ASTRO P25
RADIO SYSTEMS

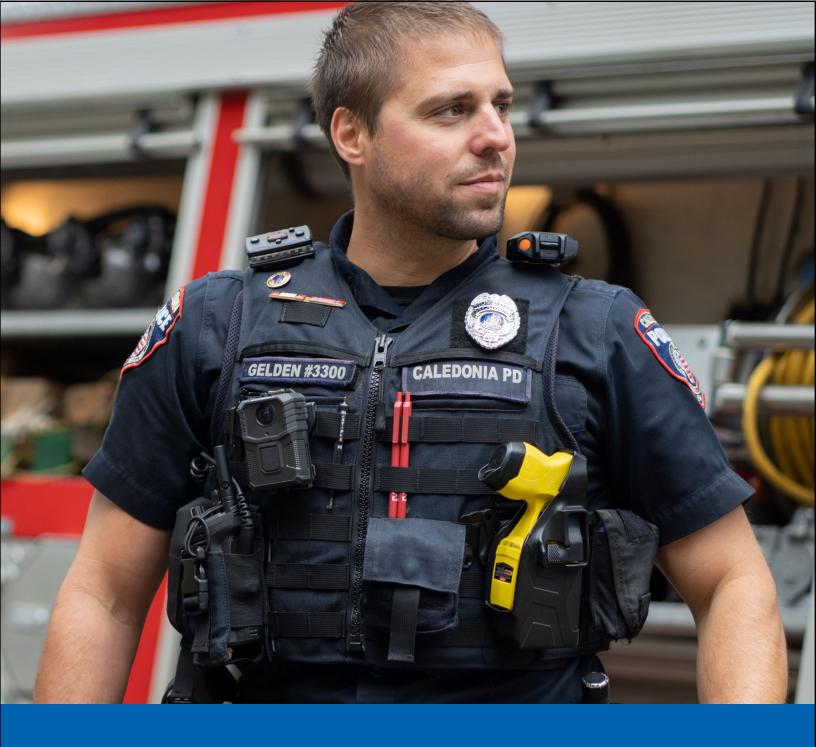## YOUR LIFELINE TO A SUCCESSFUL MISSION

MOTOROLA SOLUTIONS

THE ASTRO ADVANTAGE

Whether a traffic stop or a wide-area disaster, team communication can make the difference between a good and a bad outcome.
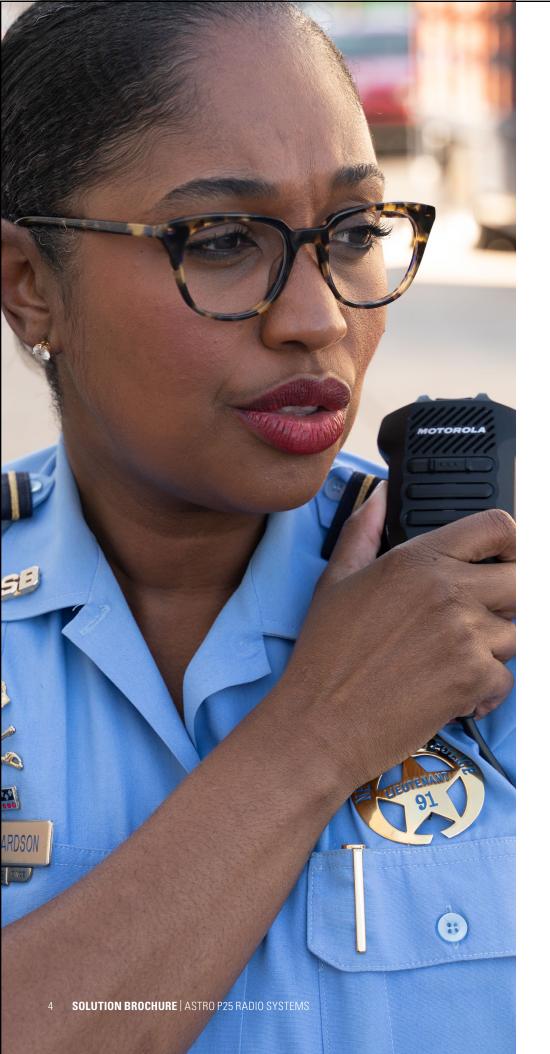
But in today's interconnected world, we know your communication technology needs to be more than just reliable. It needs to securely connect different teams using different technologies.

This is why we build ASTRO® radio systems.

Always-available communication, even under extreme conditions. Bringing together P25 and broadband for a higher level user experience. Greater interoperability and ease of collaboration between agencies. And, securely protecting the network and the information it carries.

FROM THE FIRST COMMERCIALLY-DEPLOYED DIGITAL TWO-WAY RADIO SYSTEM TO TODAY'S SOFTWARE-DEFINED NETWORK, ASTRO CONTINUES TO EVOLVE TO BE MORE CAPABLE AND MORE PREPARED TO CHANGE OUTCOMES.

CHOOSE A PROVEN COMMUNICATION SOLUTION.
CHOOSE ASTRO P25 RADIO SYSTEMS.

ALWAYS AVAILABLE

Reliable communication, everywhere you operate, is crucial for an effective operation and for the safety of your personnel. Responding to a natural disaster, routine traffic stop or ensuring safety at a parade, your personnel depend on reliable communication to change outcomes. Reliability is a fundamental tenet of every ASTRO system we build.

RESILIENT AGAINST SERVICE DISRUPTIONS

Multiple levels of resiliency, all aimed at maintaining reliable communication for everyone and every situation.

COVERAGE EVERYWHERE

Best-in-class coverage designs and radio performance combined with broadband to keep you connected.

PROVIDING MAXIMUM FLEXIBILITY

A software-defined architecture adaptable to your changing needs — from a single site to a statewide network.

BEST-IN-CLASS SERVICES

From initial design to lifecycle assurance, we can help you maintain the peak performance of your radio system.

INTEROPERABLE

Natural and manmade incidents are increasing in size and complexity. No one agency can do it all, and neither can any one communication system. Such incidents require a coordinated region-wide response equipped with seamless communication. ASTRO radio systems connect and work with other P25 systems and technologies to enable the seamless exchange of voice and data between agencies and critical infrastructure providers.

CERTIFIED APCO P25 COMPLIANT

Supporting interoperable communication with any manufacturer's P25 compliant radio.

CRITICAL CONNECT

One link connects ASTRO to multiple other radio systems and broadband PTX services for seamless collaboration.

COMMAND CENTER INTEGRATION

Integrates with our public safety CommandCentral software suite to deliver critical voice and data to the command center.

BROADBAND INTEGRATION

Get the best of both worlds — instant P25 group communications with high bandwidth of broadband. ASTRO can determine the best path for the content and device.

SECURE

It is no secret that bad actors are out there, continuously testing government IP systems for vulnerabilities. ASTRO radio systems adhere to every phase of the NIST cybersecurity framework. We use a risk-based approach throughout the entire product development, implementation and operational support lifecycle to protect user data as well as the network itself.

PROTECTING RADIO USER DATA

Radio authentication and end-to-end encryption with FIPS 140-2 compliance protects voice and data in-transit all the way between the radio user and dispatcher.

PROTECTING THE NETWORK

Guard against illicit access at all points of entry to your ASTRO radio system with link encryption and authentication, SSH/ SNMPv3, endpoint security, intrusion detection systems and stateful firewalls.

STRENGTHENING ASTRO WITH CLOUD

From its early years as a collection of discrete boxes to today's highly flexible software-platform ASTRO technology has continued to leverage advancements in technology to deliver more capability and value to its users. Now, as we see cloud-computing gaining industry acceptance, we are again looking at how this new technology can enhance ASTRO. Our CirrusCentral solutions integrate with ASTRO systems to bring the advantages of cloud to P25 radio communications.

CIRRUSCENTRAL MANAGEMENT

With lives on the line, you need to know that your communication system is up to the task. Designed for ASTRO radio systems, CirrusCentral Managment helps System Managers gain better insights into their system performance with an intuitive user interface and powerful data analytic tools. And as a cloud service, it can be accessed from anywhere on any device with a simple web browser.

CIRRUSCENTRAL CORE

A key component of reliability is having a good backup plan. CirrusCentral Core resides in our secure cloud, safely away from local natural or manmade events that might render the local on-premise core unavailable. If needed, CirrusCentral Core can take over ASTRO call control and routing to maintain wide-area communication between sites and users.

ASTRO EQUIPMENT

Tailored to meet your needs for coverage and capacity, the ASTRO radio system consists of RF site equipment, transport, centralized call control and system management. From a single site to statewide network, conventional to trunking, ASTRO gives you flexibility and scalability to expand as your needs change.

ASTRO CORE

The primary function of the ASTRO core is to enable wide area communication across multiple sites. The core provides distributed call control and routing of voice and data between multiple radio sites.

SOFTWARE DEFINED PLATFORM

The ASTRO Core is designed to adapt to the changing needs of small, single-site systems all the way up to the largest regional or national radio systems with hundreds of radio and console sites. Easy to deploy entitlement licenses and software enables simple capacity expansions, deployment of new features and capabilities, and adoption of new products and services.

RELIABLE

With no single point of failure and multiple levels of redundancy, the ASTRO Core is built for mission-critical service. ASTRO cores are built with components tested for the durability of continuous operations. Redundant hardware, software and network transport systems are ready to take over if needed. And to protect against a catastrophic loss of the core site, geo-redundant and cloud-core configurations are available.

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. ASTRO's comprehensive set of on-premise management apps includes Fault, Configuration, Accounting, and Performance functions. CirrusCentral Management, a cloud-based management application, enables anywhere, any device access to advanced tools analytics from an intuitive user interface.

RF SITES

The ASTRO portfolio of RF stations, receivers, site controllers and comparators make up the building blocks for Project 25 (P25) two-way radio communication systems from Motorola Solutions. ASTRO site equipment is built with flexibility, resilience and service in mind. For indoor installations, ASTRO site equipment comes in open racks or enclosed cabinets. And, a self-contained, environmentally enclosed cabinet is available for outdoor deployments.

FLEXIBLE DESIGN. SOFTWARE-CONFIGURABLE.

Because it is defined and configured through software, ASTRO has the flexibility to support different modes of operations based on individual site requirements. This simplifies technology migration while extending the useful life of the hardware.

ALWAYS AVAILABLE. RESILIENT TO DISRUPTION.

Built to last, ASTRO sites continue to provide wide-area communication regardless of the conditions. From technology that delivers superior coverage to site designs with no single point of failure (resulting in no more than 1 channel removed from service), ASTRO sites provide best-in-class performance.

SERVICE MADE EASY.

ASTRO sites are built to ease service and maintenance with front access modules, cable connections and LED indicators. Hot-swap modules ensure channels are back on the air with minimal downtime. Remote software upgrades with rolling activation makes it easy to stay up to date with minimal disruption.

EXTENDING P25 SERVICE AREA

Incidents don't always occur where you have strong radio coverage. Buildings, tunnels and rural areas can put your teams at risk of losing their radio signal. This is where our portfolio of coverage enhancement products can deliver the communication needed to keep your people safe, and operations successful.

DVR-LX P25 DIGITAL REPEATER

Extend the range of P25 digital or FM analog operation with the power of a 10 watt repeater. Install the repeater in a vehicle and take it with you to incidents in remote areas or permanently fix mount the repeater in a tunnel or underground parking garage.

PDR 8000 PORTABLE DIGITAL REPEATER

Set up the PDR 8000 suitcase at a special event or incident to quickly provide local P25 conventional or analog FM portable radio coverage. Connect to your Motorola Solutions dispatch console wherever it may be via a V.24 telephone connection.

VRX 1000 VEHICLE RADIO EXTENDER

With up to 3 watts of power, the budget friendly VRX 1000 provides portable radio communication in a mobile-only coverage area.

SMARTCONNECT

Stay connected to P25 even when outside P25 coverage. SmartConnect can keep you connected by rerouting P25 voice and data packets available broadband networks such as LTE, Wi-Fi and satellite. This effectively extends the service area of equipped APX P25 radios to nationwide. The switch is fast and automatic with no user intervention.

ASTRO SOFTWARE APPLICATIONS

Augment your radio system with integrated applications and software that can speed information delivery, ease operational management and improve team safety.

VIRTUAL ASSISTANT
Run routine database checks at the push of a button with ViQi, our AI-powered virtual assistant, and leave dispatchers to focus on other priorities.

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

LOCATION SERVICES
In addition to plotting users on a map, create ad-hoc talkgroups defined by geofences and ensure everyone in the area is connected.

SMARTCONNECT
Stay connected even when outside radio coverage by automatically switching to broadband — Wi-Fi, LTE, or satellite.

ALERTS
From man down to vehicle impact to shots fired, keep field teams safe with a variety of alerts automatically sent to the command center.

MESSAGING
Efficiently send text, status, telematics and other information to individuals or talkgroups to elevate awareness across your extended team.

INTEROPERABILITY
Set up interoperable communication in just a few clicks across multiple radio and broadband systems.

FLEET MANAGEMENT
Update your fleet of radios over LTE, Wi-Fi or P25 without bringing them into the shop and without operational interruption.

DISPATCH COMMUNICATIONS

Highly reliable, robust dispatch capabilities have always been a key component of P25 communications. To get the most out of your ASTRO radio system, pair it with our dispatch consoles for safer, more informed field responses when it matters most.

COMMANDCENTRAL AXS

From its flexible, intuitive user interface, to cross-platform integration and seamless multi-system access, CommandCentral AXS helps you efficiently manage and respond to the increasing amount of data and information that is flowing into today's dispatch centers.

NEXT GENERATION DISPATCH EXPERIENCE

With CommandCentral AXS, you can access what you want, where you want, in the manner you want, helping reduce stress and learning curves. A customizable interface lets you place your most important resources at your fingertips.

CROSS-PLATFORM INTEGRATION

CommandCentral AXS is built with extensible architecture, enabling bi-directional integration capabilities with other software applications found in the dispatch center. Dispatchers can place and control their primary radio resources from within their CAD application.

SEAMLESS MULTI-SYSTEM ACCESS

CommandCentral AXS enables dispatchers to seamlessly communicate and simultaneously connect across ASTRO and other P25 trunking systems, private broadband systems, MOTOTRBO™ professional systems, and analog radio systems.

MCC 7500E

The portable and compact MCC 7500E IP Dispatch Console gives your command centers access to expanded metadata and audio resources, helping you drive more informed field responses, whether you're communicating from permanent, back-up or mobile dispatch locations.

TAKE IT WITH YOU

The MCC 7500E provides a full console interface experience anywhere inside or outside of your radio network. Count on high availability, always, via redundant ethernet connections, end-to-end encryption and dual firewalls.

PHYSICAL SPACE EVOLUTION

The MCC 7500E utilizes a small form factor console that occupies only 165 cubic inches of physical space, an overall 90% reduction from other offerings. Its compact size makes it perfectly suited for cramped command centers that require best in class dispatching capabilities without all the extra weight.

ASTRO INFRASTRUCTURE SERVICES

BECAUSE DOWNTIME IS NOT AN OPTION

Your network must be available, resilient and responsive to support your operations, from everyday routines to crisis situations. Our services can help you accelerate service response, manage technology complexity and boost network performance with the right combination of expertise and tools.

NETWORK MONITORING & INCIDENT MANAGEMENT

ENSURE MINIMAL DOWNTIME AND AVOID OUTAGES

Our 24/7/365 remote network monitoring and incident management can help provide peace of mind regarding network performance. In addition to keeping a watch over your network we also monitor weather, political, national and local events so that we can help you respond to any emergency.

Our expertise, coupled with intelligent automation tools, enables faster incident identification and resolution. Service capabilities include: fault detection, incident analysis, issue resolution, performance reporting and the use of advanced analytics.

| DETECT |
| ANALYZE |
| RESOLVE |
| REPORT |
| PREVENT |

EMERGENCY & DISASTER RESPONSE

PREPARE YOUR RESPONSE

Our complete set of capabilities can help you prepare for the worst that might happen. We not only address natural disasters but also other events such as political, social and sporting events. Our teams work 24/7/365 to support your organization and keep your operations running smoothly and minimize downtime. Service capabilities include: proactive monitoring and resolution of your network and external incidents; immediate communications across teams to proactively identify risks; a knowledgeable technical service desk to resolve issues quickly; system engineering that employ best-in-class tools, diagnostics and escalation protocols; and mission-critical expertise to manage network incidents in the field.

| EMERGENCY AWARENESS |
| EMERGENCY OPERATIONS |
| TECHNICAL SERVICE DESK |
| NETWORK MONITORING |
| SYSTEM ENGINEERING |
| FIELD SERVICES |

TECHNICAL SUPPORT & PREVENTATIVE MAINTENANCE

OPTIMIZE SYSTEM PERFORMANCE

Today's technical support capabilities need to span the entire mission-critical technology ecosystem for the entire system to work optimally. Rapid resolution of system issues with effective troubleshooting and well laid out escalation procedures is critical. As the technology provider and system integrator of your public-safety systems we understand system issues better than anyone else. Trust us to provide on-site and remote support for technical issues including repair and replacement and preventive maintenance arising from devices, infrastructure, applications and video cameras.

| NETWORK MONITORING |
| SYSTEM ENGINEERING |
| FIELD SERVICES |

LIFECYCLE MANAGEMENT
IMPROVE SYSTEM PERFORMANCE AND SECURITY

We offer a full range of lifecycle management services that address technology refreshes, security and information assurance for ongoing system reliability and resilience. Software maintenance complements the lifecycle of the system by providing periodic software updates which safeguard, improve performance and extend the lifespan of the system. As new system releases become available, we work with you to upgrade software or hardware or both pertaining to base stations, site controllers, comparators, routers, LAN switches, servers, dispatch consoles, logging equipment, network management terminals, network security devices such as firewalls and intrusion detection sensors, and more – onsite or remotely.

To ensure system upgrades do not impact network availability causing business disruption requires proper planning, we perform extensive testing, flawless implementation and post upgrade training. And finally, our consultants work very closely with you to conduct periodic system assessments and adopt a cadence of communication to keep you informed of upcoming lifecycle changes and recommended strategy.

SOFTWARE MAINTENANCE

SYSTEM UPGRADES

LIFECYCLE MANAGEMENT

MANAGED SECURITY SERVICES
IDENTIFY AND MITIGATE SYSTEM VULNERABILITIES

Stop small issues from becoming big ones with our Managed Security Services. We provide the right people, technology and proven processes to proactively monitor and manage your security needs to defend against cyber attacks. Our suite of services deliver 24/7/365 threat management and data protection with security patching, network and application monitoring, incident management and reporting and advanced threat detection and response.

SECURITY PATCHING

SECURITY MONITORING

THREAT DETECTION

Learn more at **motorolasolutions.com/astro**

MOTOROLA SOLUTIONS