



# TRANSFORM PUBLIC SAFETY COMMUNICATIONS

THROUGH BROADBAND INNOVATION





# PUBLIC SAFETY COMMUNICATIONS AN EVOLVING LANDSCAPE

Public safety operations are becoming increasingly information-driven, requiring access to a widening range of text, imaging and video applications. Although TETRA networks support secure and reliable low data rate services, throughput constraints limit their suitability for real-time video or high speed data applications.

With recognition growing that operational data should be transported over mission critical networks, it is important to look at how a unified TETRA and Public Safety LTE network should be implemented and what benefits it needs to deliver.

## 3GPP LTE

Defined by the 3rd Generation Partnership Project (3GPP) LTE is a wireless technology that enables wide area broadband communications. Key enablers of LTE's exceptional spectrum efficiency and high data rates are:

- Orthogonal Frequency Division Multiplexing in the air interface
- Advanced antenna techniques including Multiple-Input Multiple Output (MIMO) and beamforming.

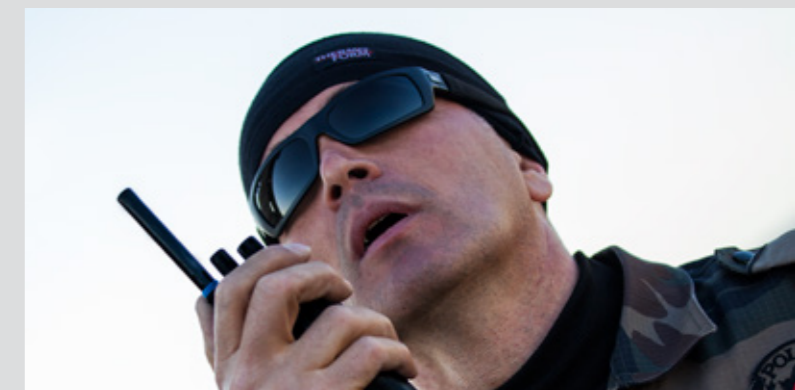
In addition to high data rates, defining characteristics of LTE:

- Flat, all-IP architecture
- Low latency

## ETSI TETRA

An open standard developed by the European Telecommunications Standards Institute (ETSI), TETRA defines a digital private mobile radio system offering mission critical voice and narrow-bandwidth data services.

The TETRA Enhanced Data Service (TEDS) is a data service, defined by ETSI in the TETRA Release 2 standard, enables wideband data rates of up to 80kbps in a 50kHz channel.



## WHY UPGRADE TO TEDS?

TEDS will provide a significant increase in data speeds whilst retaining all of the TETRA security and resilience features.

TEDS is:

- Here Today
  - Standards Based
  - Covers 90% of Applications
  - On current systems, requires no new hardware
- Motorola is 100% committed to TEDS.



## CORE REQUIREMENTS OF PUBLIC SAFETY NETWORKS

Mission critical communications require mission critical networks that guarantee:

**INTEROPERABILITY:** Emergency response units must be able to interoperate with each other, associated agencies, and cross-border organizations.

**INSTANT COMMUNICATION:** Networks must allow fast setup times for group and individual calls and rapid sharing of critical data.

**NETWORK CONTROL:** Traffic needs to be prioritized and pre-empted on a per user basis, in real time.

**ROBUST COVERAGE:** Network coverage must be extensive, spanning the entire area of responsibility.

**GOVERNMENT GRADE SECURITY:** Communications must satisfy national security requirements.

**HIGH AVAILABILITY:** Networks must be highly resilient, offering multiple layers of redundancy.

**RUGGEDIZED END-USER DEVICES:** Rugged, specialized devices are needed to support a range of applications tailored to users' roles.

We know that you are also concerned about how you can:

**Combine Public Safety LTE multimedia services with your existing TETRA services.**

**Preserve network investments and avoid quick obsolescence.**

**Reduce capital and operational costs without compromising service.**

## THE MOTOROLA SOLUTION A UNIFIED MISSION CRITICAL COMMUNICATIONS NETWORK

Combine standards-based TETRA, TEDS and LTE systems in a unified network and you can transform communications to dramatically enhance the efficiency and effectiveness of your agencies.

**ENSURE SAFER FRONTLINE OPERATIONS:** During a traffic stop, video recorded by a camera on the police car's dashboard is accessed on demand from the patrol supervisor's command vehicle. The real-time video allows the supervisor to determine the need for additional resources and minimize risks to patrol officers' safety.

**ENHANCE INFORMATION SHARING WITH REAL-TIME COLLABORATION:** Dispatchers can proactively target crime hotspots by sharing annotated maps in real time to LTE devices or guide police officers through new patrol routes, using handheld LTE devices.

**IMPROVE INCIDENT RESPONSE THROUGH DYNAMIC PRIORITISATION:** During a multi-agency response, the police incident commander requests a live video feed from a remote surveillance camera. The system dynamically prioritises this critical live video data, pre-empting lower priority traffic sharing the same broadband resources on the private LTE network. The live video stream is then further distributed by the commander to incident talkgroup participants equipped with LTE data devices.

**BENEFIT FROM A COMPREHENSIVE DEVICE PORTFOLIO:** Leverage a wide array of specialized devices to support a myriad of use cases, including LTE USB and rugged vehicle data modems; rugged LTE smartphones and tablets; rugged LTE smartphone devices; fixed location LTE devices; and a comprehensive range of TETRA portable and mobile radios.

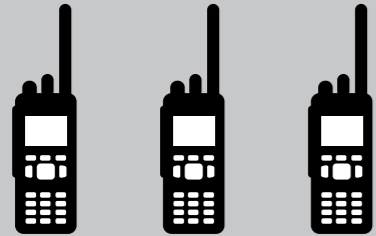
**EXTEND MISSION-CRITICAL DATA COVERAGE:** Data devices can move across TETRA, TEDS and LTE networks to expand coverage and to provide additional layers of redundancy for mission critical data applications.

**IMPLEMENT UNIFIED MANAGEMENT TO STREAMLINE PROCESSES:** To simplify operations, a single portal provides an integrated view into the health and performance of the TETRA, TEDS and LTE communication systems.

Our two-step modular evolution to mission critical broadband services builds on your core TETRA systems.

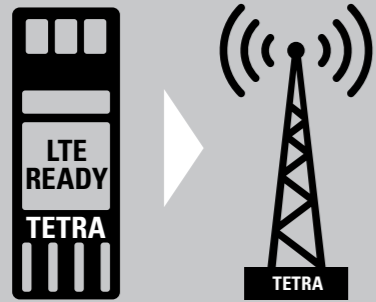
# 1

## STEP ONE DEPLOY AN LTE-READY TETRA NETWORK



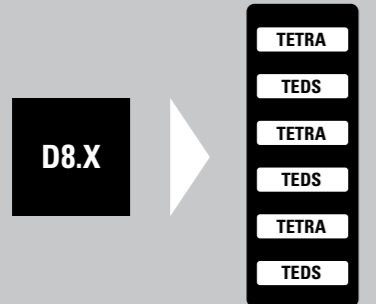
### PUBLIC SAFETY DEVICES

DEPLOY TEDS-CAPABLE TETRA RADIOS THAT ARE BLUETOOTH-READY FOR COLLABORATION WITH LTE DEVICES



### RADIO ACCESS NETWORK

DEPLOY LTE-READY, MTS4L TETRA BASE STATION CABINETS TO SUPPORT EASY EXPANSION



### CORE NETWORK AND NETWORK MANAGEMENT

DEPLOY A DIMETRA SYSTEM RELEASE 8 (D8.X) LTE-READY NETWORK CORE, UNIFYING TETRA, TEDS & LTE  
EXPAND CAPACITY TO SUPPORT GROWTH OF TETRA/TEDS VOICE AND DATA, AND ADD A SIMPLE PLUG-IN WHEN READY FOR LTE

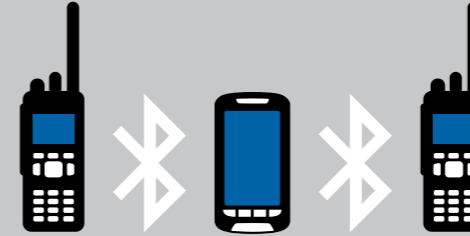


### PUBLIC SAFETY APPLICATIONS

IMPLEMENT UNIFIED APPLICATION SERVICES READY FOR FUTURE CONVERGED APPLICATION DEPLOYMENT  
AUGMENT CONSOLE AND CAD APPLICATIONS WITH DATA AND IMAGE SHARING APPLICATIONS ON TETRA AND TEDS BEARERS

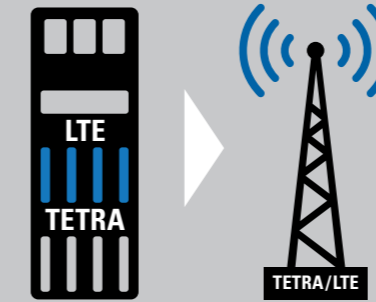
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## STEP TWO DEPLOY LTE AS A UNIFIED SERVICE WITH TETRA



### PUBLIC SAFETY DEVICES

DEPLOY LTE DEVICES OPERATING IN DEDICATED PUBLIC SAFETY LTE SPECTRUM  
ENABLE TETRA RADIO AND LTE DEVICE COLLABORATION



### RADIO ACCESS NETWORK

PLUG LTE MODULES INTO THE MTS4L TETRA CABINETS, AS NEEDED, TO SATISFY BROADBAND DEMAND  
MANAGE SITE OPERATIONS AND MAINTENANCE FROM INTEGRATED NETWORK MANAGEMENT PORTAL



### CORE NETWORK AND NETWORK MANAGEMENT

UPDATE D8.X SYSTEM SOFTWARE TO INSTALL LTE COMPONENTS  
AUGMENT EXISTING UNIFIED SERVICES WITH VIDEO STREAMING SERVICE  
INTEGRATE WITH COMMON FAULT MANAGEMENT AND COMMON SUBSCRIBER PROVISIONING AND MANAGEMENT SYSTEMS  
INTEGRATE WITH LTE CONFIGURATION, PERFORMANCE AND SECURITY MANAGEMENT SYSTEMS



### PUBLIC SAFETY APPLICATIONS

RUN MULTIMEDIA APPLICATIONS OVER PUBLIC SAFETY LTE NETWORK  
ADD VIDEO APPLICATIONS  
SUPPORT EXISTING NARROWBAND APPLICATIONS ACROSS LTE AND TETRA DEVICES

# BENEFIT FROM INNOVATION THE CONFIDENCE OF A STANDARDS-BASED SYSTEM

Our unified IP architecture is compliant with 3GPP LTE – the pre-eminent wireless broadband standard – and the ETSI TETRA specifications. Open standards encourage markets to develop so you can:

- **Benefit from economies of scale**
- **Access innovative services and applications created by developers**
- **Select devices produced by numerous manufacturers**

## HARMONIZED SPECTRUM FOR PUBLIC SAFETY LTE

With a second digital dividend approaching, Motorola Solutions is working with standards bodies to help drive global spectrum harmonization; unified spectrum will accelerate the development of dedicated, resilient LTE networks and reduce the cost of infrastructure and devices through economies of scale.

# PARTNERING WITH PUBLIC CARRIERS SUPPLEMENTING BROADBAND COVERAGE AND CAPACITY



Where access to dedicated LTE spectrum is not yet available, using commercial broadband services is an option for non-mission critical applications. While this has drawbacks – the carrier controls quality of service and reliability – our standards-based approach helps to ensure that you can integrate 3GPP public carrier systems with

your unified TETRA and private LTE networks. With the 3GPP standards-based interfaces of our unified core, public safety operators can implement the full spectrum of mobile virtual network operator (MVNO) arrangements – subject to the relevant partnership agreement being in place.

# MEETING ALL OF YOUR AGENCIES' NEEDS COMMAND, CONTROL AND MORE

Our unified TETRA, TEDS and LTE public safety architecture will offer a complete suite of network applications and command and control functionality.

## NETWORK APPLICATION SERVICES

Public safety agencies will be able to develop and integrate a range of mission critical applications using standards-based protocols to access private LTE, TEDS and TETRA services. Options include location, presence, addressing and messaging. In addition, a unified Push-To-Talk service ensures voice interoperability across TETRA, Public Safety LTE and other carrier networks.

## MULTIMEDIA COMMAND AND CONTROL

Dispatch as well as Command and Control Centre teams will be able to access more intelligence through unified application services and live information sources gathered by TETRA, LTE and fixed IP networks:

**Enhanced insight:** Using a common mapping application presenting resource location, video feeds, emergency alerts and sensors, commanders and officers have improved insight into operations and incidents.

**See more:** Operators will be able to access and edit footage from LTE-enabled mobile cameras and fixed video feeds. They will be able to send images and video to field teams using unified application services that work across TETRA, TEDS and LTE networks. Advanced analytics will enable real time alerts, while incident correlation associates video with voice and data, based on time, location and context.

**Robust protocols:** All images can be retained with strict information assurance for evidence submission.

## INTEROPERABILITY

Our solution will bridge together private LTE, TEDS and TETRA networks to deliver unified services, pairing mission critical voice with broadband multimedia applications.

A Mobile Virtual Private Network (MVPN) gateway will enable public safety data devices to move across TETRA, TEDS and Public Safety LTE networks. Additionally, unified end-to-end encryption will guarantee security for all data communications.

## NETWORK CONTROL

Your agencies will have total control over user databases, user preferences, talkgroups, fleet mapping and daily operational procedures. Through the built-in dynamic priority feature, you can optimize system access to the most critical users. The prioritisation system is multi-dimensional, enabling priority assignments based on the user's role or jurisdiction and other relevant dimensions.



## THE BEST USER EXPERIENCE

We will allow our LTE and TETRA devices to collaborate, so users can benefit from the combined coverage of the two networks for enhanced resilience. In addition, by supporting public safety grade priority on LTE as well as TETRA, the system ensures that officers dealing with critical situation will always receive the best service available.

# THE SCALE AND RELIABILITY YOU NEED

## COMBINED CORE NETWORK

Our Dimetra System Release 8 platform provides the foundation for the unified system, allowing TETRA and LTE core components to be implemented on the same hardware. By deploying the Release 8 platform, you can therefore achieve dramatic cost-efficiencies and augment your TETRA network with LTE broadband capabilities.

## ROBUST COVERAGE

The MTS4L TETRA and TEDS cabinet has provision for installing the LTE eNodeB modules in the same cabinet – so the footprint is unchanged. You can simplify site acquisition, save on operation and maintenance costs and scale your network as required. The installation of the eNode B into the MTS4L cabinet will take less than 60 minutes and at no time are TETRA carriers switched off. There will be a few minutes of interruption to the backhaul whilst it is switched to be shared by TETRA and LTE, during this time the TETRA carrier will revert to local site trunking. If there are redundant site links in place there will be no interruptions to backhaul and so no interruption to full TETRA service throughout the eNode B installation.

## CONVERGED BACKHAUL

A converged backhaul provides a reliable mechanism by which LTE and TETRA networks share a common IP transport network. Key benefits of the shared transport network are better backhaul link utilization resulting in lower operational costs.

## MTS4L TETRA/LTE CABINET

This dual technology cabinet combines TETRA/TEDS and LTE technologies into a single cabinet. Flexible deployment options allow an operator to deploy a TETRA/TEDS network which is ready for the addition of an LTE eNode B with the minimum of disruption to TETRA service. This allows the operator to time and scale the overlay of LTE service to meet their unique operational needs. The cabinet is also available in an Earthquake Region 4 version.



## INFORMATION ASSURANCE

Information assurance (IA) measures ensure the confidentiality, integrity and availability of voice, data and multimedia communications in the unified network. Features supporting IA include end-to-end encryption of communications and multiple contingencies at network and base station levels for continuous availability.

## COMMON CENTRALIZED NETWORK MANAGEMENT

You will have a single, integrated web portal to gain intuitive access to all performance, configuration, security and operational policies for the unified network. Using access controls, you can manage the access you provide to member agencies and customize how information is presented to them.

# RUGGEDIZED END USER PUBLIC SAFETY DEVICES

We will offer a complete range of radios, terminals and USB data modems. Our TETRA radios and Public Safety LTE handheld devices provide best in class RF performance and Bluetooth® for device collaboration. Collaborative functions will support a wide range of uses, such as rerouting of application data from LTE to the TETRA/TEDS network.



# POWERFUL APPLICATIONS

Combine TETRA, TEDS and Public Safety LTE in a unified network and hundreds of potential applications become available. The network, a range of intelligence sources and powerful devices with advanced, intuitive user interfaces, seamlessly interact to present your people with the information they need, when they need it. Users are better equipped to safeguard themselves, colleagues and the public, be more productive and successfully complete their missions.

**IMPROVE INCIDENT RESPONSE:** When a major incident unfolds, dispatchers can review who's nearby and create a dynamic talkgroup. Responders are given network priority and receive a live video feed to their vehicle. This swaps from the vehicle to the officer's LTE device as they arrive on-scene. Meanwhile CCTV cameras monitor for fleeing suspects. TETRA voice and private LTE data services combine to provide real-time situational analysis between the field and command. With fast access to a range of real-time intelligence resources your team effectively and quickly resolves the situation.

**IDENTIFY SUSPECTS – FAST:** With access to a range of real-time, constantly updated information supplied over the unified network, officers can be far more effective. For instance, using a fingerprint scanner securely connected to their TEDS-enabled TETRA radio or LTE device, they

can easily and rapidly confirm a suspect's identity – and decide whether to make an arrest or let them go.

**DEFUSING FLASHPOINTS:** Officers policing a big match are equipped with LTE devices and TETRA radios. Their LTE device assists with tactical decision-making, providing a real time view of the situation using images, video and maps. Commanders monitor for potential trouble-makers, assisted by CCTV. A trouble-maker is spotted and their image is sent to a multimedia talkgroup and fed into officers' real-time collaboration application using TEDS, while relevant video footage is distributed to officers using LTE. Voice instructions on the suspect's background are issued over a TETRA talkgroup and a tactical team moves in. The individual is pulled away. The flashpoint is defused.

# MOTOROLA SOLUTIONS SUPPORTING YOU EVERY STEP OF THE WAY

With Motorola Solutions you have a clear path toward transformed mission critical communications combining the benefits of TETRA and LTE technology. We offer a full spectrum of services to help you develop a technology and operations strategy. We can also build your network, own it and operate it for you (including multi-vendor environments). We have developed innovative approaches to accelerate network build and our security systems are verified by national governments worldwide to the highest standards.





To learn about Motorola Solutions for public safety organisations, contact your Motorola Solutions representative or visit [motorolasolutions.com](https://www.motorolasolutions.com).

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