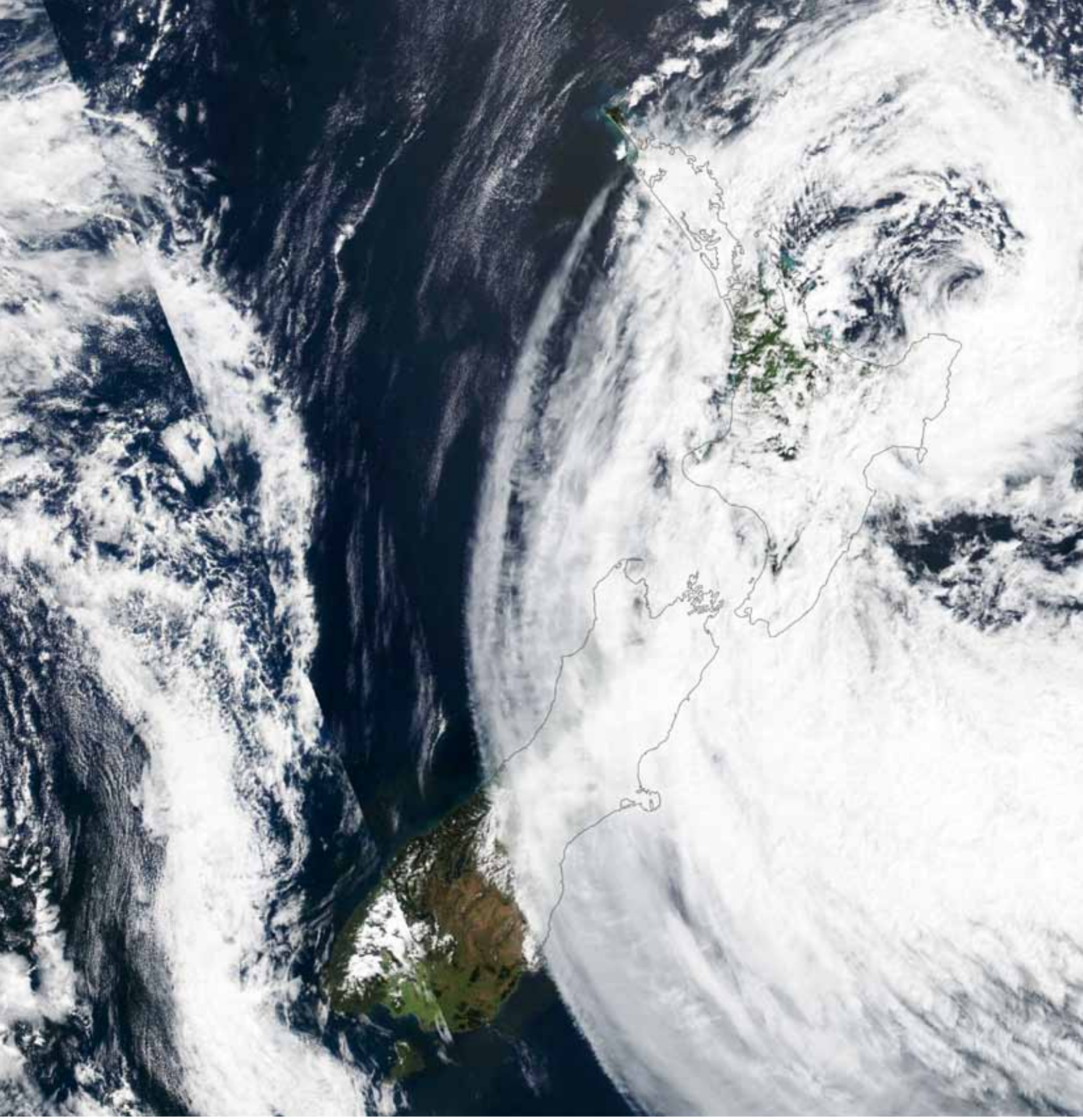
"Challenge Networks' expertise in deploying private LTE is a perfect match for Vocus's extensive experience supporting Australia's government, defence, utilities and resources sector customers with our fibre network and low Earth orbit (LEO) satellite capability, both of which provide coverage in areas others don't," said Vocus Chief Executive – Enterprise & Government Andrew Wildblood.

"Through this acquisition, Vocus will be able to provide fibre or LEO satellite connectivity to the perimeter of a site, and then through a private LTE network provide campus-wide wireless connectivity for applications such as autonomous vehicles, IoT sensors, building management systems, voice calls, push-to-talk devices, smartphones, tablets and computers anywhere on the site."

Challenge Networks co-founder Simon Lardner will join the Vocus business, along with Challenge Networks staff, while co-founder Jack Smyth will retire from the business. The acquisition will enable Vocus to build more private LTE and 5G networks for customers and then provide them with a fully managed service on a service-billed basis, rather than customers having to fund the infrastructure build.

The deal will also give Vocus a significant inventory of mobile spectrum, with a geographic focus in the resource-rich regions of Western Australia, Queensland, South Australia and the Northern Territory. This should enable Vocus to deploy private mobile networks to companies with operational technology requirements in these regions without regulatory delays and with superior mobile service levels and bandwidth utilisation.

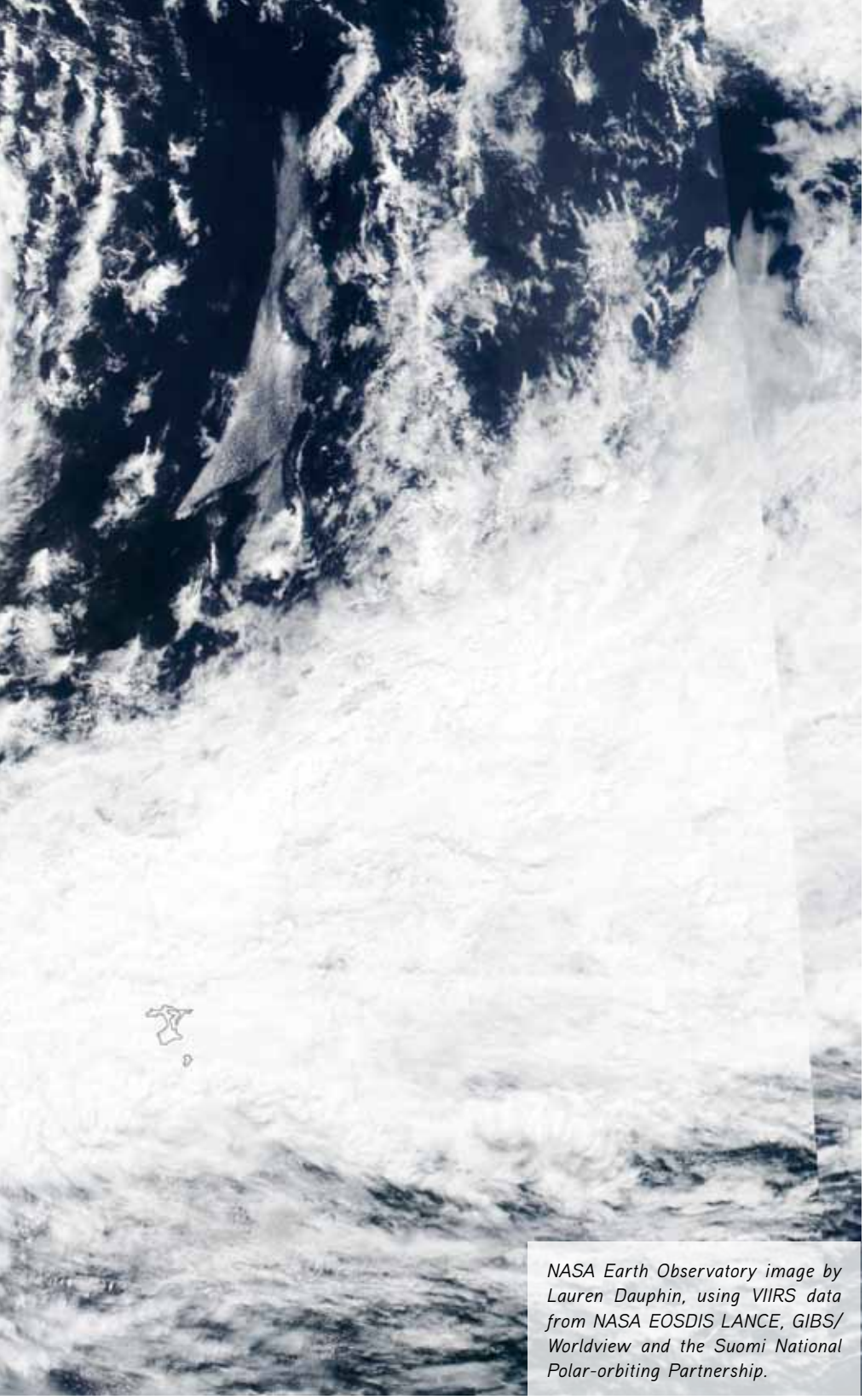
As part of its wider network and product offering, Vocus will now integrate full turnkey private mobile network capability including site survey, spectrum planning, network design, RF engineering, vendor selection, procurement, delivery, acceptance testing and ongoing service operation and network assurance.



RADIO AMATEURS RESPOND TO CYCLONE GABRIELLE

As Cyclone Gabrielle approached the coastline of New Zealand, members of New Zealand's Amateur Radio Emergency Communications (AREC) wasted no time kicking into gear.

Don Robertson ZL2TYR/ZK6EX, CEO



NASA Earth Observatory image by Lauren Dauphin, using VIIRS data from NASA EOSDIS LANCE, GIBS/ Worldview and the Suomi National Polar-orbiting Partnership.

The cyclone was expected to bring extreme winds and rainfall across Auckland commencing on 12 February. Winds in excess of 120–130 km/h were forecast and exceeded 150 km/h in some areas. These wind speeds had the potential to cause damage to power and telecommunications infrastructure. Heavy prolonged rainfall was also predicted to cause serious flooding across large parts of the North Island East Coast.

Here are just a few stories of the heroic efforts by AREC members and other licensed amateur radio operators who provided their services to the communities impacted by the cyclone. My thanks go out to all involved.

Auckland — Andrew Brill ZL1COP, AREC Regional Manager North

After meetings with Auckland Emergency Management (AEM), AREC was asked to provide radio communication support across the entire Auckland region for field teams comprising a mix of NZ response teams, NZ Defence Force personnel and other volunteers.

AREC developed a detailed communication plan and personnel rosters to assist with the operation. Radio comms planned for the disastrous event consisted of:

- AEM VHF network — 8x channels (ESB band) for Civil Defence (CD) coordination
- Commercial — 2x channels (1x EE band, 1x CN band)
- Amateur — 3x repeater channels (Auckland 670 2 m repeater, Kohukohunui 875 STSP, ZL1BQ ZK DMR) for coordination and liaison between AREC members. (Due to an outage of an AEM repeater, a crossband repeater using 70 cm uplink from the comms base with an ESB band simplex downlink was provided to the operational area).

Safety briefing prior to deployment.

Fourteen Civil Defence centres were established throughout the Auckland region and AREC maintained VHF contact with these centres, including local community response groups in the Rodney District and Waiheke Island together with various AEM and NZ Response Team resources.

AREC was based at the North Shore CDEM base in Sunnynook and provided the link between the field teams throughout Auckland and the Incident Management Team located at the Auckland Emergency Coordination Centre in the Auckland CBD, providing general situation reporting for the duration of the emergency. AREC volunteer roles consisted of:

- Communicators — talking on the radio
- Log keepers — recording messages, forwarding messages via email, data entry, etc
- People with SARTrack software experience
- People with computer skills including Microsoft Office, email, etc
- Supporters/gophers — handling phone calls, logistics, making coffee, etc.

AREC operations and preparation were activated on 8 February, while actions commenced on 12 February and continued through to 16 February. During this time,

18 amateurs supported the operation at the base. A total of 25 people were on standby throughout the Auckland region to provide remote support if needed. A total of 337 person-hours were worked.

Our team identified that additional radios were needed. AREC member Soren Low ZL1SKL sourced 60 VHF radios. He, along with Jim Smith ZL1TGS, spent eight hours programming these radios onto CDEM channels, then lending them to AEM.

A team on Waiheke Island, led by Joe Bell ZL1PMY, were able to issue handheld radios to the island communities and provide VHF coverage using their private commercial repeater, to maintain contact 24 hours a day for the duration of the operation. Without this support, evacuation centres around Auckland would not have had any backup communications.

During the afternoon of 14 February, we were requested to provide a portable repeater to provide on-scene comms between rescue workers operating at Muriwai in the search of the missing volunteer fireman, as cell coverage was down.

The ESB164 interagency liaison repeater was deployed by the North Shore Response

The main operating area at North Shore Comms Base.

team NZRT5. AREC conducted a coverage analysis to locate a suitable site to provide good coverage of the scene and also direct comms to the Sunnynook base. AREC volunteers also provided and programmed equipment to allow comms with Welfare teams who were operating rented UHF portable radios on a commercial repeater channel on the Auckland Skytower.

AREC was stood down at midday on 16 February, with a few remaining on standby if needed.

The majority of communications handled up by our volunteers was routine sitreps with no major issues; however, the operation has confirmed the value of AREC and radio comms in disaster situations, and has underlined the need for comms knowledge and skills in the event of infrastructure failures. SARTrack proved to be a valuable tool for logging radio traffic, and our improvised link to emergency communications centres (ECCs) worked so long as we retained internet connectivity.

Gerry ZL2XL providing comms support for beach searches.

Auckland ECC Operations Manager Josie Beswick passes on her thanks and congratulations for the outstanding service provided by AREC volunteers, and that is echoed by feedback from the community groups and Civil Defence evacuation centres around the region, who were kept in touch when the power and phones were down and things looked gloomy.

Hawke's Bay — John Newson ZL2VAF/ZK2EXC, AREC District Manager Eastern

AREC and Civil Defence activated the ECC in Hastings, testing the CD radio network up the East Coast and set up ready for Cyclone Gabrielle. The severity of the cyclone caused significant damage including power outages, with the main high-voltage substation that fed the wider area flooded. The rivers rose so high that the bridges between Napier and Hastings became unpassable, which meant a number of AREC/CD communications volunteers were cut off and unable to attend the ECC. In the first 48 hours, only three members supported the comms in 12-hour shifts with very little sleep; a mammoth effort by these three.

On the 13th, the CD volunteer team leaders called in to prepare for a likely event. All the handheld radio batteries were put through the chargers to ensure that they were fully topped up and ready to go. Some of the Rapid Response team were on hand getting equipment and vehicles ready. The Welfare team arranged to have the local sport centre set up as a welfare centre. We did regular radio checks with the sport centre.

In the early evening, the Eskdale Holiday Park called in to say the river was rising and those at the campsite were being evacuated to the local marae. I was asked to give 24-hour communications coverage and so gave Rob Wallace ZL2SG a call. He arrived just before 2000 hours, we did a handover and I left shortly after, prepared to come back at 0800. Rob was stood down at 2100 as Emergency Management didn't think they needed communications overnight.

I arrived at 0745 on the 14th to find people waiting on the radio at the other end for someone to answer them. This is when things started to hit home. Kereru School called in to say they were completely blocked in with slips. The marae that the campground had evacuated to was out of power and the toilets were flooding. Hukarere College had also evacuated to the marae. They couldn't get portaloos, so everyone there re-evacuated to St Joseph's College in Greenmeadows.

John Montgomery ZL2MB came in mid-morning after not being able to contact me and Ray Barlow ZL2RB came in about an hour later. Ray had been listening to the radio traffic and had also tried to contact me but I wasn't replying. Being busy, my phone was ringing until it went to messaging, so he came in to see what was happening and if I needed help.

We had limited communications with Wairoa through the emergency management advisor's 4WD Ute. We had a schedule set so that the Emergency Management Controllers could talk to each other over the radios. We started handing out our handheld radios to those who needed them and assigned radio repeaters as necessary.

Unfortunately, COVID had depleted our volunteer organisation so much that we were unable to deploy as we had planned and we started assigning call signs and repeaters on the fly. For example, we had one firm called Drainways that was sourcing generators from all over the place, and they had two of them on the repeater. We gave them a call sign of Drainways-1 and Drainways-2.

We gave out lists of repeaters highlighting the three that covered the most area and instructed each user to switch to another repeater if the one they were using wasn't working. We monitored all the repeaters and could reassign on the fly as long as they got onto one of the remaining repeaters. The main repeater we were using was on top of the Kaweka Ranges and it was powered by battery/solar. This repeater never missed a beat, although it got a little scratchy for a while until it got some sunlight back. We also lost our Taraponui repeater for about six hours and the next day we lost Kahuraniki for around 18 hours.

By the 15th, some internet and cell phone connections were coming online. Starlink systems were being flown all over the place

WIRELESS PACIFIC™

X10DR®

ELITE PLUS

SAFETY SERIES

everyone's talking

Up to **500** metres

Now with LTE/ LMR/Satellite Support

Toggle PTT : Radio-Talkaround
Off Network Local Talkaround
Mandown Monitor Capability
Auto Relay "Meshing" Mode
Dual Microphone Capability
Selectable Local Handsfree
High Visibility Safety Green
Extra Loud Speaker Audio
Lost Handset "Find Me"
Dual Radio/LTE Option

PWC

PACIFIC WIRELESS COMMUNICATIONS PTY LTD TEL: 03-98887347

and our message tally started to fall. We were still the main source of communications but that was slowly changing.

We had one urgent call from an outlying district about a man having heart problems. They were going to cross a bridge that had water flowing over it but were dissuaded by one of our CD volunteers who had a radio. He called us for help and we got hold of 111 emergency, who picked the man up by helicopter.

By the 16th, cell phone access had started becoming available over wider areas and we were getting more people able to come and help at the communications centre. The Clive Bridge was said to be passable and the Napier CD volunteers were heading to come over and help. Then they closed the bridge as unsafe, meaning the volunteers could not get to the comms base. To be honest, that was the one thing that really deflated us.

I contacted my AREC Regional Manager, Don Wallace ZL2TLL/ZK6EXC, and he said to have a think who was available locally. He was going to get hold of Peter Moore ZL2HM, who is the local club treasurer. I had another ham who I knew really well, a truck driver, and I doubted he would be driving with all the roads down. Nathan Foster ZL2ND was available and willing to help us out for a few days; he also signed up to join AREC while doing a shift! Tamsin Mendis, one of the CD volunteer radio operators, was also available for the day. At last we could start pulling the hours back and were running three eight-hour shifts.

On the 19th, the cavalry arrived at last. The road link between Hastings and Napier opened, though it took an hour to do a trip that would normally take about 15 minutes. We had enough volunteers to do three shifts with two on each shift, though we were asked if we could drop the night shift and do 0600 to 2200 each day with two shifts. We were only handling a few messages each day by this time, so we agreed. On the 21st, we dropped down to one shift from 0800 to 1600.

On the 24th, we were asked if we could go back to 24-hour monitoring as there was another large rainfall event expected in the ranges. The Regional Council Works Group were out all night keeping an eye on the rivers and the Controller wanted to have immediate knowledge of any problems so they could react quickly. It was a very light workload with very few communications being passed, but we were ready to respond if needed.

A big thank you to the AREC and CD volunteers who spent many long hours providing essential communications supporting the community, with an extra special thanks to those who worked extended hours early on. They deserve all the accolades they can be given.

VHF handheld radios loaned by AREC awaiting deployment to evacuation centres.

Te Tairawhiti (Gisborne Region) — Mike Mather ZL2CC, Volunteer

Tairawhiti was hit really hard, with all communication going out for a lengthy period. Long before the last cyclone hit the North Island, a small group of hams set up emergency communications via 'HF' radio to enable the passing of messages from Gisborne area to the outside world. The hams in Gisborne area were Roger (ZL2RC), Tom (ZL2MOT) and Mike (ZL2CC) and the 'out of town' station was Barry (ZL2BJA) in Palmerston North.

As soon as Cyclone Gabrielle hit over the night of the 13th and morning of the 14th, the 'net' (as they are called) sprang into action. They kept regular contact with Barry ZL2BJA for days and passed on several personal messages via the radio where Barry sent them off as emails to the various people who had requested such information.

As Mike ZL2CC is located in Te Karaka (where some of the worst flooding was and about 80% of the houses had water through them), many messages were sent from the local township, along with reports of damage, road conditions, etc.

It wasn't long before poor Barry ZL2BJA was inundated with requests, as other hams from all over the country were asking him for information about family and friends in the Gisborne and Hawke's Bay areas. Luckily, he was joined by other licensed amateur radio operators listening in and helping send emails, etc, and in some cases actually visiting houses to perform welfare checks on their behalf.

Our team used HF radio and it was just as well as the internet was down, power was out and the cell phones dead. The local VHF and UHF repeaters were set up to be used in the Bay of Plenty and Hawke's Bay, which were hit hard and had their own communications problems as well.

Peter ZL2AK manning radios at Napier Coastguard IMT.

Barry ZL2BJA and others did an excellent job and I know it would have been hard work taking messages and information, passing it on usually by email, and sometimes by any means possible. This is what the amateur radio community are trained to do; to always be ready to help out in an emergency such as this.

You may think we are geeks, but we can be useful and helpful geeks.

AREC is a national volunteer, not-for-profit, registered charity. It is the public service arm of the New Zealand Association of Radio Transmitters (NZART), with 47 groups and 350 volunteers spread across New Zealand.

Amateur Radio Emergency Communications (AREC)
https://arec.nz/

Private LTE

Deployment of private mobile networks for *your business*

- "Turn Key" Deployment of 4G/LTE and 5G Private Mobile Networks
- Zero CAPEX Mobile Core – Virtual 4G/LTE and 5G Core Network in our Cloud
- On site small Core Network deployment
- Radio Networks design, planning, dimensioning, optimization
- M2M and IoT Networks for your business demands

- Push – To – Talk (PoC) over Cellular services for Critical Communications, Warehouses, Farmers, Security and Public Safety workers
- Cloud Based PTT Voice and Video Group Communications within shared environment
- On Site PTT servers for the dedicated use with a Video broadcasting
- Push – To – Talk (PoC) portable, car mounted, and highly durable devices

---

- Machine vision with artificial intelligence and analytics
- Agriculture monitoring, Animal control, Transport tracking, Face Recognition

1800 APHONE (1800 274 663), or +61399998289
www.privatelte.com info@privatelte.com

News

Link Alliance Project Director Francois Dudouit.

HONEYWELL TO DELIVER COMMS SYSTEM FOR AUCKLAND'S CITY RAIL LINK

Honeywell is working with The Link Alliance to install an integrated control system and communications system for Auckland's City Rail Link project, designed to help improve rail operations and create more unified communications for better passenger and station safety by migrating multiple subsystems into a unified platform. The Link Alliance is a group of seven companies that is delivering the main stations, tunnels and systems of the City Rail Link (CRL).

The City Rail Link is being touted as New Zealand's largest transport infrastructure project ever, featuring a 3.45 km twin tunnel underground rail link up to 42 m below the Auckland city centre. It will transform the downtown Britomart Transport Centre into a two-way through-station that better connects the Auckland rail network and will allow the rail network to at least double its rail capacity.

Honeywell, having previously supported upgrades and expansion work at the Britomart Station, will design, supply, test and commission both an integrated control system (ICS) and communication system across four CRL stations and tunnels. The company will install its Enterprise Buildings Integrator (EBI) and Building Management System (BMS) solution across the stations to integrate more than 20,000 sensor points in a highly available configuration to provide the CRL operations team with a unified view across all the subsystems installed in the tunnel and stations.

"We are pleased to expand our work with the City Rail Link team to support this monumental infrastructure project, which will help to transform transportation in New Zealand," said Michelle Bunting, New Zealand General Manager, Honeywell Building Technologies. "Our team is focused on creating a more seamless control experience for the CRL operations team while also creating a safer passenger experience with more comprehensive communications protocols."

Honeywell will also provide ICT systems and solutions, create a network and Wi-Fi infrastructure for all extra-low-voltage (ELV) systems, provide cybersecurity auditing and monitoring, install a Honeywell Variodyn D1 PAVA system for public address announcements throughout the stations, deploy in-station technology solutions including passenger information display (PIDs), help points, CCTV cameras and video management systems, and install radio and cellular communications networks (DAS) throughout the stations and tunnels for emergency services, the public and rail operators.

Portable two-way radios

Hytera Communications has released the HP56X and HP50X portable two-way radios to further expand and strengthen its digital mobile radio (DMR) portfolio. The HP5 models were developed to provide voice communications for security, operations, technician and maintenance teams at office buildings, stadiums, industrial parks, school campuses, hospitals, etc.

The HP5 series is suitable for enterprises and businesses with smaller teams, who may need fewer functions from their two-way radio systems than public safety users do — while having similar requirements for versatility and ergonomics. The series has been designed to balance functionality and usability, and features dedicated dual knobs for volume and channel controls to simplify radio operation. With the universal Type-C port, the radios can be charged with a power bank or car charger the way regular smartphones are charged.

The HP56X and HP50X radios are designed to deliver crystal-clear audio enabled by AI-based noise cancellation, which suppresses annoying feedback howling and filters unwanted ambient noises. With 0.18 μV (-122 dBm) sensitivity, the series provides stable push-to-talk voice calls even at the far edge of coverage.

The series is IP67-graded waterproof and dust-proof and meets stringent MIL-STD-810G military requirements for protection against vibration, 1.5 m drops, extreme temperature, etc. The GPS and BT 5.2 modules make the radios a versatile part of the overall dispatching and management solution.

Hytera Communications Co. Ltd
www.hytera.com.au

Paging app for emergency services

Multitone Electronics' Appear Crew app provides smartphone paging for emergency services. By bringing paging to smartphones, the app complements the use of radio pagers for callouts and futureproofing emergency services.

With the ability to override silent and DND settings on smartphones, as well as the app's off-duty status for the most urgent emergencies, the app is useful for sending callout notifications to emergency service workers, particularly volunteers or retained staff. It is a two-way device enabling crew to respond at the press of a button, which is then reported to Control. The app has multiple methods of callout delivery for rapid mobilisation and to minimise risks.

Multitone Communications Australasia Pty Ltd
www.multitone.com.au

ICOM

SATELLITE

PUSH TO TALK

WWW.ICOM.NET.AU

Building World Class Radios Since 1964

News

AUTONOMOUS ANTI-JAMMING FOR US SATCOM PROGRAM

Photo by Claire Schwerin, for the US Department of Defense.

Engineers from Boeing recently demonstrated a new, autonomous technology that can successfully prevent jamming attempts on US Department of Defense satellite communications (SATCOM). The test was conducted on the US Space Force's Protected Tactical SATCOM Prototype (PTS-P), showing how this technology can provide secure communication in contested environments.

"Maintaining communication with our deployed forces during hostility gives us a tactical edge on the battlefield," said Justin Bruner, PTS-P Program Manager at the US Space Force. "Our adversaries are always attempting to deny our ability to communicate. Onboard, autonomous, real-time nulling of jammers greatly enhances our resiliency, ensuring the United States and our allies can provide our warfighters with secure, reliable communications in a contested environment.

"Boeing has made significant strides in the development and execution of a nulling algorithm with flight-like firmware, demonstrating agile anti-jam capability. PTS-P and all of our Protected Anti-Jam Tactical SATCOM (PATS) programs are critical to this effort."

PTS-P will provide space-based processing of the Protected Tactical Waveform (PTW), the US military's jam-resistant waveform. Boeing's solution uses software-defined beam-shaping to geolocate and actively suppress jamming in real time, with thousands of data points gathered every second.

The hardware–software integration demonstration featured a number of simulations where an adversary attempted to block a user's communication, including situations with numerous simultaneous jamming attempts. In every simulation, the Boeing-built prototype autonomously mitigated highly dynamic jamming attempts and preserved connectivity, including situations where the user was in close proximity to the interference source.

The US Space Force has dubbed PTS-P a 'pacesetter program' to signify the rapid prototyping approach and quick delivery timeline under the Space Enterprise Consortium's (SpEC) OTA contracting mechanism. Host vehicle integration is set to begin this year.

Boeing's PTS-P solution is scalable and hostable on both commercial and government space vehicles. The team has completed several hardware and software demonstrations, working towards a 2024 launch and ensuing on-orbit demonstrations.

Integrated hybrid power platform

The build and operation of resilient yet cost-effective power infrastructure in remote locations is a regular challenge faced across Australian industry. The team from Powerbox Australia and Remote Energy are helping to address these challenges with the TCS Series of innovative hybrid energy systems.

The TCS Series comprises an integrated high-efficiency charge generator (DC or AC), fuel tank, Polarium lithium-ion batteries and power conversion equipment from the likes of Enatel Energy and CE+T power. All solutions can be remotely monitored via a single controller and support industry standard protocols (TCP/IP, DNP3, Ethernet and Modbus).

The resilient and versatile platform has been designed with flexibility in mind to support a wide range of SAPS and RPS applications across the telecommunications, public safety, mining, utilities and railway markets. The philosophy behind the TCS Series is simple: it aims to maximise a site's full 'round trip' efficiency through the best use of renewable energy, battery storage and high-efficiency charge generator while maintaining the maximum uptime for a site's critical loads.

Powerbox Australia Pty Ltd

www.powerbox.com.au

MiMo 2G/3G/4G antenna range

Panorama Antennas' LP[G]AM-BC3G-26 range has been designed to provide MiMo cellular/LTE antenna function for IoT and M2M applications.

The compact, robust low-profile housing is weatherproof and contains two antenna elements with effective isolation and correlation covering all current global cellular and LTE bands in frequency range 698–960/1710–3800 MHz. The LG version includes an active GPS/GNSS/Galileo/Beidou antenna for applications that require position or timing function.

The antenna can be fitted on a non-conductive panel if required and offers easy, quick, secure and weatherproof installation with the single-hole mounting bush and acrylic adhesive sealing pad. Supplied with integrated 1 or 3 m cable and SMA plug connectors, the antenna will offer plug-and-play connectivity with many different terminals.

Panorama Antennas Pty Ltd

www.panorama-antennas.com

Omnidirectional antenna platform

PCTEL has announced its VerStack antenna platform, providing high-performance connectivity for critical applications. Consisting of 5G and GNSS vertically stacked antennas, the platform utilises PCTEL's broadband element technology to provide good RF performance in smart rail and IIoT applications.

The antennas have been designed in a rugged, UV-resistant, fibreglass housing, making them suitable for harsh environmental conditions. The platform is easy to install and offers 3:1 and 5:1 configurations.

Digi-Key Electronics
www.digikey.com

3D mapping software

Digital twins have become a critical tool for many industries, and to be effective they rely on accurate and up-to-date maps and 3D models derived from imagery. Esri's ArcGIS Reality is a family of products for site-, city- and country-wide reality mapping — all using the new ArcGIS Reality Engine.

ArcGIS Reality for ArcGIS Pro is an extension of Esri's flagship desktop GIS software, allowing users to input images from drones or crewed aircraft to generate 3D outputs for reality mapping. ArcGIS Reality Studio is a focused application for reality mapping from aerial images for entire cities and countries, featuring a map-centric intuitive interface that enables high production efficiency to deliver survey-grade representations of reality.

Site Scan for ArcGIS is Esri's cloud-based end-to-end reality mapping software for drone imagery, designed to simplify drone program management, imagery data collection, processing and analysis. ArcGIS Drone2Map is an intuitive desktop application focused on reality mapping from drone imagery, enabling offline processing and in-the-field rapid mapping.

ESRI Australia
www.esriaustralia.com.au

Industry Talking

iStock.com/Feodora Chiosea

2023 is an important year for our association as we get back to a more normal year, and the calendar is in full swing.

The annual planning day was held in Brisbane on 8 February and was well attended by committee members. Paul Davis has been busy over the break and presented a number of plans to streamline the administration and marketing of the association. Spirited debate was held around the direction of our industry and how to best represent all members. In the evening ARCIA hosted partners at the Greek Club to continue the day's discussions and a great night was had by all.

Event planning is full speed ahead, so make sure you check https://arcia.org.au/events/ for all events as there are now a number of event dates online across Australia.

Key events for Perth on 22 March, Sydney on 31 May, Brisbane on 27 July and of course the Annual Gala Dinner in Melbourne on 18 October are in place, so make you save the dates and get your teams involved.

The committee is happy to receive feedback on major events, especially the annual gala dinner; we want to ensure that everyone has a great time and that these events meet members' expectations. Please reach out if you have any ideas or concerns from previous years.

It is likely there will be some changes to awards for the annual gala dinner as the committee feels that some of the awards needed a refresh. Make sure you put your local industry members forward to be recognised by their peers. It is also important to remember that at the various dinners around Australia there are awards for the local 'Industry Professional of the Year'. This is separate to the annual awards and if you have someone you feel should/could be considered, please get in touch with a local committee member or contact us directly — don't wait until the end of the year.

Training dates have also been announced, with the first online course to be held in May including an introduction to radio communications, an introduction to digital LMR standards and a microwave radio masterclass. More courses are in development and we need to thank our new CEO and training convenor for putting in huge amounts of work to finally get this going.

Check the ARCIA website regularly for details on all training matters — there will be multiple updates coming along that hopefully will be in place by the time this article is printed, and I would encourage young and old members to get involved.

Ian Miller recently circulated information from an ACMA Spectrum Tune-up conference call around the 3.4–4.0 GHz band and the availability of spectrum for local area wireless broadband (aka private LTE systems); this is an important opportunity for our members and also for our clients. In addition, Ian also attended an agricultural conference in Adelaide and reported back that in every session he attended the emphasis was on how 'data is the new oil' and will open many productivity gains in the future. The other common thread was that connectivity is one of the critical issues for mobile data in agriculture in all sectors — an opportunity for our industry?

So, welcome to 2023 — it shows potential for being another great year for our industry, our events are back, and we have training locked in throughout the year. What a great start.

Hamish Duff, President
Australian Radio Communications Industry Association

iStock.com/Hirurg

COLLABORATION IS KEY

IN NATURAL DISASTER RESPONSE

*David Dennis**

It's the wet season in north-eastern Australia, and the forecast calls for a deluge. It's always rainy this time of year, but catastrophic flooding seems to come more often with global climate change.

The emergency operations centre (EOC) in a metro area is ready to coordinate response, but the flooding is likely to impact a broad swathe of urban and rural areas, crossing numerous jurisdictional boundaries in the region.

In years past, a major flooding event would force the EOC commander to pull the emergency operations plan off the shelf and look up dozens of phone numbers to coordinate with myriad agencies that might be affected as the water rises — police, fire departments, state emergency services, utilities, transportation departments, hospitals, ambulance services and the Red Cross. It's a gamble that all the contact information will be up-to-date since the last disaster.

But this metro EOC has just upgraded its technology, installing a cloud collaboration portal with assistive artificial intelligence. The EOC commander sends an email blast to a host of local, state and federal departments and agencies, providing them with a link that syncs into the portal with a few mouse clicks.

Almost instantly, they're all on the same page. The weather bureau's alerts go out to everyone, and the water utility can share its data on where the local rivers are in danger of overflowing their banks. Power companies can advise when poles are down and service is out. The transportation department can let everyone know when roads are closed. Emergency service organisations can broadcast event information and where units are deployed. As the water rises and people are displaced, the EOC can loop in the Red Cross, alerting them to set up evacuation centres in the hardest hit areas.

As the deluge develops, there's a deluge of data as well. That can be overwhelming for the decision-makers managing the crisis. That's where assistive AI comes in.

In the background, the AI is taking it all in, looking for potential problems in advance — rain totals pushing rivers towards flood stage, road closures that might affect response times — so agencies can adapt and resources can be put in place sooner rather than later.

With climate change comes more monsoons, flooding, bushfires, tornadoes and cyclones. In all those scenarios, time is of the essence for first responders, so collaboration is key.

Anyone involved in disaster response knows that disparate agencies across multiple jurisdictions aren't going to be using the same systems, and coordinating response by a hodgepodge of telephone, radio and email just isn't efficient.

The beauty of cloud-based collaboration is that everyone doesn't have to be on the same system to be on the same page during a crisis. All they need is a computer with a web browser, and they can communicate and collaborate with every other agency that's been linked into the interface.

There are no worries about accidentally sharing proprietary data. The user can share as much or as little data is needed, and access by other agencies is restricted and temporary.

And when the clouds part and the disaster is over, the EOC can go back to 'blue sky' mode, using its AI and other features to learn from the last one and plan for the next one.

For more information on cloud-based collaboration, visit reimaginecollaboration.com.

**David Dennis is a senior business development manager for Hexagon's Safety, Infrastructure and Geospatial division.*

Hexagon's Safety, Infrastructure & Geospatial division
www.hexagongeospatial.com

ICT brought to you by Helios

One DC Power System
Two DC Output Voltages

Integrated 700-watt DC-DC Converter Provides a Secondary Output for Dual-Voltage Requirements

ICT *The Power of Reliability*

ICT Hybrid Ultra

- Up to 7,500 watts of total output power
- 700- or 1500-watt DC power modules
- 48- or 24-volt DC output
- Integrated 700-watt 12- or 24-volt DC power converter
- Dual 100-amp battery disconnect breakers
- Up to 8 fully managed load outputs
- 2RU 19-inch rack mount form factor

ICT Hybrid Power Series

- Up to 3,000 watts of total output power
- 700- or 1500-watt DC power modules
- 48- or 24-volt DC output
- Integrated 700-watt 12- or 24-volt DC power converter
- Single or dual 100-amp battery disconnect breakers
- Integrated 150-amp low voltage disconnect
- 1RU 19-inch rack mount form factor

Now Available with New 1500-watt DC Power Modules

Available at:

AU: www.heliosps.com.au
+61 2 7200 9200
sales@heliosps.com.au

NZ: www.heliosps.co.nz
+64 9 835 0700
sales@heliosps.co.nz

HELIOS
POWER SOLUTIONS

5G ruggedised router

Cradlepoint has announced the R2100 Series 5G Ruggedised Router. Built for vehicle and IoT networks, the sleek exterior-mounted solution provides mass transit, public safety and other organisations that require a high-bandwidth IoT or mobile router with the latest cellular performance in a flexible and simplified form factor.

Designed to be mounted on the rooftop of a vehicle or attached to IoT cabinet enclosures, the R2100 integrates the modem, antennas and router into a single aerodynamic, IP67-rated casing that guards against weather, vibration and shock. The product is sold with or without Wi-Fi 6 and can be deployed as a self-contained router or to supplement an existing router as a 5G adapter. Since antenna cables are no longer needed, many vehicle installations will only require one power cable and a single small hole to the router on the roof, reducing installation complexity and cost.

The router is powered by Cradlepoint NetCloud, providing an enterprise-class, unified edge security solution for in-vehicle and IoT networks. For example, NetCloud gives vital public service agencies end-to-end encryption, threat detection and defence functionality to enable secure direct cloud and internet access for applications and IoT devices, with or without Wi-Fi. The router can also support the NetCloud Exchange services which provide zero trust network access and 5G-optimised SD-WAN.

The router is designed to support local containers for edge computing functionality. NetCloud handles container creation as well as container and workload distribution and connectivity, making deploying edge computing applications a simple and more secure process.

Users can add 5G to a current installation by deploying the product in Captive Modem mode as an adapter that is controlled by an attached Cradlepoint router. The NetCloud management system treats the device as an internal modem, eliminating the need for a separate licence.

Similar to Cradlepoint's Captive Modem capability, the router can serve as an additional Wi-Fi source in captive mode to expand coverage for applications such as video offload, enhanced customer broadband, computer-aided dispatch connectivity while in the station and more. Adding this Wi-Fi capability won't incur an additional expense as all control and licensing is attributed to the incumbent router.

Cradlepoint Australia Pty Ltd
www.cradlepoint.com/au

Personal satellite communication device

Iridium Communications has unveiled its ultra-portable personal satellite communication device, the Iridium GO! exec. Built for the professional but made for everyone, the product can be used off the grid to send and receive email, use chat or office applications, make phone calls, share pictures, post to social media or get help in an emergency.

Building on the original Iridium GO!, the device is based on Iridium Certus technology and provides fast data speeds. It is suitable for connecting remote workers, NGO personnel, government employees, first responders, GA pilots, sailors and everyday adventurers, helping them to stay connected and productive from anywhere.

The product's portability means it can fit in a backpack or on the glareshield of a personal aircraft, and be easily carried from the boat to the beach or from a jeep into the field. Multiple users can wirelessly connect their smart devices over Wi-Fi or by using the built-in Ethernet port to connect wired devices to the internet.

The unit can function as a standalone device to make calls using its built-in speakerphone or initiate an SOS call if the user's smart device runs out of power. It works with popular messaging, email and other native applications well known to users. It provides extended usage on the go and can even be used as a power bank to charge a smartphone or tablet directly with a dedicated USB-C power output.

The device comes with an application manager that helps the user choose what apps they want to use, prioritise their connections, and set time and data limits; custom applications can also be developed using an Iridium-provided API. An external antenna and fixed-install kit for boats and remote locations are available to order, with additional accessories expected in the coming months.

Iridium Communications Inc
www.iridium.com

GaN MMIC power amplifiers

Wolfspeed's 50 W CMPA5259050S and 80 W CMPA5259080S are 5–5.9 GHz GaN MMIC power amplifiers featuring a two-stage reactively matched amplifier design approach that enables high power and power added efficiency to be achieved in a 5 x 5 mm surface mount (QFN) package.

The power amplifiers have a typical power added efficiency of >48% and >50%, respectively; small signal gain of 29 and 27 dB, respectively; typical PSAT of 110 and 65 W, respectively; and operation up to 40 and 28 V, respectively. They also feature high breakdown voltage and high temperature operation.

The devices are suitable for civil and military pulsed radar amplifier applications, including phased array radar.

Richardson RFPD
www.richardsonrfpd.com

CASE STUDY

Rethinking vegetation management along powerlines with satellite imagery

Geospatial developer platform and marketplace UP42 helped AiDash, an AI-first vertical SaaS company based in the USA and India, transform vegetation management for a Fortune 500 power utility company. An AiDash customer, the utility company wanted to manage vegetation effectively along distribution lines spanning over 80,000 km.

Vegetation management remains one of the single largest line items in most power utilities' annual operations and maintenance budgets. It exceeds $100 million annually in the US at many larger utilities.

Poor vegetation management is one of the primary reasons for frequent power outages and wildfires, with consequences costing an average of around $33 billion per year in the United States alone. Furthermore, increasing scrutiny from customers, the media, regulators and more has led utility companies to understand the risk of liabilities better.

For most power utilities, the vegetation management process is manual, routine and unoptimised. AiDash's client faced challenges with this traditional approach. Scheduled trimming cycles spanning 4–5 years and manual data collection left the company with minimal predictive capabilities to prevent future outages, damages and costs.

Managing distribution lines and assets, spread over 80,000 km across multiple states, proved expensive, difficult and time-consuming. The lack of visibility concerning urgent situations and hazards and an inability to identify the exact point of failure resulted in reactive and ad hoc maintenance that is primarily expensive.

AiDash wanted a solution for its client that was reliable, accurate and easy to use. To solve this, the company developed an end-to-end AI proprietary model called the Intelligent Vegetation Management System (IVMS), using satellite imagery powered by UP42.

Through the platform, AiDash could easily access both 'archive' and 'tasked' very-high-resolution Airbus Pléiades satellite imagery of utility lines in more than one state in the Southern US. This 50 cm resolution multispectral imagery from the twin satellite constellation provided AiDash with detailed coverage for the customer's remote asset monitoring needs that would have otherwise been very difficult to obtain.

By combining these images with a deep neural network model, AiDash's system was able to learn and then predict the growth rate of the vegetation species in each feeder at a span level — ie, powerlines between two consecutive poles. Knowing these span-level predictions then led AiDash to cluster these predictions at section or sub-feeder and feeder levels.

The plug-and-play AI model for vegetation management enabled the utility company to predict the growth rate of different species along powerlines — at an individual tree level. The company was able to prepare a 3- to 5-year trim plan for the entire network with an accuracy of over 85%.

The IVMS solution ultimately enabled the utility company to improve system reliability by 15% and reduce its annual budget for vegetation management by 20%. The company can now identify risks and urgent situations in real time and plan vegetation management operations years in advance, saving costs and managing contractors through an app-based approach. Post-trim satellite image analysis can also be used to audit the compliance of vegetation clearance without the need for a supervisor on the field.

"Working with UP42 helped us with the most critical element of our AI-first solutions: data," said Abhishek Singh, co-founder and CEO of AiDash. "Using archive satellite imagery alongside tasked imagery helps us provide precise and timely predictions for our customers, enabling them to make their infrastructure climate resilient and sustainable."

UP42
https://up42.com/

ALL-NEW, ALL-IMPROVED: Hytera's Latest Products Out Now

New Generation Compact DMR Repeater: HR652

Hytera HR652 is flexible to deploy and easy to network, which allows businesses to set up reliable two-way radio coverage at a designated venue with the least space and most usability.

Compact and lightweight, HR652 can be flexibly mounted to the wall or carried around in a backpack with tailored accessories. With the minimum requirement for on-site installation conditions, HR652 allows the communication connection anywhere it's needed.

It weighs only about 2kg and can be carried on the back easily. In case of an outage, the 12.5Ah battery is ready to support up to 9 hours of 10W operation and up to 4 hours of 25W operation. Also, HR652 operates in analog mode, DMR mode, or dynamic mixed digital/analog mode.

HM6 Series DMR Mobile Radios

Hytera has recently expanded its DMR mobile two-way radio portfolio by releasing two new models, HM682 and HM652. HM682/652 are designed to provide reliable voice and data connectivity for workers on the road.

The modular and compact design makes HM6 mobiles easy to install, remove and operate in the vehicle. HM682 is equipped with keys and a transflective display, which is readable both in direct sunlight and under poor illumination.

The HM6 series mobiles deliver superb audio in noisy environments. The AI-based noise cancellation filters out echoes and background noises such as horn and engine sounds.

Thanks to the high receiver sensitivity, HM6 mobiles deliver clear and dependable communications even in the area where the signal is unstable or weak. They operate in either analog or digital mode. Besides reliable voice calls, HM6 series mobile radios provide various services such as text messages, data transmission, emergency alarm, radio enable/disable, and GPS location.

New PoC Mobile Radio: MNC360

In late 2022, Hytera announced the launch of MNC360, a PoC mobile radio designed to help transportation users to communicate easily and efficiently while also providing safe driving functions and a wide range of supplementary services.

The MNC360 is compact and lightweight. Programmable keys can also help users achieve pre-defined function in one touch.

With dual SIMs, the MNC360 can automatically switch to the network with greater signal strengths for constant and reliable connectivity in any situation.

The MNC360 features a 4-watt speaker with distortion suppression, howling suppression, and noise cancellation technology, which enables the MNC360 to transmit loud and clear audio.

The MNC360 is highly versatile in various areas, such as patrol vehicles, school buses, coaches, logistics, ambulances, taxis, etc., where users can quickly collaborate effectively.

CAELUS

Caelus Wireless
www.caeluswireless.com.au

Radio Matters

I am pleased to advise that Radio Spectrum Management implemented a new Radio Register of Frequencies on 13 December 2022.

While many in the industry have experienced some glitches, rest assured the team at Radio Spectrum are very keen to find resolutions for all issues. As with any system, there are bound to be a number of teething problems, so patience is paramount — but importantly, if a problem persists the RSM has requested that you contact them directly at info@rsm.govt.nz.

A log of issues is being maintained and updated weekly. If anyone is interested in seeing what has been raised to date, or when fixes are likely, just send an email to our Administrator, Debby Morgan, at admin@rfuanz.org.nz.

History of RSM

I would also like to take this opportunity to congratulate Radio Spectrum Management on the 100th anniversary of the first radio regulations. These regulations were first gazetted on 17 January 1923, covering rules for amateur, experimental and broadcast radio stations. They were issued under the *Post and Telegraph Act 1908*.

The NZ regulations were based on findings of the preliminary International Radio Conference held in Washington in 1920.

Radio Spectrum Management timeline:

- 1923–1959: Post & Telegraph Department
- 1959–1987: New Zealand Post Office
- 1987–1995: Radio Frequency Service, Telecom New Zealand
- 1995–2000: Radio Frequency Service, Ministry of Commerce
- 2000–2012: Radio Spectrum Management, Ministry of Economic Development
- 2012–Current: Radio Spectrum Management, Ministry of Business, Innovation and Employment.

Annual General Meeting and Gala Dinner for RFUANZ

As mentioned in our December/January column article for *Critical Comms*, our annual Gala Dinner, Industry Awards and Annual General Meeting will be held on 13 June this year, again in Christchurch at Te Pae.

To learn more about RFUANZ, I invite you to attend our Annual General Meeting during day one of the Comms Connect exhibition. We welcome all spectrum users, as it is an opportunity to have your say in the industry. The AGM takes only an hour.

Registrations for the annual Gala Dinner and nominations for the annual awards have now opened, so please see our website for details and where possible nominate all worthy recipients in each category. The keynote speaker and MC, Kerre Woodham, has a long history of broadcast radio and television.

I look forward to seeing you there.

John Laughton
Chairman
Radio Frequency Users Association New Zealand

Hot-swappable DC power module for critical comms networks

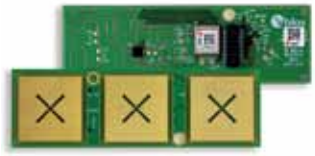
Helios Power Solutions has announced the availability of a hot-swappable, 1500 W DC power module to complement its existing 700 W DC power modules. Available in 48 and 24 V DC models, the 1500 W power module is compatible with ICT's Modular Power Series, MPS Ultra, Hybrid Power Series and Hybrid Ultra DC power systems.

All systems integrated with the ICT 1500 W module offer: remote Ethernet-based communications for monitoring and control; enhanced security features including SNMPv1/v2c/v3 and TLS 1.2; fan fail detect alarms; and advanced battery management features for sealed lead acid and lithium-ion batteries.

The product is suitable for applications such as fixed wireless access; radio access networks; FTTP/H PON GPON; distributed antenna systems (DAS); security and surveillance; and commercial and industrial SCADA systems.

Helios Power Solutions
www.heliosps.com.au

Compact antenna board



The u-blox ANT-B11 compact antenna board is designed to deliver high-precision direction finding and 2D indoor positioning. It can be integrated into commercial tracking solutions.

The product contributes to solving the ongoing indoor location challenge, where technologies such as GNSS find difficulties in performing effectively. It is equipped with the u-blox NINA-B411 Bluetooth 5.1 module and runs the u-connectLocate software, which executes the u-blox angle calculation algorithm. In conjunction with an application board, the product functions as an indoor angle-of-arrival (AoA) anchor point. The angle calculated by the antenna board does not require any additional processing; thus, it is ready for use at the application level.

Depending on its orientation, the board outputs the final azimuth or elevation angle in fractions of a second. With this information, it is possible to track assets and plot their positions in applications aiming at 2D visualisation.

Due to its 29.5 x 93.5 mm compact size, the board easily fits existing enclosures or casings. It can be used to follow assets in indoor areas, grant building access and avoid collisions, making it useful for industrial, retail and medical environments. In addition, it can be used in indoor spaces for positioning purposes wherein showing the location of an asset in 2D may suffice.

u-blox Singapore Pte Ltd
www.u-blox.com

SOFTIL ISSUES MCX STATE OF THE UNION FOR 2022

Anatoli Levine, Director, Products and Standards at Softil Innovative Communications

iStock.com/MicroStockHub

Softil, a leading enabler of IP communications solutions for mission-critical communications (MCX) products and services, has released its annual state-of-the-union review of the MCX industry covering the 2022 period.

"The year 2022 was another important year in the developing history of broadband mission-critical communications," said Softil CEO Pierre Hagendorf. "The standout development was undoubtedly the introduction of dual-mode LTE/MCX devices for blue light agencies, enabling them to better grasp the many advantages of MCX group communications during life-threatening incidents using a familiar form factor."

Dual-mode TETRA/MCX devices

In the cache of tools that first responders use daily, the humble radio communications device is probably the most important. Despite group-wide broadband mission-critical communications being available to them for more than five years, the basic radio remains 'the tool' for emergency communications during incidents.

It was therefore inevitable that new dual-mode broadband communication devices came to market using the familiar form factor of the ruggedised, trusted radio to drive change. These dual-mode LMR/LTE radios, such as those now offered by L3Harris and Sepura, give first responders immediate connectivity with MCX networks around the world including those of AT&T FirstNet and Southern Linc's Critical Linc, all packaged in the familiar radio form factor.

For the first time, blue light agencies saw the benefits of interagency group calls using dual-mode radio and MCX handsets, as well as in private MCX calls between radios and MCX handsets. The result? First responders worked faster and better, saving many more lives in the process.

Continued buildout of public safety broadband

The year 2022 saw South Korea announcing a complete switch in 2023 to MCX public safety broadband, which includes not only first responders but also train, coast guard and maritime communications. The goal is to completely turn off radio communications by the end of 2024. In the UK, the Home Office demonstrated its unwavering commitment to rolling out the MCX-based Emergency Services Network (ESN) and start the procurement process for a new MCX core server.

In the US, AT&T FirstNet continued to develop its dedicated public safety network, adding 5G capabilities and increasing the number of public safety subscribers to now over 4 million users. Southern Linc advanced its Critical Linc network offering mission-critical push-to-talk (MCPTT) capabilities to utility and first responder customers.

TELUS in Canada announced its MCX service powered by Samsung MCX servers, becoming the first network operator in Canada to offer 3GPP open standards-based public safety broadband communications solutions to first responders. Other service providers, such as T-Mobile, Verizon and Bell Canada, continued to evaluate their options to offer standards-based public safety communications networks to first responder customers.

Clearing the fog — public safety operators setting up transition plans

When new technology becomes 'the talk of the town' with amazing features that appear obvious yet ingenious at the same time, the technologists always feel that transition from old to new will be instantaneous. The benefits are so great and obvious. In reality, public safety communication tools are so essential that replacing them requires

iStock.com/Qunica5tudio

very careful and methodical planning, and transition is anything but instantaneous.

However, the year 2022 saw MCPTX technologies building enough momentum and trust for public protection and disaster relief organisations around the world to announce transition plans towards broadband-powered public safety communications.

Belgium's ASTRID, Finland's Virve 2.0, France's RRF, Germany's BDBOS, Norway's NGN, Sweden's MSB Rakel 2 and many other national public safety organisations are planning their initial introduction of MCPTX communications by 2026 with both broadband and narrowband communications running in parallel. By 2028, they expect that MCPTX technology will become the fundamental tool of public safety daily communications, and the use of LMR devices will drastically subside.

Other MCX 2022 highlights

Work on the Future Railway Mobile Communication System (FRMCS) continued at pace. In 2022, delegates involved in the development of this important MCX system defined further rules for 5G alignment and added more 3GPP standards enhancements and functionality. A number of testing and proof-of-concept projects were developed.

MCX recording solutions also became critical in 2022 to first responder control room operations. As MCX deployments grew in first responder groups, so did MCX recording proof-of-concept testing in control rooms around the globe.

Finally, interoperability testing continued strongly in 2022. First there was a virtual ETSI Plugtest dedicated to FRMCS functionality focusing on MCX FRMCS-related features such as Functional Alias, Multitalker, MCData, IPCon and so on. This virtual event was followed by an ETSI plugtest in Malaga, Spain, three years after the previous plugtest in Kuopio in 2019, which was attended by more than 90 engineers and a number of technologists remotely.

The Malaga face-to-face event was focused on both MCX and FRMCS, and saw a slew of testing activities dedicated to the 3GPP release 17 functionality and advanced MCX features. There were also discussions about the joint GCF/TCCA MCX testing work geared towards an official MCX certification program, which could be offered as soon as the 2023–2024 timeframe.

Softil
www.softil.com

Outdoor antennas

Linx Technologies has launched the IPW Series of rugged, outdoor, IP67-rated dipole antennas. With a frequency range of 617 MHz to 7.1 GHz and a gain rating of up to 8.7d Bi, the outdoor antennas deliver robust performance for a range of cellular, Wi-Fi and LPWA/ISM applications. The series provides ground-plane independent dipole antenna solutions capable of mounting permanently to both metallic and non-metallic surfaces.

The ANT-W63-IPW3-NP Wi-Fi 7/6/6E outdoor whip antenna is designed for 2.4, 5 and 6 GHz bands supporting Wi-Fi 7, Wi-Fi 6 and Wi-Fi 6E. The antenna is housed in heat- and chemical-resistant, UV-stabilised ABS and connects using an N plug connector. In addition to extensive Wi-Fi and WLAN coverage, the outdoor antenna offers connectivity for Internet of Things (IoT) devices, smart home networking and remote monitoring.

The ANT-8/9-IPW3-NP outdoor LPWA antenna is designed for use in the 868 to 915 MHz frequency range, and is suitable for low-power, wide-area (LPWA) applications. The antenna's low-power performance also makes it a good option for remote control, monitoring and sensing applications.

The ANT-5GW-IPW3-NP outdoor cellular sub-6 5G antenna offers stable performance for 5G New Radio, LTE and cellular IoT applications. Offering good peak gain and efficiency, the outdoor antenna also supports private cellular networks, including the Citizens Broadband Radio Service.

Mouser Electronics
au.mouser.com

Release 17 compliant 5G NR software

Radisys Corporation has announced its Release 17 compliant 5G NR software, extending its Release 16 software with features like non-terrestrial networks (NTN) and integrated access and backhaul (IAB) that expands coverage ability for 5G networks.

Release 17 relay node and satellite access capabilities are set to improve worldwide cellular service availability by enhancing the accessibility of fast 5G connectivity for unserved and underserved areas. In addition to driving ubiquitous 5G consumer access, Connect RAN 5G software supports enterprise, infrastructure and public safety use cases including intelligent transportation systems (ITS), aeronautic broadband, maritime, critical communications, fleet management, smart factories and Internet of Things (IoT) devices.

The software facilitates a flexible 5G network to meet varied deployment requirements and provide universal 5G connectivity for diverse applications and use cases. By deploying the software, users should be able to minimise their development costs and operational and capital expenses while at the same time improving time to market and shortening their ROI.

The software's NTN feature supports geostationary, medium and low Earth orbit (GEO/MEO/LEO) satellite access with flexible and scalable software architecture and well-defined interfaces to SATCOM infrastructure. The IAB feature enhances centralised and distributed units (CUs/DUs) to service relay nodes as 3GPP compliant donor CUs and donor DUs. The software provides a foundation for features such as NR positioning, reduced capability (RedCap) and NR SideLink, enabling OEMs, ODMs and operators to scale their 5G networks.

Radisys
www.radisys.com

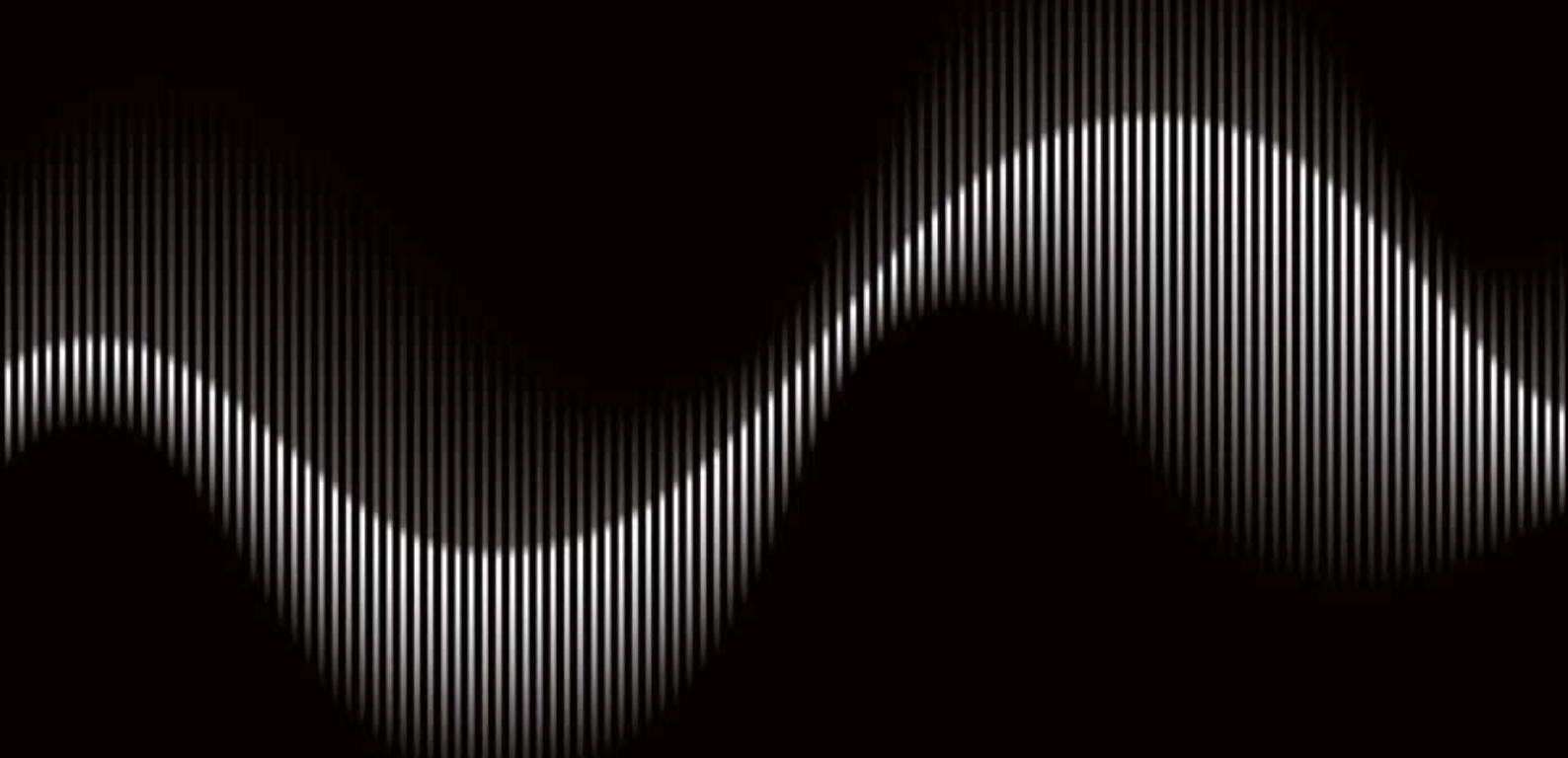
FREE

for industry and business professionals

The magazine you are reading is just **one of 11** published by Westwick-Farrow Media. To receive your **free subscription** (print or digital, plus eNewsletter), visit the link below.

wfmedia
connecting industry

www.WFMedia.com.au/subscribe



NOVEL DEVICES FOR BLOCKING ELECTROMAGNETIC INTERFERENCE

Two separate research groups have recently developed devices to block electromagnetic radiation, which could be useful for strengthening wireless connections and securing mobile communications against intrusion.

Electronic devices are found throughout our homes, on factory floors and in medical facilities, and electromagnetic shielding is often used to prevent electromagnetic radiation from one device from interfering with another. But such shielding — which is also used in the military to keep equipment and vehicles hidden from the enemy — can also block the optical communication channels needed for remote sensing, detection or operation of these devices. A shield that can block interference but allow for optical communication channels could thus help to optimise device performance in a variety of civilian and military settings.

Silver mesh

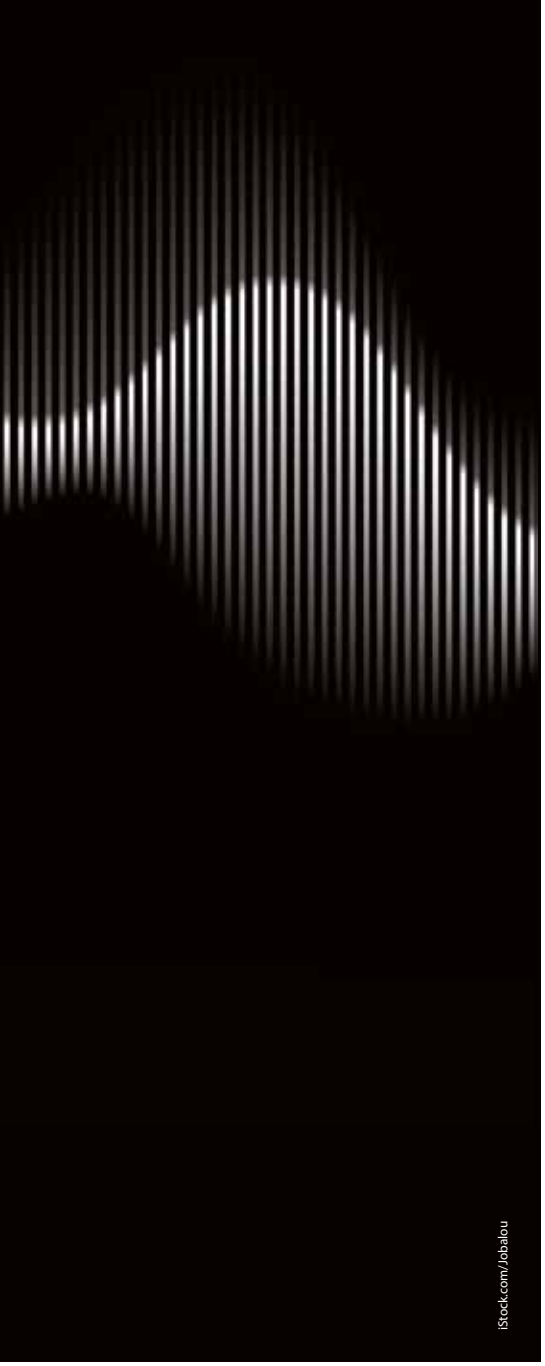
Researchers from Zhejiang University have now experimentally demonstrated a mechanically flexible silver mesh that is visibly transparent, allowing high-quality infrared wireless optical communication and efficiently shielding electromagnetic interference in the X band portion of the microwave radio region. Their work has been described in the journal *Optical Materials Express*.

"Many conventional transparent electromagnetic interference shields allow only visible light signals through," said research team leader Liu Yang. "However, visible wavelengths are not well suited for optical communication, especially free-space — or wireless — optical communication, because of the huge amount of background noise."

The researchers designed their silver mesh with a very simple structure — a repeating square grid pattern applied to a transparent and flexible polyethylene substrate. The continuous grid structure makes the mesh very flexible by releasing stress during bending. Because the transparency of the silver mesh is primarily determined by the opening ratio, a measure of the size of the holes in the mesh, it is independent of the incident light wavelength.

"A large opening ratio, for example, is beneficial for a high broadband transparency and low haze, but is detrimental to high conductivity and thus electromagnetic shielding performance," Yang said. "Because the physical parameters for our mesh can be easily optimised by changing the grid period, line width and thickness, it is easier to achieve well-balanced optical, electrical and electromagnetic properties compared with what is possible with other kinds of transparent conductive films such as silver nanowire networks, ultrathin metallic films and carbon-based materials."

To demonstrate their new technology, the researchers fabricated a silver mesh onto a polyethylene substrate. The mesh had a grid period of approximately 150 μm, a grid line width of approximately 6 μm and a thickness that ranged from 59 to 220 nm. This was then covered with a layer of 60 μm-thick polydimethylsiloxane. The resulting film showed high transmission for a broad wavelength range from 400 to 2000 nm and sheet resistance as low as 7.12Ω/sq, allowing a high electromagnetic


iStock.com/Jobalou

shield effectiveness up to 26.2 dB in the X band. The researchers also showed that the film could shield low-frequency mobile phone signals.

"We take the advantage of the ultrabroad transparency and low haze of a metallic micromesh to demonstrate efficient electromagnetic shielding, visible transparency and high-quality free-space optical communication," Yang said. "Sandwiching the mesh between transparent materials improves the chemical stability and mechanical flexibility of the silver mesh while also imparting a self-cleaning quality. These properties will enable our silver mesh to be applied widely both indoors and outdoors, even on corrosive and free-form surfaces."

The researchers acknowledged that their work is only a prototype demonstration, so there is much room for improvement. For example, using more conductive materials would improve the electromagnetic shielding effectiveness, and materials that are more transparent and have a lower haze could improve not only the visible transparency but also the free-space optical communication quality.

They are also exploring mid-infrared transparent conductive materials, which would extend the free-space optical communication to longer wavelengths where atmospheric interference is reduced and higher communication quality can be achieved. For commercialisation, the mesh would also have to be more practical to install and less expensive.

Thin film device

A second device, fabricated by spray coating, has been designed to block electromagnetic radiation with the flip of a switch. The breakthrough, enabled by versatile two-dimensional materials called MXenes, was made by researchers from Drexel University and has been published in the journal *Nature Nanotechnology*.

MXene is a unique material in that it is highly conductive — making it well suited for reflecting microwave radiation that could cause static/feedback or diminish the performance of communications devices — but its internal chemical structure can also be temporarily altered to allow these electromagnetic waves to pass through. This means that a thin coating on a device or electrical components prevents them from emitting electromagnetic waves, as well as being penetrated by those emitted by other electronics. Eliminating the possibility of interference from both internal and external sources can ensure the performance of the device, but some waves must be allowed to exit and enter when it is being used for communication.

The Drexel team had previously demonstrated that the two-dimensional layered MXene materials, when combined with an electrolyte solution, can be turned into a potent active shield against electromagnetic waves. Their latest discovery shows how this shielding can be tuned when a small voltage — less than that produced by an alkaline battery — is applied.

"Without being able to control the ebb and flow of electromagnetic waves within and around a device, it's a bit like a leaky faucet — you're not really turning off the water and that constant dripping is no good," said team leader Professor Yury Gogotsi. "Our shielding ensures the plumbing is tight, so to speak — no electromagnetic radiation is leaking out or getting in until we want to use the device."

The key to eliciting bidirectional tunability of MXene's shielding property is using the flow and expulsion of ions to alternately expand and compress the space between material's layers, like an accordion, as well as to change the surface chemistry of MXenes. With a small voltage applied to the film, ions enter — or intercalate — between the MXene layers altering the charge of their surface and inducing electrostatic attraction, which serves to change the layer spacing, the conductivity and shielding efficiency of the material. When the ions are de-intercalated, as the current is switched off, the MXene layers return to their original state.

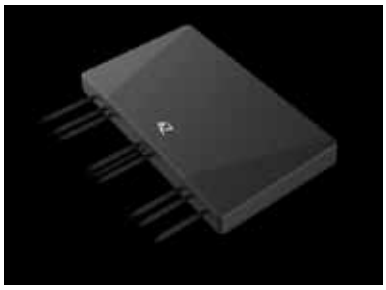
The team tested 10 different MXene–electrolyte combinations, applying each via paint sprayer in a layer about 30 to 100 times thinner than a human hair. The materials consistently demonstrated the dynamic tunability of shielding efficiency in blocking microwave radiation, which is impossible for traditional metals like copper and steel. The device sustained the performance through more than 500 charge–discharge cycles.

"These results indicate that the MXene films can convert from electromagnetic interference shielding to quasi-electromagnetic wave transmission by electrochemical oxidation of MXenes," the study authors wrote. "The MXene film can potentially serve as a dynamic EMI shielding switch."

For security applications, Gogotsi suggests that the MXene shielding could hide devices from detection by radar or other tracing systems. The team also tested the potential of a one-way shielding switch, which would allow a device to remain undetectable and protected from unauthorised access until it is deployed for use.

"A one-way switch could open the protection and allow a signal to be sent or communication to be opened in an emergency or at the required moment; this means it could protect communications equipment from being influenced or tampered with until it is in use," Gogotsi said. The next step for the team is to explore additional MXene-electrolyte combinations and mechanisms to fine-tune the shielding to achieve a stronger modulation of electromagnetic wave transmission and dynamic adjustment to block radiation at a variety of bandwidths.

"Dynamic control of electromagnetic wave jamming has been a significant technological challenge for protecting electronic devices working at gigahertz frequencies and a variety of other communications technologies," Gogotsi said. "As the number of wireless devices being used in industrial and private sectors has increased by orders of magnitude over the past decade, the urgency of this challenge has grown accordingly. This is why our discovery — which would dynamically mitigate the effect of electromagnetic interference on these devices — could have a broad impact."



5G adhesive mount combo antenna box

The Quectel YEMA013AA is a 5G adhesive mount combo antenna box that is optimised for 5G and 4G networks. It offers 8x8 5G/4G MIMO and GNSS L1 and L5 antennas in a compact form factor of 264.6 x 157.6 x 30.5 mm.

The ultrawide-band 5G/4G antenna box provides broad coverage from 600–6000 MHz and is backward-compatible to support 3G/2G networks as well as Cat M and NB-IoT. The antenna is designed to work with various GND plane sizes or in free space for ease of integration, with connection via nine cables of customisable length between 300 and 5000 mm, terminated with SMA connectors.

The device is utilised for passenger transport applications in the bus, rail and air industries, in the automotive sector for heavy equipment and vehicle tracking and telematics, in remote asset and pipeline monitoring, and for first responder and emergency services. It is particularly suitable for those using industry routers and supports a wide range of applications in IoT or M2M and use cases involving HD video over LTE.

The adhesive mount omnidirectional IoT antenna is easy to install and durable, featuring an IP67 and IP69 KIBILAC ASA enclosure. It is compatible with Quectel's RM520x Series modules. Quectel provides comprehensive antenna design support such as simulation, testing and manufacturing for custom antenna solutions to meet specific application needs.

Quectel

www.quectel.com

Upgraded phase noise analysers

Rohde & Schwarz introduces improved performance for its phase noise analysis and voltage-controlled oscillator (VCO) measurement instruments. Both the high-end R&S FSWP phase noise analyser and VCO tester plus signal and spectrum analyser and the R&S FSPN dedicated phase noise analyser and VCO tester are now upgraded. Simultaneous hardware and software upgrades improve the products' performance, reducing noise levels and measurement times while increasing accuracy. Both analysers include test sequence recording functions (SCPI recorder), which are rare in this class of instrument.

The new hardware basis common to both phase noise analysers includes upgraded DC sources with reduced noise levels, enhancing sensitivity. Users should appreciate the improved capacitive screen featuring higher colour intensity and better antiglare properties, making the display brighter and clearer in all working conditions. In addition, multi-touch features like zoom are supported by the updated user interface.

For very low noise oscillators with the inherent noise largely thermal at wider offsets, any potential cross-spectral collapse is now suppressed. In particular for production use, higher measurement speed for VCO measurements should help reduce the cost of test. With the newly introduced SCPI command recorder, Rohde & Schwarz implements a function to record sequences of manual settings. Using the command recorder, engineers can create easily repeatable test sequences, including the necessary synchronisation, to operate correctly.

Rohde & Schwarz (Australia) Pty Ltd

www.rohde-schwarz.com.au

10-bit broadband data converter

Teledyne e2v has previewed its EV10AS940 10-bit broadband data converter, which forms part of the company's push into software-defined microwave technologies. The single-channel sampler will be of use to microwave radio link engineers, making it possible to conceive of simple radio designs where frequency planning is entirely abstracted to the digital domain.

Conventional radio systems are still based on the heterodyne principle largely owing to existing component bandwidth limitations. Heterodyning is the process of mixing two signal frequencies in a non-linear mixer. For receivers, the lower frequency heterodyne signal lands within the baseband reception range — invariably defined by the input bandwidth of an A/D converter.

By moving to high-bandwidth, direct conversion devices, it becomes possible to conceive of simplified, software-defined receivers with frequency agility. This is especially helpful when managing the considerable parallelism demanded of beam-steered applications.

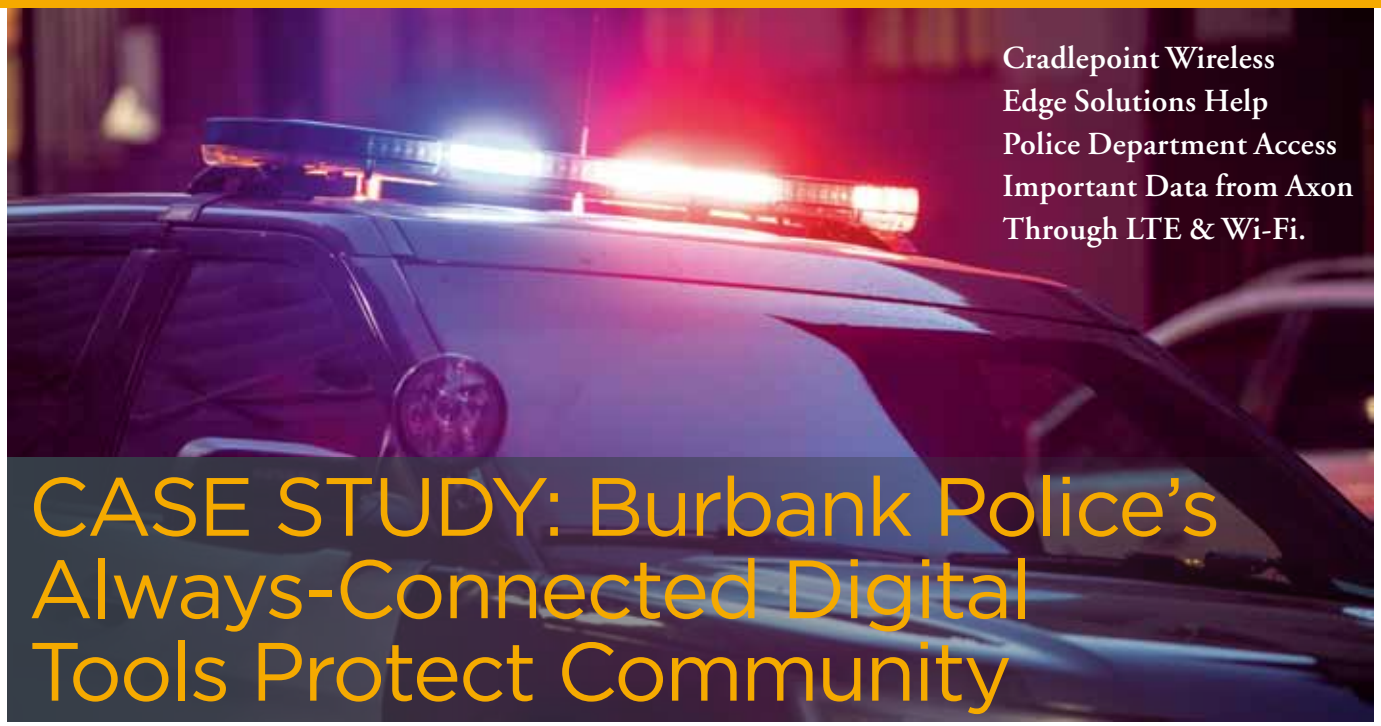
Frequency planning, signal demodulation, filtering and front-end design will all benefit from direct sampling. Moreover, with a raft of integrated digital assist features, the product enhances receiver operation. Four independent numerical controlled oscillators (NCOs) enable agile frequency hopping, while a programmable digital down converter (DDC) provides a variety of decimation intervals (from 1 to 1024).

The device connects via licence-free ESIstream serial links to FPGA-based signal processing. Additionally, an easy-to-use, multi-channel synchronisation facility provides synchronous sampling across a plurality of devices — useful in phase-sensitive, beam-steered systems.

By migrating to single-ended (SE) design rules for the clock and signal lines, frequency-dependent baluns can be eliminated. These components add both cost and weight whilst band limiting frequency selection, as baluns negatively impact upon dynamic performance and simultaneously prevent multi-band operation.

Teledyne e2v Asia Pacific Limited

www.teledyne-e2v.com


iStock.com/JasonDoiy

Cradlepoint Wireless Edge Solutions Help Police Department Access Important Data from Axon Through LTE & Wi-Fi.

CASE STUDY: Burbank Police's Always-Connected Digital Tools Protect Community

Background & Challenges

The Burbank Police Department (BPD) in Southern California has deployed critical technical equipment to help officers protect and serve the community while keeping citizens and officers as safe as possible. Each BPD cruiser is outfitted with a variety of essential policing tools, including:

- Mobile data terminal (MDT)
- Built-in dashboard screen
- Axon's Fleet 2 in-car video system
- Video inverter that sends information from an onboard PC to the dash screen
- Automatic License Plate Reader (ALPR)
- Automatic Vehicle Location (AVL) system that sends GPS coordinates to a server

More recently, BPD decided to expand its in-vehicle technology even further by adding body-worn cameras from Axon. All of these on-board devices and applications require highly reliable connectivity — including stable Wi-Fi in and around the vehicle and an LTE link from the car to the cloud and headquarters. However, as BPD continued to expand its digital footprint, it had a few key networking challenges to account for:

Connection Challenges in Mountainous Region

Burbank's landscape includes many mountains and extreme terrain, which makes it difficult to ensure consistent network availability in fast-moving vehicles. Also, the density of vehicles on local roads varies a great deal throughout the day. Because of these variables, there are many spots where one cellular carrier offers much better coverage than other carriers.

Limitations of USB Modems

Previously the department had used USB modems to connect laptops inside its law enforcement vehicles. However, those modems are built for consumer use; they didn't provide Wi-Fi, they lacked durability, and they were difficult to manage and unsuitable for sensitive data.

Solution

To ensure constant connectivity for its many safety-focused technologies and applications, BPD deployed Cradlepoint's NetCloud Service for Mobile and ruggedised in-vehicle wireless edge routers featuring built-in LTE modems. This comprehensive solution includes high-performance LTE and Wi-Fi connectivity, integrated data security features that can be scaled up as needed, centralised network management, and support for nationwide public safety networks. Connected by Cradlepoint, Axon's Fleet 2 in-car video system, Axon Body 3 body cameras, and Axon Evidence platform ensure that important footage protecting residents and officers can be uploaded and offloaded anytime.

Benefits

Consistent Network Connectivity Across the City

With support for multiple wireless carriers and interoperability with a vast array of external antennas, Cradlepoint routers with built-in LTE modems provide BPD's officers in the field with steady network access throughout this uniquely situated city — and the option of introducing automatic cellular failover to a second network operator if the need arises.

"The flexibility of Cradlepoint routers helped us drastically improve network connectivity and signal strength in our police vehicles," said Garen Essakhanian, Operations Manager, City of Burbank's IT Department.

Wi-Fi-as-WAN for Fast Video Offload

When officers drive within range of strategically placed hotspots around the city, they can use Cradlepoint's Wi-Fi-as-WAN feature to automatically send video evidence footage from the Axon Fleet system to the Axon Evidence platform.

Network Management & Rapid Troubleshooting from Anywhere

NetCloud makes it easy for the department's IT team back at headquarters, at home, or anywhere to centrally monitor and adjust network performance and data usage, respond to outages, and make security updates. Time that formerly would have been spent troubleshooting each vehicle in person is now much better utilised.

"Cradlepoint NetCloud is amazing. I use it for everything, such as monitoring each vehicle's data usage and troubleshooting on the fly. And I do it all from a mobile app on my phone," said Garen Essakhanian, Operations Manager, City of Burbank's IT Department.

Scalable Security Options for Protecting Sensitive Information

BPD uses a carrier-provided private network through its Cradlepoint routers to protect citizens' private information. The solution supports other security measures too, including VPN tunnelling as well as IPS/IDS to detect and prevent cyberattacks. Through NetCloud Manager, the IT team also can monitor an array of security analytics from a single dashboard.

cradlepoint

PART OF ERICSSON

Cradlepoint Australia Pty Ltd
www.cradlepoint.com/au

LIFE-SAVING AND LIFESTYLE-CHANGING DRONES SET TO TAKE OFF IN 2023

After years of circling, the technology and regulatory stars are aligning for wide-scale drone use to take off in 2023 — with passenger and not just pizza deliveries on the horizon.

Australian-listed connectivity company Elsight has started trials in the futuristic Israel National Drone Initiative, which has the goal of flying heavy cargo and passengers to reduce road congestion. Given Elsight's strong Australian links and contracts with major drone delivery providers internationally, learnings from the trials could also be applied to the plans for electric air taxis to be operating in Brisbane by the 2032 Olympics.

Flight beyond visual line of sight (BVLOS)

Elsight's Halo drone connectivity platform for BVLOS drone operations has won the company contracts with drone delivery companies DroneUp, Spright (a wholly owned drone subsidiary of Air Methods) and Speedbird Aero. DroneUp supports US retail giant Walmart's expanding drone delivery service, while Spright solves some of the toughest time-sensitive challenges facing health services in the US.

Regulations catch up with tech

Leaders in the Australian drone industry are confident that 2023 is the year we'll start to see drones disrupting crewed aircraft. What's propelling the lift-off of drones is the alignment of cutting-edge BVLOS tech with the streamlining of approvals for its industrial and commercial uses.

BVLOS refers to operations where the operator of the drone can't physically see the device during some or even all of its flight, even across hundreds of kilometres. As noted by Dario Valenza, founder and CTO of leading Australian drone manufacturer Carbonix: "Without BVLOS, drones are on a leash."

Valenza said the catalyst for more BVLOS approvals came late last year when the Federal Department of Infrastructure gave the Civil Aviation Safety Authority (CASA) more discretion on drones. CASA is now using this discretion to be proactive in streamlining electronic approvals for potentially life-saving and lifestyle-changing applications, ranging from shark surveillance, bushfire and flood management to remote healthcare deliveries, urban grocery drop-offs and even verifying corporate carbon offset statements.

Elsight CEO Yoav Amitai said: "It is not a question of if anymore, but a question of when and how fast, and being a major part of it is a great feeling.

"We've only started to scratch the surface with the use cases that will be enabled by this infrastructure, including delivering to remote or hard-to-get locations.

"The commercial drone sector is like the internet in the '90s, when we saw it move from national security to facilitating everyday life across the whole of society."

Lifesavers at beaches

For the first time, CASA has approved BVLOS surveillance trials over Sydney beaches as part of the NSW Government's more than $85 million in shark mitigation measures over the next couple of years. The trials will expand on the use of drones operated within visual line of sight by Surf Life Saving NSW.

iStockphoto.com/Bestgreenscreen

Groceries on the fly

In the US, commercial drone delivery has become a reality as retail giant Walmart expands its drone delivery operations to 36 hubs across six states with support from DroneUp.

Google-owner Alphabet's Wing unit has deployed delivery drones to hundreds of thousands of homes in Australia, Finland and Texas, and recently predicted that millions more will be within range of drone deliveries in 2023. In Australia, Wing operates through its partnership with Coles from Canberra, Brisbane and the Gold Coast.

Emergency relief

In South Australia, a state reeling from devastating floods, Carbonix has partnered with electricity distributor SA Power Networks to conduct BVLOS aerial inspection on remote electricity lines and other assets across its 180,000 km^2 footprint. Valenza said the drones provided a clear alternative where it would not be safe to fly helicopters.

"During the floods, drones have prevented ground crews being sent out into dangerous weather to check whether the power needs to be cut off in flood-damaged areas," he said.

"They're also up to 80% cheaper to operate and emit 98% less CO_2 than crewed aircraft, making drone use an easy win in cutting greenhouse emissions."

The drones will also speed up the utility provider's asset inspection for bushfire preparedness and maintenance work, ultimately improving safety for the SA Power Networks' customers, 30% of whom are in remote areas.

Drones are also improving health care in regional Australia, with Swoop Aero awarded $1.8 million in federal funding to expand operations that include transporting medical samples from remote locations to pathology labs.

Counting carbon offsets

Drones are increasingly being used as a vital tool in holding large companies to account on carbon emissions. Tom Caska, CEO and co-founder of 'Uber for drones' company Aerologix, said they are used for above-ground, granular carbon calculations that satellites cannot do because the analysis must be so granular.

"This isn't about just getting cool images, it's about ensuring transparency in corporate ESG statements," he said.

Caska also noted that in Australia, with its huge distances, the use of drones instead of crewed aircraft provides an easy solution in terms of cutting emissions.

What's next?

Valenza said the next disruptive event in the drone sector will come when regulations allow for 'one to many' BVLOS operations. "That's when a remote operator can control numerous drones at the same time, leading to remote operations at scale," he said.

But with more drones sharing the sky, other aircraft safety is a key priority — and that's where Elsight's Halo comes in.

Joe Resnick is President of Spright, which delivers healthcare supplies by drone to some of the most difficult-to-reach communities in the US. He said, "Halo leverages four major cellular networks, as well as satellites, to allow for safe and secure BVLOS drone operations.

"With the implementation of this solution on our aircraft, Spright is now becoming a safer and more efficient autonomous solution for the pick-up and delivery of healthcare goods.

"Safety and mission continuity are key for Spright, and for the industry as a whole as well as regulators, which is why we chose Elsight as the best solution to fit those needs."

Elsight
www.elsight.com

Compact body-worn camera

Hytera Communications' GC550 2K Mini Body Camera, designed with intensive attention to ergonomics, can be used to promote workplace transparency and personnel safety for law enforcement and security.

The compact and lightweight body-worn camera captures every incident in a 150° super-wide field of view. Equipped with a powerful processor, it can deliver ultra-clear 2K videos at 30 fps; every frame of the video includes fine details. The starlight night vision technology makes it possible to shoot sharp and colourful footage under extremely low light conditions, eg, at night.

A built-in backup battery gives the user an additional 5 min to swap the main battery in the field and meanwhile allows uninterrupted recording. If the camera detects a drop or sudden impact while recording, it will automatically save the ongoing recordings and keep what's already recorded safe and sound.

Weighing just 115 g, the device can be worn on the epaulet or the front pocket with a 360° rotatable clip. Users can easily rotate the bodycam and find the best recording angle without having to remove it. Its sliding switch enables a quick start to record in emergencies and intuitively shows the recording status through its position. Users can thus stay focused on the situation without paying excessive attention to their body cameras.

Hytera Communications Co. Ltd
www.hytera.com.au

EMC EMR SAR SAFETY
Accredited testing and global product approvals since 1992
EMC Technologies Pty Ltd
Melbourne Telephone: +61 3 9365 1000 **Bayswater** Telephone: +61 3 9761 5888
Sydney Telephone: +61 2 9624 2777 **Auckland (NZ)** Telephone: +64 9 360 0862
EMC Technologies
www.emctech.com.au
NB-IoT SigFox LoRaWAN

Assured PNT reference

VIAVI Solutions has announced the PNT-6200 Series Assured Reference for resilient positioning, navigation and timing (PNT). This solution is based on VIAVI's acquisition of Jackson Labs Technologies in November 2022, and delivers critical security for PNT to communications service providers, network equipment manufacturers, government and military, and avionics markets.

As networks become dependent on disaggregated, cloud-native architectures, traditional methods of positioning and timing become less reliable. Concurrently, they are increasingly susceptible to threats of spoofing and jamming. GPS, the most widely used timing and geolocation system, uses low-power radio signals that are easily jammed or spoofed, often inadvertently. These issues can disrupt operations in a range of environments, from aircraft instrument landing systems to timing and synchronisation in mobile networks.

The assured reference provides resiliency for critical infrastructure dependent on positioning and timing. The compact system can supplement or even replace GPS signals based on connectivity to the broadest range of timing sources in the market, including low Earth orbit (LEO), GNSS, commercial satellite, terrestrial, wireline and atomic clock services. When plugged directly into the antenna port of the timing receiver, the series takes the timing signal from the most reliable source and converts it to a radio frequency (RF) signal as a direct replacement for the GPS input, seamlessly enabling continuous operation.

When installing 5G systems indoors via microcells, access to GPS for timing synchronisation and E911 positioning purposes becomes difficult or impossible, and placing an antenna on the roof of the building may not be feasible. With indoor reception, and fully GNSS-independent timing and positioning capability worldwide, the small form factor and diversity of signal sources enable the PNT-6200 Series to effectively address these challenges.

VIAVI Solutions Inc
www.viavisolutions.com.au

5G positioning software

Ericsson has introduced a software feature for indoor networks called Ericsson 5G Precise Positioning, which provides location services for a wide range of use cases that communication service providers (CSPs) and enterprises can use, like asset tracking and tool positioning, in environments such as factories, mines, hospitals, warehouses and other industrial private network applications, as well as in emergency response scenarios.

The software is designed to enable new enterprise use cases and advanced 5G monetisation, due to its mobile 3D positioning precision of <1 m for any 5G device indoors. Only a mobile connection is needed (no sensors) and it is fully integrated with the existing network. The software feature is also part of Ericsson's Private 5G Networks offering to enable enterprises to easily deploy a 5G network.

Ericsson Australia Pty Ltd
www.ericsson.com/au

Image©Makan Karegar/University of Bonn.

LOW-COST SENSOR DEVELOPED FOR RIVER LEVEL MONITORING

Researchers at the University of Bonn have developed a cost-effective method that allows the water level of rivers to be monitored around the clock, which will be useful for area-wide flood warning systems. Their work has been published in the journal *Water Resources Research*.

There is a wide range of methods to determine the level of a watercourse — from very simple ones (by yardstick or staff gauge) to advanced radar solutions. But they all have a catch: most measuring devices can be damaged due to direct exposure to the high water level, many do not allow continuous monitoring, remote reading is difficult, or they are simply too expensive.

In Wesel on the Lower Rhine, however, a measuring device that does not have these disadvantages has already been in service for two years: it is cost-effective, reliable and capable of continuously transmitting the water level to an evaluation centre via mobile communication. In principle, this means that such a sensor is suitable for providing a densely distributed network for flood and drought warning systems.

"The core of our device is a low-cost GNSS receiver and antenna," said Dr Makan Karegar of the Institute of Geodesy and Geoinformation (IGG) at the University of Bonn. This is a sensor that can conventionally determine the position of its location with several-metre accuracy, which it does using US GPS satellites and their Russian counterparts, GLONASS.

"Satellite signals can also be used to measure the height of the GNSS antenna above the river surface," Karegar added. This is because the waves transmitted by the satellites are partially picked up directly by the antenna. The rest is reflected from the nearby environment (in this case, the water surface) and reaches the receiver via detour. This reflected part therefore travels longer. When superimposed on the directly received signal, it forms certain patterns called interference. These can be used to calculate the distance between the antenna and the water level.

"We can attach the GNSS antenna to any structure, whether it's a bridge, a building, or a tree or fence next to the river," Karegar said. "From there, it can measure the river level around the clock without contact — to within around 1.5 cm on average. And yet it is less likely to be damaged during extreme flooding events."

The accuracy of the method does not match that of a radar-based sensor. However, it is completely sufficient for the intended use. At just under €150, the device is also considerably cheaper than its advanced counterpart.

The GNSS antenna is connected to a Raspberry Pi microcomputer, whose flexibility and low-power consumption makes it popular among hobbyists for a wide variety of projects. As noted by IGG's Prof Dr Kristine Larson, "The device is about the size of a small smartphone, yet it has enough power to calculate water levels from raw data." It can be powered by solar cells and then works completely standalone. It can also transmit its data via mobile network.

Larson said the researchers' software is open source, so it can be used by anyone for free, and that all the information about the project is available on the internet. Interested parties can therefore easily reproduce the measuring device.

The process does have one disadvantage: it is only suitable for rivers with a width of at least 40 m, as this is the smallest radius from which the antenna can receive the reflected satellite signal. "If the watercourse is too narrow, most of the reflected signals come from the land," Karegar said. The researchers plan to further optimise their evaluation code so that they may obtain reliable results for smaller rivers.

MoU signals mutual cooperation between Aust and UK

In September 2022, the University of Melbourne Centre for Disaster Management and Public Safety (CDMPS) and British APCO (BAPCO) executed a memorandum of understanding (MoU) that recognised both groups have public safety at their heart, and there was the opportunity to work closer together for mutual benefit to their respective emergency service organisations and the communities they protect and support in times of emergency in Australia and the United Kingdom — recognising our membership of the 'Commonwealth'.

British APCO has extensive knowledge of public safety IT and communication technology because of its members' use and delivery of real-life public safety solutions, while within Australia, CDMPS continues to seek recognition in government policy of mission-critical communications as an integrated ecosystem within Australia's 'critical infrastructure'.

Through the MoU, BAPCO and CDMPS will seek to establish a relationship to cooperate in a range of areas and to work together for their mutual benefit and encourage and develop collaborative activities in various ways, including the exchange of information; attending business meetings; sharing data; and combining, where possible, to make public statements about their core areas of business.

Topics BAPCO and CDMPS wish to explore for mutual cooperation include:

- Ensuring each has the common goal of supporting and promoting open standards technologies for critical communications and, where appropriate, sharing research that helps provide an understanding of the global implementation of critical communications technology.
- Working together in surveying, gathering and evaluating user requirements to provide a common view to enhance disaster management practice and policy.
- Providing the opportunity for collaborative research and learning for members or researchers from each other's organisation.

Illustrations of initial areas of interest and collaboration are:

- The development and use of open standards technologies for critical communications.
- Public Safety Mobile Broadband (PSMB).
- Interoperability across critical communications ecosystems.
- Government policies and strategies relevant to and impacting the critical communications 'market'.

In the policy context, both the UK and Australia continue to invest in rail and critical communications systems. The Australian Government recently announced one of its key priorities will be to improve the interoperability of Australia's rail systems in anticipation of the $155 billion investment that Australian governments are about to make in their rail networks with a focus on aligning signalling and control systems, recognising that a lack of national standards is a key challenge for the rail sector.

Likewise, Australia's national Emergency Management Ministers agreed to a review of natural disaster governance arrangements to ensure that the national governance architecture is 'fit for purpose'. The Ministers also noted that the PSMB Strategic Review is now complete, and the Australian Government is carefully considering the Review's recommendations, including next steps required to deliver the PSMB capability. However, notable by its absence was that there was no mention of the Royal Commission into the 2019–20 bushfires recommendation that there should be interoperable communications for Australia's fire and emergency services across jurisdictions.

Two key areas of work BAPCO is monitoring closely in the UK are the implementation of fully digital NextGen 999/112 and the 4G LTE-based Emergency Services Network. It is not just about the underpinning technology but the opportunity to review and modernise processes that better serve the community when reaching out for help in an emergency, and being better informed when responding to that emergency. In both instances voice remains key but is supplemented by additional communication channels that support data, video and accurate location information.

It is timely then that that ETSI continues with its 'plug test' program to test the interoperability of open standards-based products before they come to a market that is consolidating through the development by the 3GPP of MCX standards across both existing and emerging sectors.

Geoff Spring is an Honorary Fellow and Senior Industry Advisor to the University of Melbourne's Centre for Disaster Management and Public Safety.

Duncan Swan is Chief Operating Officer of British APCO.

PUBLIC SAFETY | TRANSPORTATION | UTILITIES | GOVERNMENT | ENTERPRISE

FREE EXHIBITION ENTRY

COMMS CONNECT NEW ZEALAND

EVENTS FOR CRITICAL COMMUNICATIONS USERS AND INDUSTRY

TE PAE, CHRISTCHURCH

13-14 JUNE 2023

SPEAKERS INCLUDE

KEVIN GRAHAM
Chief Executive Officer
The Critical Communications Association (TCCA)

JOSH BAHLMAN
General Manager, Telco Cloud
Spark NZ

FADIA MUDAFAR
National Manager
Radio Spectrum Management

RICHARD HUTCHINSON
Infrastructure Engineer
NZ Police

CRISTIAN BURUNGIU
Head of Customer Engineering APAC
Ceragon Networks

400+ users and industry experts | 30+ exhibitors | 40+ speakers

IN CONJUNCTION WITH RFUANZ Radio Frequency Users Association of New Zealand

GALA DINNER & AWARDS NIGHT, 13 JUNE 2023
TE PAE CONVENTION CENTRE

Gold Sponsors

Go Wireless NZ Ltd – Suppliers of Long Range Wireless Network Equipment & Accessories
tait communications
ZETRON

Exhibitors

BENELEC Innovative Radio Technology
BroadtechLtd TECHNOLOGY SPECIALISTS
CABLEWAYS
Cambium Networks
COMPLETE-COMS
AUSTRALIA DAMM Critical communication made easy
GME
Hytera Respond & Achieve
Inrico®
JVCKENWOOD
logicwireless
Novaris
telechnics
Vicom
4RF
AgileNetworks
Amber TECHNOLOGY
com test
ETL ELECTROTEST
enatel
HITEC AERIALS NZ LIMITED
Enclosures
powerbox Powering Progress
RFI TECHNOLOGY SOLUTIONS
SEL SCHWEITZER ENGINEERING LABORATORIES
sepura
SUNNY
VENTECH SYSTEMS

Media Partner

comms critical

Association Partner

RFUANZ Radio Frequency Users Association of New Zealand

Supporting Associations

TCCA
ARCIA

FOR MORE DETAILS **WWW.COMMS-CONNECT.CO.NZ**

Even on the loudest race track, with CRS Accessories you'll be heard...

GREAT COMMS, WE JUST NEED A CAR AND DRIVER!

QUALITY 2WAY ACCESSORIES TO SUIT

KENWOOD
MOTOROLA
ICOM
sepura
tait communications
GME
TOOOAir
Hytera
KIRISUN
HYT
Vertex Standard
simoco
Uniden
RELM WIRELESS
CASSIDIAN
HARRIS
MIDLAND

CRS Accessories have the pole position

in the supply of 2way accessories – little competition.

When it comes to Grand Prix we are on a mission

to get a driver, a car and beat the opposition.

Our 2way radio accessories have great recognition

so don't ask for permission, and make the transition,

across to CRS Accessories for all acquisitions!

When you start your engines *insist* on CRS!

AUSTRALIAN OWNED AND OPERATED

Phone 1300 307 334

www.crsaccessories.com.au

CRS ACCESSORIES