



ENHANCING INTRA- AND INTER- AGENCY COMMUNICATION AND COLLABORATION

NEW MISSION CRITICAL COMMUNICATIONS ECOSYSTEM



INTRODUCTION

Heraclitus, an ancient Greek philosopher, is credited with saying “change is the only constant in life”, meaning that change is an ever present condition that occurs continuously in the world around us, so get used to it. Even Heraclitus would agree, though, that the speed and magnitude of change experienced over the last several years has been unprecedented. These changes, including everything from a global pandemic, to extreme weather events, to calls for policing reform, are, in turn, driving a significant transformation in public safety.

- Public safety agencies are being required to do more with the same or fewer resources because municipal, county and state budgets are under financial pressure.
- Multiple agencies from different jurisdictions are required to work together in a coordinated response to major incidents, both natural and man-made.
- Trained professionals, aka “social responders”, are being used as an alternative to first responders when answering calls concerning mental illness, substance abuse, and other non-violent issues.

At the same time it is being asked to make major changes in policies and procedures, public safety also faces several challenges in how it communicates:

- Communication networks and tools that are siloed, making it difficult to share information with other agencies
- LMR communication available only in a specific, geographically-defined coverage areas
- Limitations on the types of devices and media that can be used for communication

To overcome these challenges, public safety needs a unified communications solution, one that is:

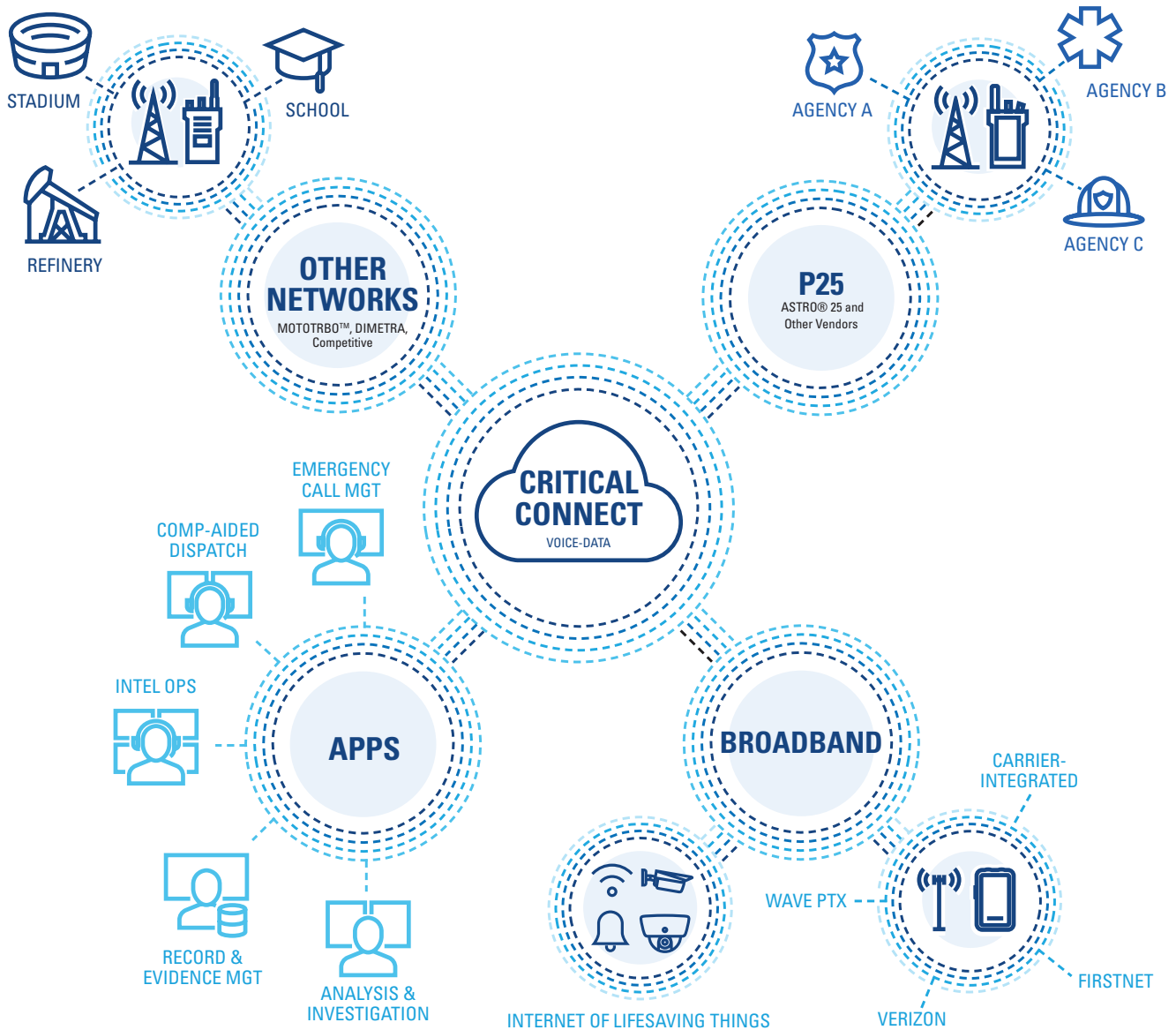
- Not restrained by coverage area, network or device type
- Capable of adapting to the diverse needs and roles of its users (i.e. first responders, command staff, social responders)
- Able to use each network type to its best advantage and extend LMR access to users of smartphones, tablets and other devices
- More affordable, with a monthly fee structure that makes it easier to expand or reduce service levels, and a “bring your own device” policy
- A platform to integrate new technologies, applications, and devices

“DURING EMERGENCIES, RELIABLE COMMUNICATIONS ARE CRITICAL. DISASTERS, SUCH AS 2017’S HURRICANES, CONTINUE TO TEST THE NATION’S EMERGENCY COMMUNICATIONS CAPABILITIES. AS DISASTERS CAN CROSS JURISDICTIONAL BOUNDARIES, COLLABORATION WITHIN AND ACROSS REGIONS IS VERY IMPORTANT.”

Quote from April 2018 GAO report, *Emergency Communications, Increased Regional Collaboration Could Enhance Capabilities*



What public safety needs is Motorola Solutions' Mission Critical Communications Ecosystem. The Mission Critical Communications Ecosystem delivers the combination of network technologies, devices and interoperability necessary to seamlessly connect all agencies serving the public good. With Critical Connect at its center, the Ecosystem ensures that first responders, social responders, and others have access to the right information, people, and applications whenever and wherever needed.



“I’M NOT GOING TO GET MORE MONEY. I’M NOT GOING TO GET MORE COPS. I HAVE TO BE BETTER AT USING WHAT I HAVE...”

Quote from Charlie Beck, retired Chief of the Los Angeles Police Department

P25 LMR

Project 25 land mobile radio (P25 LMR) systems have been and continue to be the primary tool public safety uses for mission critical voice communication. Agencies appreciate having a highly reliable, redundant, secure communications network dedicated to their specific use. But, those same attributes can also limit agency communications to that one network, making it difficult to share information with other agencies in real time.

Major hurricanes, wildfires, and the COVID-19 pandemic have shown that responses to large-scale events increasingly require close coordination and collaboration between multiple agencies. The coordination and collaboration required for a successful response is dependent on the ability of first responders, field commanders, and others involved in the response to communicate seamlessly, irrespective of their network or device. In other words, a successful response is increasingly dependent on interoperable communications between P25 networks, interoperability that not only supports voice, but also talker ID, emergency calling, roaming, encryption, and other capabilities.

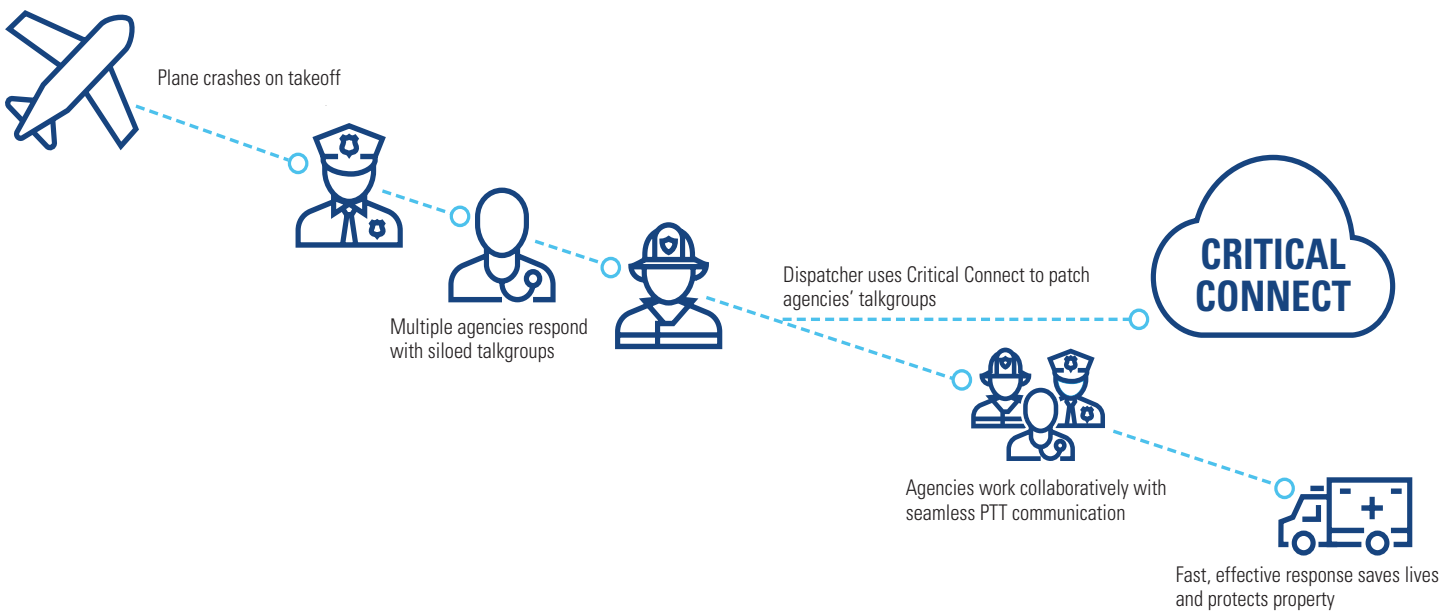


USE CASE - AIRLINE CRASH AT REGIONAL AIRPORT

A commercial passenger jet crashes on takeoff at a regional airport, causing property damage and casualties on and off airport property. A number of public safety agencies, including local police and fire, airport security and fire, and county emergency medical, respond to the incident.

At a moment when seamless communication is needed most, commanders on the scene are carrying multiple radios, or using cell phones to relay information between their respective agencies. As a result, communication is imprecise, information is lost, and the inter-agency collaboration necessary for a fast, effective response doesn't take place.

That's where Critical Connect comes in. Critical Connect is a cloud-based hub that provides interoperable communication between different ASTRO 25 networks and between ASTRO 25 and third-party P25 networks, enabling real-time communication between agencies whenever and wherever needed.



With Critical Connect, our use case has a better outcome because:

- Critical Connect delivers simple, flexible, scalable interoperable communications between agencies, across town, across state, or across the nation.
- One physical link to Critical Connect provides interoperability with other ASTRO 25 networks, AT&T's EPTT, Verizon's PTT+, Verizon's Group First Response, and WAVE PTX broadband PTT services.
- Critical Connect allows each agency, even those in a multi-tenant environment, to dynamically manage its own resources for PTT interoperability.
- As a monthly subscription service, Critical Connect addresses the cost issues that have hindered interoperable PTT communications in the past.
- The real-time exchange of voice and data enabled by Critical Connect improves collaboration between agencies and makes it easier to share information regardless of device or network.

When compared with the traditional solution for P25 network interoperability, ISSI, Critical Connect delivers much more. Critical Connect delivers all of the ISSI capabilities such as group calling, emergency calling, ID and alias transport, and manual roaming. And, Critical Connect delivers an enhanced set of voice communication features, including private calling, grouping/regrouping, and end-to-end LMR encryption. Critical Connect can also support data interoperability, allowing users on different networks to share location, presence, and status.

ISSI STANDARD PROVIDES

- One-to-One Interop
- P25 CAI
- Registration
- Group Call
- Affiliation
- ID/Alias Transport
- Emergency Group Call & Alert
- Announcement Group
- Manual Roaming
- Automatic Roaming
- Messaging
- Encryption

CRITICAL CONNECT DELIVERS MORE

- One-to-One Interop
- P25 CAI
- Registration
- Group Call
- Affiliation
- ID/Alias Transport
- Emergency Group Call & Alert
- Announcement Group
- Manual Roaming
- Automatic Roaming
- Messaging
- Encryption
- Many-to-Many Interop
- Private Calling
- Ruthless Preemption
- Grouping/Regrouping
- Data Communications
 - Location
 - Presence
 - Status
- Status/Query Update
- End-to-End LMR Encryption



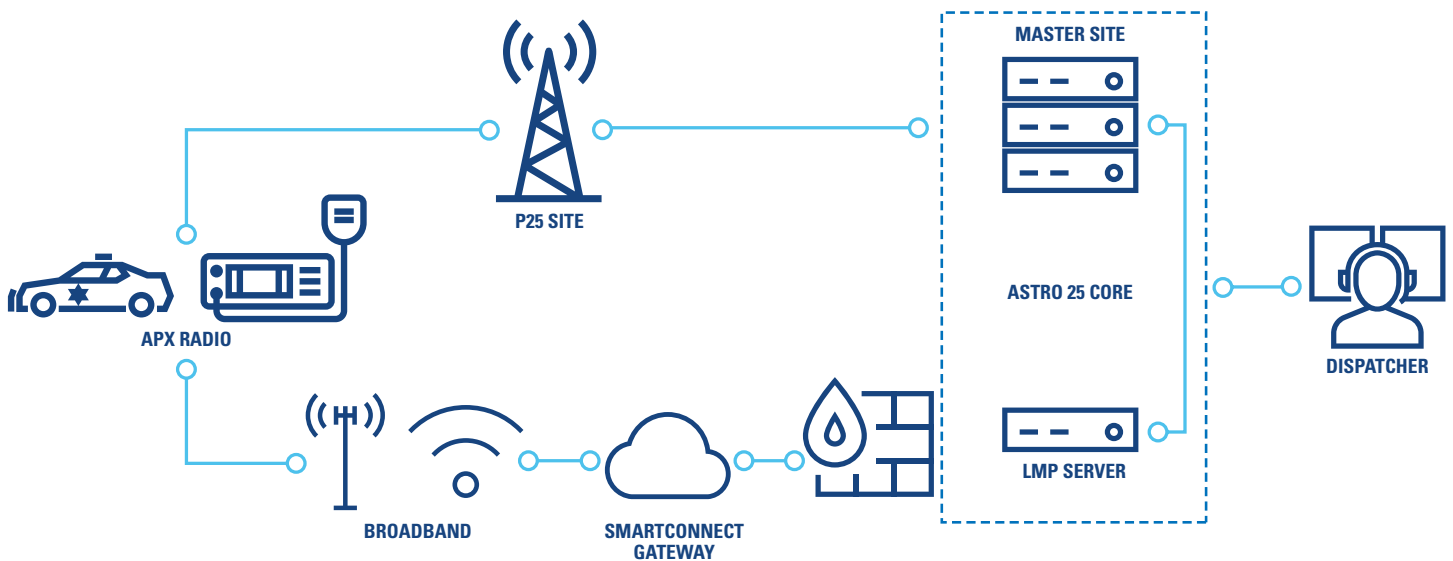
Also included as part of the ecosystem is SmartConnect. SmartConnect provides device-level interoperability for APX NEXT and APX users. With SmartConnect, first responders can use both P25 and broadband transport to remain connected to their home ASTRO 25 network.

USE CASE – HIGH SPEED CHASE ON MAJOR HIGHWAY

A local police officer spots a suspect wanted in connection with multiple bank robberies and pursues them. The ensuing car chase on an interstate highway crosses municipal/county boundaries and takes the officer well out of range of their P25 home network.

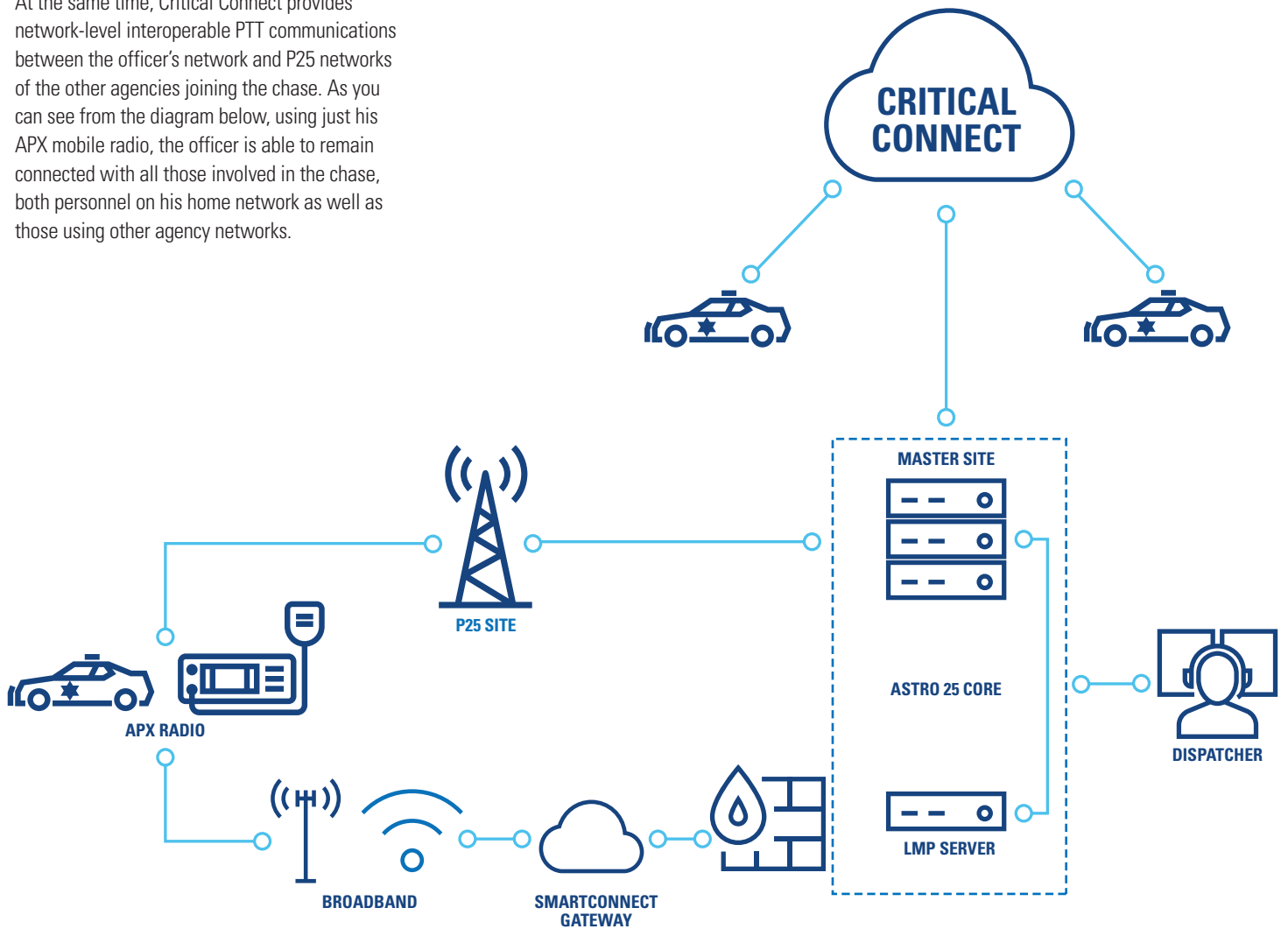
To ensure the chase ends safely, with the suspect in custody, the officer needs to maintain radio communication with dispatchers on their home network, as well as officers from other agencies assisting in the chase.

As you can see in the diagram below, SmartConnect and APX radios allow the pursuing officer use both P25 and broadband to stay connected with users on their home ASTRO 25 network. So, when the chase takes the officer well out of P25 coverage, SmartConnect automatically switches the voice channel to an available broadband network to ensure they remain in contact with dispatchers, supervisors, and other members of their agency.



If during the chase the officer returns to P25 coverage, SmartConnect automatically switches the voice channel back to the ASTRO 25 network without intervention by the officer. The switchovers are fast and seamless, with audio remaining on the same talkgroup and radio functionality and voice quality maintained.

At the same time, Critical Connect provides network-level interoperable PTT communications between the officer's network and P25 networks of the other agencies joining the chase. As you can see from the diagram below, using just his APX mobile radio, the officer is able to remain connected with all those involved in the chase, both personnel on his home network as well as those using other agency networks.



ONLY MOTOROLA SOLUTIONS DELIVERS SEAMLESS INTEROPERABILITY AT THE DEVICE AND NETWORK LEVELS, KEEPING PUBLIC SAFETY ALWAYS CONNECTED AND FOCUSED ON THE TASK AT HAND.



BROADBAND PTT

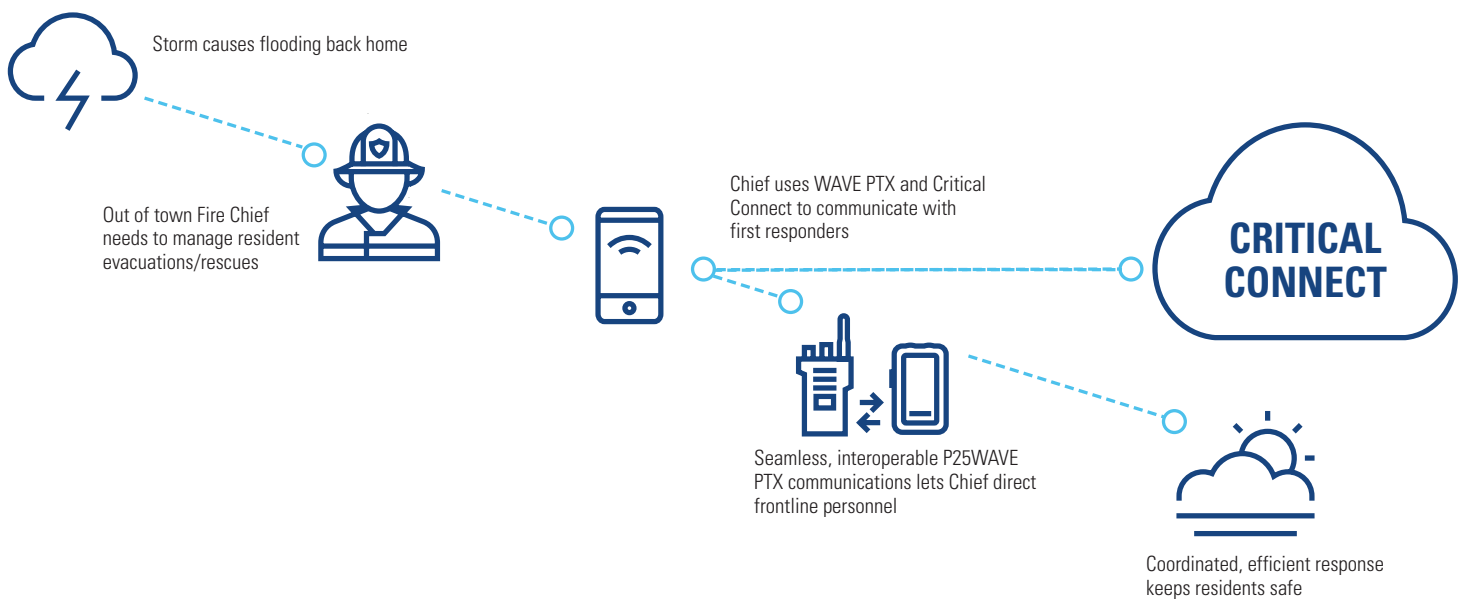
Thanks to the ubiquitous deployment of LTE and wide scale availability of smartphones, we enjoy constant connectivity in our personal lives, able to communicate with each other without concern for location, network, or device. And, public safety is beginning to enjoy the same level of connectivity in their communication.

Just as LTE and smartphones changed our personal communication, so too is it changing communication for public safety. The availability of broadband PTT over LTE services compliant with the 3GPP standard for Mission Critical PTT (MCPTT) provides public safety with fast, secure, reliable push-to-talk communication over smartphones, tablets and other broadband devices. When deployed with an LMR interoperability solution, public safety personnel without a radio or outside of coverage can use broadband PTT to communicate with radio users on the frontlines.

USE CASE – FIRE CHIEF OUT OF TOWN

A Fire Chief is travelling out of town when a major storm causes significant flooding back home, creating the need to evacuate residents and rescue others already trapped by the flood waters. Real-time communication with the Chief is required to help plan and coordinate the multiple units responding to the flood.

Because the Chief is outside LMR coverage, they need a solution that makes it possible for them to use their smartphone or tablet for PTT over an LTE network to communicate directly with their own personnel using P25 radios.



Part of our Mission Critical Communications Ecosystem, WAVE PTX for public safety is a carrier-independent service that turns smartphones, tablets, and other broadband devices into PTT handsets.

- WAVE PTX delivers the speed and simplicity of push-to-talk communication along with the ability to share multimedia information at the touch of a button.
- WAVE PTX for public safety links to Critical Connect to provide interoperable PTT communication with users on LMR networks.

- WAVE PTX for public safety also offers the emergency calling, remote monitoring, and other MCPTT-compliant features that enhance user safety, increase situational awareness, and improve operational efficiency.
- The SafeGuard Multi-Role feature set adds MCPTT features that make it possible for WAVE PTX for public safety to easily adapt and stay in sync with the changing roles and responsibilities of its users.

So, with WAVE PTX and Critical Connect, the Chief is able to stay in contact with frontline personnel, keeping everyone coordinated and informed even when travelling across the country.

OTHER LMR

Just as public safety agencies are seeing an increased need to work together, so too are agencies with security resources at schools, stadiums, and other critical facilities. This time, however, not only are personnel from different agencies and organizations on separate networks, but typically those networks are using different technologies.

Whether it is an active shooter on campus or a sniper firing on an entertainment venue, clear and timely communication between first responders and security personnel on site is key to a fast and effective response. What is needed is seamless interoperability between users with P25 radios and those using MOTOTRBO, DMR, and conventional radios, or LTE devices with broadband PTT.



USE CASE – SCHOOL INCIDENT

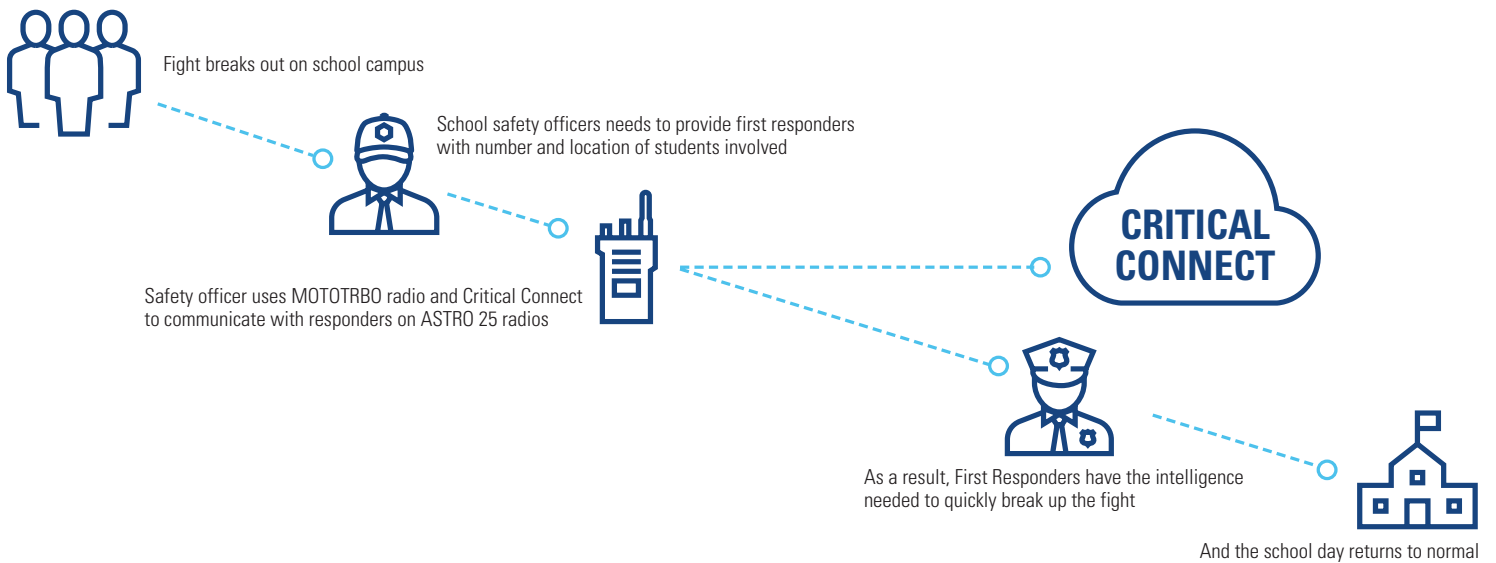
The school day is interrupted when a fight between rival gang members escalates into a widespread brawl. While school safety personnel have information on the number and location of the students involved in the brawl, they are unable to provide it to law enforcement personnel as they arrive on the scene.

School safety personnel and first responders use different radio technologies and networks for communication, making it impossible for them to get critical information to the people that need it when they need it.

Effective incident response often requires communication beyond P25 public safety networks. Key secondary responders, like safety personnel for schools, stadiums, and other civic facilities, frequently use MOTOTRBO or other types of DMR radios for on-site communication. So, when an incident such as a school shooting occurs, secondary responders lack the ability to communicate with first responders who are using P25 radios.

In a crisis, Critical Connect can bring secondary and first responders together, providing seamless, real-time PTT communication between different technology networks. Critical Connect can also provide interoperability between first and secondary responders using radios and teachers, administrators, and others using the WAVE PTX mobile application on their Android or iOS device to link necessary personnel in the moment.

Because it supports interoperability between multiple LMR technologies, as well as broadband PTT, our school incident has a better outcome with Critical Connect as school safety personnel are able to provide real-time situational information to first responders coming on to the scene.



APPLICATIONS

Applications play an increasingly important role in the public safety workflow, making it easier for first responders and those that support them to locate, access, and share information in the moments that matter. But, the benefit applications provide is directly tied to the availability of seamless, interoperable voice, text, data, and video communications for both public safety personnel and the applications themselves.

To develop a complete operating picture of an event, applications must be able to access and analyze information from all personnel regardless of agency or jurisdiction. In turn, applications must also be able to share the situational view with responders, commanders and other field personnel to enhance safety and improve operational efficiency.

USE CASE – HIGHWAY CRASH

Icy conditions on a major interstate highway leads to multi-vehicle pileup with serious injuries, a number of disabled vehicles, and one leaking tanker. Dispatch and situational awareness applications require real-time access to multiple data sources at the scene in order to develop and distribute a common operating picture to those involved in the crash response.

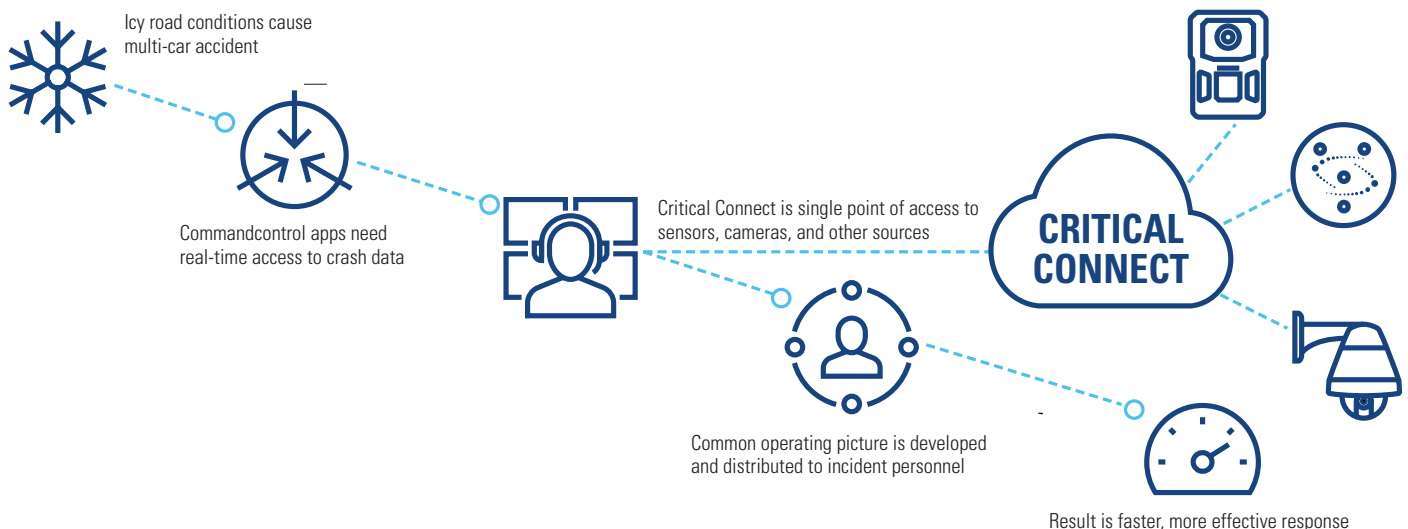
Crash detection sensors, CCTV cameras, in-car and body cameras, and first responders, can all represent important sources of information, but the unpredictable nature of emergencies make it difficult, if not impossible, to predict when or if access will be needed.

That's why it is important that Critical Connect provides a single hub for situational awareness command center and other applications to dynamically access voice, data and video communications from a wide variety of networks, devices, and sensors.

For example, computer-aided dispatch applications can use one link to Critical Connect to access location, presence, and other information for personnel from each agency responding to the crash, including those using broadband PTT devices, to create a single map display identifying the position and status of all responders.

Situational awareness applications can use Critical Connect as a single point of access to video feeds from fixed cameras, drone-based cameras, and body-worn cameras to create a single display that covers the entire incident scene.

Back at the crash, because Critical Connect provided applications with a single hub for access to radios, smartphones, cameras and sensors, analysts had the information necessary to provide a common operating picture to those at the scene. As a result, the response was coordinated and efficient, with victims quickly receiving the help they needed.





SUMMARY

As we said at the beginning, an effective multi-agency response to an emergency hinges on effective multi-agency communication. But the very nature of a multi-agency response, such as disparate networks, coverage limitations, and lack of connectivity, makes it difficult to share the information needed for an effective response.

To overcome these challenges, agencies need a holistic communications solution, one that brings together broadband PTT, land mobile radio and Wi-Fi along with the interoperability necessary to seamlessly connect all those serving the public good.

Our Mission Critical Communications Ecosystem is the holistic solution public safety needs, bringing together multiple network technologies, applications and interoperability to eliminate communication barriers, improve collaboration and increase information sharing.

A PROVEN SOLUTION

Motorola Solutions continues to be at the forefront of PTT technology, delivering proven solutions used by hundreds of thousands of public safety customers daily. We are proud to be in a position to provide the combination of network technologies, devices and interoperability necessary to enhance the service you provide to your community.

To that end, we created the first and only technology ecosystem built for public safety. Founded on customer-centered R&D, reinforced with over 90 years of mission-critical expertise, and designed to evolve alongside you, it's the ecosystem only Motorola Solutions could build. Radio and broadband communications are unified. Software solutions are integrated from end-to-end. Video is intelligently captured and analyzed. And services ensure your technology is always advancing.

So you can hear, speak, see and be your best in the most demanding moments. It's the technology lifeline your mission depends on. Our mission is to never stop advancing it.



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