POSITION PAPER

Evolving to the Future– Technology and Network Choices

Technology That's Second Nature™

MOTOA4™ Mission Critical Portfolio

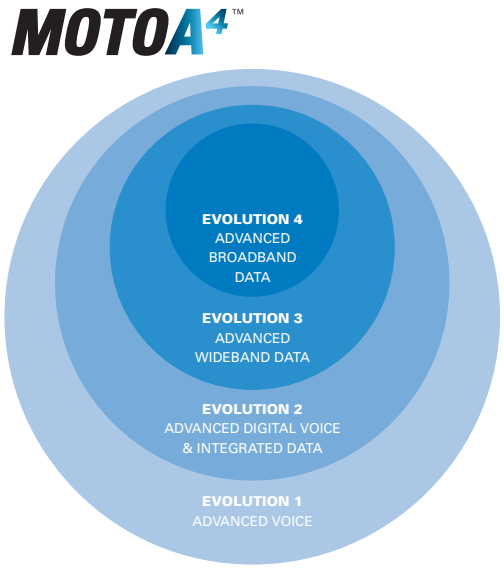
Not so long ago, public safety communications meant a conventional voice radio. Now it encompasses a toolbox of ever more advanced voice and data technologies, enabled by underlying networks that deliver an unprecedented level of interoperability, capacity, coverage, bandwidth, and flexibility. The networks of the past that most agencies still depend upon simply can't deliver on the promise of today's advanced applications.

Customers need a path to the future that brings their networks up to date, while respecting agency priorities and maximizing limited resources. The road ahead must consider on prior investments and get customers to where they're going with minimal disruption to users. This is "Technology that's second nature™."

Motorola's MOTOA4™ portfolio of mission critical solutions guides agencies along a flexible path, through four advanced evolutions from voice to video communications:

1. **Advanced Voice** – Mission critical voice communications using Motorola's proven analog or mixed mode analog/digital systems.
2. **Advanced Integrated Digital Voice and Data** – Interoperable Project 25 networks supporting applications such as vehicle and user location, text messaging, dual-mode FDMA/TDMA operation, and reprogramming of user devices over the air.
3. **Advanced Wideband Data** – Wireless data networking across a wide geographic area for web access, graphic images, and mobile office applications.
4. **Advanced Broadband Data** – High-speed networks for video, multimedia and bandwidth intensive applications.

Each evolution can build upon previous systems, although customers are not required to start with advanced voice in order to move to broadband data.



Executive Overview

Lay a foundation for future growth. The MOTOA4 portfolio provides flexibility, easy and cost effective expansion when it's time to add users, applications, and coverage areas. No matter where the customer is today, MOTOA4 offers a path to more powerful communications for the users on the front lines.

Leverage Prior Investments

The future evolution can build upon existing networks—including site infrastructure, core systems, user equipment, dispatch and network administration facilities, and software. Backward compatibility allows customers to continue using many of the applications and equipment they already own.

Migrate Gradually

Customers can incrementally select geographical areas or particular agencies for pilot projects. They can phase in new equipment as part of the normal replace/repair cycle. Users on new and existing systems will be able to seamlessly communicate with each other through advanced integration methodologies.

Begin with an ASTRO® 25 Network and Build on the Capability to Add:

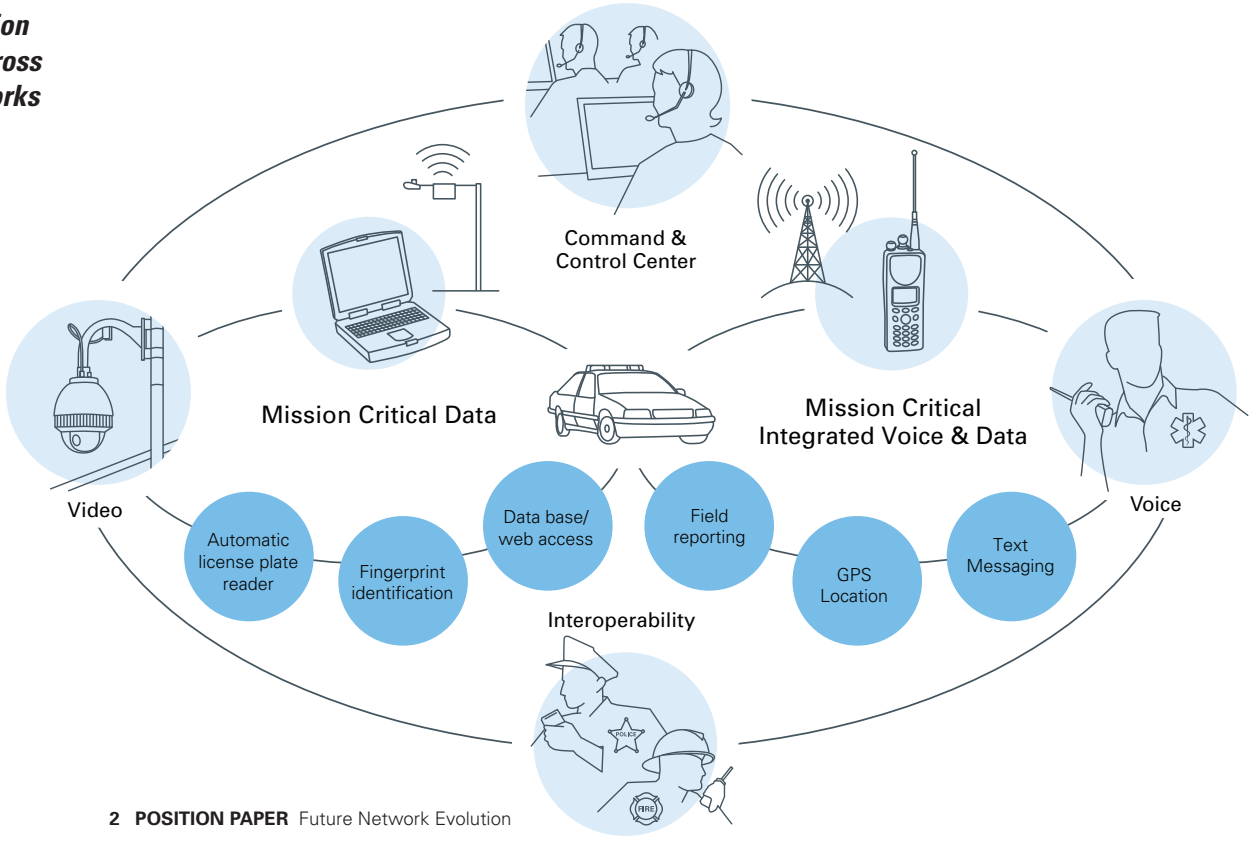
- Interoperability with neighboring Project 25 networks
- Spectrum efficient voice capability for improved grade of service with out the need for additional spectrum
- Mission critical data for access to information across a wide area
- Wireless broadband networks for access to data intensive applications such as full motion video
- Tie in to customer enterprise networks for application sharing
- Expand the number of applications that can be shared wirelessly
- Migrate to future Project 25 Phase 2 standards once they are defined and implemented

Motorola has a vision for the future and the capability to integrate together multiple technologies, evolving at the customers pace.

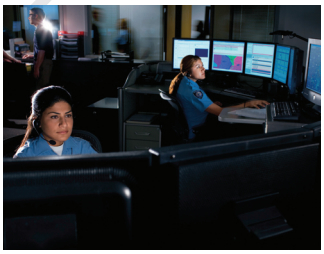
In the Pages that Follow…

Discover ways to add functionality and spectrum efficiency to an existing ASTRO 25 system or how to incorporate the latest in mobile video technology. See how customers at any stage can step up to wideband and/or broadband data and manage seamless handoffs between networks.

Share Information Seamlessly Across Multiple Networks



Gradual Evolution to Project 25 Voice & Data



Within the dispatch center Centracom™ Gold Elite and their newer IP-based (MCC7500) consoles can co-exist as the gradual migration of a system is implemented. This makes for disruption in the dispatch center and increases reuse of existing resources.

Customers have a clear and gradual path to the ASTRO 25 integrated voice and data platform. This strategy creates a powerful hybrid network that blends existing site equipment with new ASTRO 25 sites for enhanced interoperability and flexibility.

Gradually Migrate to ASTRO 25

As networks age, repair and maintenance costs increase, as does the cost of expanding capacity and/or coverage and functionality. Changing out an older analog system by comparison, may be the right way to go. From console patches to full system change out there are multiple methods to evolve your system.

ASTRO 25 is compatible, therefore, customers can continue to use many of their radios and other end-user devices, gradually migrating. Also, they can often leverage their existing site facilities for further cost savings.

Begin with a New IP Master Site

At the heart of the ASTRO 25 network is the IP Master site (core), advanced network management platform, and an IP routing and switching center. Installing a new IP core is the first step to a gradual migration from a current analog ASTRO system to a P25 compliant ASTRO 25 system. It supports existing sites, provides flexible dispatch connections and allows customers to add ASTRO 25 functionality as needed – including Integrated Voice and Data, conventional and trunking, HPD and in the future Phase 2 TDMA and ISSI.

Next, Add SmartX Site Converters

These devices convert SmartZone site audio and signaling information to IP data packets that can be routed on the ASTRO 25 network. These converters allow you to maintain your current site architecture and gradually change out the site components.

Gradually Change Out Site Equipment

ASTRO 25 supports multiple site configurations, SMARTNET, SmartZone, and ASTRO 25. By intermixing station types public safety agencies can gradually change out equipment at a site to meet their operating budgets. The G series software definable site equipment is Phase 2 TDMA capable.

Migrating End User Devices and Consoles

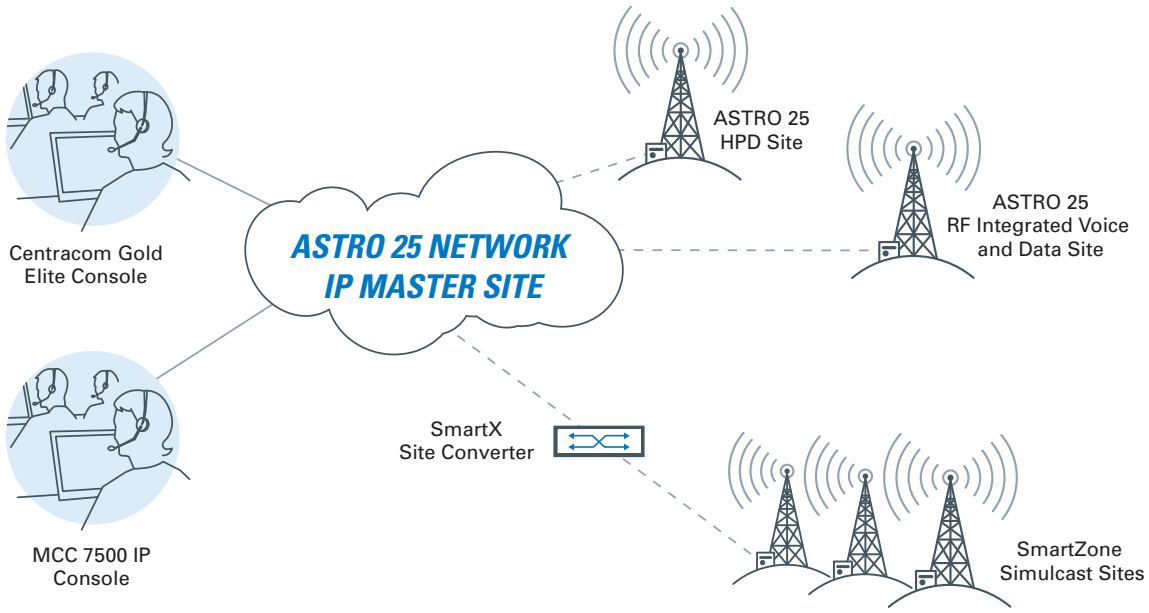
When agencies are ready to upgrade end-user equipment to P25, they can choose to upgrade their existing equipment or invest in new products. Current non P25 devices will continue to work on the system while customers roll out a gradual migration strategy.

Multi-mode Capability

Motorola offers end-user equipment that can operate in multiple modes (including conventional, SMARTNET/SmartZone trunking and P25 trunking). This allows users to roam throughout a region served by a mix of conventional channels, SmartZone/SMARTNET trunked systems, and ASTRO 25 systems without any interruption in service, and without having to carry multiple radios.

Gradual ASTRO 25 Migration

Add ASTRO 25 Master site; Place SmartX converters at the site between existing station; Add ASTRO 25 Master site (core); Gradually replace or add new sites



Additional Options for Voice Networks

Adding to an existing system using self contained deployable systems

Designed for rapid response during special events, disasters, or routine maintenance, Motorola's Deployable Response systems allow customers to quickly set up communications on wheels, a backhaul site, or even an entire standalone core master when and where needed.

Customers with voice networks have options to gradually and cost-effectively introduce P25 standards-based capabilities. They can migrate to an ASTRO 25 platform or, if preferred they can utilize their existing system longer and gain interoperability using a MOTOBRIDGE™ IP Solution to link multiple networks within and outside their agency in support of mutual aid, large-scale planned operations, emergency response, and other interoperability objectives.

MOTOBRIDGE IP Makes the Connection

Customers may not be ready to change out an existing system to Project 25, or they may need an interim step that gives them more options while waiting for the funding to implement a long-term ASTRO 25 regional interoperability solution.

MOTOBRIDGE IP solutions can be used to solve a wide range of interoperability issues involving:

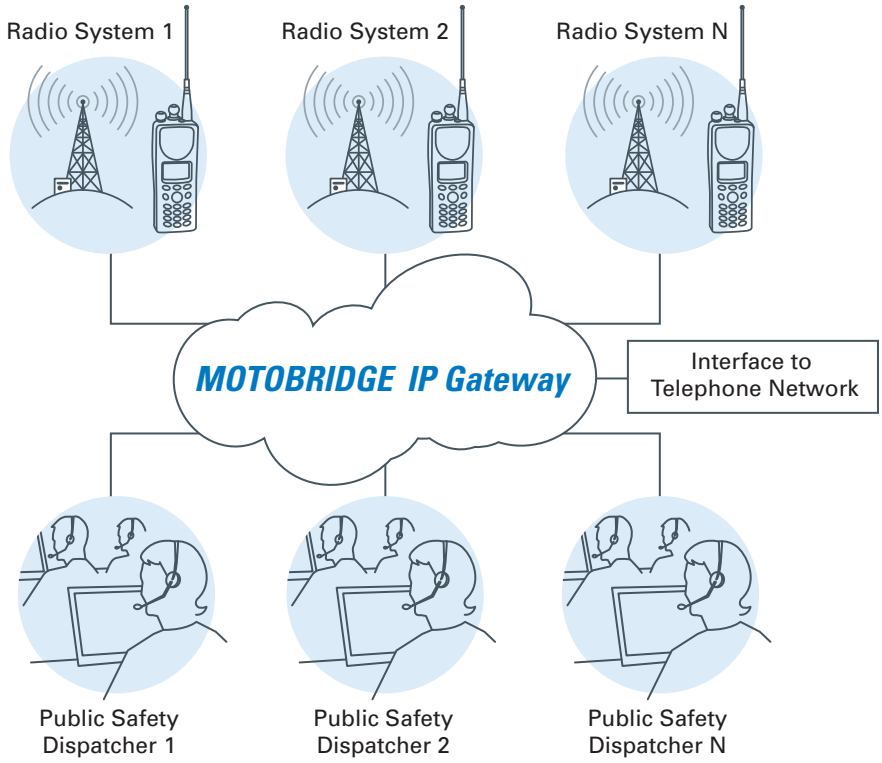
- Analog to P25 interoperability
- Trunked to conventional
- IP voice networks to IP networks
- 700/800 MHz to UHF to VHF to Low Band
- IP to circuit switched networks
- Radio to radio
- Different vendor networks to each other
- Radio to telephone (PSTN)

MOTOBRIDGE IP Distributed Architecture

A distributed architecture means there is no single point of failure. Radio Gateway Units (RGUs) interface with existing radio systems. Workstation Gateway Units (WSGUs) allow dispatchers and other administrators to set up communication links and/or assume joint dispatch duties.

Any number of systems can be linked together. Dispatchers/administrators may activate connections at any time, among any number of systems on the network.

MOTOBRIDGE distributed architecture provides no single point of failure when connecting multiple networks together



Increasing the Number of Users with Spectrum Efficient Technology

Make More Efficient Use of RF Allocations

The airwaves are crowded, but networks need room to grow. Phase 2 TDMA will increase call capacity so customers can add users and applications without licensing additional spectrum from the FCC.

Increase the voice calling capacity of an ASTRO 25 network allowing customers to add more users and/or implement additional services such as wideband data—all within the current radio bandwidth allocation.

Increase Voice Capacity

For many customers, spectrum availability has been an obstacle to expanding their communications. Whether they intend to add users, extend coverage, interoperate with other agencies, or introduce new data applications, agencies have often contended with the difficulty of acquiring more radio channels.

ASTRO 25 is TDMA operational and Project 25 Phase 2 capable. Project 25 Phase 2 TDMA will effectively double the capacity of voice channels on an ASTRO 25 network. This will give the system room to grow without acquiring more spectrum.

Easy Integration, Backward Compatibility

The TDMA capability can gradually be deployed on ASTRO 25 systems as system requirements evolve.

Motorola's newest sofware defined infrastructure and subscriber products can operate in Phase 1, TDMA or both dynamically. Customers can leverage their investment as they deploy new functionality. Through the Dynamic Dual Mode (DDM) feature the ASTRO 25 system provides seamless interoperability between Project 25 Phase 1 users and TDMA users.

Dynamic Dual Mode

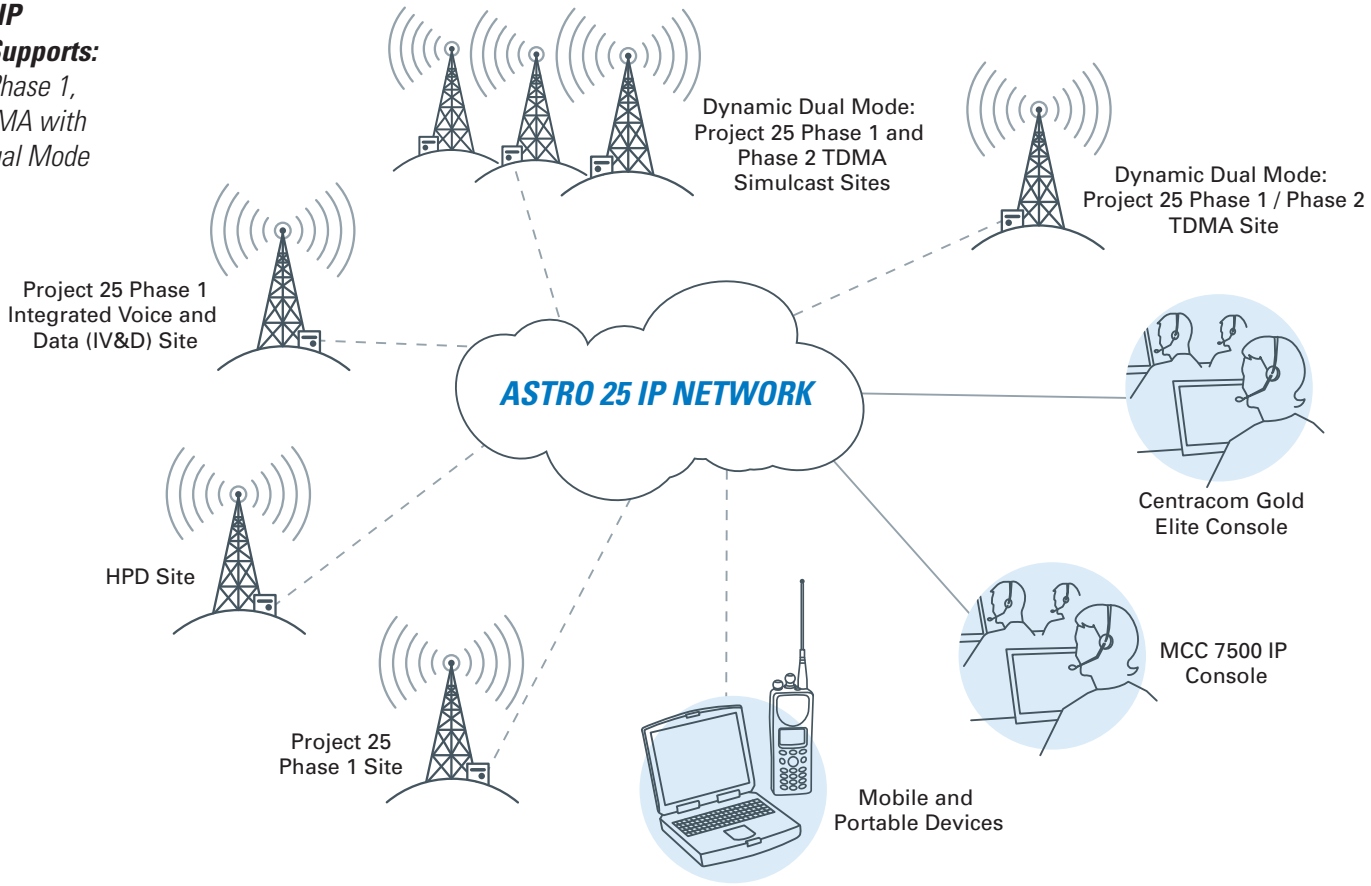
Motorola's unique Dynamic Dual Mode feature enhances interoperability between Phase 1 users and TDMA users. In real-time the system assigns a call as a P25 Phase 1 or TDMA call depending on the resources involved in the call.

Project 25 Standards

Motorola is committed to the Project 25 Standards and has been working with the standards committees on both the Phase 2 standard and ISSI. The ASTRO 25 platform is Motorola's Project 25 solution that customers can deploy today with peace of mind that this platform will also support future standard offerings.

ASTRO 25 IP Network Supports:

Project 25 Phase 1, Phase 2 TDMA with Dynamic Dual Mode plus HPD



Public Safety Data & Multi-Net Mobility™

ASTRO 25 HPD Evolution 3 Applications

GPS location
Text messaging
Automatic License Plate Recognition (ALPR)
Internet/Intranet access
Photo IDs
Database access
Mobile AFIS
Mug shots
Maps & drawings

Graphics-intensive applications require wide-area data. This is the next evolution in government and public safety wireless communications. Most of the resources available on computers at the station can now be made available to users in the field—giving them vital information when and where they need it.

ASTRO 25 HPD

HPD is an Internet Protocol (IP) network that can be installed as a standalone system or integrated into the customer's current networks. HPD provides the highest data speed available in 25kHz channels.

Add Data to a Voice System

For customers at Evolution 1, HPD can be installed alongside a voice-only analog network. In addition to introducing wireless data, HPD can be the first step in migrating toward ASTRO 25 functionality.

Add On to an ASTRO 25 Network

HPD is an easy add-on for ASTRO 25 networks. Fully integrated, it shares network resources to reduce overall costs and maximize users' ability to share voice and data across the entire network.The master switch is the same hardware that forms the core of an ASTRO 25 system. Customers at Evolution 2 can install the HPD software on their existing ASTRO 25 master site. Customers at Evolution 1 who install HPD will later be able to build upon the same master site when they are ready to migrate to an integrated voice and data ASTRO 25 system.

Bridge Gaps Between Local Broadband Networks

For customers who have begun to implement advanced broadband Evolution 4 solutions, HPD is an ideal way to bridge potential coverage gaps between mesh networks. Unlike mesh networks, which are optimized for coverage corridors, HPD is a cost-effective way to deploy wireless data coverage over an entire city, county, or similarly large geographic area. For example, a municipality may choose to deploy a MOTOMESH network with 24 hour video surveillance in high crime areas and deploy an HPD network with Multi-Net Mobility™ for the increased throughput throughout the remainder of the jurisdiction.

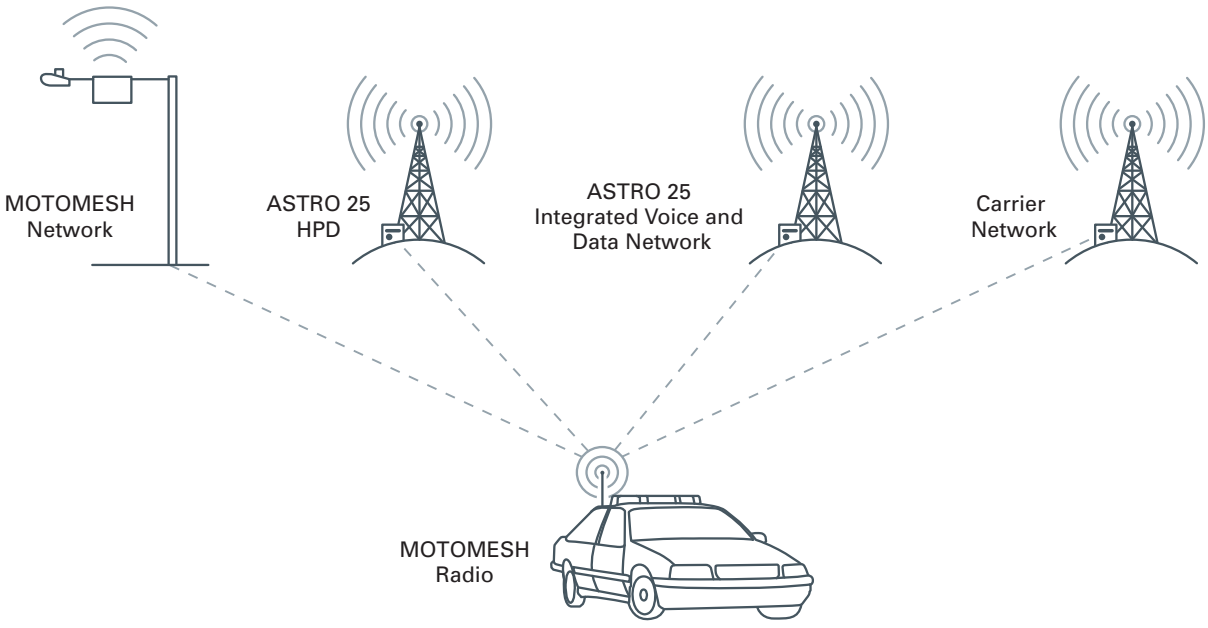
Multi-Net Mobility Ties Data Networks Together

For the ultimate flexibility in network design, users can receive uninterrupted data coverage as they move between different data networks.

Seamless Handoffs Between Networks

Multi-Net Mobility works across a wide range of TCP/IP networks including ASTRO 25 IV&D, HPD, MOTOMESH, as well as the public carrier networks. It establishes a Mobile Virtual Private Network (MVPN): a transport and platform independent solution that maintains an encrypted data session (VPN tunnel) as a user roams between subnets or networks.

Multi-Net Mobility ties multiple networks together so users can roam between networks.



Maximum Broadband Deployment Flexibility

Evolution 4 applications in addition to location, internet/ intranet browser activities found in HPD networks.

- *Video Recording*
- *Mobile Video Sharing*
- *Video Surveillance*
- *Biometrics*

Evolution 4 introduces broadband data allowing new high bandwidth services based on video and multimedia for increased productivity. They can be deployed as standalone networks, or integrated with ASTRO 25 IV&D or HPD for seamless connectivity across multiple networks.

From Voice to Video

Integrated with ASTRO 25 networks, MOTOA4 Evolution 4 provides a seamless path from voice to video. Broadband speeds allow the network to carry multiple real-time video streams and vast amounts of data. Customers can deploy more types of applications, support more users, and handle more data traffic. These capabilities are especially valuable in locations where population, crime rates, or security risk justify more intensive public safety coverage.

MOTOMESH™ Technology

MOTOMESH supports both WI-FI and mesh networking in both unlicensed and public safety 4.9GHz band. Mesh technology, initially developed by the military for use on the battlefield, is an interconnected web that extends coverage to users through multi-hopping. Its self-organizing and self-healing characteristics automatically form new network structures when new devices arrive at a scene or in the event of a transmitter failure. MOTOMESH is a fully mobile solution allowing uninterrupted coverage even while driving at high speeds.

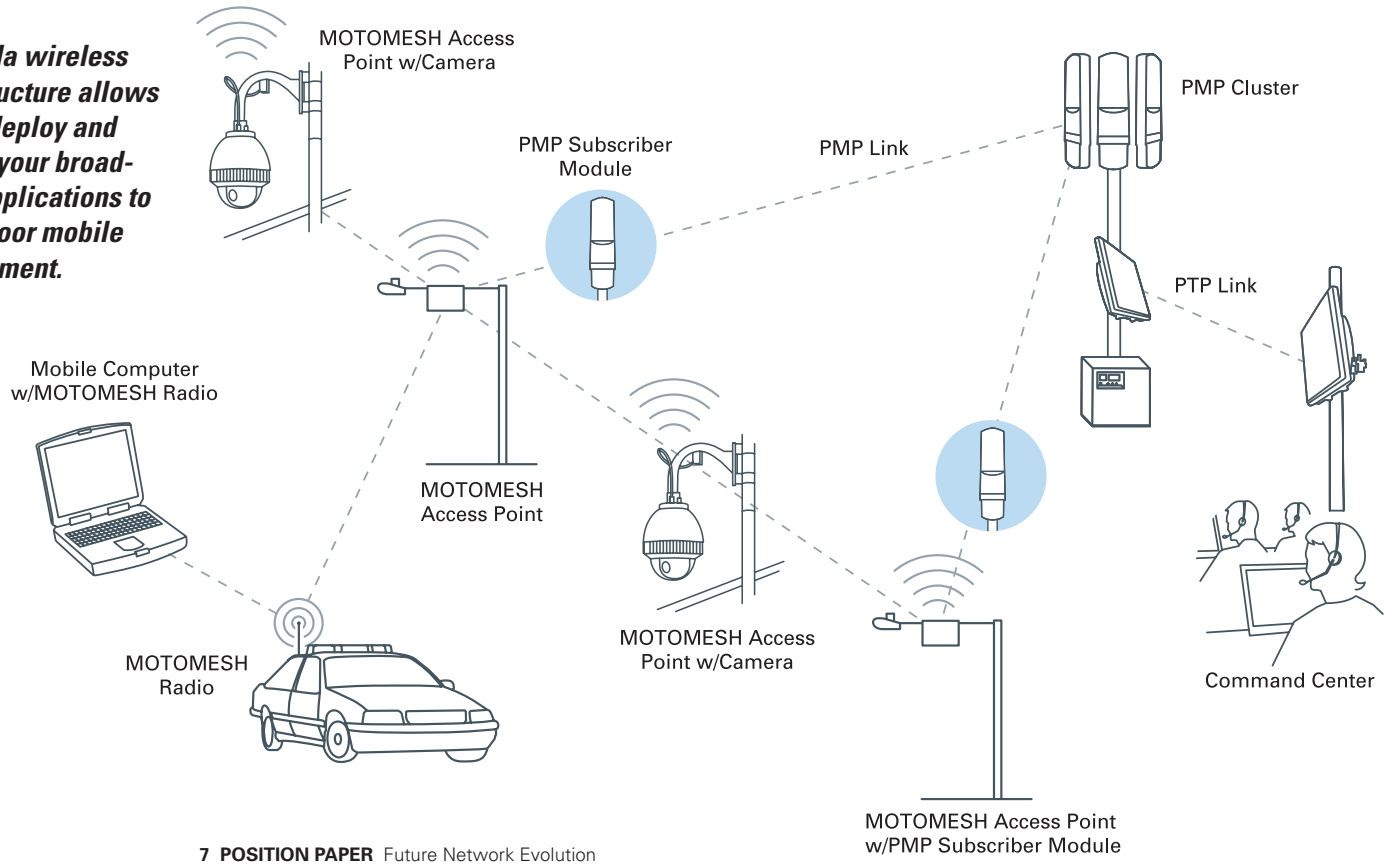
wi4 Fixed Point-to-Multipoint (PMP)

Available in frequencies from 900MHz to 5GHz, Motorola's PMP system provides fixed and nomadic broadband access with enhanced over-the-air security for wide geographic areas. It's simple network design makes it exceptionally easy to install without the costs of running overhead or in-ground wire. The PMP system is scalable making it easy to expand coverage or increase capacity as demands change over time.

wi4 Fixed Point-to-Point (PTP)

Motorola PTP systems span open spaces between buildings to provide a reliable, high-speed, and low-cost connection in licensed or unlicensed spectrum. The PTP system can deliver up to 99.999% reliability in even the most challenging situations—non-line-of-sight environments. Its small form factor makes it easy to install and maintain in a variety of applications including: last-mile and heavy-duty backhaul, communication between buildings, quick emergency deployments, over long distances (miles) or around obstacles and much more.

Motorola wireless infrastructure allows you to deploy and extend your broadband applications to an outdoor mobile environment.



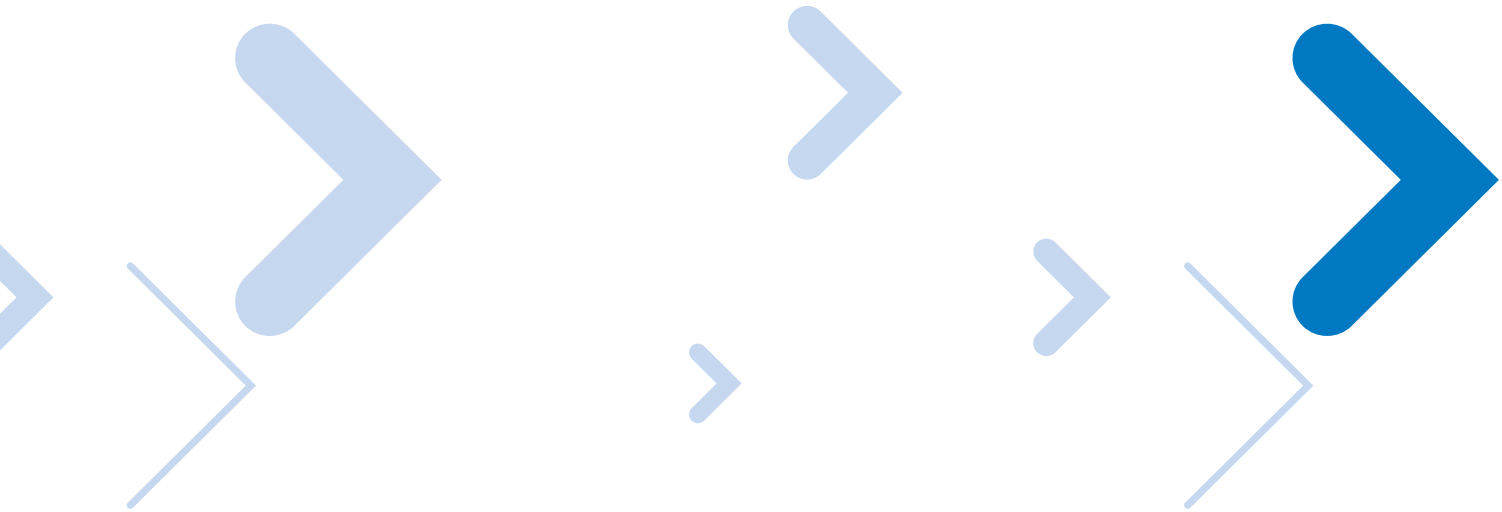
MOTOA4™

Mission Critical Portfolio

Technology that's second nature and a evolution path that will get you there…from a vendor who understands public safety.

Only Motorola enables public safety agencies to confidently take the next step in mission critical communications. Motorola helps agencies move beyond the basics to achieve the most reliable and innovative wireless solutions that help to save lives and protect communities. We provide flexible system designs that can deliver seamless technology into the hands of first responders: simply, reliably, and without distracting users from their work. This is "Technology that's second nature™."

For more information about the MOTOA4 portfolio and Motorola's commitment to the public safety industry, please visit our website **www.motorola.com/secondnature** or contact your Motorola representative.



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