3GPP Mission Critical Broadband Services: 3GPP Releases, Interoperability, Best Practices and Successful Deployment of MCX (Case Study)

Presenter: Bidar Homsey
Chair of the Australasian Critical Communications Forum (ACCF), chapter of TCCA
Principal Consultant and Head of Public Safety Business FREQUENTIS Australasia

Agenda

- Important Step Towards Standardisation
- 3GPP Global Standards
- Standardisation Roadmap & Releases of MC LTE 4G, 5G
- Testing, Certification and Activation
- LMR to MCX migration path =

"Australian Case study looking at the implementation of MCx Mission-Critical Communication Solution based on 3GPP 4G/5G standards that provides reliable access to mission-critical voice, individual and group communication, multimedia messaging, data and location"

Continuous Technology Evolution

From critical Narrowband to critical Broadband

Why Open Standards are so important – what does it mean

Standards provide assurance that everything from different vendors is going to provide seamless interoperability

- Create an evolving ecosystem of investment, research, development, and manufacturing to reduce unnecessary variety in the marketplace and dependence on a single supplier or proprietary solutions
- Encourage competition, competitive price environment, innovation and associated economies of scale that ultimately benefit all stakeholders and particularly the end users
- Pick the best solution from a range of options in line with global standards from Standardisation bodies such as 3GPP, ETSI and NIST - that support **P25, TETRA, DMR, LTE 4G, 5G and future 6G**

About 3GPP – Global Standardisation

The 3rd Generation Partnership Project (3GPP) unites seven international regional telecom standards development organizations from USA, Europe, China, Japan, South Korea and India

3GPP provides their members with a stable environment to produce the reports and specifications that define 3GPP technologies for **3G, 4G, 5G standards** and beyond (6G) that underpin global cellular wireless system and mission critical services.

3GPP 7 Organisational Partners

atis (USA)
ARIB (JAPAN)
CCSA (CHINA)
TTC Telecommunication Technology Committee (JAPAN)
ETSI (EUROPE)
TTA (KOREA)
tsdsi (INDIA)

3GPP 27 Market Representatives

GSMA, TDIA TD-SCDMA Industry Alliance, TD FORUM, COAI, ngmn, SMALL CELL FORUM, mobility, ctia, 5G americas, 5G IA, GCF, Broadband India Forum, GSA, PSCEurope, TCCA, IPv6 FORUM, 5GAA, Wireless Broadband Alliance

3GPP standards are major contributor to the global economy

3GPP plays a critical and important role in the development and maintenance of open standards

3GPP supports the development and implementation of global operational communication technologies for specific business and mission critical sectors of the communications market

Global participation and support

- based on an established dialogue with government agencies, public safety, security agencies, transport, manufacturers and industry stakeholder level

Path to a Connected Society

- 3GPP standards provide a path to a connected society via LTE and 5G specification
- to meet a futuristic set of use cases –evolving broadband access, meeting the need of machine type communications and by providing ultra-reliable & low latency connectivity

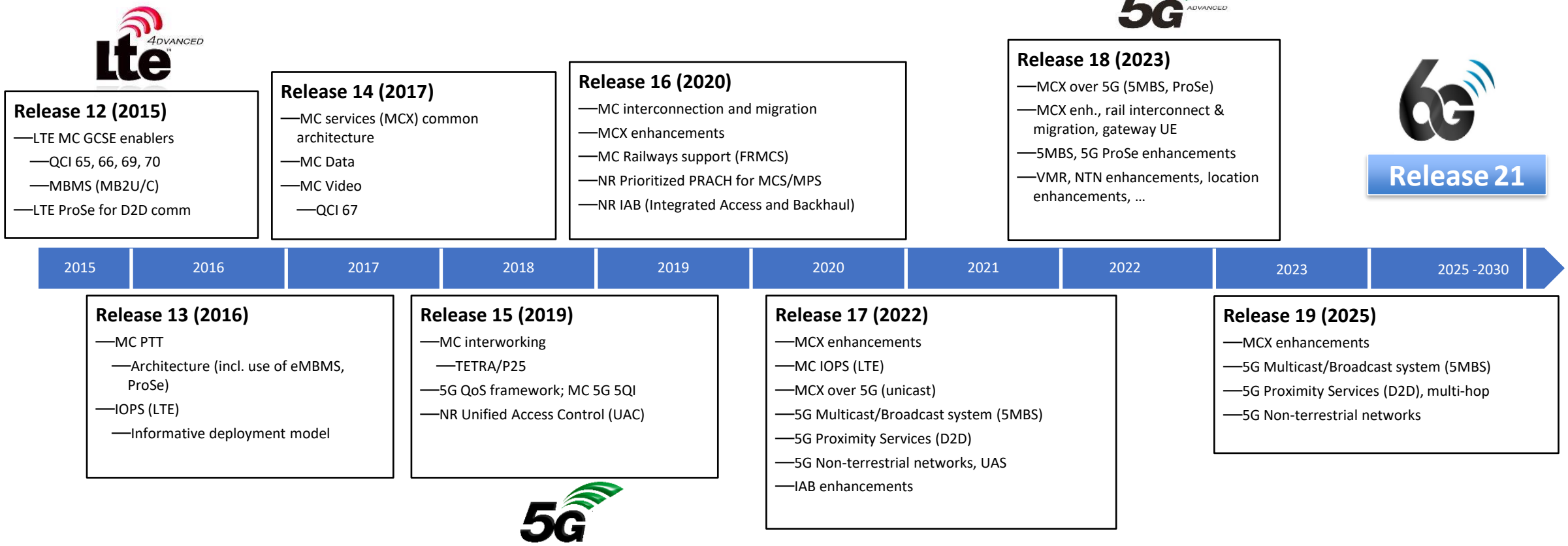
Road to Mission Critical Broadband

Mission Critical Broadband evolution started in 2015 with release of Mission Critical Push to Talk (MCPTT) in 2016 and first Release of MCX (Voice, Data, Video) in 2017 with continuing work that include:

- *MCX multi-media enhancements*
- *Interworking Function (IWF) for LMR/TETRA/P25*
- *Proximity working (direct mode)*
- *5G Multicast/Broadcast system*
- *Sidelink facility*
- *Non-Terrestrial networks (NTN)*
- *Control Rooms connected to MCX servers and enabling the connection of different systems, agencies and/or countries*

Work also includes specific MC services for the Future Railway Mobile Communication system (FRMCS) to replace GSMR.

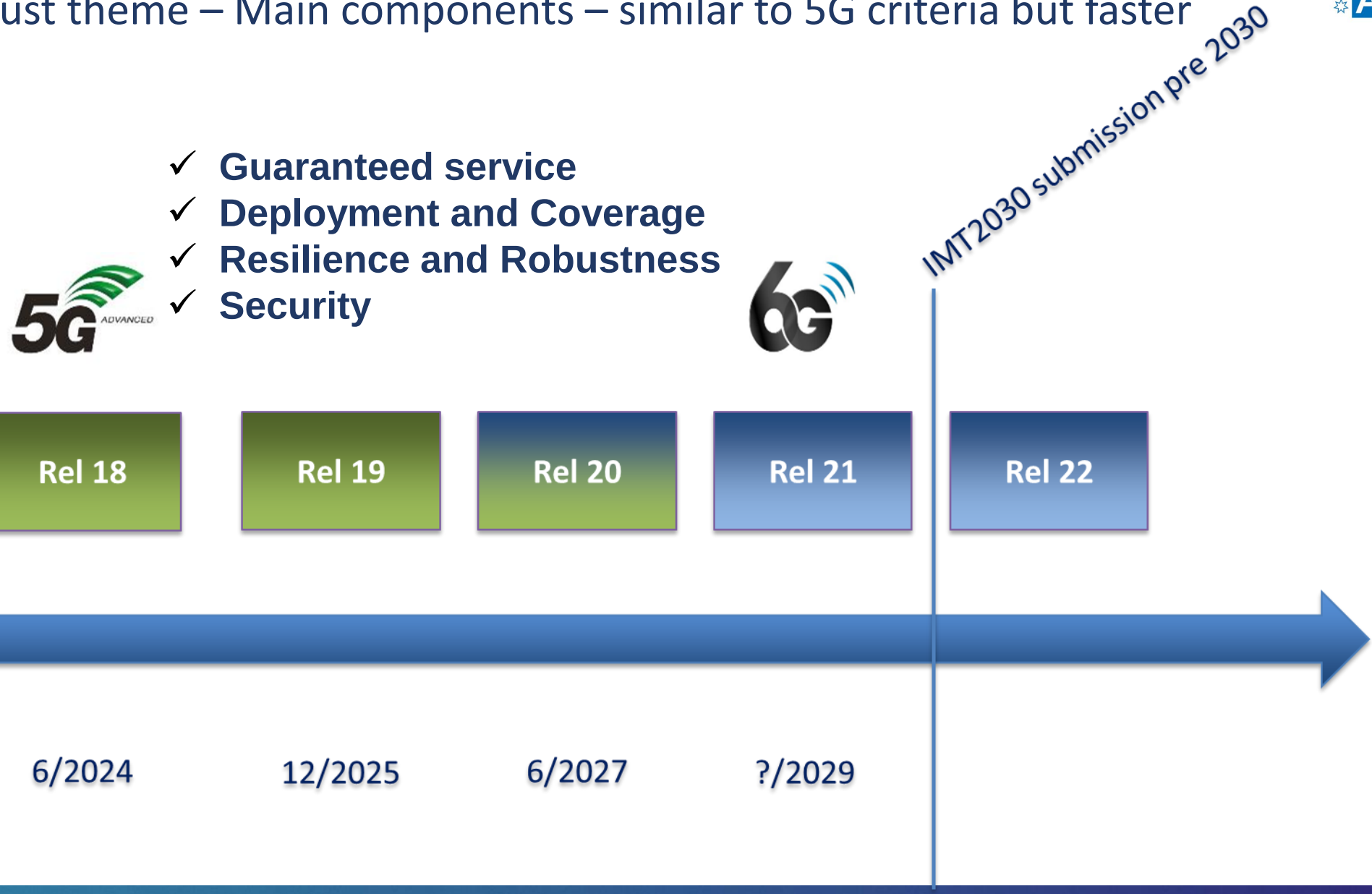
Standardisation Roadmap



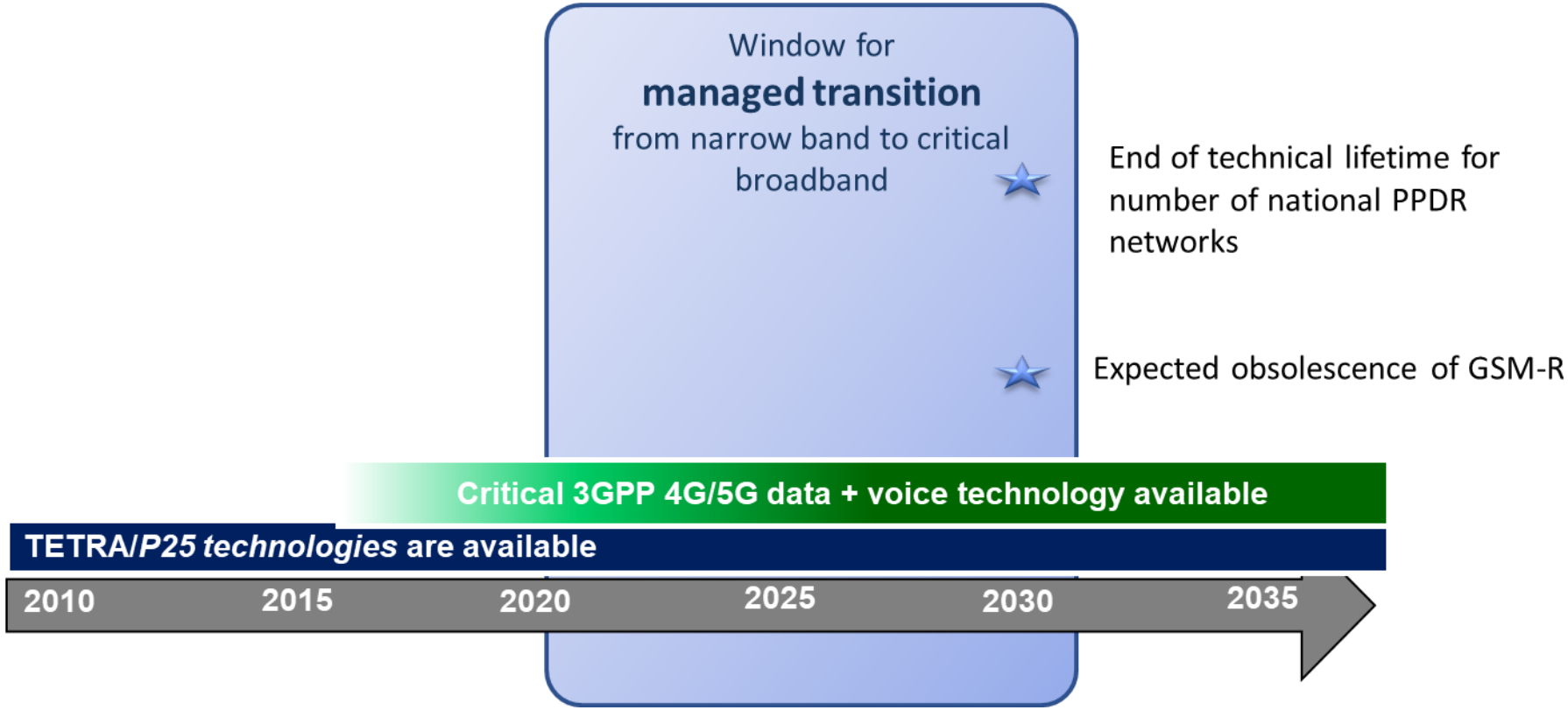
On the horizon - 6G for critical communications

Trust theme – Main components – similar to 5G criteria but faster

- ✓ Guaranteed service
- ✓ Deployment and Coverage
- ✓ Resilience and Robustness
- ✓ Security

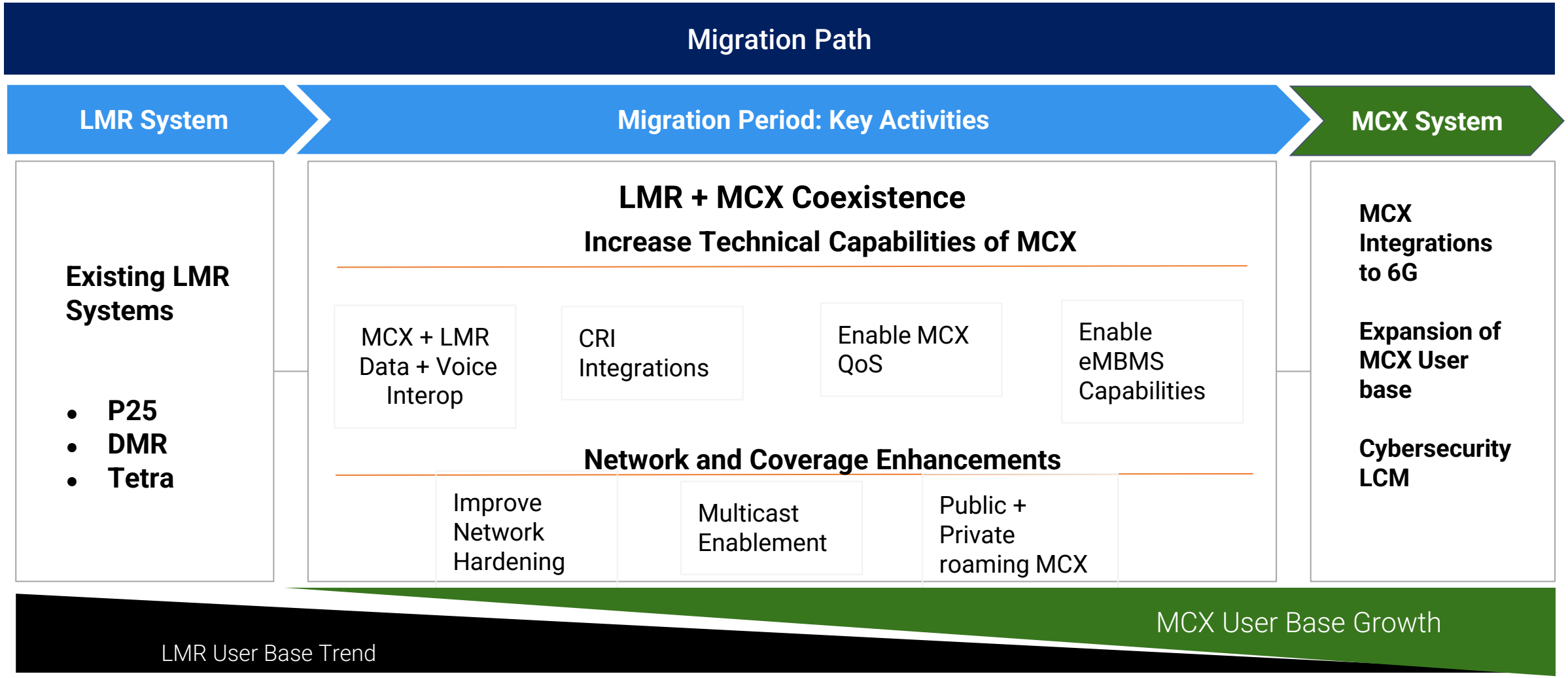


2020s – Decade of managed transition



Path to success- Important Step Towards Standardisation

Migration Path LMR to MCX



Objectives & scope of MCX Plugtests interoperability events

The goal of MCX Plugtests event is to validate the interoperability of variety of implementations using different multi-client/vendor complex scenarios based on 3GPP Mission Critical Services

The Plugtets at Texas A&M College Station, USA 2/2025 was focussed on off-network communication and the 3GPP Release 18.
The format of the event will be live testing conducted face-to-face over 4G and 5G Networks.
The event will feature tests with 4G and 5G radio equipment (gNBs, eNBs, 5GCs, EPCs, UEs) and will also allow Over-The-Top (OTT) testing of Mission Critical Servers and Clients.
Test Equipment vendors will have a possibility to test as well in the Plugtests event.

Specifics are on cross communications, off network communication and inter MCX scenarios (enabling the connection of different systems, agencies or countries.)
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Broadband brings new opportunities and adds value
How to get there with minimal disruption

Break down the plan into phases to make it more manageable

Stepwise approach starting with a new broadband access solution

Embrace a hybrid approach to minimize risks

Build roadmap towards open MCX ecosystem in the future

Evaluate and prioritize ecosystem changes

Managed and scheduled control room, dispatching, and application transitions

Engage users by offering new and useful services

Support existing operational way of working during transition

Critical communications for all professional users

MCX Applications with Real-world Results
Case Study – Icon Waters ACT
MCx Mission-Critical Communication solution

About Icon Water

Icon Water Limited is an unlisted public company wholly owned by the ACT Government that manages and operates all water and wastewater services for the ACT with approx $3B of water & wastewater related assets

Water
278GL combined dam capacity
50 Reservoirs, 25 pump stations, 2 treatment plants
3,400Km of water pipes
Approx. 130 million litres of treated water each day

Wastewater
25 pump stations, 4 treatment plants
3,400Km of wastewater pipes
Approx. 117 million litres of sewerage each day

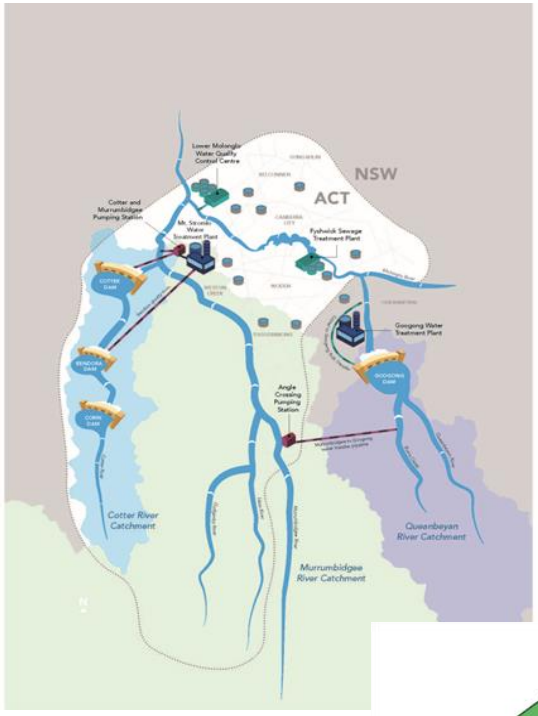
Challenges and Requirements

Challenges

- LMR System was an old analogue MPT system, well past end of life
- It provided the primary method of communications for operational staff & in some locations, the ONLY communication tool
- LMR System did not offer coverage where Icon Water operated
- Lone Worker requirements were not met with the current LMR network

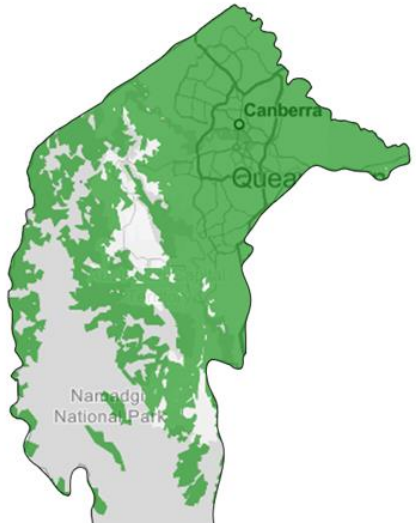
Requirements

- Solution to enable staff to work remotely, reducing dependence on office environments
- Must provide reliable group communications, especially in areas without cellular coverage
- Must meet Icon Water availability, RTO & RPO metrics
- Critical locations to have resilient connectivity
- Current 4G Network didn't cover all Icon operational regions
- Increasing demand to use more data centric applications
- Must support both voice and data services securely
- Based on a Standards Solution – non proprietary



Icon Water Assets and places of operations

Telco coverage with black spots where Icon Water operate



Solution Overview

The heart of the solution comprises a Broadband Saas Agnet system, based on 4G/5G 3GPP, providing reliable access to mission-critical services, such as multimedia messaging, voice + data and location services including:

- Geo-redundant configuration hosted in Microsoft Azure
- 99.99% Availability of Agnet Core
- Integration with PBX, Microsoft SSO, SMS
- Agnet Smart Phone Client and Agnet Console
- iSafe Smart Phones
- iPhone Smart Phones and Tablets
- Ania Bluetooth RSM
- Cradle Point Vehicle Routers
- Telstra SIM Cards
- Starlink Satellite Vehicle Antennas
- WIFI Vehicle Antennas
- In Building Wi-Fi and Cell Extenders
- 24/7 Monitoring & Support through Vertel NOC

i.safe IS530

The i.safe device has a number of physical buttons that can be used to interact with the AgnetWork application.

Use the PTT button to talk to the selected group

Breaking Down Coverage Barriers

- Using a “Network of Networks” strategy by delivering multiple broadband networks, allows users to connect and communicate anywhere Icon Water operates today.
- Unlike traditional LMR networks where you are limited to the network footprint and data speeds of narrowband networks, broadband networks extends coverage, enhances operational requirements with many of the tools used today in the workforce on smart devices.
- By delivering a Broadband centric approach supporting Voice and Data requirements for users, ensures ubiquitous coverage anywhere enhancing communications and workplace safety for their teams with LTE, Satellite, In Building WIFI extenders combined with Agnet MCX.
- Agnet, LTE, Satellite, Vehicle Routers, Wi-Fi extenders, Smart Phones, Tablets, Dispatchers delivers the complete communications ecosystem for Icon Water.

Icon Water vehicle with Satellite Antenna mounted

Agnet operating on iPhone and iSafe devices

Ania Bluetooth RSM

Vehicle as a Node Smart Router Solution

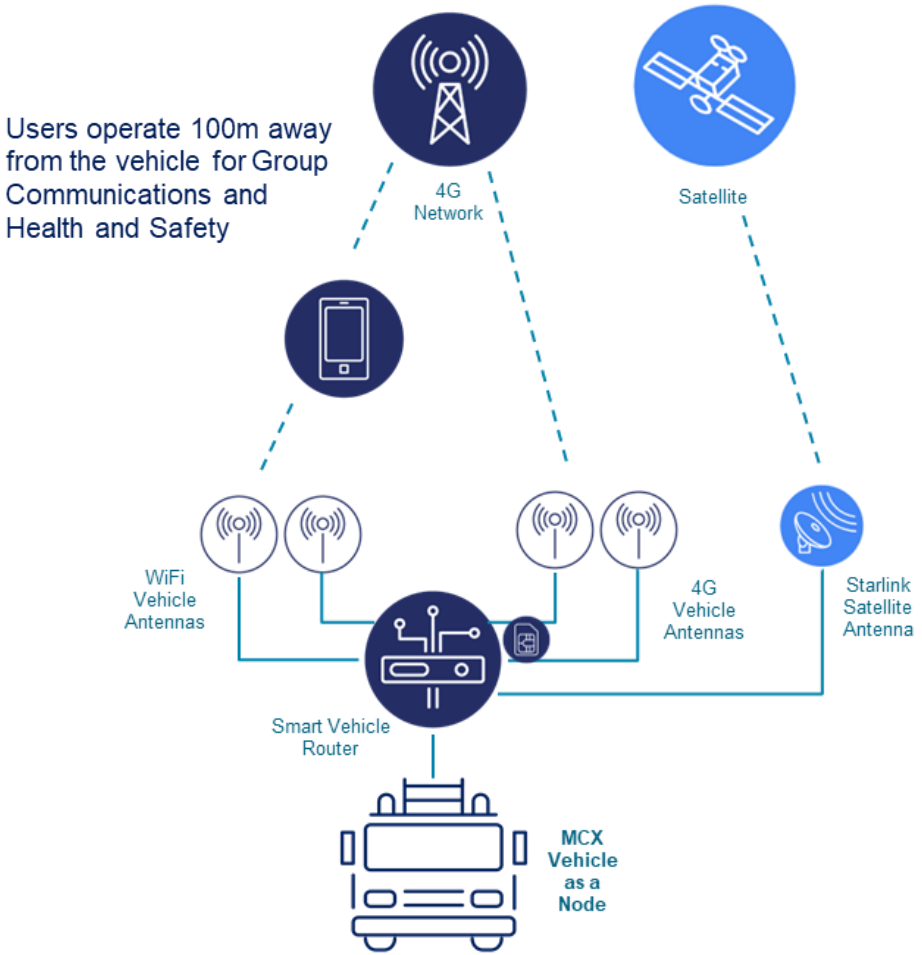
Vehicle as a Node Transforms your Vehicle into a robust network
Smart Phones and Tablets using Data Applications

Mobile Wi-Fi

- Safety of Staff outside the Vehicle for Lone Worker and Durness
- Wi-Fi Coverage Outside of the vehicle up to 100m
- Vehicles can mesh using Wi-Fi as WAN for extended coverage
- Quality of Service for prioritisation of Agnet Data Traffic (Voice and Data)
- Remote monitoring and configuration

Resilience

- LTE and Satellite for Broadband Connectivity
- Multiple Wi-Fi antennas for diversity and redundancy
- Multiple 4G antennas for diversity and redundancy
- Redundancy to LTE if required (secondary Telco SIM)



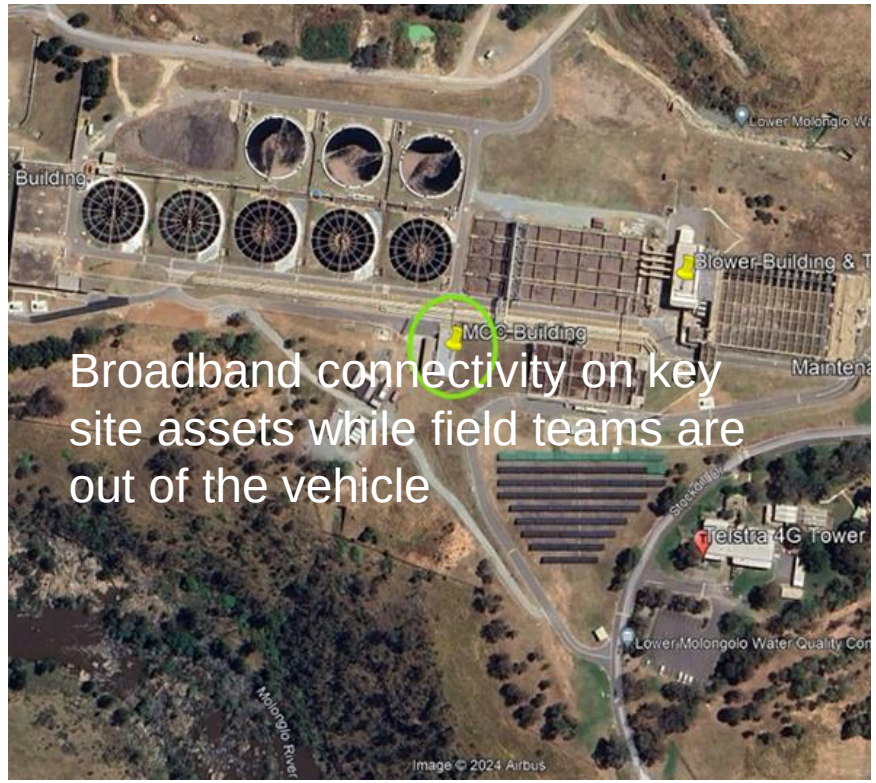
In Building Solution

Provide coverage from both Wi-Fi and 4G to ensure resilient connectivity in key locations.

Solution WIFI
Existing corporate Wi-Fi extended to cover key areas

4G
- Validate existing 4G coverage
- Design and implement coverage extensions to areas with no or poor coverage
- Test, validate & document coverage improvement
- 21 x 4G extenders deployed

Broadband connectivity on key site assets while field teams are out of the vehicle



User Benefits & Feedback

- Enhanced Operational Communication
- Improved Safety and Emergency Response
- Supports media rich applications

Icon Water CTO, Dr Tony Pollock stated “Vertel’s extensive experience and their breath of knowledge in being able to address Icon Water’s requirements enabled the development of our next-generation network, ensuring we are not only responsive to the needs of the Canberra region, but also enabling us to remain compliant with our OH&S policies, procedures and compliance guidelines”.

- Operational Efficiency
- Secure private communications
- Superior Audio Quality and Broader Coverage

Thank You for Your Attention

Contact Details: Bidar Homsey: chair@criticalcommsforum.com.au
For more details on ACCF and TCCA please contact admin@criticacommsforum.com.au
Website https://tcca.info/australasian-critical-communications-forum/

EVENTS

TCCA Event

Critical Communications World
17 – 19 JUNE 2025
https://www.critical-communications-world.com/

COMMS CONNECTS Events

Christchurch NZ 4-5 June
Melbourne AUS 15-16 October
https://www.comms-connect.com.au/

Western Sydney Sundowner: 28 August – Register Online https://arcia.org.au