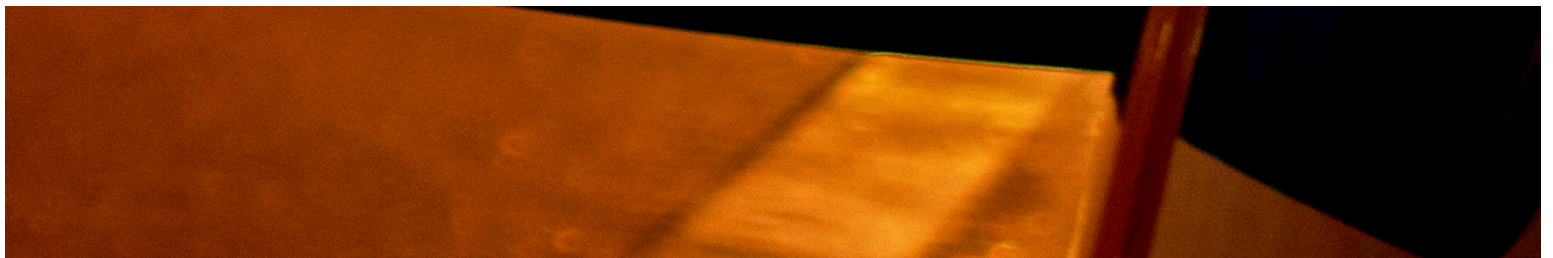**MOTOROLA** *SOLUTIONS*

ASTRO® 25 SYSTEMS
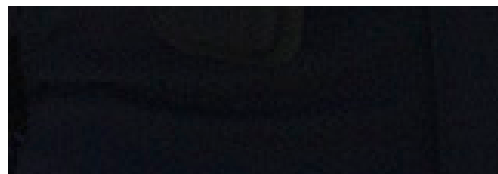## YOUR LIFELINE FOR SUCCESSFUL MISSIONS

ALWAYS AVAILABLE

INTEROPERABLE

FUTURE-READY

GIVE YOUR TEAM THE SAFETY OF ALWAYS AVAILABLE COMMUNICATION WITH INTEROPERABLE COLLABORATION ACROSS TECHNOLOGIES AND AGENCIES ON A FUTURE-READY PLATFORM.

ALWAYS AVAILABLE COMMUNICATIONS

Reliable communication, everywhere you operate, is crucial for an effective operations and for the safety of your personnel. Responding to a natural disaster, routine traffic stop or ensuring safety at a parade, they all need reliable, mission-critical voice and data communications, regardless of the conditions. With ASTRO® 25 you can change the outcome.

RESILIENT AGAINST SERVICE DISRUPTIONS
Built with multiple levels of redundancy and fallback modes, ASTRO 25 systems maintain wide-area communications under the harsh conditions, even in the event of multiple points of failure.

CAPACITY WHEN YOU NEED IT
Large scale incidents and disasters can put increased demands on your communication system. With advanced channel management technology and system engineering, ASTRO 25 can handle the load and ensure the most urgent communications will get through.

SECURE YOUR COMMUNICATIONS
Mission-critical systems are a primary target for eavesdroppers and hackers. ASTRO 25 authentication and encryption technology blocks unauthorized access. And if one of your devices is lost or stolen, ASTRO 25 can disable the unit and track its location to assist in the recovery.

COVERAGE EVERYWHERE
Because nobody knows where the next incident will occur, you need a communication system with superior coverage. With best in class prediction tools, system designs and radio performance, you know ASTRO 25 will be there.

INTEROPERABLE COLLABORATION

IMPROVE MULTI-AGENCY RESPONSE

Connect and collaborate across systems, technologies, frequencies and geographies while you maintain control and extend your communication boundaries.

P25 STANDARD COMPLIANT

Because ASTRO 25 is certified APCO Project 25 compliant, it can connect to and work with other P25 compliant systems, radios and dispatch consoles. This makes it easier for you to support radios and equipment from other agencies, regardless of manufacturer, for mutual aid and joint operations.

INTEROPERABILITY

More and more, operations require collaboration among multiple agencies and organizations. Seamless communications requires connecting disparate communications systems so that everyone can participate. Transverse technologies with secure PTT talkgroups between radio and broadband users across town or across the country.

INFORMATION SHARING

Communication is all about the sharing of information, but today this means more than voice. More than ever, mission-critical information includes location data, text messaging, database queries, identity and more. ASTRO 25 shares information across applications to deliver critical data to P25 radios and broadband devices, keeping everyone more informed.
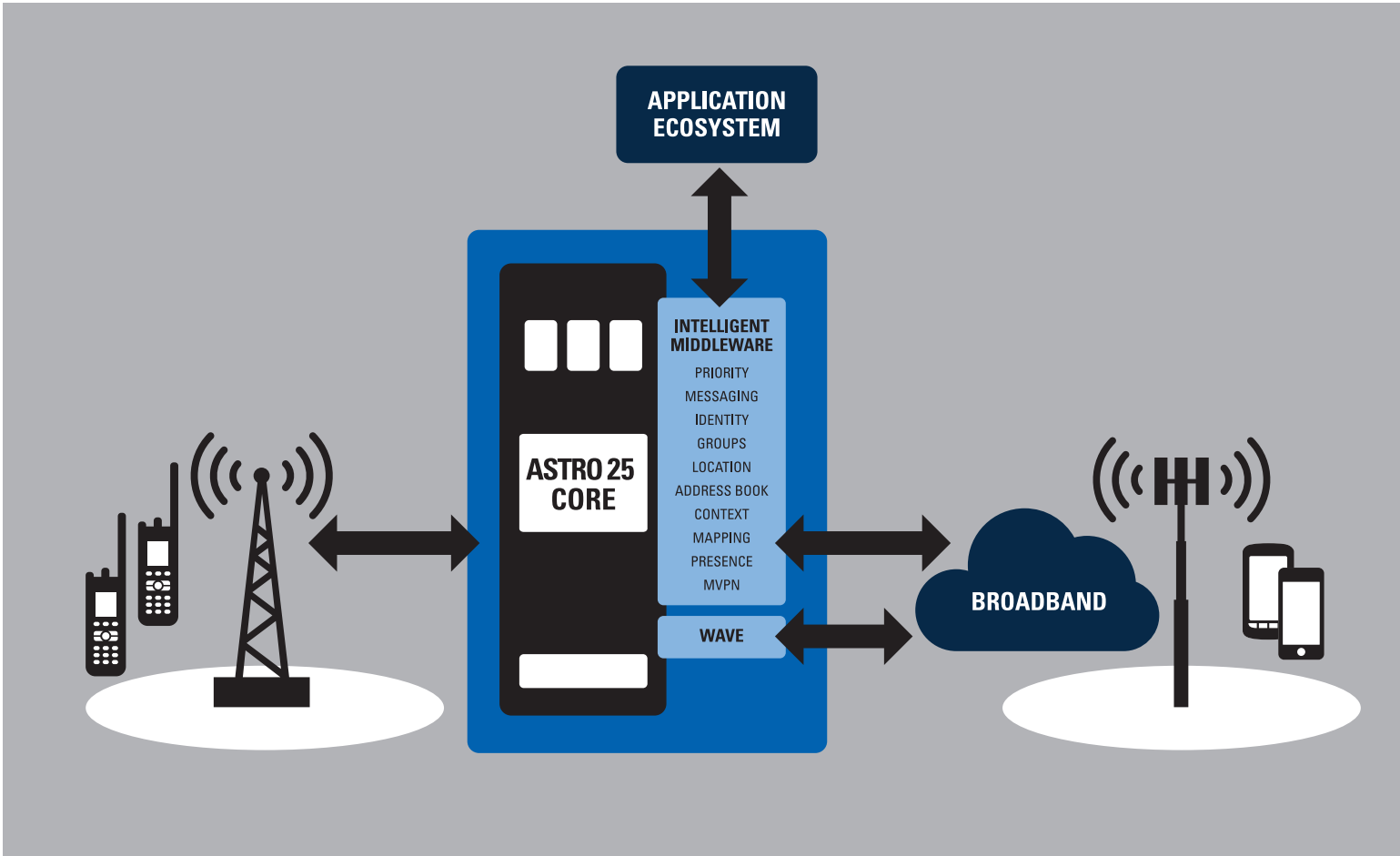
CONVERGENCE SUITE
SHARE MORE INFORMATION WITH MORE USERS

Simplify the ability for multiple applications to come together for seamless communications. Whether in ASTRO 25 or broadband environments, multiple applications can subscribe to key services for a common view.

Information such as talkgroups, location and presence is available to any application and any network. This reduces network traffic by eliminating the need for each application to ping each device individually. Different mapping applications can now each plot the same location of P25 and LTE devices, providing a common operating view regardless of the application or network. Likewise, shared presence, identity and talkgroup data can be used to send text messaging to groups of users on radios, laptops and smartphones.

APPLICATION ECOSYSTEM

INTELLIGENT MIDDLEWARE

PRIORITY
MESSAGING
IDENTITY
GROUPS
LOCATION
ADDRESS BOOK
CONTEXT
MAPPING
PRESENCE
MVPN

ASTRO 25 CORE

WAVE

BROADBAND

FUTURE-READY PLATFORM

The end user services being demanded today require a new kind of platform that bridges between the talkgroup dominated services of P25 with the data-oriented services of broadband. ASTRO® 25 has evolved into a software-defined platform that converges radio and broadband services. The result is a flexible IP solution that maintains P25 compliance and offers new capabilities made possible by the integration of voice and data.

FLEXIBLE

Public safety organizations are customized to meet the unique needs of the community they serve. Because ASTRO 25 is a software-defined system, you can easily expand capacity and activate new features to meet your specific needs.

A wide set of available Application Programing Interfaces (API) give you access to raw system data and developer interfaces to integrate 3rd party applications or build your own customized application.

SOFTWARE APPLICATIONS

Get more out of PTT by augmenting it with software applications that give you more control and efficiency of voice services. Combine talkgroups with text messaging to form talkgroup text messaging. Integrate location and dynamic regrouping with talkgroups to ensure everyone at an incident is on the correct channel. Stay safer by broadcasting your location and alias ID with every PTT to everyone on your talkgroup.

CONVERGENCE

Broadband is changing the landscape of public safety communications, and ASTRO 25 is already leading the way toward converging P25 voice and broadband data services. With WAVE and Intelligent Middleware, ASTRO 25 can provide seamless interactions of voice and data between LMR and broadband users. Video cameras and broadband integrated into speaker microphones with an Android user interface bring the LMR and broadband worlds closer together.

ASTRO 25 SOFTWARE APPLICATIONS

Expand beyond voice with a variety of applications chosen and developed specifically for the needs of mission-critical communications.

SYSTEM MANAGEMENT
A suite of applications giving you key metrics to monitor and manage your system so that you know it is ready for the next mission.

FLEET MANAGEMENT
Reduce the time and effort to manage your fleet with tools that can automatically push software updates to every radio with no loss of user productivity.

SECURITY
Neutralize system breaches and block eavesdroppers that can put your agency at risk during and post incident.

INDUSTRIAL INTERNET OF THINGS (IOT)
Remotely monitor the performance of your critical infrastructure and correct problems instantly to extend the life of your assets and better safeguard your personnel and communities.

DISPATCH
As the centralized control point for your operations, make your dispatch the the information pipeline on which your team can rely for relevant, real-time intelligence.

INTEROPERABILITY
Empower your team to connect across technologies and collaborate with others whether on a radio, smartphone, computer or tablet.

LOCATION SERVICES
Improve the safety of your personnel with applications that show where everyone is located and can ensure everyone within a geofence is communicating on the same channel.
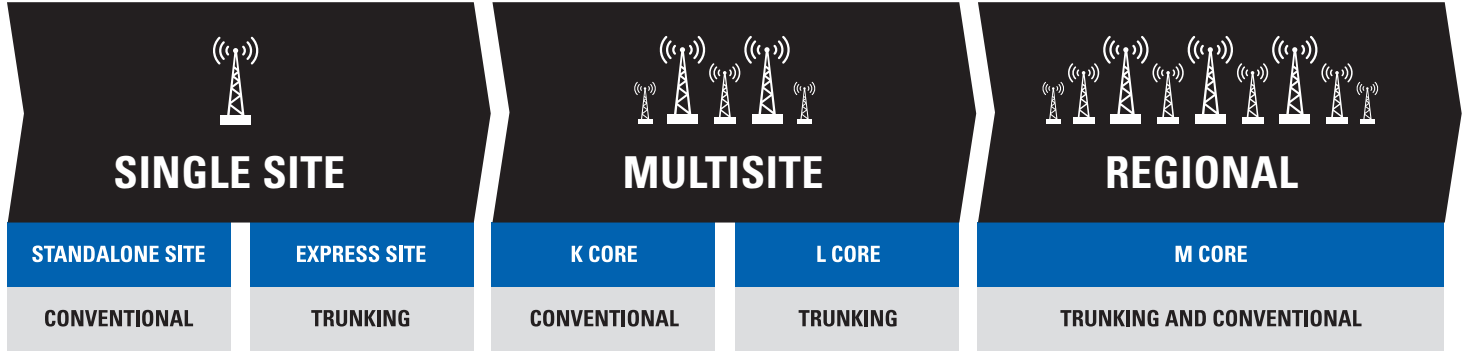
SAFETY
Increase safety with purpose-built applications that monitor and verify the status of your personnel.

ASTRO 25 SYSTEM CONFIGURATIONS

SELECT THE RIGHT SYSTEM FOR YOUR NEEDS

The ASTRO® 25 platform is designed to give you maximum flexibility and scalability. From a single site to multisite to statewide, ASTRO 25 software-defined platform gives you the flexibility to grow the system as your needs expand.

SINGLE SITE		MULTISITE		REGIONAL
STANDALONE SITE	EXPRESS SITE	K CORE	L CORE	M CORE
CONVENTIONAL	TRUNKING	CONVENTIONAL	TRUNKING	TRUNKING AND CONVENTIONAL

ASTRO 25
K CORE SYSTEM
For wide area conventional repeater service, the K Core provides an IP platform that can connect multiple repeater sites with IP dispatch systems and data services.

ASTRO 25
L CORE SYSTEM
This multisite system provides the channel efficiency of trunking on a software-defined platform with the flexibility to grow and add features as your needs change.

ASTRO 25
M CORE SYSTEM
Built for large scale systems and multiple agencies, the M Core supports a comprehensive list of feature and capabilities to meet the variety of needs of its users.

	K CORE	L CORE	M CORE
FEATURES	**CONVENTIONAL**	**TRUNKING**	**TRUNKING AND CONVENTIONAL**
Geo Redundant Core			●
Analog Conventional	●	Mutual Aid Only	●
P25 Phase 1 (FDMA) Conventional	●		●
P25 Phase 1 (FDMA) Trunking		●	●
P25 Phase 2 (TDMA) Trunking		●	●
Integrated Voice & Data (IV&D)	●	●	●
Enhanced Data		●	●
Intelligent Middleware	●	●	●
WAVE Broadband PTT		●	●
P25 ISSI Interoperability		●	●
Encrypted Voice	●	●	●
Encrypted Data	●	●	●
Over the Air Rekeying (OTAR)	●	●	●
Group Services		●	●

G-SERIES EQUIPMENT
THE BUILDING BLOCKS FOR ASTRO 25 SITES

The G-Series hardware platform is the primary building block of ASTRO® 25 radio site equipment.

- Software Configurable
- Backwards Compatible
- Smooth Technology Migration
- Front Accessible, Hot-Swap Modules

GTR 8000 BASE RADIO
ASTRO 25 base radio

- Supports Control, Voice and Data channels
- Trunking and conventional configurations
- VHF, UHF, 700, 800 and 900 frequencies
- FDMA and TDMA

GGM 8000 GATEWAY
Multi-purpose network communication unit

- Interconnects devices and networks within ASTRO 25 systems
- Provide a clear demarcation point between your IP networks and ASTRO 25

GCP 8000 SITE CONTROLLER
Used at ASTRO 25 trunking sites to:

- Assign voice and data channels
- Manages and reports alarms on site resources
- Provide Ethernet switching

GPW 8000 RECEIVER
Used in voting or simulcast applications:

- Conventional and Trunking sites
- Increases in-bound signal coverage
- Dual receive module reduces space

GCM 8000 COMPARATOR
Used in voting or simulcast applications:

- Conventional and Trunking Operation
- Performs frame-by-frame voting on multiple received signals
- Recombines the frames to produce a signal with the best possible audio quality

GTR 8000 EXPANDABLE SITE SUBSYSTEM

SPACE EFFICIENT, SELF-CONTAINED SITE

Comprises G-Series and other components to make up a complete standalone RF site in a single rack

- Factory configured and tuned for your system making installation quick and easy
- Completely front serviceable means you can back it up to a wall with only 6" clearance
- Easily expand site capacity by adding additional racks
- Connects into an ASTRO® 25 core to become part of a wide area communication system

G-SERIES COMPACT SITE

SELF CONTAINED OUTDOOR SITE

- Built with G-Series components
- Complete site engineered for outdoor installations
- Pad, pole and wall mounting options lower site construction costs and reduce environmental impact
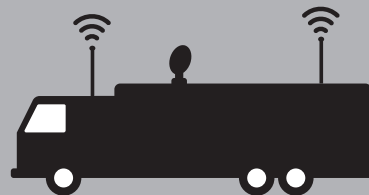- Ideal for difficult to reach terrain or file-in site coverage

A CONFIGURATION FOR EVERY NEED
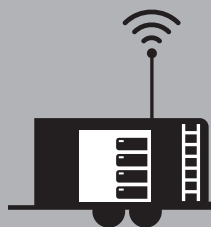
FIXED **DEPLOYABLE** **MOBILE** **PORTABLE**

# ASTRO 25 DISPATCH COMMUNICATIONS

MOBILIZE AND INFORM WHERE AND WHEN IT'S NEEDED MOST

As the world continues to become more connected, the expectation for instant coordination and a seamless flow of information is increasing. Empower your dispatchers to coordinate faster and provide the intelligence necessary to support those in the field and the community they serve.

MCC 7500 IP DISPATCH CONSOLE
BACKUP IS NOT ONLY ON SCENE
Make your Dispatch Center an information pipeline, on which first responders can rely for the relevant, real-time intelligence they need with the Project 25 (P25) standard-based MCC 7500 IP Dispatch Console. Enable effective, secure communications to keep responders connected and informed when it matters most.
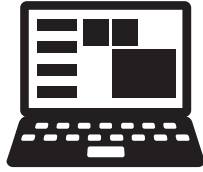
MCC 7500E IP DISPATCH CONSOLE
CONTINUAL PURSUIT FOR OPERATIONAL EFFICIENCY
Better manage the flow of critical information. The MCC 7500E console's small form factor simplifies deployment in dispatch centers where space is at a premium. Enhanced Integrated Instant Recall Recorder (IRR) provides dispatchers with the ability to access more recorded call audio and metadata.

MCD 5000 DESKSET SYSTEM
POWERFUL & FLEXIBLE VOIP COMMUNICATIONS
Extend your communications with powerful and flexible VoIP technology. Scalable from small operations to complex control centers and geographically dispersed operations, this easy to deploy solution enables communications across your network when and where you need it most increasing safety, awareness and coordination of your first responders.

PROVIDE THE RIGHT INFORMATION, RIGHT AWAY
ENSURE THE SAFETY OF YOUR FIRST RESPONDERS
Provide the timely and essential information to your first responders by turning dispatch positions into information pipelines. Allowing them to respond faster and provide the necessary mission-critical intelligence ensuring the safety of your first responders. Provide clear and reliable voice communications across your ASTRO® 25 Trunked and Conventional Systems and when voice is not an option rely on Talkgroup Text Messaging for silent on-demand collaboration.

THE INTELLIGENCE YOU NEED, EVERY TIME
ENSURE INFORMATION ALWAYS GETS THROUGH, SECURELY
The inherent reliability and security of ASTRO 25 ensures first responders and dispatchers stay connected no matter what and with the assurance that they are operating in a secure environment. For peace of mind that the right information always gets through, rely on our smart voice prioritization and intelligent audio routing capabilities in your dispatch positions. Furthermore, continuous link and resource polling gives your dispatchers the confidence that once connected, they stay connected.

EASE OF USE FOR MORE EFFECTIVE SUPPORT
ENABLE AN EFFECTIVE AND EFFORTLESS RESPONSE
Provide dispatchers with an intuitive means to organize resources, coordinate a response and communicate valuable information. A highly configurable, intuitive user interface allows dispatchers to quickly adapt to a new system with minimal training. Purpose-designed workflows with minimal click-throughs critical resource information displays and contextual right-click, menus are just some of the features that can help your dispatch operation become more streamlined and effective, and your dispatchers more efficient and productive. Customizable features including window sizing and placement, color schemes and icons, allow you to create a workflow unique to your agency's needs.

SCALE UP YOUR SYSTEM, NOT YOUR COSTS
SAVE RESOURCES AND MINIMIZE DOWNTIME
Help keep costs down with flexible servicing and voice processing module (VPM) deployment options. That means less purpose-built hardware for you to buy and maintain, with additional savings on the space and electricity needed to run the system. The software based nature of the platform makes it easy to manage via a centralized single point of contact and reduces the time and skills needed for updates. The scalability of the platform lets you grow as much or as little as you need, making it a perfect choice for long term use.

ASTRO 25 CYBERSECURITY ASSURANCE SOLUTIONS

KEEPING YOUR VOICE AND DATA COMMUNICATIONS SECURE

Cyber breaches are the reality of the world we live in. Attackers today are more pervasive, persistent, and proficient at evading and disrupting your operations. With the mission and the safety of your personnel on the line trust the worldwide leader in mission-critical communications to give you the confidence you need to identify and manage cyber risks in a constantly changing environment.

NIST CYBERSECURITY FRAMEWORK

The NIST Cybersecurity Framework was developed under the auspicious of the US Government with industry leading best practices. This framework highlights a set of processes which, when executed concurrently and continuously, serve to improve an organization's cybersecurity posture. Organizations that adopt the framework are better positioned to comply with future cybersecurity and privacy regulations.

KNOW YOUR CRITICAL ASSETS

Know your physical assets, people and processes to understand your risk posture. Understand the actions to take to mitigate, react, and respond to cyber threats based on your unique operational requirements

SEAMLESS RECOVERY AND LESSONS LEARNED

Quickly recover from an event and ensure the continuity of your operations, even in the event of a catastrophic event or attack.

RESPOND IN REAL-TIME WITH A MULTI-PRONGED APPROACH

Stop an attack in real time in order to maintain system wide availability and isolate compromised components while at the same time increase security for the rest of the network.

IDENTIFY

PROTECT

RECOVER

DETECT

RESPOND
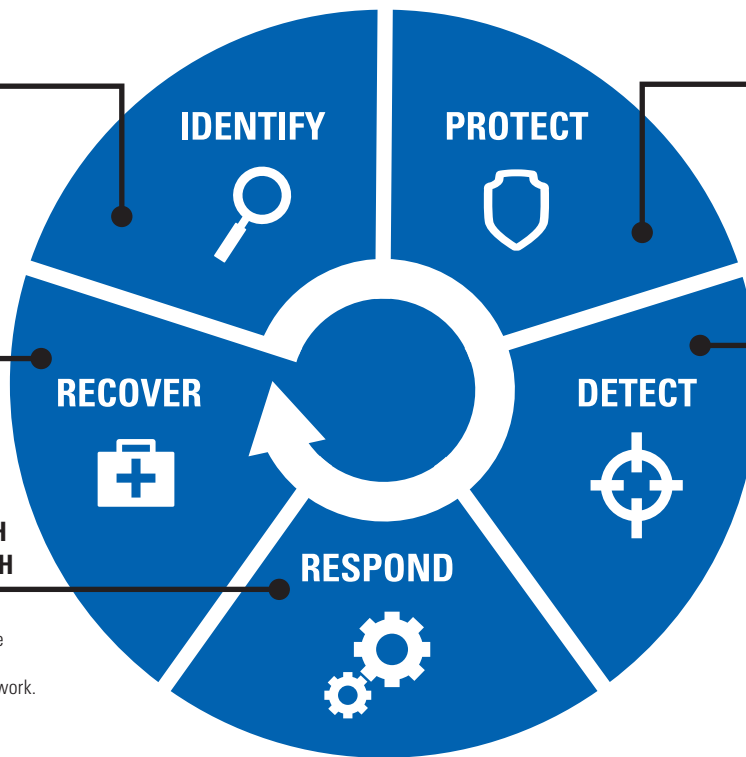
SAFEGUARD YOUR INFRASTRUCTURE

Safeguard your critical infrastructure with a set of tools designed to ensure the confidentiality, integrity and availability of your mission-critical operations.

DETECT THREATS WITH PROACTIVE MONITORING

It is not enough to simply barricade your network with advanced firewalls, anti-malware, encryption algorithms and sophisticated access controls. You need to continuously monitor your system 24x7x365, looking for unusual activities, traffic anomalies, suspicious logs, and failed logon attempts.

KEY MANAGEMENT
Simplify encryption key management remotely over the air from an easy to use web-based management tool.

CERTIFIED HARDWARE ENCRYPTION
Secure your voice and data communications with certified FIPS 140-2 Level 3 hardware encryption.

DISPATCH CONSOLE ENCRYPTION
Encrypt and decrypt radio traffic directly on your wireline dispatch console positions for end to end encryption.

ASTRO 25 SYSTEM MANAGEMENT

To achieve peak system operating performance you need complete visibility and control of your system components and the devices that run on them. The ASTRO® 25 system management portfolio includes a comprehensive set of fault management, configuration management and performance tools needed for daily operation of the network and radios. And, when you need customization, ASTRO 25 has application programming interfaces to connect to third party or your own developed management application.

FCAPS NETWORK MANAGEMENT FRAMEWORK

The FCAPS Network Management Framework was developed jointly by ISO (International Organization for Standardization) and IEC (International Electrotechnical Commission). The framework defines the major functions of network management systems and services.

FAULT MANAGEMENT

UNIFIED EVENT MANAGER (UEM)

As the primary fault manager tool, the UEM provides system administrators a single interface to view the health of their system infrastructure. Drill down from a high-level dashboard to identify the finest component-level alarm, view metering data and access environmental status and controls.

UEM System Map
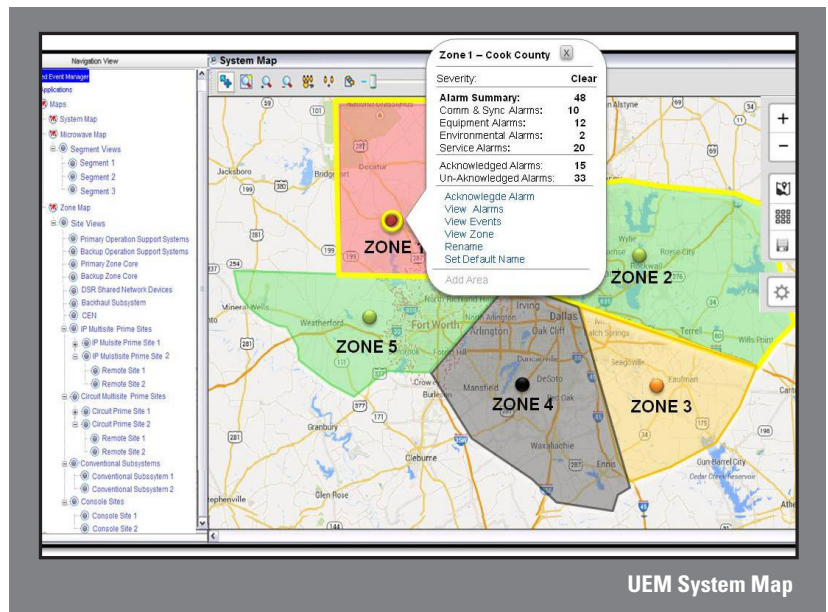
CONFIGURATION MANAGEMENT

### PROVISIONING MANAGER (PM)

The PM application is a web-based interface that allows you to provision the subscriber radios, consoles and other devices that need access to the system. Default configurations and batch creation simplify the provisioning effort. Role based access, centralized user authentication and agency partitioning enhance security and control.

UNIFIED NETWORK CONFIGURATOR (UNC)

The UNC is a network provisioning and configuration management tool that enables administrators to manage the configurations of networks and devices in an ASTRO 25 system. The UNC offers automatic discovery of devices and enables configuration changes to the network using a centralized tool.

LICENSE MANAGEMENT

The License Manager is a central software and licensing hub designed to simplify and speed the time to add new features and capacity. An easy to use web interface allows users to view existing licenses, purchase and activate new licenses.

Provisioning Manager PM
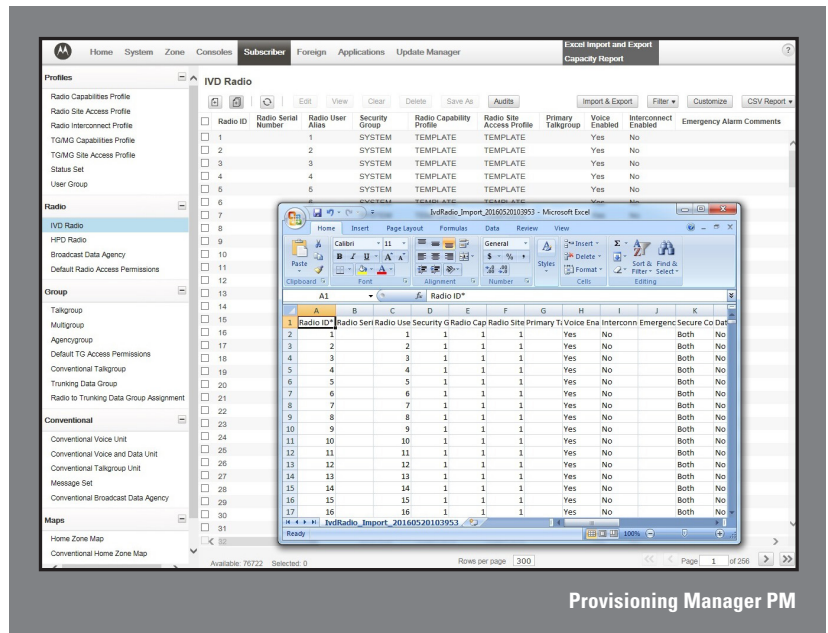
PERFORMANCE MANAGEMENT

ZONEWATCH
Proactive resource planning decisions are easier with the ZoneWatch real-time monitoring feature. See real-time channel usage and radio traffic activity with the intuitive graphical display.

Zone Watch
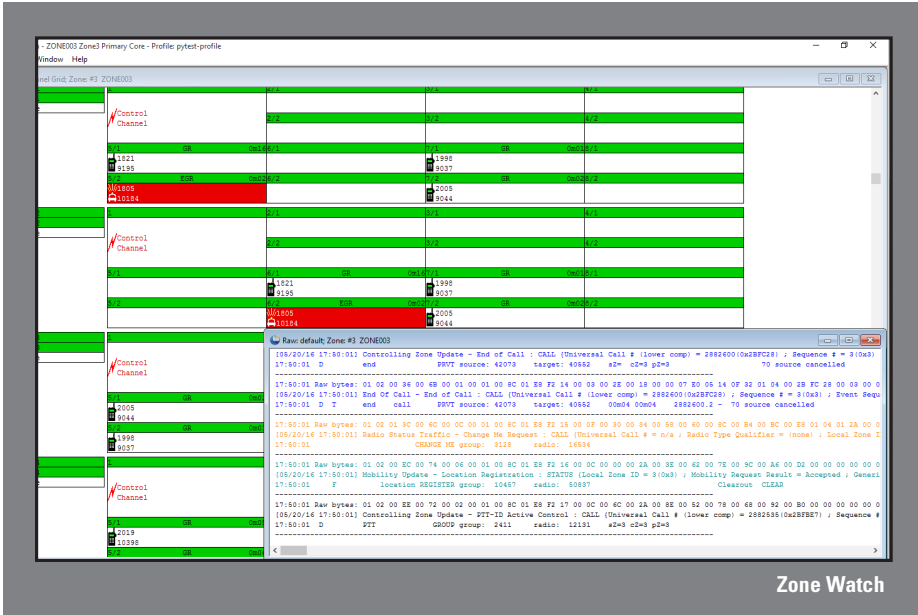
DYNAMIC AND HISTORICAL REPORTS
A variety of reports enable you insight into trends in call activity and system performance that can help you plan future system design changes.

RADIO CONTROL MANAGER
Remotely control radios in the field to check the status, monitor for emergencies and status events. Commands sent by your system managers can change the radio channel, issue storm plans and inhibit a lost radio.

GENESIS GENWATCH3
GenWatch3 is a 3rd party developed performance management suite, certified, sold and supported by Motorola Solutions. GenWatch3 collects data from multiple ASTRO® 25 interfaces to display real time activity, send critical notifications, and archive data for forensic reporting and analysis.

SYSTEM MANAGEMENT DEVELOPMENT FRAMEWORK

ASTRO 25 systems offer a robust suite of Application Programming Interfaces (APIs) that enable you the ability to integrate 3rd party solutions and applications customized to meet your needs.

AIR TRAFFIC INFORMATION ACCESS (ATIA)
The ATIA provides an access point for air traffic call information, including talkgroup and site affiliation information on the ASTRO 25 system. This raw data provides a wealth of information for customized system management uses.

NORTHBOUND INTERFACE (NBI)
The NBI provides a real-time event stream using an industry standard protocol to forward events to a fault management application or to a centralized Network Operations Center (NOC) for event management.

COMPUTER AIDED DISPATCH INTERFACE (CADI)
The CADI feature improves the level of service to radio users by integrating system monitoring and dispatch capabilities allowing a CAD server to receive radio status information. The CADI also provides a programming interface for performing dispatcher actions within a radio system.

PROVISIONING MANAGER INTERFACE (PMI)
The Provisioning Manager Interface (PMI) allows importing and exporting of subscriber data between 3rd party applications and the central database. The PMI allows access to configuration data and supports application developers with message specification content (e.g., billing and accounting).

ASTRO 25 SERVICES

IT'S NOT JUST ABOUT HAVING THE RIGHT TECHNOLOGY…
IT'S ABOUT ACHIEVING PEAK PERFORMANCE

PLAN

Designing a radio system to meet the unique needs of its users is both a science and an art that is best learned from experience. Through knowledge gained on thousands of systems over multiple decades, Motorola Solutions has the experience and custom-built tools to design an ASTRO® 25 system to meet your coverage, capacity and service needs.

DEPLOY

Deploying a network that your personnel will rely on for their safety should not be left to beginners. Motorola Solutions has unparalleled expertise and experience in deploying large-scale public safety networks that marry IP-based networks with optimized transport of voice and data services across wide and local area networks in the most challenging environments.
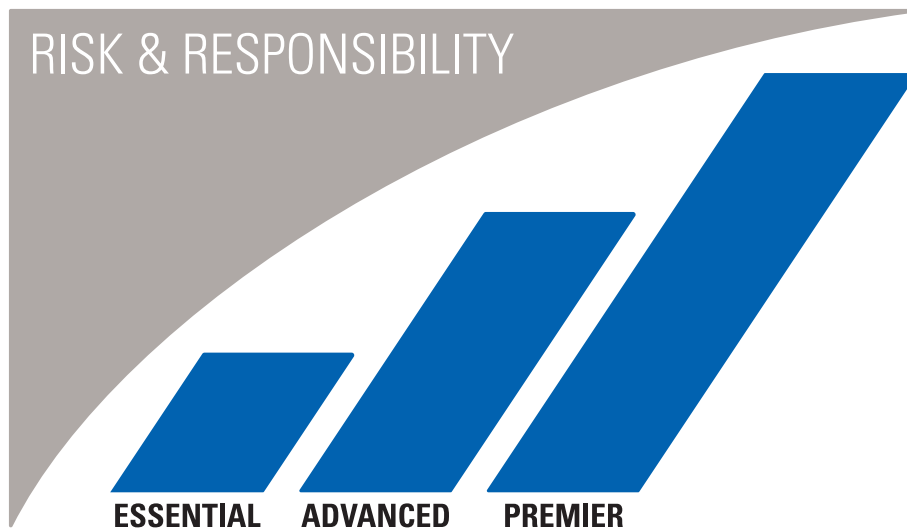
SUPPORT

Operating a modern mission-critical network can be complex, with evolving user needs and rapidly changing technology. Yet it is vital to get it right: the safety of your personnel and the public depends on it. Rely on Motorola Solutions to help you operate your network at peak performance levels. As the global leader in mission-critical communications, we provide expert engineers and network specialists, so you can focus on what matters most – your mission.

DRIVE YOUR PERFORMANCE WITH THE RIGHT LEVEL OF SERVICE

Each package provides an increasing level of support, transferring more of the risk and responsibility to Motorola Solutions.

RISK & RESPONSIBILITY

ESSENTIAL   ADVANCED   PREMIER

ESSENTIAL
BASIC SUPPORT WORK YOU NEED IT

When the unpredictable happens to your network, Essential Services provide you access to Motorola Solutions' Technical Support teams and resources for troubleshooting and maintenance. And when remote resolution is not possible, a local field technician will be dispatched to resolve the issue.

### ADVANCED
IMPROVE RESPONSE AND CONTINUITY

With advanced services, Motorola Solutions' expert service teams will monitor your system remotely, proactively detecting and resolving network issues. Get fast response by our qualified technicians who analyze and diagnose your network as well as deliver routine maintenance. With Advanced Plus, you can cost-effectively extend the lifespan of your system with planned upgrades to the latest hardware and software required.

PREMIER
MAXIMIZE PERFORMANCE AND REDUCE RISK

Transfer the day-to-day operations management of your mission-critical system and technologies to Motorola Solutions' experienced, managed services professionals focused on ensuring availability and maximizing performance. Premier Services are tailored to address your performance goals and relieve you of the financial and operational risks of managing your communication system. Motorola Solutions will be fully accountable for guaranteed performance and assured outcomes 24x7x365, enabling your staff to focus on core tasks and objectives.
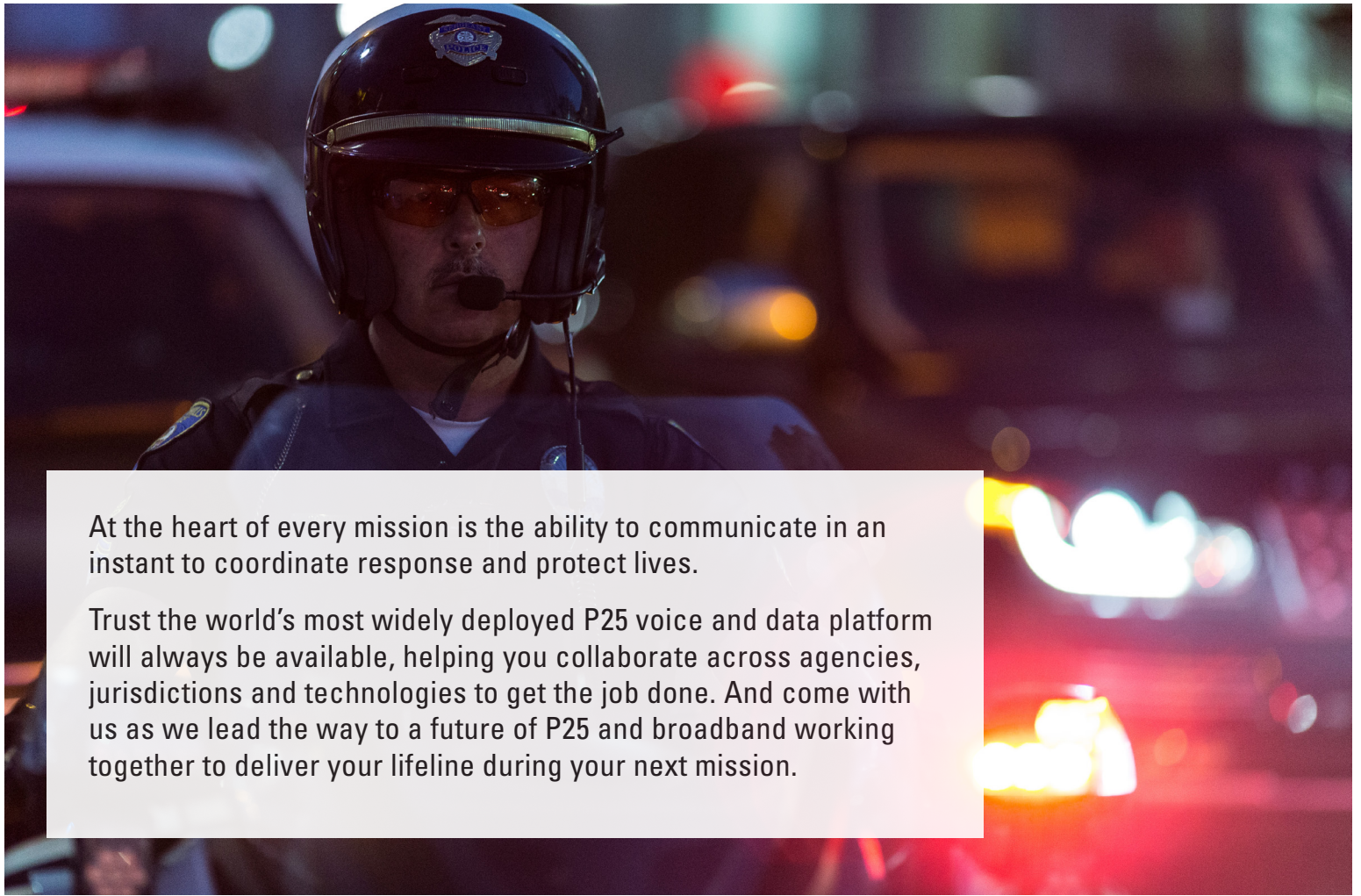
At the heart of every mission is the ability to communicate in an instant to coordinate response and protect lives.

Trust the world's most widely deployed P25 voice and data platform will always be available, helping you collaborate across agencies, jurisdictions and technologies to get the job done. And come with us as we lead the way to a future of P25 and broadband working together to deliver your lifeline during your next mission.

For more information on how your organization can gain the benefits of an ASTRO 25 solution that fits your needs and your budget today, contact your Motorola Solutions representative or visit **motorolasolutions.com/ASTRO25**

MOTOROLA SOLUTIONS