MISSION CRITICAL COMMUNICATIONS DESIGNED TO A TOUGHER STANDARD

Split-second decisions. Harrowing circumstances. First responders often find themselves in the eye of the storm. It's the nature of the job; a job that requires considerable personal danger and risk. Voice and data communications keep them connected, informed and safe. It is their most powerful weapon.

In both routine and extreme situations, public safety responders need reliable communications to do their jobs, to keep citizens and communities safe. But what does that really mean? It means emergency calls connect instantly. First responder group calls are established in under a second. Resources from multiple jurisdictions collaborate and deploy quickly.

Communications simply cannot fail when lives are at stake and every second counts. Mission critical networks and devices ensure that they won't. These solutions are different by design and their proven, dependable performance in daily operations, countless storms, earthquakes and major public safety incidents underscores why purpose-built mission critical technologies matter. There simply is no substitute.

WHY COMMERCIAL NETWORKS ARE NOT ENOUGH

When Superstorm Sandy came roaring ashore in October of 2012, private, mission critical networks worked as designed. Public safety officials and government agencies could communicate and coordinate responses across multiple jurisdictions and multiple departments. Public networks, on the other hand, took a major hit:

- At the storm's peak, 25 percent of the region's commercial cell sites were knocked out of service
- Nearly 9 percent of these sites were still inoperable a week after the storm, and some public carrier users reported nationwide network performance impacts[1]

This scenario is not unusual. In many emergency situations, commercial networks become overloaded, lose power and fail. Why? Because the public reaches immediately for their mobile phones – to check on family, call for help, etc. – inundating the network with voice and data traffic causing the network to be unavailable. If public safety agencies relied on commercial networks, they would be just another customer, not distinguished in importance from any other and would risk lack of availability at potentially critical times. The ability for first responders to communicate quickly and reliably protects lives and property. Anything less is a risk no community can afford.

Despite the destructive power demonstrated by Hurricane Sandy in the Northeast, public safety systems in New York City remained operable for the entire incident.

> **"PUBLIC SAFETY AGENCIES IN THE AFFECTED AREA HAVE BEEN ABLE TO MAINTAIN COMMUNICATIONS IN THE AFTERMATH OF SANDY…[1]"**
>
> **WILLIAM BROWNLOW, TELECOMMUNICATIONS MANAGER, THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS**

COMMERCIAL AVAILABILITY DURING AN EMERGENCY

EVENT	FAILURE	CAUSE	IMPACT
SUPERSTORM SANDY OCTOBER 2012	CELL PHONE SERVICE DISRUPTED	COMMERCIAL CARRIER CELL SITES KNOCKED OUT OF SERVICE BY EXTREME WEATHER CONDITIONS	25% OF THE REGION'S COMMERCIAL CELL SITES WERE KNOCKED OUT OF SERVICE
MID-ATLANTIC EARTHQUAKE AUGUST 2011	CELL PHONE CALLS BLOCKED	CELL PHONE NETWORKS OVERWHELMED WITH VOICE CALLS TO AND FROM AFFECTED AREAS	SERVICE WAS NOT RESTORED UNTIL HOURS LATER WHEN CALL VOLUME SUBSIDED

THE MISSION CRITICAL DIFFERENCE

What makes technology mission critical? Reliability. Availability. Redundancy. Security. Dedicated mission critical networks – and all the components that go with them – are designed to withstand the rigors and environmental extremes of everyday use. They help first responders work safer, smarter and faster in disasters and day-to-day incidents. They keep communities safe. And while mission critical solutions require significant investment, the returns – one to many calls in less than a second, capacity to handle increased network traffic in an emergency, coverage where and when you need it, back-up for the back-up systems – remain unmatched by commercial wireless solutions.

THE FIVE ELEMENTS THAT MAKE COMMUNICATIONS MISSION CRITICAL

Mission critical networks are different because they need to work when they are needed in the most difficult of times. They provide customized coverage where and when it's needed for community events, daily operations and the unexpected. Data applications – GPS, messaging, man-down, biometrics, alarms and sensors – improve efficiency, collaboration and safety. Flexible configurations and talk groups also allow various departments to connect and collaborate in real time. But most important, they are built with capacity so emergency communications can get through even under the most challenging circumstances.

Here's a quick overview of the defining characteristics that set mission critical communications apart and why they matter.

STANDARDS-BASED COMMUNICATIONS CAPABILITIES

Pre-programmed interoperability and prioritization. Voice connectivity for all users in under a second. Dedicated, redundant coverage where and when it's needed. Over-the-Air (OTA) device rekeying. End-to-end encryption and radio authentication. It's more than a wish list, but requirements of a Project 25, standards-based system endorsed by government agencies across North America. These are the essential functions that the public safety industry has defined as essential to mission critical operations – and what makes them unique. In a disaster, time is the enemy. Reliable communications remain the primary lifeline for first responders. Split-second decisions must be made based on available information. Dedicated over-the-air protocols via standards-based P25 networks make it easier and safer to do just that.

If officers had to rely on their mobile phone to connect with dispatch, commanders or each other, it could take several seconds or more to dial and connect. Standards-based mission critical systems get calls out to all users on a system in under a second.

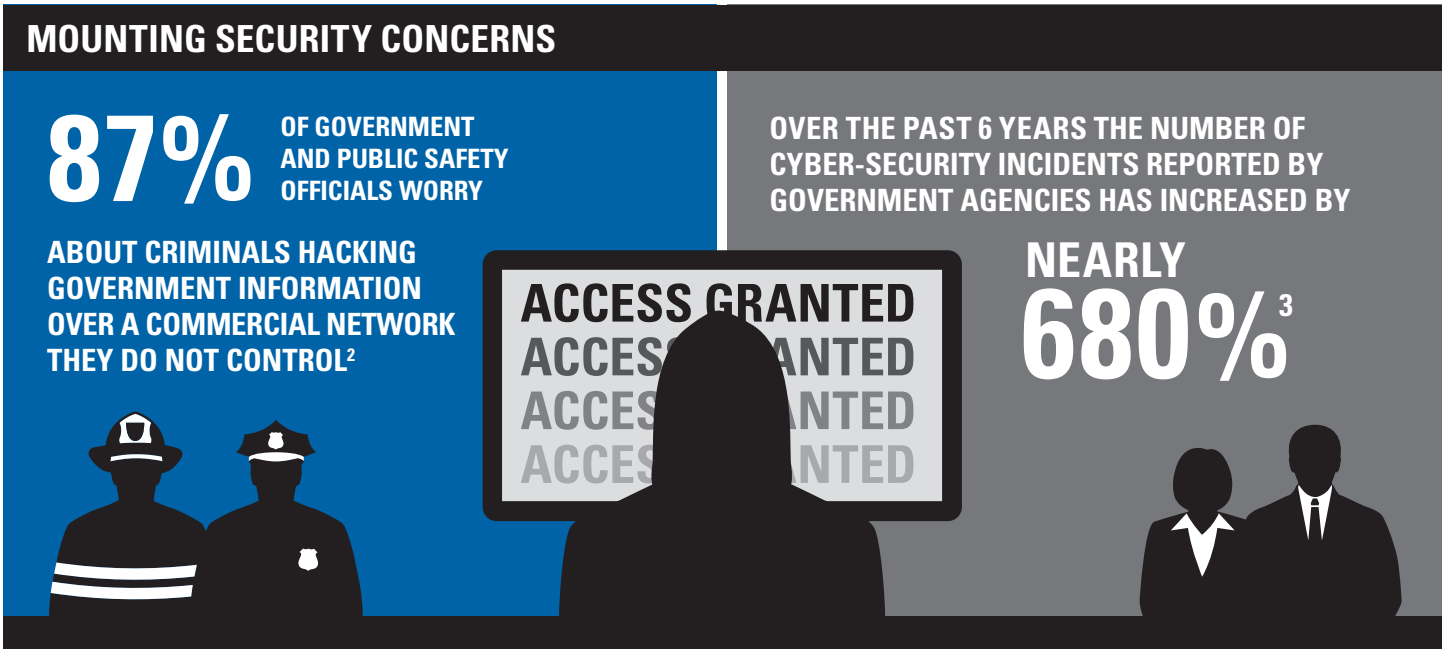
MISSION CRITICAL COMMUNICATIONS ENABLE

- First responders to safely and quickly call for back-up whether in their car or on foot
- Dispatchers to collect all significant caller details and immediately communicate with officers en route
- One-to-many dispatch call capability and fast, low-latency group communications, improving collaboration and decision making
- Prioritizing communications by individual, group, jurisdiction or agency
- Emergency calls to override all traffic on the system to immediately identify a responder in distress

CONTROL

The benefits of public safety agencies owning their own communications system are tough to ignore. Above all else, private, mission critical communications deliver control – over who can access the system and who can't, what changes need to be made and when, and knowing the status of all users. Proactive support identifies and resolves network issues before they have any impact to the system and enhances network availability. Network management is streamlined and network health visible at all times.

Mission critical networks also provide other key elements of control – call prioritization and pre-programmed interoperability. Both ensure that when a disaster strikes, neighboring systems can talk and additional users can be immediately added to the network, no matter what radio technology they have deployed. Built in authentication identifies who users are, where they are and denies connectivity to devices not authorized on the network. Mission critical systems can be configured with information assurance options to manage and mitigate security-related risks. Commercial networks simply don't come with the same security guarantees.



COVERAGE WHERE IT'S NEEDED MOST

Instant, anywhere access. For public safety users, always available coverage means whenever they need their radio, it works. Events like super storm Sandy and the Washington, D.C. earthquake shine a light on the importance for public safety agencies to have dedicated, secure access to a critical communications network. Designed with geo-redundancy, excess capacity and fallback strategies built in, these powerful mission critical networks effectively handle usage peak scenarios, support multi-agency interoperability and continually prioritize traffic for efficient system use. And that's particularly important when a grid blackout, floods or other disasters occur.

Ensuring you have required coverage where you need it is fundamental to mission critical network design. Carrier networks must meet the needs of residents, enterprises and other users built to maximize revenue. Public safety networks, on the other hand, are designed to meet the coverage requirements of their jurisdictional geography, regardless of population. Carriers are not as concerned with coverage in low density areas because they evaluate coverage based on business costs.

Many factors ultimately determine mission critical network design. The bigger the system footprint, the greater the user density, number of channels required, the type of coverage needed (mobile coverage outdoors and in-buildings) and available budget adds complexity. Coverage prediction and analysis tools help generate detailed coverage maps and the number of tower sites needed to support them. Mission critical networks help to ensure sites are hardened against wind and flood threats, have back-up generators in place and account for all emergency contingencies.

NETWORK CAPACITY AND RESILIENCY

For a system to be defined as mission critical, it must be inherently reliable and resilient. How is this accomplished? It's more than putting back-up systems in place. It really begins with the system design. Operating systems are hardened to disable unnecessary services. Sites are equipped with redundant controllers and links ensure maximum wide area availability. Fallback modes protect communications even when sites go down, allowing first responders to talk to each other via radio talkaround functionality. Redundant cores are built in different geographic locations to maximize availability. Commercial networks don't accommodate redundancy or resiliency at all points of a system and aren't designed to handle every contingency.

Private radio systems have back-ups for their back-ups. A fully resilient network can withstand multiple single point failures in its core before functionality is affected. Redundancy is built into hardware and software components. The system also features a range of capabilities designed to maintain continuity of voice and data services, even under conditions that would cause most networks to fail. And in the unlikely event the system does suffer a failure first responders maintain the ability to communicate within their team using radio-to-radio communications – a capability not even possible with carrier networks.

BUILT-IN SYSTEM FAILURE RESISTANCE 8 LEVELS OF REDUNDANCY

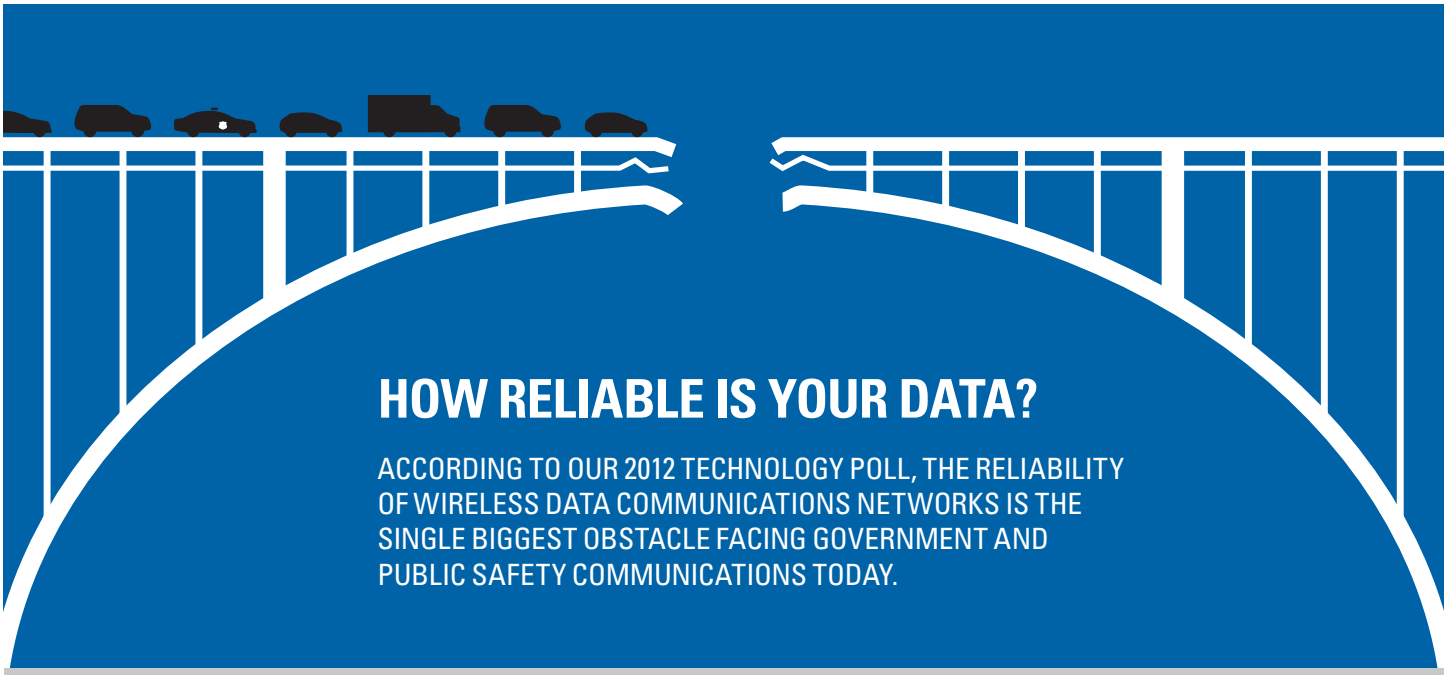
(1-2) MINIMUM 2 FAILURES ARE NEEDED TO BRING DOWN THE MAIN SITE AND SWITCH TO THE GEOGRAPHICALLY REDUNDANT MAIN SITE

(3-4) MINIMUM 2 FAILURES ARE NEEDED TO BRING DOWN THE GEOGRAPHICALLY REDUNDANT MAIN SITE AND SWITCH TO SITE TRUNKING

(5-6) MINIMUM 2 FAILURES ARE NEEDED TO HALT SITE TRUNKING AND MOVE TO FAILSOFT

(7) CHANNEL FAILURE IS NEEDED TO HALT FAILSOFT AND FORCE A MOVE TO RADIO TO RADIO COMMUNICATION

(8) RADIO FAILURE IS NEEDED TO HALT RADIO TO RADIO COMMUNICATION



HOW RELIABLE IS YOUR DATA?

ACCORDING TO OUR 2012 TECHNOLOGY POLL, THE RELIABILITY OF WIRELESS DATA COMMUNICATIONS NETWORKS IS THE SINGLE BIGGEST OBSTACLE FACING GOVERNMENT AND PUBLIC SAFETY COMMUNICATIONS TODAY.

76% SAY CURRENT DATA NETWORKS ARE NOT RELIABLE ENOUGH[2]

60% OF PUBLIC SAFETY IT PLAN TO INVEST IN BROADBAND COMMUNICATIONS IN THE NEXT 2 YEARS, DESPITE OVERALL BUDGET CONCERNS[2]

DEVICES BUILT FOR PUBLIC SAFETY

Built for the way public safety works; it's what sets mission critical solutions apart. First responder communications needs are unique. As a result, they require rugged devices that can withstand the rigors of constant outdoor use – and batteries that cover 8 to 10-hour shifts. Loud and clear audio with noise suppression ensures they can hear and be heard no matter the chaos or weather conditions that surround them.

Mission critical, purpose-built devices offer not only security but also a number of other advantages over their consumer and commercial counterparts. A rugged form factor stands up to heat, cold, rain, and dust as well as the challenges of prolonged daily street use. These devices also cost less to operate.

Purpose-designed devices support applications developed specifically for the unique needs of public safety. And, they work the way government and public safety users' work, saving valuable time and providing streamlined access to relevant information right where and when it is needed. Devices must deliver critical information without interruption and ensure the most important functions are always accessible. Their lives – and those of the citizens they protect – depend on it.

MISSION CRITICAL NETWORKS THERE'S SIMPLY NO SUBSTITUTE

Are you willing to stake the lives of first responders and the citizens they are sworn to protect on anything less than mission critical communications? Ensuring voice and data delivery meets mission critical standards on a commercial network is nearly impossible. With no way to prioritize public safety data over consumer data, there's no guarantee of its security or if you'll be able to use that vital information to protect the public and your first responders.

Designed to withstand the most grueling environments and events, mission critical communications provide the real-time connectivity, availability and control you need to keep the men and women on the front lines safer, more informed and efficient. Control – over the network, its assets and users – remains yours. Are you willing to settle for anything less?

BENEFITS OF TWO-WAY RADIOS OVER CONSUMER DEVICES

- EMERGENCY CALL BUTTON
- MULTIBAND INTEROPERABILITY
- RUGGED HOUSINGS
- 1 WATT AUDIO
- EXTREME NOISE SUPPRESSION TECHNOLOGY
- SUPERIOR RF SPECIFICATIONS DESIGNED TO OPERATE IN URBAN ENVIRONMENTS
- LARGE EASY-TO-CONTROL KNOBS
- HIGH POWER RADIOS: 1-6 WATTS OF PORTABLE RADIO POWER AND UP TO 110 WATTS OF MOBILE RADIO POWER TO ENSURE CALLS GET THROUGH
- DATA APPLICATIONS THAT ENHANCE SAFETY AND AWARENESS
- INTELLIGENT LIGHTING
- MISSION CRITICAL WIRELESS WITH SECURE BLUETOOTH PAIRING

THE DATA CONNECTION

89%

OF PUBLIC SAFETY DECISION MAKERS NOW RECOGNIZE DATA AS BEING JUST AS CRITICAL TO SUPPORTING THEIR MISSIONS AS THE INSTANT, TWO-WAY VOICE COMMUNICATIONS THEY DEPEND UPON[4]

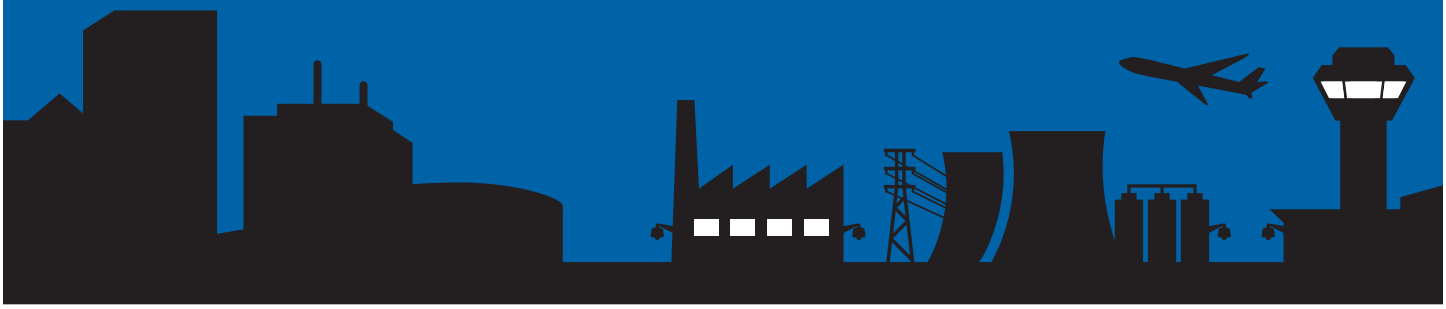
72%

OF PUBLIC SAFETY DECISION MAKERS ARE INTERESTED IN USING CITIZEN PROVIDED VIDEO AND TEXT TO MOBILIZE OFFICERS[2]

A PARTNER YOU CAN TRUST

With more than 500 ASTRO® 25 trunked systems and thousands of conventional sites deployed, two million users rely on Motorola solutions for daily communications as well as emergency response in the most demanding situations. Today, we are driving innovation by creating connections between LTE and P25 technologies; enabling interoperability across voice and broadband networks.

As the leader in public safety communications with years of domain expertise, we are here to help ensure your first responders have the intelligence they need to keep your community safe and prosperous.



SOURCES

1. "Public-safety Communications Fare Better than Commercial Networks after Superstorm Sandy," Urgent Communications, November 6, 2012
2. Motorola Government and Public Safety Data Communication Survey, January-February 2012
3. "Cybersecurity: Threats Impacting the Nation", United States Government Accountability Office, April 2012
4. "Critical Issues In Policing Series: How Are Innovations in Technology Transforming Policing?" Police Executive Research Forum, January 2012

For more information on how we can serve the needs of your community with our Next Generation mission critical solutions, please contact your Motorola Solutions representative or visit **motorolasolutions.com/safercities**.

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