



# Evolving to the Future: Technology and Network Choices

Motorola's MOTOA4™ Mission Critical Technology Portfolio



# MOTOA<sup>4</sup>™ Mission Critical Portfolio

Motorola's MOTOA4 portfolio of mission critical solutions provides a flexible strategy to deliver advanced applications and services through four phases of evolution:

### Assured mission critical communications:

Motorola offers complete TETRA solutions including infrastructure, terminals, consoles and command and control rooms. These systems and devices form the heart of a mission critical network delivering highly resilient and secure mission critical communications and the foundation on which to add more advanced systems and services.

### Advanced applications and services:

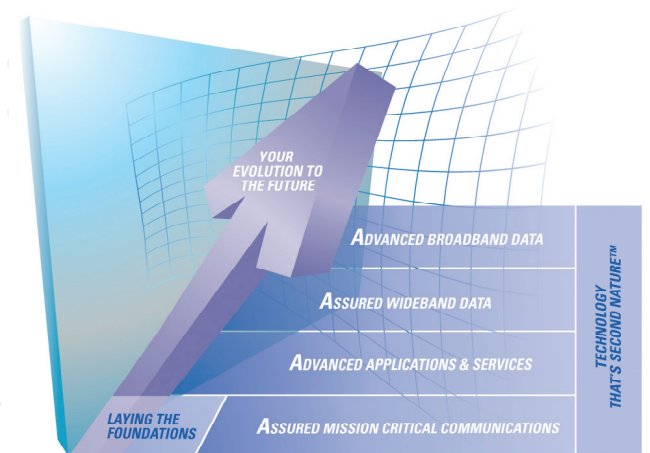
Building on this secure mission critical communications foundation, Motorola provides the expertise to optimise network performance and the advanced application portfolio to harness the inherent data capabilities of our infrastructure and products. Applications such as vehicle and user location, text messaging and mobile office solutions enhance operational effectiveness.

### Assured wideband data:

As data usage and demand for more advanced applications in the field increase, Motorola can improve bandwidth to support more services, more users and enhanced data capabilities (for richer content and services) through its TETRA Enhanced Data Service (TEDS). TEDS provides the assurance of highly resilient mission critical communications, delivering wireless data over wide geographic areas, wherever and whenever users demand it.

### Advanced broadband data:

TETRA networks meet the demands of the majority of mission critical users and organisations. However, some teams require the complementary support of broadband services to assist them with particularly challenging events such as major sports fixtures, concerts, economic or political conferences. Motorola's IP-based wireless broadband technologies make it easy to integrate wireless broadband with TETRA, to deliver high-bandwidth video and multimedia applications to teams in targeted areas.





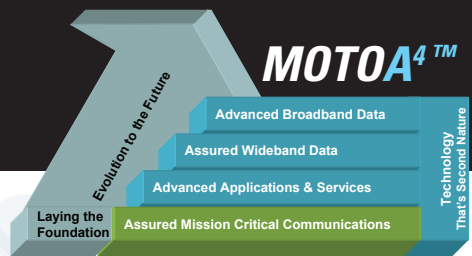
Not so long ago, critical communications relied on a conventional voice radio. Now new technologies provide the capability to deliver a toolbox of ever more advanced voice and data technologies, enabled by underlying networks that deliver an unprecedented level of interoperability, resilience, security, capacity, coverage, bandwidth and flexibility. With these changes in mind, this guide provides details of Motorola's flexible approach to evolving networks to support the provision of richer voice and data services to field teams.

## **Optimise prior investments**

Motorola's MOTOA4 portfolio prepares organisations to meet the demands of teams working in critical communications environments now and in the future. It is founded on a core mission critical network, providing ultra-resilient, secure and robust voice and data communications. The portfolio's solutions are designed to capitalise on the value of previous investments by reusing and enhancing this core foundation to evolve service delivery.

Using IP-based technology, new applications can be seamlessly deployed across networks while maintaining services for current users. Many applications can be offered through simple and cost-efficient software enhancements so that existing radios and terminals can be affordably upgraded to deliver new services. Enhancements to infrastructure are simple too. As a leader in mission critical technology, the IP DNA of our systems ensures it is easy to integrate TEDS to enhance the wide area data capabilities of existing TETRA networks.

The MOTOA4 portfolio is designed to mitigate the risk of network upgrades and ensure that systems are enhanced as cost-efficiently as possible. Our products are backed by a world-class support team that works with customers to understand their demands, plan their requirements and deliver and optimise networks. The systems put powerful capabilities in the hands of field teams, delivering critical and timely information where and when it is required.



# MOTOA4™ Assured Mission Critical Communications

Forming the foundation of our MOTOA4 portfolio, Motorola’s Dimetra IP TETRA solutions provide the foundation for future growth. The systems are highly flexible, supporting easy and cost-effective expansion when it’s time to add users, applications and coverage areas. And no matter where the customer is today, our MOTOA4 portfolio offers a path to more powerful communications for users on the front line.

## Successfully Managing the 2007 G8 Summit in Germany

In June 2007, Heiligendamm, Germany was host of the G8 Summit. To ensure the smooth running of the extensive security operation, a Motorola Dimetra IP TETRA network covering 9,200 square kilometres was installed. It comprised a Multi-Switching Centre, two control centres, 19 base stations, 1,300 Motorola radios, 625 mobile radios and 175 fixed radios. The devices were GPS enabled to allow the control team to optimise the allocation of resources and quickly direct personnel to areas where emergency calls were triggered. The infrastructure was installed and the security team fully trained in the technology within just three months.

The system demonstrated clear value. The security forces relied on continuous, secure communications without incident throughout the event. More than 20,000 security personnel were available anywhere at any time within the operational area. And more than 170,000 calls were connected almost instantly to underpin a successful event.

## Dimetra IP

Motorola’s Dimetra IP is the most widely deployed TETRA mission critical network across the world. Supplying all of the high-quality voice and seamless data services demanded by professional mobile radio users, it delivers two key advantages: a robust TETRA core and ‘grow as you go’ expandability.

### The robust core TETRA foundation:

Dimetra IP is built around Internet Protocol (IP) specifications, the same advanced and proven communication standards that underpin the Internet. With its IP DNA, new infrastructure is easily expanded to build capacity and coverage in line with organisations’ requirements – from installing a single base station, to providing full nationwide coverage.

### Resilience is built in too:

from the redundancy of base station components and robust high quality terminals to full fallback and disaster recovery solutions. This ensures continuous communications whatever the situation, whenever and wherever it is needed. Communications are also exceptionally secure. ‘Class 3’ encryption, and Group Cipher Key encryption, the toughest level of defence for the air interface, is employed by Dimetra IP. For additional peace of mind, an overlay option is available that applies end-to-end encryption.

### Grow as you go expandability:

Dimetra IP offers an extensive range of communication services that are ready to be implemented in line with available investment and operational requirements. These include Short and Packet Data Services to improve efficiency and productivity with data messaging; a wide range of dispatch applications; telephony services to extend the reach of the network by providing both cellular and TETRA capabilities in a single handset and voice recording capabilities to keep track of what happens on the network. All services are available from day one or as and when required.

### Maximise Network Use

As well as the core features outlined, Dimetra IP enables the network to be partitioned to maximise the network's use. Organisations can therefore have access to private communications for their operations over their own Virtual Private Network (VPN) securely tunnelled across the system. If interoperability between agencies is required, this can be accommodated securely and with ease.

### Comprehensive Integration Services

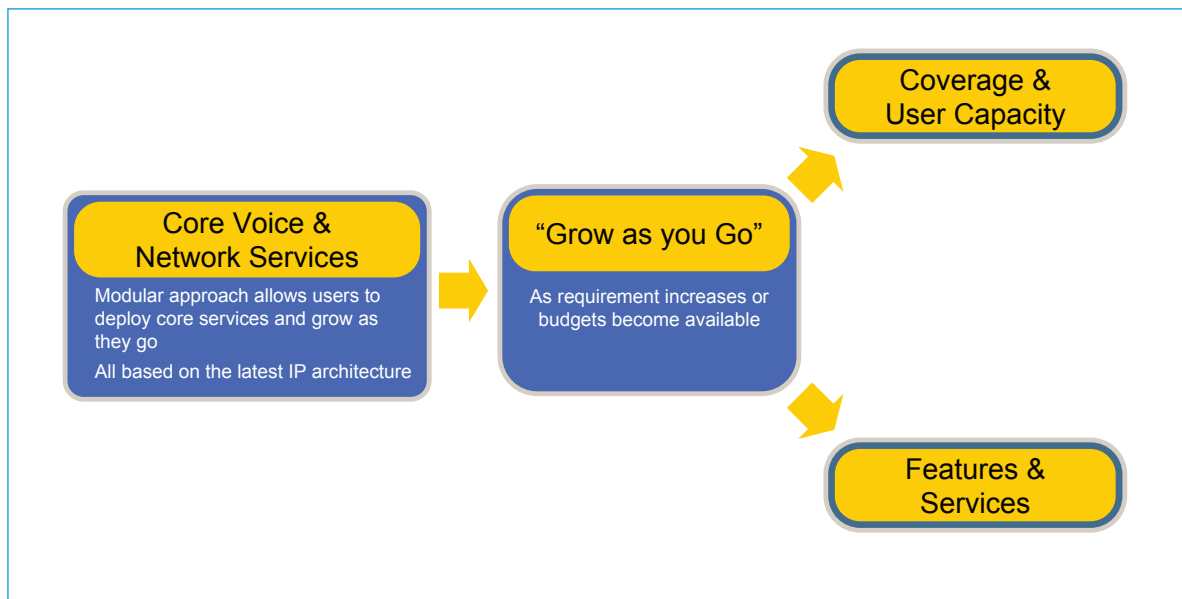
In support of TETRA implementations, Motorola offers comprehensive integration services. From initial concept to system planning, design and network construction, to the integration of third-party network components and applications (with exhaustive testing) to deliver robust, reliable and high-performance TETRA networks.

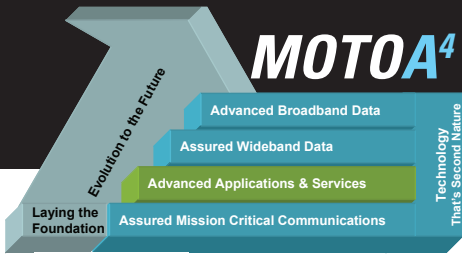
### Assured Mission Critical Foundation

With systems in place, organisations have the assured mission critical foundation on which to deliver more advanced applications and services to the field.

## Grow as you go

Motorola's IP DNA enables coverage, capacity and features to be added as and when they are required





**MOTOA<sup>4</sup>™**

## Advanced Applications and Services

With the assured mission critical foundation in place, organisations can exploit TETRA's inherent capabilities by expanding the applications available to field teams.

A wide range of applications are available that can be added into Dimetra IP networks at any time. The portfolio is continually expanded by Motorola's vibrant Application Partner Programme: third-party developers use Application Programming Interfaces (APIs) published by Motorola for Dimetra IP to create new services for teams working in uniquely demanding environments.

Highlights of applications developed for Dimetra IP include:

### **MotoLocator and MotoMapping:**

MotoLocator receives and stores location data from a variety of GPS-enabled devices. Location data can be accessed as it is received. Or it can be stored and accessed retrospectively to determine the location of devices at a particular time and date. It enables enterprises to remotely manage different types of mobile devices. For instance, the rate at which a device reports its position can be set based upon a variety of parameters, including time, distance and device triggers such as when the emergency button is pressed. The information harvested by MotoLocator can be integrated with a range of applications such as MotoMapping which displays locations on a map ensuring resources can be easily located.

### **IMAGIN: A complete portfolio of images in the field**



Scotland's Northern Constabulary provides its officers with on-the-street access to a wide variety of images and CCTV footage. The pioneering service delivers images from the UK's TETRA network to a Motorola WAP-equipped radio. The radio's large clear screen provides excellent detail of the range of images available to officers under the IMAGIN (Images Made Available to Groups or Individuals or Networks) concept developed by the force. Officers can view images of missing persons, suspects, and CCTV, and access maps while on patrol. They can also interrogate the voters' roll for the Highlands and Islands region to verify names and addresses (freeing up operations centre staff), and the DVLA driver database to check drivers' identities.

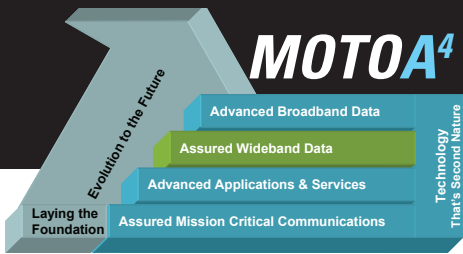
Taking advantage of TETRA's data capabilities, the scheme returns a range of benefits: officers will be able to spend more time on the streets (information on persons can be distributed without the need to return to the station), their safety is enhanced as they approach incidents armed with information about individuals, and missing persons can be traced more quickly which has potential to save lives. Ian Latimer, Chief Constable, Joint Police Board, says: 'The benefits in terms of officer safety cannot be overestimated and our ability to locate missing persons or track down criminals more quickly will only assist us in ensuring we continue to make the Highlands and Islands a safer place to live, work and invest.'

### **Motorola Messaging Communication**

#### **Switch 3 (MCS3):**

MCS3 is a digital IP-based unified messaging system. It securely links different communication systems so teams can share information with ease and confidence. Messages can be sent and received from radios, wireless mobile data devices, dispatch consoles, enterprise email clients, mobile phones and pagers.

These applications and more enable users to be more productive, make informed decisions based on critical real-time information and better safeguard themselves as well as the public they serve. To enhance the performance of networks, Motorola also offers a wide range of services and support to maximise the performance of networks, deliver high levels of security and optimise the service experience. We also provide full managed services solutions that leverage our mission critical expertise to reduce risk, increase flexibility and enable organisations to focus on their core business.



# Assured Wideband Data

Motorola is already seeing growing demand for enhanced data services to enable organisations to deliver more advanced services in the field. The MOTOA4 TEDS capability is designed to meet the increased requirement for robust and secure data access across wide geographic areas.

TEDS is part of TETRA standards Release 2. The specification is an evolution of TETRA Release 1. A key advantage of the technology is the enhanced data rate which reaches a maximum theoretical speed of 157kb/s <sup>(1)</sup>

Providing the same security mechanisms of TETRA Release 1, TEDS can be introduced into existing TETRA networks through a simple network upgrade programme. Its increased spectral efficiency (the amount of information that can be communicated within a given bandwidth) means that TEDS can be the most cost-effective way of expanding the overall system capacity including creating extra capacity for voice calls. To provide wide geographic coverage – similar to TETRA 1 – most networks are expected to be deployed with 25 kHz or 50 kHz bandwidths. This achieves a good balance between delivering services over wide areas while providing strong bandwidth performance to support new applications and larger numbers of users.

## Moving to TEDS

Motorola's latest generation of base stations are TEDS ready, requiring only a software upgrade and the addition of new base radios to provide this new capability in an extremely cost effective manner. Costs are further controlled as the Motorola IP core is fully scalable. So TEDS, along with voice and existing TETRA data services, can be supported on one integrated network. The existing infrastructure

links and network management, security systems and control room centres are all retained. The integration of TEDS is expected to gather pace over the coming years and will support an enhanced range of TETRA services.

## TEDS applications

Implementing TEDS will provide sufficient bandwidth to support the majority of applications that mission critical users require, including faster and richer database enquiries, higher resolution images and video streaming – low-rate video clips can be sent to officers to aid identification for example. Mission critical users can also be sent more detailed records and images, such as providing medical records to paramedics and images of missing persons to police officers. The intelligence forewarns teams of situations they are about to face. And it provides vital information to make informed decisions which improve incident management and better safeguard teams and the public they serve.

TEDS also provides more capacity for concurrent data usage by multiple users sharing the same data channels and intelligent mechanisms for managing data fairly between users. As well as building out TEDS coverage for advance applications and services, wireless broadband networks can be integrated alongside data in localities to support specific operations.

## Norway invests in TEDS

The roll-out of the world's first TEDS system has been announced by Norway's Nodnett Network based on Motorola's Dimetra IP TETRA infrastructure. The network will provide TETRA services across most of Norway for hand-held radio users including extensive up lift for indoor coverage in built-up areas. TEDS services are initially planned to be deployed to cover densely populated areas and major motorways with around one third of base stations expected to be equipped with a TEDS carrier. This will enable the Ministry of Justice to accommodate many more users across the TETRA footprint.

To upgrade to the TEDS service, an additional TEDS transceiver will be added to existing base stations followed by a simple software upgrade.

<sup>(1)</sup> Assuming no error correction and a 50KHz channel bandwidth



As data requirements continue to evolve, complementary technologies, such as wireless broadband, have an increasing role to play in critical communications. The systems can be used to provide high-speed data capabilities, delivering more advanced services such as full motion video that complement the capabilities of TETRA in support of local operations.

### Wireless potential

Motorola provides the complete range of wireless broadband technologies from mesh networks WiMAX systems.

Private mesh networks are easily built. The systems comprise small compact 'nodes' mounted on street furniture. The coverage is quickly constructed as the nodes instantly recognise one another to create a wireless network.

### *Connecting police officers in Bournemouth, UK*

Dorset County Police, like many other public safety organisations, often needs to provide enhanced security around major local events. It has teamed up with Motorola to review how wireless broadband can provide quickly built, low-cost, high-performance video surveillance and communications services to support major operations.

At the high-profile Labour party conference in Bournemouth, an event with major security implications, services available to officers were enhanced by the provision of wireless broadband coverage created by point-to-multipoint (Canopy) radio technology and Motorola's municipal wireless broadband solution, MOTOMESH™ Solo. MOTOMESH Solo delivers an instantly deployable, mobile video network and integrates Motorola's Mobility Enabled Access (MEA) directly into Personal Video Encoders (PVE) from Darim Vision.

The technology blanketed previous coverage blackspots in the area. Images were sent back to the control room both from fixed cameras and also the small remote cameras attached to officers' clothing. Dispatch teams scoured the footage for known offenders, making images of suspects available to field officers through the integrated WAP browser in their Motorola TETRA terminals, so they could approach possible troublemakers and pre-emptively prevent potential incidents.

The system is highly reliable and robust. And as coverage is private, no subscription fees are required. The technology complements TETRA, for instance if extensive use of full motion video is required.

Public networks such as Wi-Fi and WiMAX and metropolitan mesh systems (which are increasingly providing broadband across cities) can also be used to manage high-bandwidth applications that require lower levels of security. For this to happen, users will need devices that are compatible with TETRA, Wi-Fi, cellular, WiMAX, mesh and other wireless technologies.

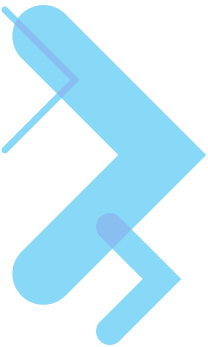
### Seamless Mobility

Motorola can offer a 'Seamless Mobility' solution so, as a user moves across network environments, the device will automatically connect them to the best available network for the service they are requesting, be it accessing the Web, filing a report to base, or communicating with colleagues. In this way a continuous, reliable and secure connection will be maintained.

### Your Evolution to the Future

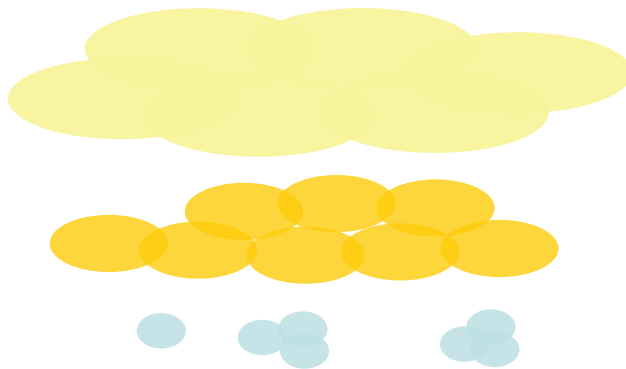
From its first deployment, TETRA has been proven to deliver advanced security, ultra-resilient voice and data communications over wide geographic areas. The second phase of the technology's evolution is seeing organisations take advantage of the inherent capabilities of TETRA to deliver more comprehensive data services and applications. This process will progress through the integration of wideband data services through TEDS and, also, the assimilation of high-speed data through wireless broadband technologies to support specific operations on a local level.

Motorola is leading the drive to build on the core capabilities of TETRA networks to advance the services available to field teams through its affordable and clear MOTOA4 mission critical portfolio. Moving forward, we are focused on continuing to advance the applications available to end-users, improving device design and working with governments and legislators around issues such as spectrum allocation to ensure the smooth evolution towards next generation mission critical networks.



## Complementary Data Solutions

Multiple Bearers Can Be Combined To Create A Seamless Solution



- **TETRA/TEDS provides wide area coverage for high-availability & secure high speed data transmission**
- **Complemented by public networks (GPRS/UMTS) for non-secure / commercial applications**
- **And/or a private (or public) broadband network (e.g. WiMAX, Wi-Fi, Mesh) for smaller areas and hotspots**



Making use of a multi-bearer seamless mobility solution

## **MOTOA4™** **Mission Critical Portfolio**

### Technology That's Second Nature and an Evolution Path That Will Get You There...From a Vendor Who Understands Mission Critical.

Only Motorola enables organisations to confidently take the next step in mission critical communications. The MOTOA4 portfolio presents a clear, affordable and flexible strategy to enhance the capabilities of TETRA networks. The four phases outlined can be implemented at any time and can be integrated individually (without the need to implement all phases) in line with resources available to organisations and their changing operational demands.

MOTOA4 enables mission critical users to optimise the value of their highly resilient, secure and robust TETRA networks. From this strong foundation, organisations can deliver reliable and innovative wireless applications to safeguard teams, and to support them in being more efficient day-to-day and, when crisis strikes, in making better decisions that lead to more successful mission outcomes.

For more information about the MOTOA4 portfolio and Motorola's commitment to mission critical users please visit our website <http://www.motorola.com/tetra>



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