TECHNICAL WHITE PAPER

Hytera OMDIA

Advancing the

Convergence-Native Next-Gen Mission-Critical Networks

-Towards a New Era of Seamless Connectivity

OMDIA and Hytera

MAY 2022

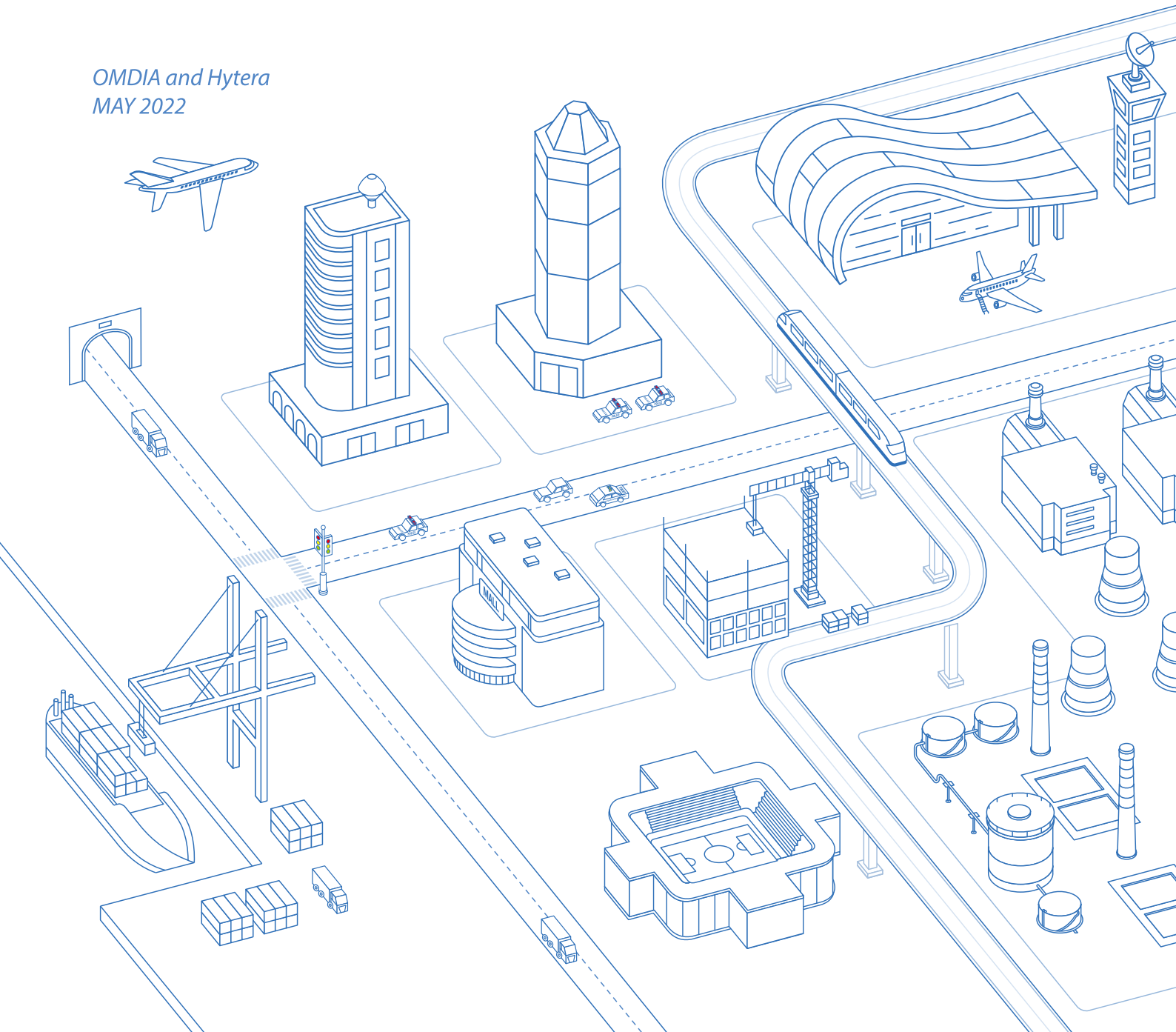


TABLE OF CONTENTS

1 Introduction

The very nature of Mission-Critical Communications (MCC) technology is in constant evolution and optimization in order to remain ahead and guarantee its successful performance against potential threats under the most difficult circumstances.

In addition to reliable, resilient and secure voice, MCC technology needs to address the demands for empowered features and multimedia services. Mission-Critical technology will pivot on data & multimedia to power the necessary technology enhancements that guarantee the reliability of the information exchange and the efficient data analysis to help the decision making processes of emergency responders in the field and the smooth run of Business-Critical operations.

In this whitepaper, Hytera aims to demystify the evolution path of Mission-Critical Communications leveraging the MCC research from OMDIA in a study of the fundamental trends driving the market and the coexistence of PMR technology with Mission-Critical LTE/5G. Additionally, it aims to highlight the impact of convergence-native hybrid networks in the future of Mission-Critical communications, along with a detailed list of strategic requirements for the solutions, implementation and future operations of the next generation of Mission-Critical networks.

2 Mission-Critical Communications are evolving

2.1 Critical communications are at the core of functioning emergency services

Communications are "critical" when the failure would lead to optional failure resulting in injury, death, property harm, business revenue loss, brand damage, or increased costs.

Critical communications as well as mobile technologies, including Push-To-Talk (PTT), have never been more critical, particularly with the threat of COVID-19 complicating the incident response. critical communications are usually classified under two use cases, which are Mission-Critical (i.e., public protection and disaster relief [PPDR]) and Business-Critical (i.e., transport, electricity, oil & gas production, private security etc.).

- Mission-Critical (MC) refers to reliable communications for safety, security or emergency crisis management and prevention, where lives and environmental or social damage are at stake. This type of communication is typically associated with public safety operations.

- Business-Critical (BC) describes sensitive communications in which poor or unavailable radio communications may lead to operational failure, resulting in business revenue loss, brand damage, or increased costs.

2.2 Mission-Critical systems migration to broadband is an evolution, not a revolution

The key driver of the critical communications systems is to ensure the overall effectiveness and efficiency of the emergency management. The dominant technologies used in networks for critical telecommunications were collectively called Professional Mobile Radio (PMR), including Terrestrial Trunked Radio (TETRA), Digital Mobile Radio (DMR) and Private Digital Trunking (PDT), and Project25 (P25), designed for robust, reliable and secure group voice communications, and the transmission of limited amounts of data. Whereas, the maturity of LTE is boosting PTT and the transmission of large amounts of data and video to or from connected broadband mobile devices and IoT or sensory devices such as cameras, drones, sensors, and more. Public safety agencies and enterprises are increasingly considering how to use LTE for MC or BC communications.

MC systems that are designed for Public Protection and Disaster Relief (PPDR) missions and first responders operations, which are associated with serious safety or security damages, injuries, and loss of life, thus, require a communication network that works without failure and support constant and reliable communication at the scene, even in remote locations where mobile phone service may not make good business sense. The MC Communications ecosystem has been built on PMR technologies for decades, largely made up of PTT, and public safety-grade infrastructure, which requires multiple levels of fault tolerance when a network fails. However, LTE system rarely offers these capabilities.

As a consensus, while moving towards MC broadband, PMR with a proven track record in high availability and security, still holds an essential place for emergency operations and guarantees MC voice communication, anytime, anywhere. As such, PMR continues to be "indispensable", especially in emergency communications, whereas MC LTE complements PMR through more robust communications in the existing coverage, adding more geographic areas, increased data speeds and enhanced capacity.

Therefore, the migration journey to broadband is an evolution, not a revolution. LTE-powered PTT over Cellular (PTToC) solutions are being integrated with PMR systems to build next-gen networks. Hybrid networks will equip commanders with the improved ability to communicate with responders all the time during emergencies and daily operations when lacking sufficient PMR radio coverage. Additionally, LTE smartphones ensure undercover law enforcement operations with unobtrusive devices. Overall, new hybrid networks will boost the resilience of national MC communication, and synchronously reduce capital expenditures (CAPEX) on a limited government budget by leveraging commercial networks.

BC systems serve organizations that operate in an environment with significant economic value and/or sensitive information at stake. The BC communications ecosystem shares similarities with and also benefits from the MC ecosystem.

As solutions mature and newer technologies emerge, MC LTE enables leverag of cloud platforms accessible for various types of devices through integrating disparate and heterogeneous systems to create converged and interoperable communications networks for broader collaborative operations between or within MC and BC.

2.3 5G accelerating the industrial revolution

5G refers to the fifth generation of mobile technologies, in which each generation builds capabilities onto its predecessor. Three key aspects of 5G pertain to transformation, renewal and resilience: ultrafast data rates, low latency and high density. The 5G network architecture is also more cloud-native, software-driven, intelligent and programmable than ever. Other technologies, such as AI, automation, analytics and edge computing, have evolved to play a broader role through closer integration with 5G. Along with a paradigm shift in the ecosystem, 5G combining other powerful technologies opens up the potential to support a broader range of industry and enterprise use cases towards digital transformation (i.e., Cyber Physical System [CPS]-based Industry 4.0), interacting with business processes, such as smart manufacturing, smart power grids, and digital railway.

The public safety sector has also benefited from critical Internet of Things (IoT)-based ecosystems, LTE/5G augment PMR with new data capabilities that bring about profound changes in emergency management. In summary, 5G capabilities will deliver improvements in two distinct ways to enable innovation for public safety: enhancing use cases currently enabled by LTE; creating new and emerging use cases, previously unviable with earlier generations, such as massive critical machine-type devices.

However, the growing consensus is that MC users should consider proceeding with LTE networks because 4G data speeds, capacity and low latency features and network coverage are likely sufficient for most purposes of PPDR at this moment. It would be prudent to allow 5G to mature and only then attempt to realize its considerable benefits, where applicable.

2.4 The four trends are converging, creating a new "hybrid" era of MCC

OMDIA research in 2022 identifies four major trends for future MCC, (refers to as "the next-gen Mission-Critical Communications"), which are:

1. Wide-scale emergencies, like the recent coronavirus (COVID-19) pandemic, extreme natural disasters, and broadly impactful security events, demonstrate the need to reexamine MC Communications, which are essential for national security and emergency preparedness. This depends on MC Communications technologies, networks and infrastructure systems to play a vital role in making the world better and safer, **where PMR networks remain vital and growth for voice communication.**

2. Because of the increasing complexity of the world today, MC Communications technology is forced to go beyond voice and rely **on new sources of information and multimedia communication,** bridging the "Digital Gap" between citizens and first responders. Effective communication and the ability to acquire and analyze data are critical components of successful outcomes. LTE and new mobile technologies take on new meanings and lead to profound changes enabled by new capabilities, making LTE increasingly appealing for public safety and industries.

3. The breadth and scale of the **hyper-connectivity revolution** worldwide have been shaping modern society, thanks to radical technology offered by service operators at increasing speed, with groundbreaking platforms brought to market by internet and social media giants. They are fundamentally changing MC industries, fueling innovation, and creating both threats and opportunities.

4. In a digitally transformed Industry4.0 era, combining the automation and digitization of production processes, CPSs will open new production methodologies leading to greater agility, flexibility, and cost-effectiveness, and will be present in most industry sectors, where Industry 4.0 aims to converge operational technology (OT) and information & communication technology (ICT). CPS-based MC Communications will open up the potential to change public safety from reactive to proactive by incorporating more critical sensors and infusing them with new levels of intelligence, such as from response to prevention, and observation to prediction, reducing time to real-time.

The four trends converge to build the next-gen MC Communications, However, the new expansions will not come at the expense of PMR, voice continues to play an essential role and narrowband digitalization is still ongoing in MC Communications. As OMDIA has predicted, **global PMR shipment market is expected to grow to $6.3B by 2025 (from $5.2B), in which 80% of worldwide MCC active radios will be digital by 2025.**

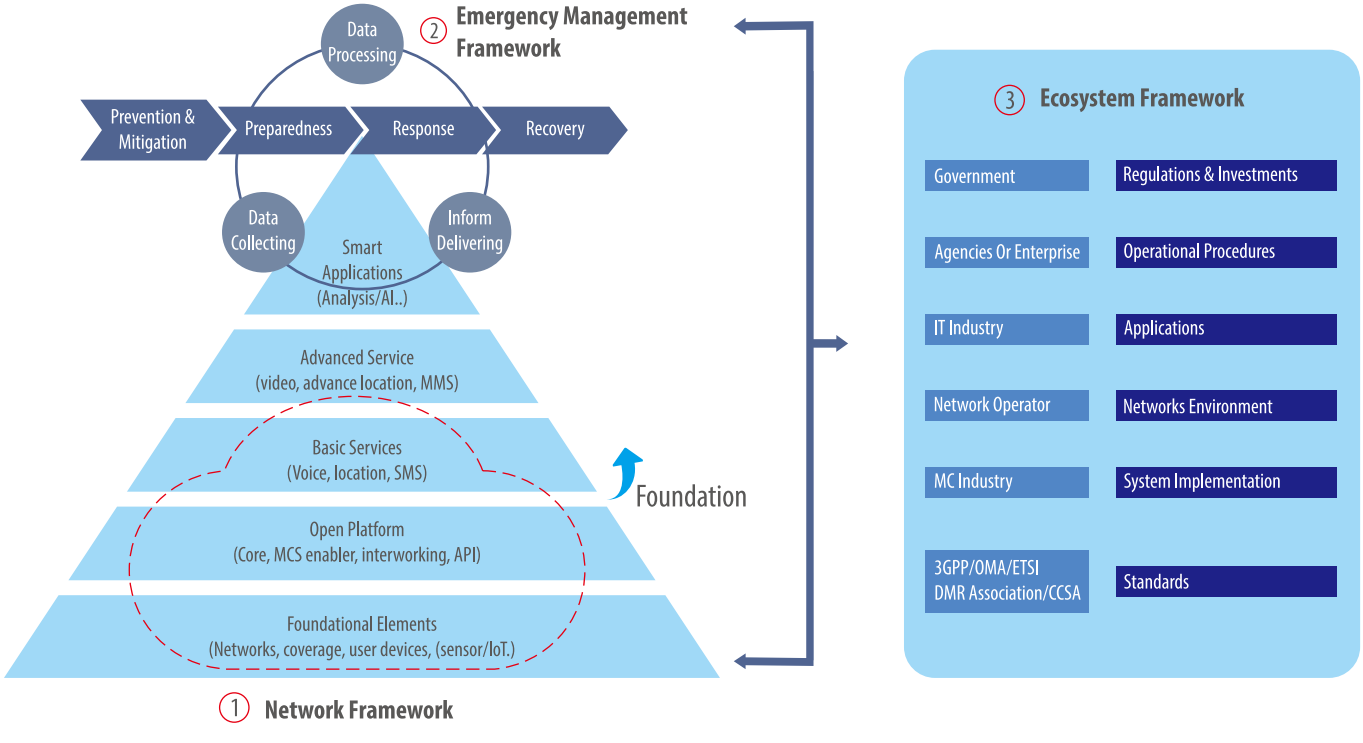
At the beginning of a new "hybrid" Era, taking those trends into account, rethinking the implementation strategy and prioritizing investments are necessary for public safety organizations and industries.

3 Build the future-proof Mission-Critical networks for success

3.1 Rethinking sustainability using a closed-loop framework

The successful deployment of a sustainable next-gen MC system relies on more than a choice of technology or a network on; it implies important considerations of networks, emergency management processes and ecosystem, which compose a closed-loop framework described as follows:

future-proof frameworks of next-gen MC Communications



1. Streamlining the emergency management process and improving rescue and security service

Emergency Management (EM) generally refers to the management of emergencies concerning all hazards, including all activities and risk management measures related to prevention and mitigation, preparedness, response and recovery. These risk-based functions are undertaken sequentially or concurrently, and are not independent of each other during public safety operations.

The technological evolution affects the whole EM involving not only the public safety first responder but also the Emergency Coordination Center (ECC), as well as the public. Combining a high-performing network and data analysis will lead to dramatic improvements in efficiency and productivity by streamlining EM throughout the entire process. During the intervention, the voice service used will be complemented by data service, through collection from multiple sources, data processing, actionable information transmission at ECC, then delivery to Incident Commander (IC) and first response at the scene via smartphones, tablets, etc. As such, rescue and security services can act more proactively, better prepared and improve safety by creating a real-time situational awareness, richer context and insight.

Consequently, technologies have been developed for BC and MC purposes, all the capabilities built on the next-gen networks must be smoothly integrated into the whole EM, to enable agencies to reshape their services and improve overall operational efficiency, and effective prediction prevention and protection.

2. Effective partnership ecosystem and stakeholder collaboration have never been more critical

Considering organizational, operational, implemental, investment and technological factors, an open ecosystem environment of networks, devices and applications is the key to success, allowing scalability and sustainability, avoiding vendors lock-in, enabling collaboration and speeding up solutions.

New standards issued by a series of organizations, mostly 3GPP for LTE, form the basis of the MC mobile networks to ensure capabilities and requirements around public-safety fundamentals, inter-vendor or inter-systems interoperability, and other aspects aligning with other organizations, vertical industry standards for a specific purpose are also needed, such as security and encryption.

The shift toward a commercial-based ecosystem opens a window for telecom operators that own wider coverage, mature LTE system, and richer technical and operational experience. Mobile Network Operators (MNOs) are most capable of managing and operating MC LTE systems and providing services, and will play a leading role in a central position in the next-gen MC ecosystem. However, MNO must collaborate with vertical-specific networks and equipment suppliers, integrators and even hyper-scalers to deliver a Business to Business to X (B2B2X) model for public safety, along with different deployment options.

More importantly, the successful implementation of future MC systems will strongly depend on the availability of regulatory framework, stakeholder efforts and government legislation, including, for example, dedicated frequency, obligations imposed on MNO, and required investments.

3. Prioritize implementing a foundation framework

The multi-layer network framework encompassing radio networks, MC service and applications presents first responders' "hierarchy of needs", in which basic requirements are at the core, including network coverage, connectivity, and voice service continuity needs to be guaranteed for operation. Therefore, agencies should prioritize implementing foundational elements (i.e., devices, RAN and core network, and basic services) that

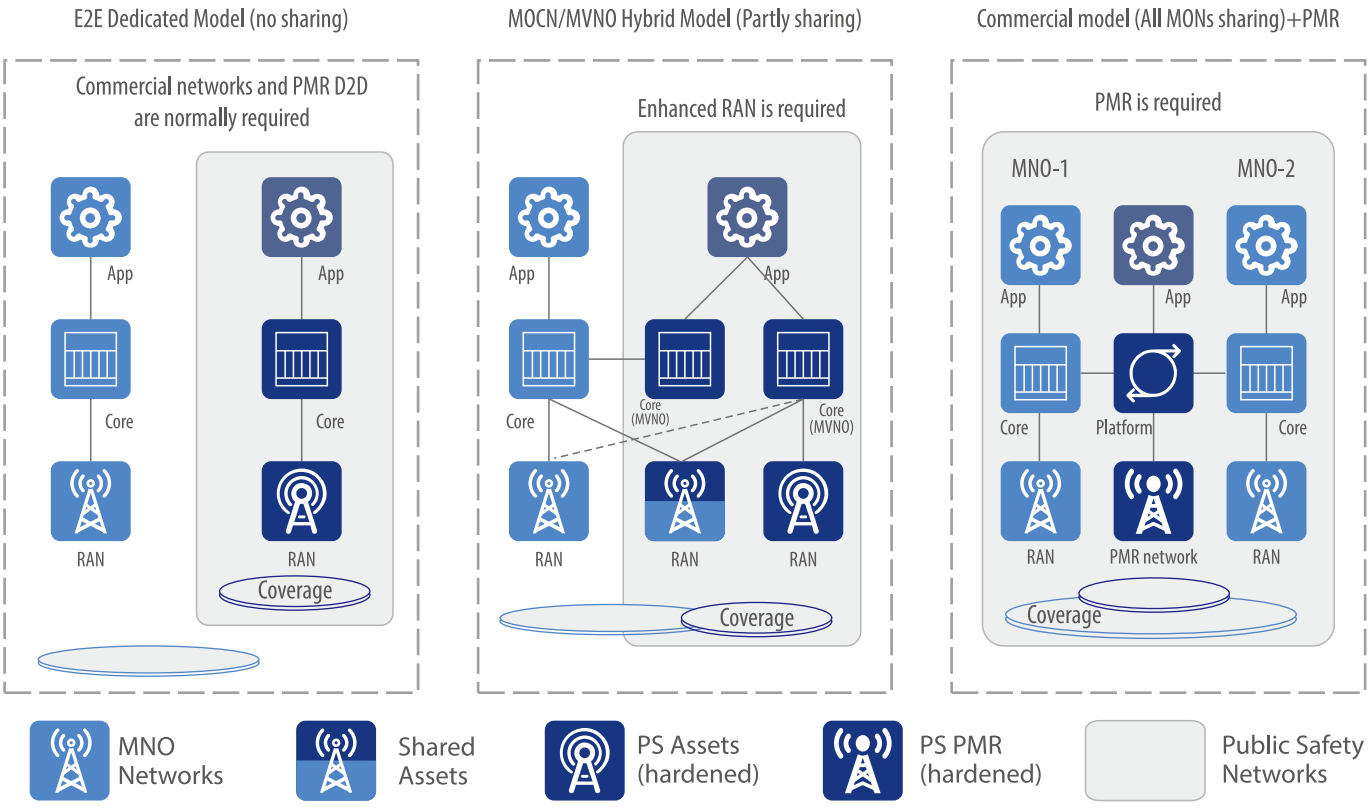
require ruggedization, extended coverage, specific hardening, Quality of Service (QoS), Priority, and Pre-emption (QPP) mechanisms, etc, ensuring MC communication at the public safety level of reliability, resilience and availability. Networks also need to support robust field communication, in a lack of coverage or during network congestion, by including a range of non-infrastructure-based systems. In addition, an open platform that comprises a core network, Mission-Critical Service (MCS) server and an interworking gateway, etc., is required to enable enhanced capabilities such as new MCX services, seamless communications, real-time location & tracking, and more. On top of the hierarchy, advanced capabilities (i.e., video, data analysis and AI) will further be built upon the underlying infrastructure.

So that, there will be many challenges ahead that need to be taken into more consideration around implementations, including robust partnership, standardization and harmonization, technological framework, future-proof network, PMR-LTE interworking, sufficient budget and financial support, and time-to-market.

3.2 Leveraging commercial resources for network Implementation

Addressing the challenges of how to organize and implement next-gen MC Communications in terms of network architecture and operation models leveraging commercial networks (i.e. dedicated network, hybrid network and commercial network) is the key question. Typical deployment approaches are generally classified into three models, illustrated as follows:

How to leverage commercial resources to implement MCX networks?



Model1 refers to the usage of a private network. A few countries implement their MC system through an E2E dedicated LTE network, such as Korea's Safe-net. Supporting public safety-grade MCX services, Private LTE networks must guarantee the availability of 99.999% from RAN to application services, including geographic

and indoor coverage, must be comparable with PMR networks. Furthermore, higher LTE spectrum (i.e., 700MHz) and lower RF signal propagation attenuation, redundant system and hardening infrastructure will be accomplished at a higher cost. Therefore, private LTE usually needs to leverage commercial networks to fulfill the need for MC and BC.

Most countries have chosen an approach relying on commercial networks. In practice, there needs to be considerable investment in hardening commercial networks to the level of performance, reliability, and security necessary for public safety. This includes coverage extensions, infrastructure hardening, QPP mechanisms, and more. Combining the benefits of both commercial and dedicated assets, Model2 (refers to broadband hybrid model) has a stronger proposition than the dedicated LTE approach, it not only ensures public safety requirements are guaranteed but also that agencies benefit from the latest innovations enabled by the commercial market. So that, Model2 is a more popular approach for some developed countries, such as the US with FirstNet and the UK with ESN. Model2 normally means "self-owned infrastructure is past", but, there are still specific requirements and consideration, which includes developing a specific legal framework ensuring the cooperation among stakeholders (including MNOs), enhancing RAN networks with guaranteed public-safety grade network (i.e. cell site hardening) and building for a field network that comprises deployable, ad hoc systems with dedicated or authorized frequency, and satellite in case of in harsh events or catastrophic failures.

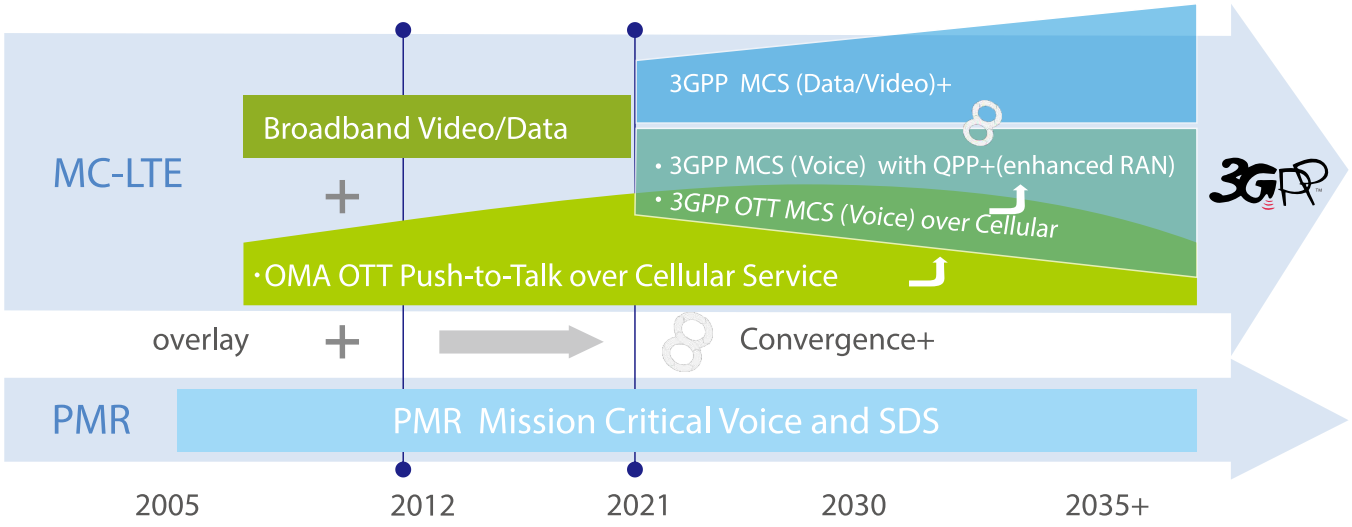
However, both Model1 and Model2 are less workable and affordable for most other countries. Alternatively, a practicable approach (refer to Model3, PMR&LTE hybrid mode) is to integrate commercial networks with existing and growing PMR systems using a method of network convergence, that leverages the benefits and readiness of both PMR and commercial LTE networks, while combining advanced features over convergence. This way, PMR remains the baseline of a public-safety grade network, offering reliability, resilience and security, while providing controllable, dedicated and guaranteed access for first responders during emergency operations. Model 3 allows agencies to benefit from broadband services currently while waiting for the necessary migration path to MCS with QPP.

However, both Model1 and Model2 are less workable and affordable for most other countries. Alternatively, a practicable approach (refer to Model3, PMR&LTE hybrid mode) is to integrate commercial networks with existing and growing PMR systems using a method of network convergence, that leverages the benefits and readiness of both PMR and commercial LTE networks, while combining advanced features over convergence. This way, PMR remains the baseline of a public-safety grade network, offering reliability, resilience and security, while providing controllable, dedicated and guaranteed access for first responders during emergency operations. Model 3 allows agencies to benefit from broadband services currently while waiting for the necessary migration path to MCS with QPP.

4 The convergence of PMR and LTE -Differentiating hybrid networks

4.1 The MCPTT ecosystem is at an inflection point

PTToC & MCPTT Technologies Roadmap



Wireless radio PTT communications have evolved into complex digital radio systems designed for optimal spectrum utilization and data messaging capabilities built on the TETRA, DMR, PDT and P25 "gold" open standards, and have supported public safety and industry for over 20 years.

- DMR is an open standard, designed by the European Telecommunications Standards Institute (ETSI) with the primary goal of creating an affordable digital system with low complexity. DMR products designed to its specifications are sold worldwide. The DMR association mainly focuses on DMR TierII and III.

- Private Digital Trunk (PDT) is an open standard and is also China's first digital trunking communication standard, which has been widely adopted by public security and fire and rescue operations to build the world's largest nationwide interconnect networks in China. PDT technology allows the development of a lower-cost, larger coverage and backward compatibility system, which is ideal for public security. At the same time, PDT Alliance aims to promote PDT worldwide.

- TETRA: Terrestrial Trunked Radio (formerly known as Trans-European Trunked Radio) is a professional mobile radio and two-way transceiver specification, developed by the European Telecommunications Standards Institute (ETSI) to carry data as well as voice to address the unique needs of public safety agencies. TETRA technology has consolidated its recognition by the Mission-Critical market due to its reliability, resilience and security features.

- Project 25 (P25) or APCO-25 (developed by the Association of Public Safety Communications Offices, APCO) refers to a suite of standards for digital radio communications for use by federal, state/province and local public safety agencies in North America, Australia, New Zealand and some other regions to enable them to communicate. In this regard, P25 fills the same role as the European TETRA protocol, although it is not interoperable with it.

Among them, TETRA, PDT and P25 are mainly used in government and public security fields. As cost-optimized technologies, DMR and PDT having support smooth evolution from analog MPT1327 to digital trunking and wide-ranging coverage, are positioned as ideal replacements for analog radios in systems.

At the same time, PTToC technologies have evolved through a standardized approach since the Open Mobile Alliance (OMA) produced its first version of specifications in 2005. LTE-powered high-performance cellular networks with near-ubiquitous coverage provide fertile ground for satisfying and boosting over-the-top PTT as a result of significant adoption worldwide.

Future 3GPP MCPTT specifications enable the establishment of network-integrated features to support priority access and traffic priority starting during network congestion from Release 12. A series of released 3GPP MCS standards support MC LTE network optimizations and a feature-rich suite of IMS-based protocols addressing PTT, push-to-video, and MC data. PTToC can take the form of this 3GPP network-integrated approach with simpler policy-based mechanisms by using the access point name (APN) that MNOs allocate for MC traffic to provide preferential traffic assignment.

3GPP standards aimed at a harmonized ecosystem have been in progress for more than a decade, and PTToC approaches have emerged as viable alternatives. An expanding array of PTToC implementations with rich features, value to end-uses and off-the-shelf smartphones co-exists with newer standardized offerings based on MCPTT specifications issued by 3GPP. The latter is expected to be adopted in national public safety MC LTE programs as network-integrated systems that deliver PTToC defined by 3GPP MCPTT specifications facilitating interoperability.

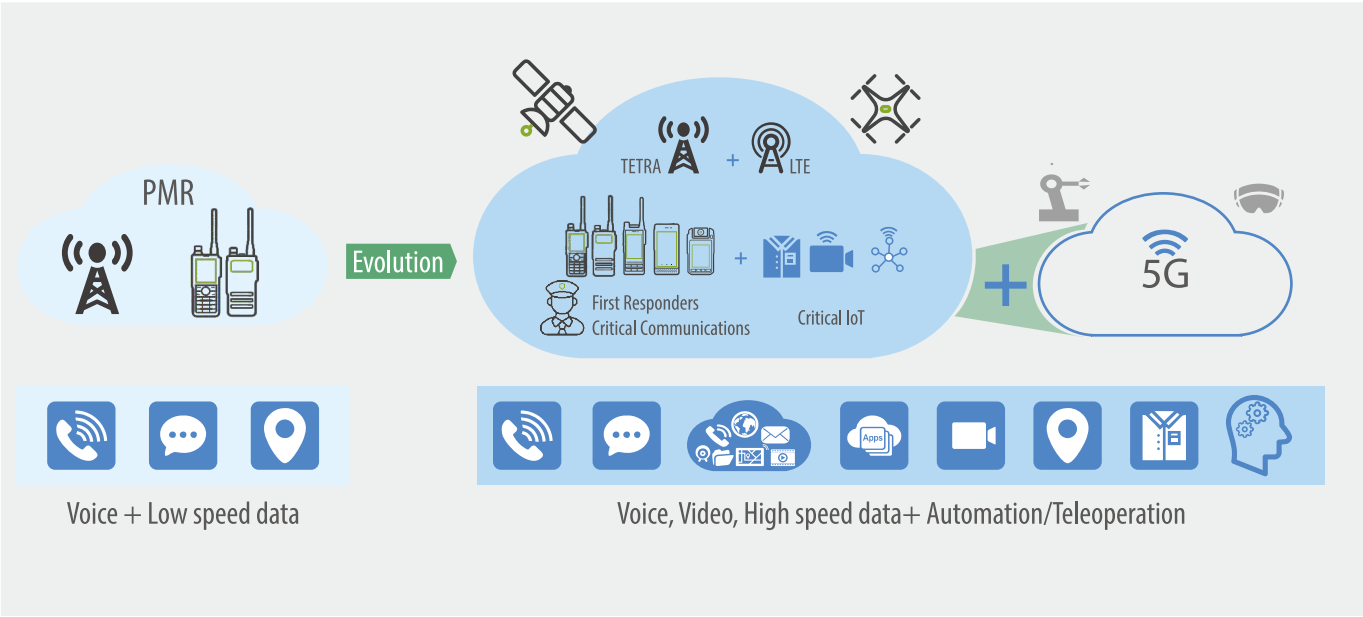
The rich communications suite that underpins MCPTT lays a foundation for other "push" services, including push-to-video and MC data. In fact, for many years, LTE has established itself as an important player in broadband data applications beyond PMR voice service. The OTT voice or data service will remain active in use for daily operations, especially when cellular networks can not offer MC features. MC services architecture has referred to push-to-X, alongside continuous evolution towards 5G. The reality is that simple PTT works better for field communications than a push-to-video (PTV) that demands eye contact. While push-to-video will undoubtedly have killer applications, such as license plate recognition, photo transmission, and improved situational awareness, coordination will remain focused on push-to-talk.

Driven by the increasingly strong needs for video streaming and data (sensors) and seamless voice communications, reinforced with convergence strategy, and coupled with an expanding set of devices options and innovative network offerings coming online, 2021-22 is shaping up as an inflection point for PTToC technology adoption for public safety and enterprises. We also know that the factors that influence outcomes include impediments to standardized PTToC, a direct mode feature gap, interworking efforts, interconnection of the control room hybrid console and the rise of push-to-video. More innovative solutions are expected to come online to easily, fundamentally and cost-effectively address these complex issues.

4.2 Convergence PMR/LTE, an accelerator of hybrid strategy

When the technologies underlying 4G became more affordable, concerns have been raised for a few years, if LTE can replace PMR as the primary MC voice communications technology? Following tremendous efforts in research, practices, and even advocacy around the globe, at the moment while PTToC is rolling out, the industry's consensus is definitely that PMR digital trunking systems and LTE networks are not alternatives to each other, but are complementation and remain in coexistence for the foreseeable future. The reason for that is that PMR has three key characteristics that are notable limitations of LTE or even 5G:

Convergence strategy is an accelerator of hybrid networks implementation



- PMR systems are mandated in redundancy and hardening by design (such as power backup, system redundancy, multiple transport links etc.), which allows "graceful degradation" to the back system and ensures the delivery of a committed public safety grade network for PPDR organizations.
- The PMR supporting both "on-networks" (trunking mode) and "off-networks" (DMO or TMO) are critical for life-saving situations, much more powerful mobile and handheld radios can guarantee "bottle lines" voice communications even during final degradation.
- Rugged user devices are designed to use in rigorous and harsh environments, allowing for prolonged operation with a high-level of user familiarity and availability, which is indispensable to fulfilling the emergency operation needs.

At the same time, LTE augments PMR with new data capabilities. As such, PMR and LTE have their own dedicated place, they will work together on different critical applications. So that, the most solid communication foundation that public safety organizations' operations can rely on is to build on the hybrid PMR&LTE networks, in which PMR continues to improve and expand, and PTToC or MCS is increasingly maturing and incorporated. The basic drivers for the hybrid strategy will help provide responders with the benefits of both PMR and LTE. However, "technologies" do not mean the same thing as "real networks", the convergence strategy seeks to "seamlessly" fill the gap between PMR and LTE in real networks, as detailed as follows:

1. **Consistency and usabilities** -From a user's perspective, the features and functionalities available on PMR have been the same for decades; LTE MC-PPT should Inherit existing PMR devices' user experience: for instance, with dedicated PTT and emergency buttons, high-volume speakers, the same high level of audio clarity (i.e., noise canceling), glove usage, water and dust-proof, ruggedized and Remote Speaker Microphones (RSM), and more. In this way, **converged devices that combine PMR connectivity with LTE access can provide such capabilities, minimizing the operation gap impact.**

2. **Enhancing commercial networks for public safety** - From both a performance matrix and network design perspective, there is a need to fulfill an array of characteristics such as availability, stability, durability, reliability, maintainability, interoperability and compatibility. However, commercial LTE networks are subject to vulnerabilities in infrastructure, inaccessibility of information, and a lack of fulfilling core concepts. All these requirements can be addressed with enhanced private or hybrid broadband networks which normally present economic constraints, or alternatively, **can be conducted by converging PMR networks with LTE commercial networks**, along with a range of resilient functionalities including fallback model, Device-to-Device (D2D) communication, broadcasting, infrastructure hardening, and the ability to communicate in harsh environment communication.

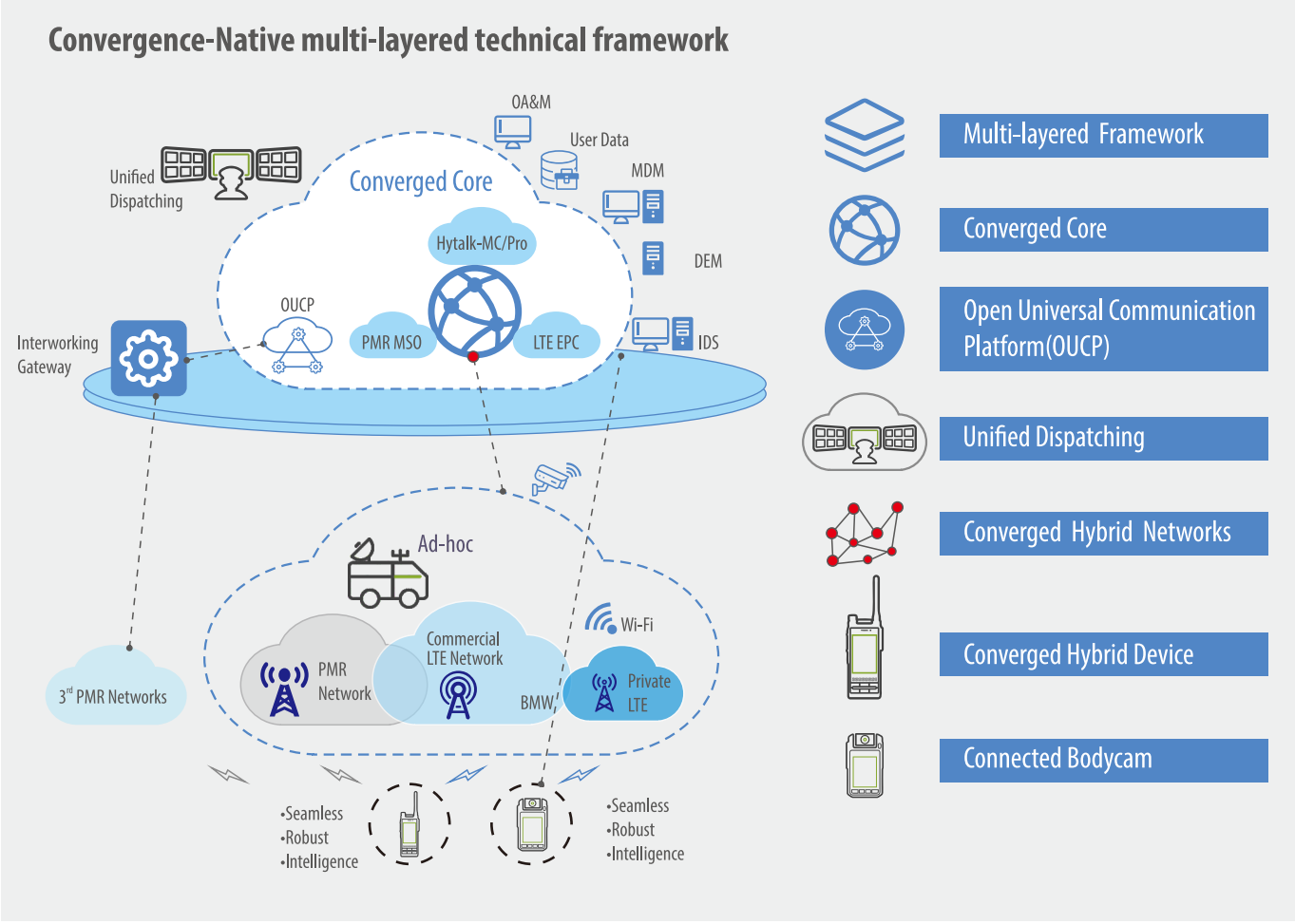
3. **Fallback ensures robustness** – For some reason, QPP is a rather common issue for many operators' LTE networks, either sometimes or at all times. As a result, the operators can not guarantee responders an MC service in a crisis. For example, when congestion happens in a converged network environment, the call fallback can be triggered by the system mechanism automatically or by the responder manually, and then voice traffic is redirected to PMR networks or in DMO mode to always ensure a **robust and reliable** Mission-Critical voice. In addition, low frequency, narrow bandwidth and high-powered radios coupled with radio repeaters augment the robustness with the ability of long-distance coverage to penetrate well through buildings or underground.

4. **Seamless connectivity enables higher performance and higher availability** - Public safety ubiquitous access requires reliable, dependable and consistent coverage. A **broad coverage** footprint typically needs a significant amount of budget, which poses a real problem for the public safety organizations. The convergence strategy can help customers reduce RAN network investment by identifying each other's strengths and leveraging the best of them. For example, filling in PMR coverage gaps with a cellular network when responders are in rural or in buildings with no PMR coverage, but have LTE service available, whereas, users can access PMR systems when out of the cellular network range like in remote areas. Moreover, the user similarly switches to PMR DMO mode when out of the range of cellular network coverage, like in deep underground areas of a building. The converged networks can support all access and shifting to be automatic with no failure, enabled by two key capabilities: agnostic access and seamless handover.

Therefore, the convergence solutions towards next-gen MC networks are described as "The best solution includes seamless mobile techniques that select the best available network and shift without disrupting the end user's attention". Today, there are multiple interworking-based solutions, some of which are expensive and time-consuming to implement. Beyond interworking solutions, public safety organizations need innovative approaches to achieve the goal, which is to put PTT service everywhere across PMR and LTE easily, conveniently, seamlessly and inexpensively.

5 Convergence-Native, a future-proof solution for next-gen hybrid networks

5.1 "Convergence-Native" creates a convergence-in-depth framework across multiple layers and components



With a goal of "to empower global public safety organizations and industry enterprise with seamless connectivity at the critical time at any place via professional devices through future-proof solution built with convergence-native innovation and expertise". Hytera has proposed the multi-layered convergence strategy known as "Convergence-Native", which defined as "the convergence-in-depth framework of implementing integration of PMR network and LTE network to build a Mission-Critical network across multiple layers and components, delivering advanced seamless connectivity and full interoperability.

The service-centric networking architecture aims to break siloed communications to realize fully interoperable communications through vertical decoupling and horizontal convergence. Converged core, open Universal Communication Platform, unified dispatch, converged device, connected body-worn cameras compose a complete End-To-End (E2E) solution that enables converged blend applications and various devices access, anytime, anywhere.

1. Converged core is the enabler for native interoperability between PMR and LTE

As a key component, the proposed converged core is defined as a purpose-built component across layers and domains. For the goal of delivering a cost-effective solution with a simplified deployment model, it is primarily designed for PMR network and PTToC/MCS in-depth convergence instead of implementing separate entity, standalone gateway and complex interfaces. The converged core together with database, OA&M, and mobile device management (MDM) creates an integrated MC service enabler platform to support PMR, P-LTE, PTToC and MCS service.

The next-gen converged core can be backward compatible and deliver customer meaningful benefits by providing a range of advanced features, which enable and accelerate the smooth transition to hybrid PMR&LTE networks along a flexible evolutionary path with minimal risk and reduced cost.

2. Converged network creates great values over convergence

The converged network that supports PMR Network+Private LTE network+Commercial LTE Network (MCS/PTToC) in-deep convergence, enables agnostic access and automatic shifts without users' attention by providing advanced seamless mobility features across networks without geographical interruption for voice calls and with voice continuity against dropped syllables and words. These capabilities are absolutely critical to Mission-Critical Communications.

3. The comprehensive platform OUCP enables full interoperability and greater system integration

As a next-gen ready cloud-based platform, the Open Universal Communication Platform (OUCP) is designed to resolve the increasing challenges of integration and interworking of more complex and disparate systems, including landline, video streaming and conferencing, rich media and legacy systems, also interconnecting 3rd part standards-based MCS systems with well-defined and open protocol flows. In addition, OUCP is an integral part of distributed ICT platforms that are seamlessly integrated into a single, geo-redundant architecture, covering IoT and video platforms, CAD dispatch, emergency systems, video surveillance and MC networks.

4. Next-gen dispatch system enables unified dispatching and comprehensive controlling of MC communications

With the goals of improving agencies' efficiency, effectiveness and safety, coupled with the "Convergent-Native" strategy, the next-gen Computer-Aided Dispatch (CAD) system facilitate a smooth evolution path by providing customers with a range of types of role-based consoles leveraging OUAP, along with comprehensive capabilities, including unified dispatching, fully interoperability, seamless access and efficient controlling of MC Communications across PMR/LTE networks and different disparate systems.

5. Converged Devices with ruggedization are indispensable for emergency operations

The rugged and converged device that combines reliable PMR (PDT, DMR or TETRA) trunking and DMO communications with LTE connectivity, is capable of SDK-based traffic tunneling, enabling more instant communications and enhanced seamless mobilities, coupled with Convergence-Native strategy. This hybrid device can also be used as a data hub with WI-FI/Bluetooth connecting to biometric and environmental sensors to build a robust Personal Access Network (PAN). So that, a converged device is an effective approach to address the interoperabilities challenge between PMR/LTE systems, facilitating a fast and smooth evolution path by providing both the option of MCPTT and PTToC solutions.

6. Connected body-worn cameras converging for video-streaming, Push-To-X and footage capture into one device

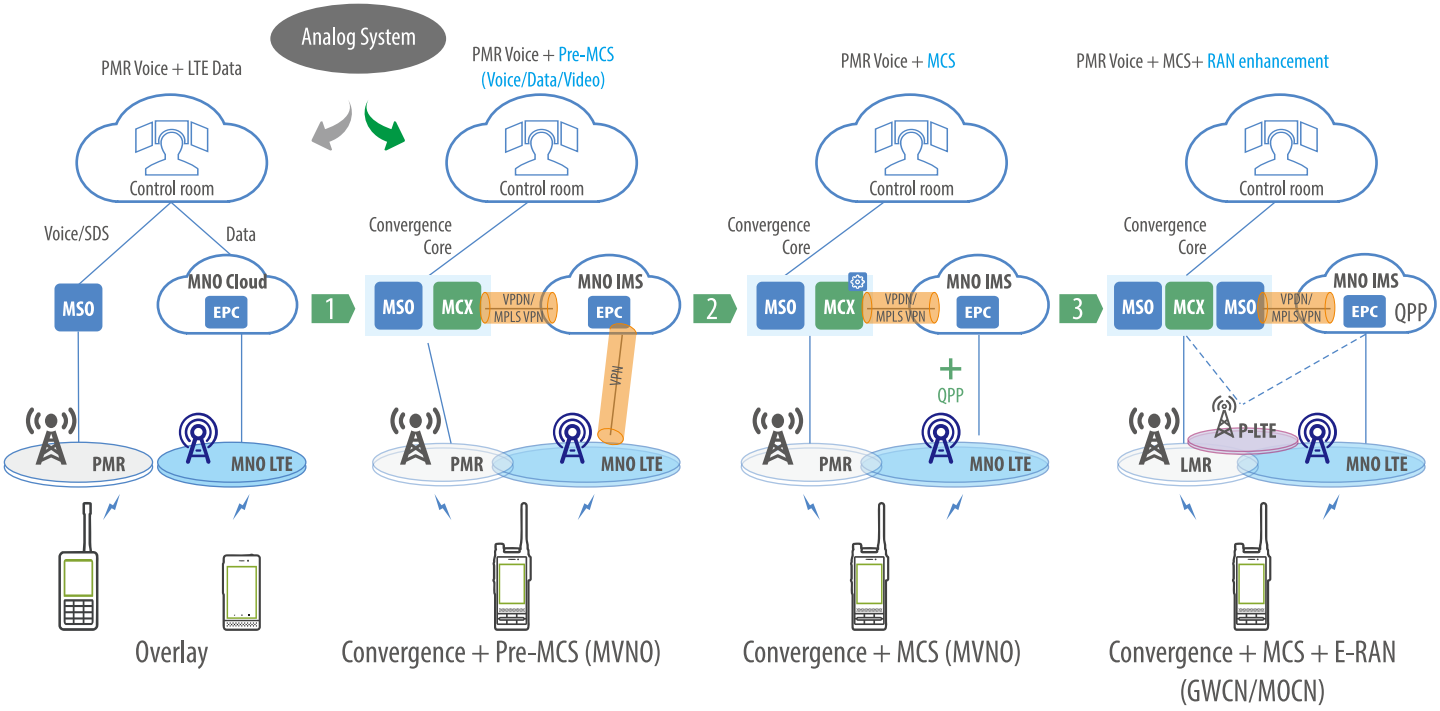
4G body-worn cameras are designed for the operational needs of the police officer, firefighting and ambulance users and never miss capturing evidence, enabled by features such as ultra-compact design, long battery life, pre-events recording and security features. It is also an MC Communications device that supports push-to-X services simultaneously with the built-in MCX app and dedicated PTT button. Moreover, connected 4G body-worn cameras deliver an objective view of an event for officers' safety and reassurance during an incident through real-time video-streaming triggered by an officer with needs, capturing a wide-angle view in full HD resolution even in the lowest of light conditions. As a complement to Closed-Circuit Television (CCTV), 4G body-worn camera is a video sensor with AI-powered video analytics, such as facial recognition.

In summary, a hybrid system that lets agencies benefit from the best characteristics of both PMR and LTE technologies, on top of hybrid, innovative Convergence-Native technologies are not only at the core of developing future-proof solutions but also at the core of creating and increasing customer value.

- Convergence-Native technologies suits that enable to deploy swiftly and consistently with flexible and deployable components, form ONE in-depth converged network with various types of devices access and build the foundation of next-gen MC Communications towards an optimal evolution path with lower cost, reduced workload and simplified maintenance while introducing new technology.
- Convergence PMR&LTE strategy promises to advance MC Communications by best leveraging PMR and LTE networks ahead with a straightforward update of the PMR system, prioritizing capital investment, reducing Capex by maximum leveraging existing components.
- Convergence in-depth solution provides for TURE seamless PMR/LTE usage is a game-changer for MC Communications, supporting reduced call setup latency and improved network performance without degradation to achieve better responders' satisfaction, launching new services rapidly using standards-based API and integrated converged services.
- Converged device enables a new PTT usage model by utilizing both PMR and LTE technology on a single device, which its ruggedization is indispensable in a harsh environment.

5.2 Convergence differentiates the evolution path, ensuring successful impementation

Convergence-Native differentiates evolution path



The transformation towards the next-gen network is no doubt a complex and long-term evolution journey, since narrow-band and broadband will work in parallel for many years to come. As is often the case, there are different implementation combinations need to be considered, which is challenging for policymakers to start. Managing such an implementation is about reducing risk while providing the right for the transformation mission in a method that fosters seamless operations, balances these factors, maps out the strategy and develops the roadmap.

Based on Hytera's thorough research and best practices in the market, the perceived key factors are taken into account to propose the MCX implementation roadmap, which include network coverage, features, devices, cost, interworking, and performance. They are generally classified under three grades in terms of next-gen MC networks-Grade1 (i.e., public safety), Grade2 (BC) and Grade3 (non-MC).

The implementation can be optimize a start up system with the proposed converged solution around PTToC/MCS and PMR, reducing time-to-market with a low cost, then active Mission-Critical features with software upgrade (i.e., QPP) when operators are capable of supporting these network functionalities. going further, It will allow to support RAN enhancements together with added dedicated LTE EPC (full or not full) in the universal platform, when specific locations coverage and full sovereignty are needed.

The proposed cost-optimal model by leveraging a commercial network, selecting the suitable technology and smooth evolution path detail the roadmap in three steps, differentiates the implementation with the minimum risk as follows, in an example of public safety.

- In most counties, most agencies still rely heavily on PMR voice communication and even a significant amount of analog radios for daily and emergency operations, where the adoption of LTE data is in a way of overlay and not capable of MC capabilities, they work in parallel without interworking and may depend on dispatch systems for integration. In the first implementation stage, the diagram above depicts architecture as "convergence+pre-MCS". The proposed approach aims to fulfill the basic service among "the hierarchy of needs" because the continuity of service is fundamental. Integrating commercial LTE network, the convergence native solution enable building a converged PMR/LTE system, by deploying a converged platform hosting access of them, converged devices deeply combining of them, a unified dispatch seamless bridging of them. MNO deploys policy-based mechanisms Access Point Name (APN) that are allocated with preferential traffic treatment to ensure QoS of the radio link, as well as established PPP-based Virtual Private Dialup Network (VPDN) or MPLS-based VPN link between agencies and MNO networks for QoS and security. A complete technology suite is essential for building the foundation of a next-generation network, and delivering pre-MCS service with minimal implementation efforts, while supporting advanced capabilities such as broader network coverage, carrier agnostic, service continuity, and high user experiences.

- In stage2, when QPP are deployed by MNOs, the network built in the first stage will smoothly support full-MCS functionalities through software upgrade with minimal impact on customer service. Convergence-Native enabled network will meet the requirement of true PSG which refer to convergence+MCS.

- Going further, Enhanced PSG network will require organizations to deploy a dedicated core network coupled with the operator's RAN network to realize full self-management, more self-control and more ensured security. Sometimes, operators or organizations may require additional investment to further boost RAN networks, including coverage extensions and infrastructure hardening. The model convergence+ GWCN or MOCN allows PMR, dedicated and commercial resources combined and pooled to improve public safety networks to a higher level of connectivity and reliability for MC Communication which can further leverage 5G networks and network slices and more dedicated resource, such as infrastructure redundance and dedicated PPDR spectrum can be needed.

5.3 "Convergence-Native" enables full interoperability

The development and implementation of the interworking between PMR and LTE is a major roadblock, so that the solution is particularly important to give organizations maximum choice for their transformation plans on a long-term basis. Many significant steps have been made toward a multi-vendor environment to support a variety of interworking approaches, because it is indispensable to develop a suite of 3GPP MC applications including MCPTT, MC-Data and MC-video, as well as general use of broadband networks for enhanced bandwidth and higher speed data applications, such as body-worn cameras video-streaming.

It is important that 3GPP/ETSI has developed the standardized interworking; however, in practice, there is no"one size fits all" interworking approach because of the complexity of existing narrowband networks. Therefore, PMR/LTE Interworking implementation requires the adoption of a more diversified set of approach by selecting the right combination of the standard-based interface, proprietary method, and all sorts of customized requirements, along with simple, effective and tailor-made products, combining with the consideration of the wide rage of perceived factors. The following highlights key points in term of TETRA, PDT and DMR interworking with LTE.

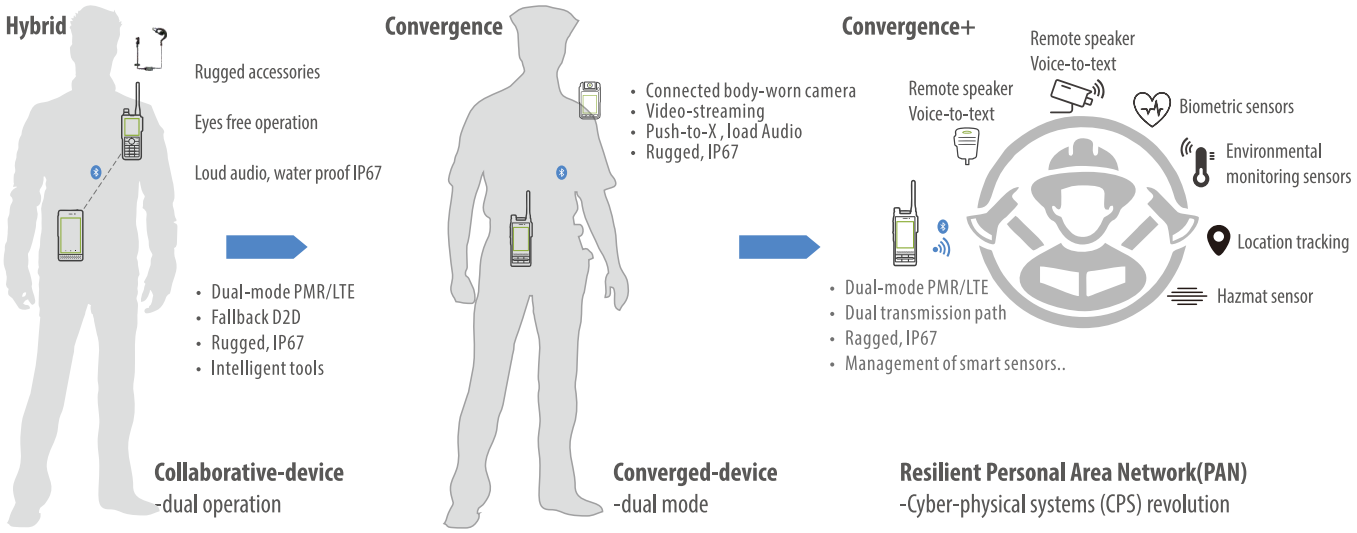
In general, TETRA/MCS interworking will utilize IWF defined by 3GPP and ETSI as the interworking gateway, while this requires significant efforts in both resource and time including test, as well as vendor-agnostic IWF product availability. At the same time, an approach w/o using IWF is thus an alternative to help to mitigate the issue by leveraging an enhanced unified communication to bridge TETRA and MCS via standard interfaces-CSSI of Tetra and UE of MCS. This approach benefits organizations by saving costs, tapping into the market quickly and simplifying implementation.

In DMR and PDT market, interworking is in a more complex situation where radio digitalization is still undergoing and analog radio, DMR Tier II/III and PDT remain coexistence for a longer time. The key challenge for organizations is how to seek for a problem-solving solutions to interconnect all of them towards and build a network foundation from public safety to industries sectors, particularly undergoing financial constraints. To resolve this issue, Hytera propose a network-layered interworking approach that aims to enable an "open", "converged" and "compatible" interworking with PDT while existing ISI interfaces don't need upgrade. It is meaningful to address concerns to build the basic MC Communications, along with some additional important capabilities including service continuity, shared components and reduced cost, E2E encryption, etc. However, the main problem for DMR is that the network-layer open interface (i.e. system interface) similar to TETRA and PDT is not defined yet, this issue can be addressed by using a similar approach with PDT. Alternatively, DMR Application Services Interface (ASI) can be used for interworking between PTToC/MCS and DMR with limited features, which is feasible for small-scale networks.

Full interoperability solutions aim to support all of the network-layered PMR/LTE interworking approaches depicted above, as well as field-level interworking, including donor RoIP radio (mobile, repeater, and relay) along with extensive radio coverage and analog radio while analog radio transitions to new PMR/LTE hybrid networks.

5.4 Converged device is the key accelerator of Mission-Critical transformation

Convergence devices accelerating transformation -from TRUE reliable MC communication to HIGH robust MC intelligence



Ruggedization of personnel equipment is one of the key considerations for emergency responders to increase the lifespan of devices with better economic benefit and ensure reliant and resilient service. As the adoption of MCX grows, the particular concern is that responders still rely on commercial off-the-shelf (COST) cellular phones that are not designed to meet PSG requirements. In the typical operating environment where it is rigorous, first responders need rugged devices to get the job done with a high level of user familiarity, availability and accessibility based on their position and responsibilities. Rugged body-worn cameras that support video capture and record keeping are also essential to ensure responders improve accountability and protection.

A wide range of ruggedized solutions are intended for responders and workers to prolong emergency operations while ensuring devices withstand tough conditions. Ruggedized technologies enable to provide high rates (IP67&IP68) protection, coordination and efficiency equivalent to PMR, while improving safety.

At the same time, **the ability to establish interoperable communications in a quick and cost-effective manner is key during an emergency**, hybrid device is an optimal option, which can access PMR, private and public LTE, WIFI and built-in GPS.

Two proposed approaches resolve this issue: collaborative and converged. In a collaborative device mode (i.e., dual operation), the synergy of rugged smartphone and TETRA device can guarantee their routine and emergency communications across networks along with DMO capability, benefiting agencies with re-use of existing devices, including accessories to lower the cost. TETRA device operates as an intelligent remote speaker and Mic supporting high-volume voice and hand-free operations, under the control of a smartphone.

While preparing for future converged networks, a converged rugged hybrid device enables to support seamless voice communications across PMR and LTE, access LTE data services via apps, and advance MC Communications capabilities and robust connectivity. More customers' demands will start reflecting the requirements for hybrid devices. OMDIA expects 2022 to be the year that hybrid LTE & PMR devices become widely available for the reasons as following:

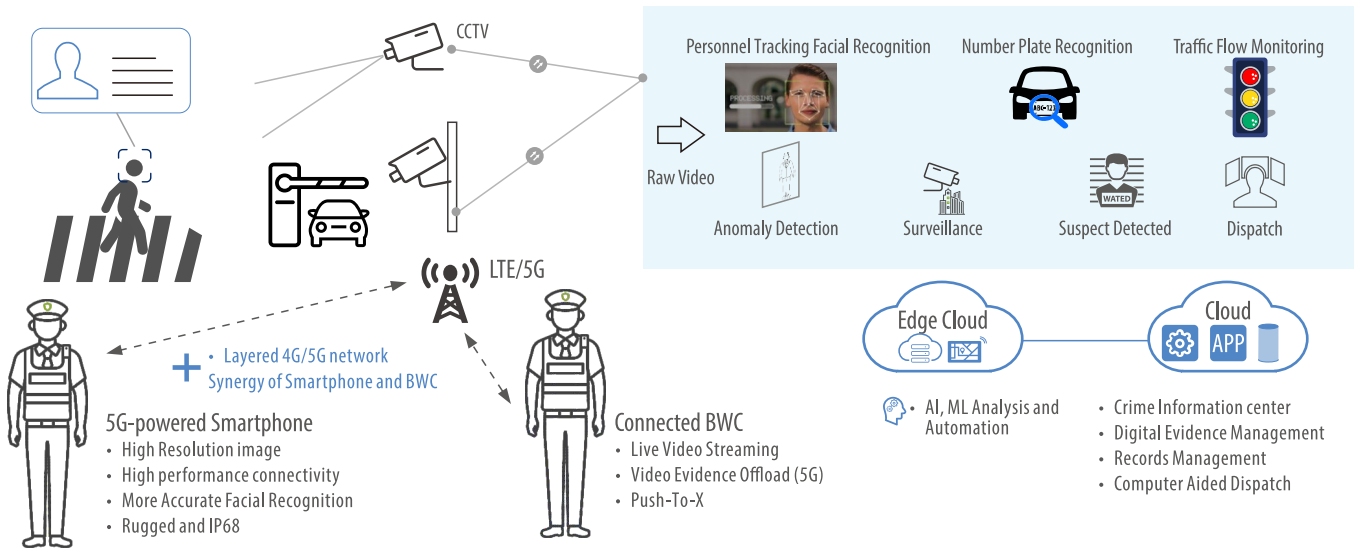
- Combine the two technologies into a single device, **reducing burdens and improving availability.**
- Stay with the PMR technology, ensuring **trusting** communication during emergencies.
- Proven track record of **robust** D2D comms when off networks or working in a confined area.
- Ease the transformation and **optimize capital investment.**

Aligning with 5G network rolls out, the convergence+ strategy allows for synergy of body-worn cameras and 5G smartphones for live streaming towards 5G-powered MC video service. Going forwards, IoT-based and AI-enabled CPS are increasingly integrated into public safety communication, one emerging use case is personal real-time health and safety monitoring through incorporating personal environmental and biometric sensors to create a Personal Area Network (PAN), where handheld devices play a role of not just a communication device, but also an access hub for sensors. Converged devices are capable of multiple wireless technologies access, coupled with converged networks and enhanced by field communication and ad hoc network to build a robust and resilient Wireless Sensor Network (WSN) and PAN by establishing redundant transmission path, along with MC Communications.

In summary, ruggedization, convergence, video streaming and sensors are the center of next-gen personal equipment, enabling the acceleration of the transformation well- from TRUE reliable Mission-Critical Communications to HIGH robust IoT and AI-enabled Mission-Critical Communications from public safety to industries.

5.5 Connected body-worn cameras enable improved emergency operations

Unlock new powerful capabilities with 4G and 5G, enabling "Video as an intelligent Sensor"



Video surveillance continues to change, while the market is undergoing continuous growth in the safe city and business sectors. The development of AI, in particular advances in Edge AI coupled with Deep Learning Algorithms (DLAs), migration to the infrastructure of cloud and 5G, adoption of professional devices and unified digital platforms, together with high-performance connectivity are transforming video surveillance in public safety and security sectors. These all contribute to making analytics more automatic and increasingly ingrained

in workflows, aiming not only to "protect" but also "prevent".

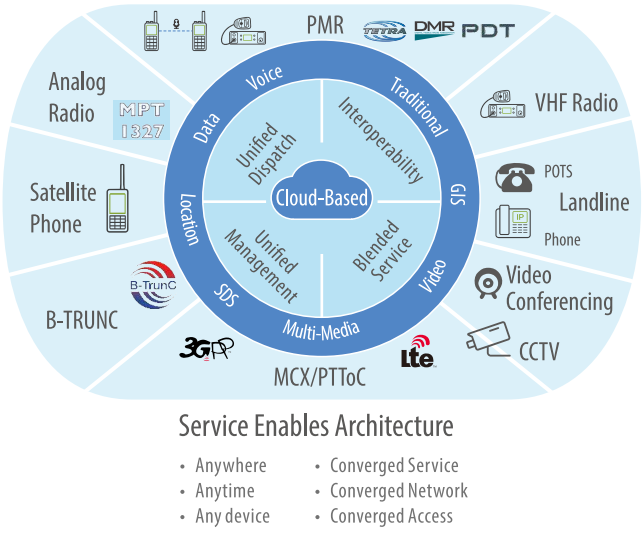
By connecting to, controlling, receiving and forwarding video either to an individual or a group, video surveillance is increasingly used by agencies in real-time rather than getting activated for investigation "after the event" or 24/7 human monitoring. As the complement to CCTV, wireless cameras have been playing more important roles because of their mobility ability -for an instant, using a connected 4G body-worn camera for live-streaming during daily operations. 5G exploits the capabilities offered by substantially greater bandwidth to enable higher resolution images and the near-elimination of latency for real-time monitoring and transmission, thus supporting more edge cameras in remote locations and mobile cameras anywhere.

Body-worn cameras are broadly taken up across police, fire and ambulance services with a range of use cases, of which many are traditional devices used only for recording, also discouraging abusive behavior. With a rise in the number of risks to public safety, organizations need to take more initiatives to safeguard officers. Connected body-worn cameras to 4G or 5G networks allow officers to deliver an objective view of an event, improve officers' safety and reassurance during an incident, realize a situation in real-time and take proper actions quickly, particularly in an escalating situation. These can be achieved through either continuous live-stream transmission, a triggered live video stream on-demand, or remotely activated video streaming by supervisors in a control room.

As a killer application, MC Video provides responders with the ability to capture and stream video securely through Mission-Critical networks. It must rely on a stable, robust connection to minimize loss, interruption and delay during transmission, by supporting reliable access, seamless handover and high performance. Convergence+ strategy enables collaborative video devices around 4G body-worn cameras and 5G smartphones, supporting in-depth synergy between them ensuring intelligent management and robustness connectivity. Going beyond the ordinary BWC, it is a converged body-worn camera allowing for users to use it as a radio with a built-in PTToC app, also allowing for enhanced location tracking and monitoring with a built-in GPS.

5.6 Harness open universal communication platform (OUCP) unleashing the potential of hybrid networks

Next-Gen Open Universal Communication Platform (OUCP)



Service Enables Architecture

- Anywhere
- Anytime
- Any device
- Converged Service
- Converged Network
- Converged Access

The hyper-connection revolution will undoubtedly drive and expand towards more network connections and data collections through coordinated wireline and various wireless networks, providing public safety and industries with a resilient communication infrastructure and creating a distributed architecture coupled with cloud-based ICT platforms, including mobile edge cloud (MEC).

While evolving to the next-gen MC networks, with rare exceptions, the most significant challenges surrounding public safety and industries are building an interconnection network, creating a future-proof technical architecture that seamlessly

integrates different technologies and disparate networks, blending sophisticated services, and gathering a significant amount of data. These can be overwhelmed and costly, in practice, the concerns are around the uncertainty and complexity, along with considerations of an upgrade legacy system for supporting interoperability, public safety and industry organizations reluctantly decide to start.

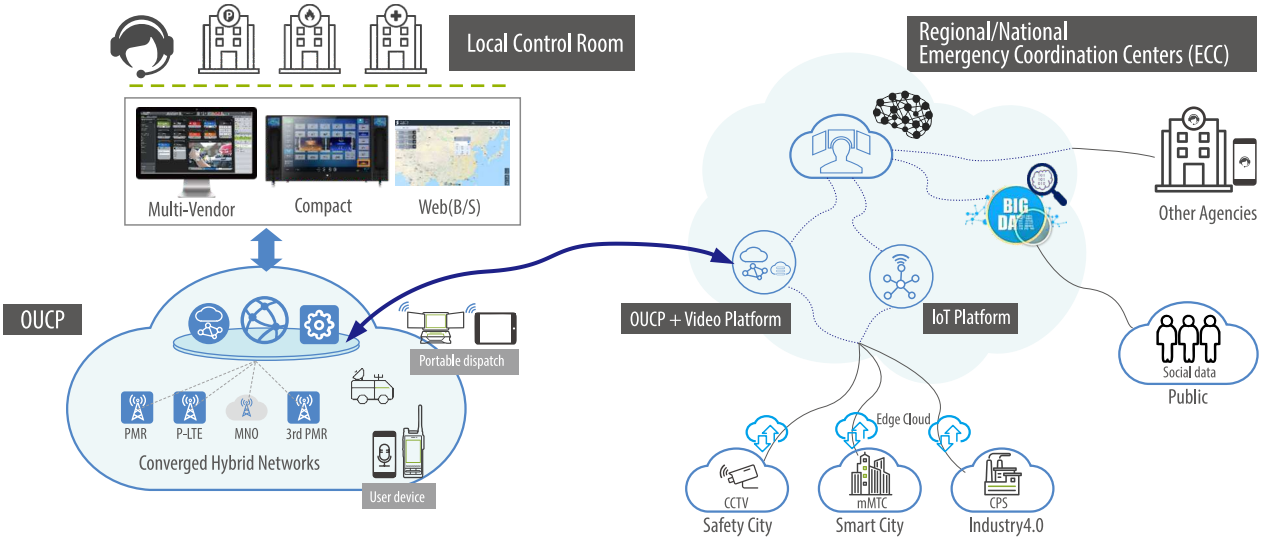
As the diagram illustrates, the proposed one suite of communication integration approaches, along with a "service enabled" framework, aims to build a universal platform that guarantees seamless communications across homogenous and heterogeneous systems. The proposed next-gen OUCP offers market-proven interoperability across networks by integrating complex systems and breaking down information silos, enhancing public safety coordination and collaboration across agencies through real-time information sharing. Centralized management and service controller enable introducing new applications easily via flexible SDK and standardized API interface. Intelligent model-design components with highly scalable and flexible configurations support small-scale deployment with CAPEX & OPEX reduction.

The OUCP offer a unified experience of agility, simplicity and flexibility across various networks anytime, anywhere, on any devices, with value-added features like seamless mobility and blended services, delivering meaningful values to customers who no longer have to make comprise their service by supporting flexible PMR/LTE interworking approaches, broader interoperabilities among disparate systems and comprehensive networks integrations.

The next-gen OUCP enables significant value-creation for customers, integrators and service providers with multiple networks interworking, simplified software development, standard-compliant MCX applications, converged multimedia services, blended video conferencing and unified next-gen dispatching.

5.7 Developing and implementing next-gen dispatch systems

Advancing Control Room with Next-Gen Dispatch Systems



Emergency Communication Centers (ECC) or control rooms are used to provide daily command-and-control support for first responders through PMR networks, which virtually reply on consoles to manage voice-centric communication with extensive features and capabilities.

The new demands placed on agencies' control rooms have never been greater, driver for the building of new

consoles advances towards the next-gen dispatch systems aiming to support control room to adapt to hybrid networks and geo-diverse cloud deployment, leverage rich data and multimedia resources, address the critical issues of interoperability and operations of PMR/LTE, and tackles challenges involving the complexity of the build-out. The proposed next-gen dispatch system enables the delivery of enhanced customer value with the following key features.

1. Flexible consoles and Improved user experience: Provides a range of types of role-based consoles-desktop, laptops, E-Center, tablets and handsets carried by responders-adapting to the different use cases, and simplifies partner software development by delivering SDKs. Browser/Service (B/S) and Client/Service (C/S) architecture allow dispatchers to access and operate from IP-connected environments locally and remotely anytime. Using user-friendly GUI and plug-in design, supervisors can easily administer functional models to deliver roles-diversified capabilities with an exceptional user experience, simplifying operation and speeding up processing.

2. Seamless and smooth bridging of PMR and LTE: Single console supports the unified dispatching and operations of multiple network functions of both PMR (DMR/PDT/Tetra) and LTE (PTToC/MCPTT) along with a set of advanced features, maximizing customers' existing capital investments while minimizing operation workloads.

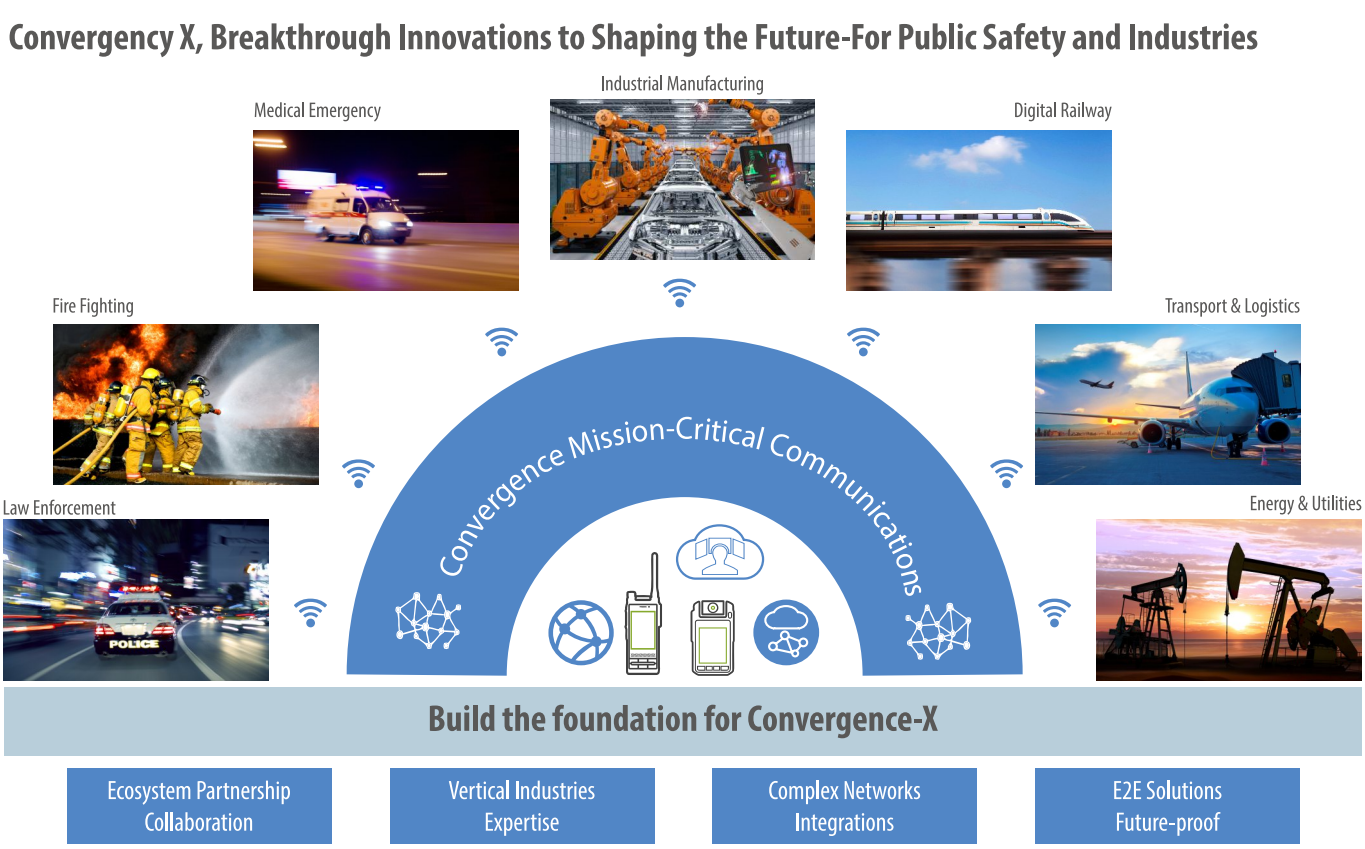
3. Comprehensive situation awareness and coordination: By accessing Analog, PMR, LTE, body-worn cameras video, CCTV, conferencing, satellite, landline, public phone and connected responders, the Next-Gen dispatch system integrates with other command-and-control systems including GIS-based contextual mapping, video streaming and data (sensors) and other external feeds to enhance control rooms' perception capabilities, keeping responders safe, providing a clearer and real-time understanding of the situation and better preparation, improving overall productivity, efficiency and effectiveness.

4. Streamline the incident management workflow: By seamlessly integrating into call-talking, records, analytics and report, duty management, and major event management, the next-gen dispatch system facilitates executing workflow to streamline the entire call reception and incident management process.

5. Across organizations collaborations: In a multi-vendor, multi-technology, and multi-carrier network environment, leveraging OUCP, the system has a multi-level and hierarchical architecture which supports flexible implementations from localized to centralized, from on-premises (agency-hosted) to cloud-centric (operator-hosted), and from server-level redundancy to cloud geo-redundancy, meeting the rising needs for multiple organizations collaboration and information sharing among police, fire, disaster rescue and EMS, as well as assisting responders, enterprise and public during large-scale incidents and major events.

With such strengths and specialization, the next-gen dispatch system products can be used by public safety and BC industries, including oil & gas, metro and railway worldwide.

6 Advancing convergence towards various industrial transformations



The massive number of connected devices, fast-growing complex systems, overwhelming amount of information and increasingly emerging technologies significantly drive the need for implementation of multi-layered convergence networks to simplify implementation, lower cost, and improve flexibility around the transformation.

The best possible outcome is making the customer happier by solving the problem. The standards-based convergence approach and the convergence-enabled solutions have been well demonstrated with a wide array of successful Proof-of-Concept (PoC) use cases and commercial cases across public safety and industries around the globe, we believe we will see the enormous potential in convergence-native solutions to help customer accelerate the transformation of the traditional narrowband system to the next-gen hybrid networks with the adoption of MC-LTE and new technologies.

A successful industrial digital transformation goes beyond technology. Getting these starts with partnership across the ecosystem, rethinking customer business processes, and creating thrust throughout value chains, Hytera builds four pillars in the field-ecosystem and partnership collaboration, vertical industries expertise, complex network integration experiences and future-proof E2E solutions, for the foundations and underpinnings of supporting public safety and various industries' Mission-Critical Communication evolutions, aligned with the "convergence-X" accelerator.

7 Case studies

Convergence-Native Solution of Public Safety Users to Extend Outdoor Coverage to Indoor

Background:

Per the communication requirements of the 2014 Youth Olympic Games, the eastern China City has deployed a PDT trunking system for public safety users, which covers the outdoor areas of the city. However, there are still many indoor areas that need to be covered, such as supermarkets and shopping malls, underground parking lots, hospitals and banks, etc. So it is necessary to extend the outdoor coverage to indoor areas with blind spots where police work on their duties.

Solutions: Convergence-Native Network Supports Voice, Location, and Multimedia Data Services Covering both Outdoor and Indoor

In 2020, Users adopted Convergence-Native solutions, updated the core network, MSO of the PDT system to interwork with the APN network, meanwhile adopted dual-mode rugged radio PDC680, so that in indoor areas mentioned above, the officers can use the dual-mode radio and public network coverage to realize high-quality PDT voice communication and make an individual call, group call, and emergency call, etc. Also, the indoor location of the officer can be transmitted back to the control room in real-time, based on the location technology of the public network.

What's more, in indoor and outdoor areas with public network coverage, the dual-mode rugged radio is enabled by multimedia trunking services, such as ID information inquiry, image transmission, video calls, etc.

Convergence-Native Solution Realizes Unified Dispatching for COP15 Security

Background:

The United Nations Convention on Biological Diversity now has 196 parties, making it the international environmental convention with the most significant number of signatories globally. Phase I of the 15th Conference Of the Parties (COP15) was held in a southwest China city, from October 11 to 15, 2021, to review the "Post-2020 Global Biodiversity Framework" and set the global biodiversity targets for 2021-2030. Delegates from over 192 countries attending this high-level international meeting raise the bar of security standards, and nearly 10,000 public safety users from different departments are helping the conference be held successfully.

Solution: Convergence-Native Dispatch Platform at Control Room Provides Unified Dispatching Across Departments and Systems

A PDT digital trunking system has already been in place, covering the major areas of the city. To address the COP15 communication requirements of unified dispatching:

1. Hytera upgraded the PDT system into a convergence-native solution, with an OUCP (Open Unified Communication Platform) platform deployed in the control room, connected to the CCTV system.

2. The public safety officers for the event were equipped with Dual-mode Rugged Radio PDC680, and part of the security staff and volunteers were equipped with PTToC Radio PNC380, interconnected with one another to achieve solid voice communication, and multimedia services such as data, video, AI data analysis services, and Internet of Things (IoT) applications.

3. The control room monitors the real-time location of VIP fleets, and surveillance real-time video information of key venues like the conference center and hotels for timely decision-making. Commanders can also circle on the electronic map in the control room, and set up a one-click unified dispatch of on-location security staff on the circled area.

The OUCP platform guarantees unified dispatching with zero failure during the whole COP15 event period, which has proved the native convergence solution to be secured and reliable.

Application of Convergence-Native Solution for Incidents Prevention and Control

Background:

With the growth of the southeast China coastal city, the city's public safety sector faces more pressure on daily security management, in addition to major security tasks such as mega-events and international conferences every year. In order to cope with this situation, it is necessary to replenish the security staff, and security patrol team personnel in the existing public safety and security system.

Solution: Terminals and Control Rooms Deployed using Convergence-Native Solution

The city upgrades the existing PDT system using Convergence-Native solutions; adopts dual-mode rugged radios and Body-Worn Cameras (BWC) for first responders, and equips the security patrol team and security staff with PTToC devices, BWC, and PoC radios; deploys control rooms in different locations to implement multi-levels managements.

The convergence-native solution utilized the interoperabilities among different departments under different communication systems, and improved the security prevention and response efficiency.

www.omdia.com
askananalyst@omdia.com

Copyright Notice and Disclaimer

The Omdia research, data and information referenced herein (the "Omdia Materials") are the copyrighted property of Informa Tech and its subsidiaries or affiliates (together "Informa Tech") and represent data, research, opinions or viewpoints published by Informa Tech, and are not representations of fact.

The Omdia Materials reflect information and opinions from the original publication date and not from the date of this document. The information and opinions expressed in the Omdia Materials are subject to change without notice and Informa Tech does not have any duty or responsibility to update the Omdia Materials or this publication as a result. Omdia Materials are delivered on an "as-is" and "as-available" basis. No representation or warranty, express or implied, is made as to the fairness, accuracy, completeness or correctness of the information, opinions and conclusions contained in Omdia Materials. To the maximum extent permitted by law, Informa Tech and its affiliates, officers, directors, employees and agents, disclaim any liability (including, without limitation, any liability arising from fault or negligence) as to the accuracy or completeness or use of the Omdia Materials. Informa Tech will not, under any circumstance whatsoever, be liable for any trading, investment, commercial or other decisions based on or made in reliance of the Omdia Materials.

Hytera Communications Corporation Limited
Stock Code: 002583.SZ
Address: Hytera Tower, Hi-Tech Industrial Park North, 9108# Beihuan Road, Nanshan District, Shenzhen, P.R.C
Tel: +86-755-2697 2999 **Fax:** +86-755-8613 7139 **Post:** 518057
Https://www.hytera.com **marketing@hytera.com**

Hytera retains right to change the product design and specification. Should any printing mistake occur, Hytera doesn't bear relevant responsibility. Little difference between real product and product indicated by printing materials will occur by printing reason.

HYT, Hytera are registered trademarks of Hytera Communications Corp., Ltd.
©2022 Hytera Communications Corp., Ltd. All Rights Reserved.