1st Responder Emergency Communications Issues and Solutions

Any scenario involving multiple, disparate first responder agencies requires reliable inter-agency communications to effectively coordinate response and mitigation efforts. Unfortunately, current embedded communication systems often fail to provide the connectivity necessary for success.

In the past two years we have seen an escalation in the number and severity of attacks on our nation's Law Enforcement Officers (LEOs), 1st responders, and general citizenry.

- 12/24/2012, West Webster NY; Firefighters Mike Chiapperini and Tomasz Kaczowka were murdered and firefighters Joseph Hofstetter and Theodore Scardino wounded by a sniper when responding to a structure fire that had been deliberately set by the sniper.
- 4/10/2013, Atlanta, Ga; Four firefighters were taken hostage at gunpoint when they responded to a medical call. During the course of hostage negotiations and the ultimate rescue of the 4 firefighters, one LEO would be shot and wounded.
- 4/15/2013, Boston, Ma; Terrorists detonated two pressure cooker bombs on the finishing straight of the Boston Marathon. Three people were killed and an estimated 264 others were injured.

These incidents exemplify the need for seamless, reliable communications between LEOs and rescue personnel, and within their respective organizations. Emergency Responders do not carry defensive weapons and therefore rely on Law Enforcement Agencies to render an area safe to operate. As the time and severity of an incident grows, additional agencies are called in and the requirement to disseminate critical information to a large number of personnel grows. In all of the above mentioned cases an Incident Commander (IC) needed to be able to communicate with numerous first responder organizations, to include Law Enforcement agencies on the local, state and federal level, fire departments and Ambulance Corps. Casualty information also needed to be relayed to area hospitals to prepare them for a mass casualty incident.

The solution and its capabilities

A solution that addresses this disparity and "puts everyone on the same page" would be one that provides the opportunity for faster mitigation, safer response, and much more effective operational capabilities (the "Force Multiplier"). The most efficient way for a 911 call center to disseminate information and for the Incident Commander who is coordinating the efforts of the different agencies to communicate to multiple fixed locations, mobile phones, and radio networks, is via the solution proposed below.

This solution includes the ability to connect today's existing networks with modern evolving technologies, such as the "FirstNet Network", currently in development. In addition to tying these disparate networks together, there exists a need to group responder communications into operational units in the Incident Command System structure. A communications solution with the ability to provide flexible conferencing capabilities is essential to the management and security of these critical communications. The SLICE2100, with TRANSip®, from REDCOM Laboratories, Inc., located in Victor N.Y., is specifically designed to address these issues.

The RDEC3, with a REDCOM SLICE 2100 as its communications switching core, allows an Incident Commander to reach out to personnel in all of the involved agencies via cell phone, radio, and land line. REDCOM's conferencing capabilities allow an operator or a dispatcher to conference together personnel across agency lines no matter what type of communications device they are using. For example, these personnel can be cellular subscribers, Land Mobile Radio (LMR) subscribers, or land line (IP and TDM) subscribers. Individual conferences are scalable from as few as 3 to over 100 subscribers per conference. This allows rapid, real time updates and information sharing between different agencies and departments which will ultimately result in efficient mitigation and management of the incident.

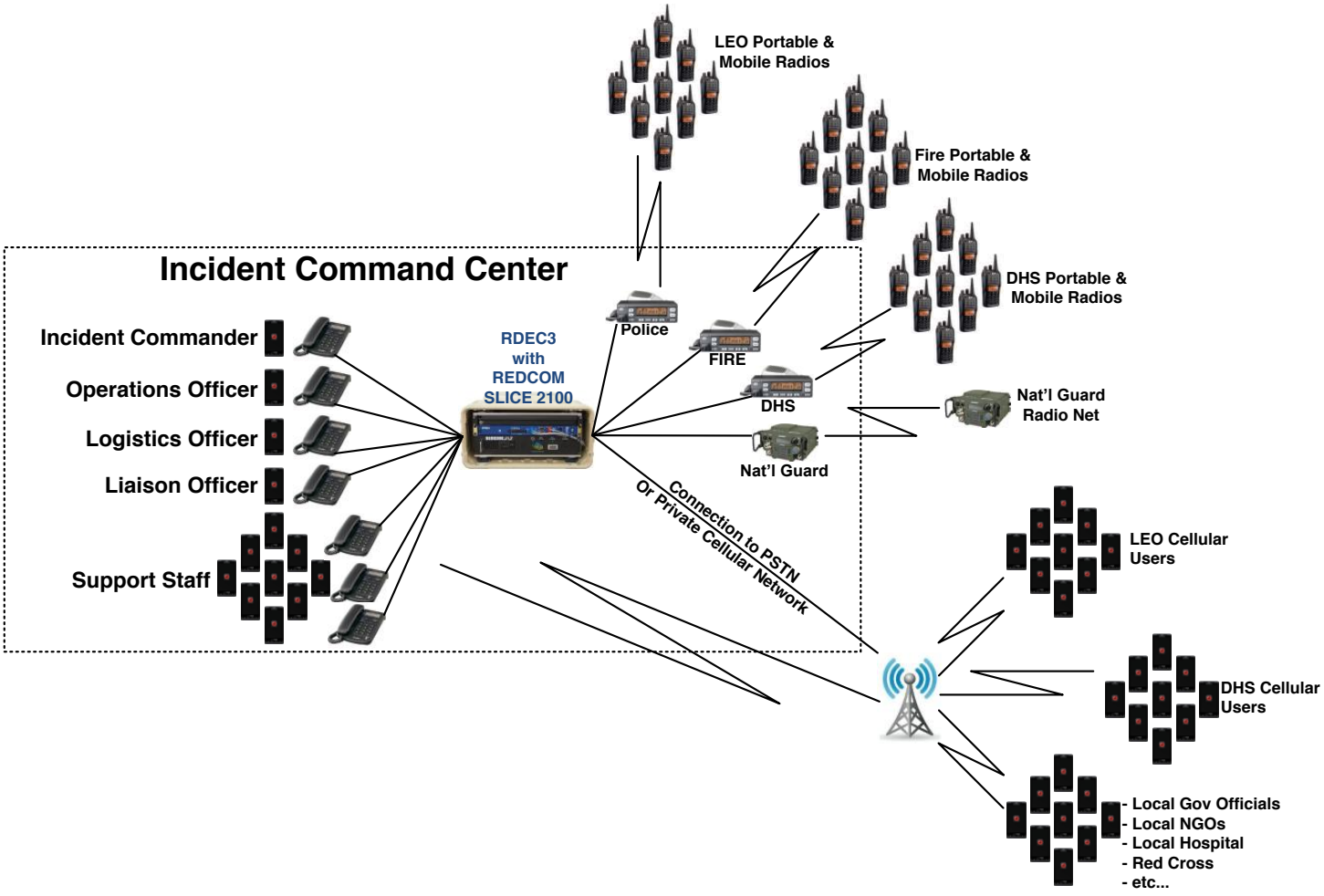
Multi-agency, Large Incident Communications Network

The following diagram depicts a communications network, supporting a large scale incident involving local police, local fire, FEMA (DHS), National Guard, local government, and other agencies.

The Rapidly Deployable Emergency Command and Control Communications (RDEC3) solution is at the hub of this network.

Police, Fire, DHS, and National Guard base radios are co-located in the Incident Command Center and are directly connected to the RDEC3. If no cellular coverage is available, cellular subscribers can be registered directly to the RDEC3's built in cellular base station. The RDEC3 can be directly connected to the Public Switched Telephone Network (PSTN), if available, allowing subscribers to be reached just as they would be during normal, day-to-day operations. The RDEC3 enables "phone calls" between different radio networks, as well as between telephony devices and radios.

1st Responder Interoperability via the RDEC3



RDEC3 (Rapidly Deployable Command and Control Communications)

At the core of the tactical communications solution is the RDEC3. The RDEC3 is a small, fully-specified GSM/Softswitch solution. REDCOM and TLC Solutions have teamed up to "cut the wires" by combining the technologies of REDCOM's SLICE® 2100™ and TLC Solutions' Portable Cellular Network. This network creates a self-contained switching system, designed to serve as the communications hub for a Rapidly Deployable Emergency Command and Control Center (RDEC3).

Backed by REDCOM's and TLC Solutions' world-class integration and support services, this system can provide the features found in today's commercial PBXs and cellular networks including voice calling, Short Message Service (SMS), GPRS/EDGE data, handovers and mobile authentication.

The design and flexibility of the RDEC3 make it the ideal solution for the communications core of an Incident Command Center where reliable communications are critical. The switching core of the RDEC3 is REDCOM's SLICE 2100. The RECOM SLICE 2100 has extensive conferencing capabilities which provide the Incident Commander the capability to give and receive information simultaneously with a large number of people across multiple technologies. This ensures that everyone in the Incident Command System structure has the latest, up to date information with which to work.

The RDEC3 can operate in a variety of modes, including as a single base station subsystem or as a larger base station network with multiple nodes. All communications between the components of the RDEC3 network are accomplished via IP connectivity, resulting in network flexibility that can be easily integrated into an existing network infrastructure. The cellular network is available in 850 MHz, 900 MHz, 1800 MHz and 1900 MHz frequency bands and supports both GPRS and EDGE data connectivity.

For more information about the RDEC3, please visit:
redcom.com/products/government/rdec3/

For more information about the REDCOM SLICE 2100, please visit:
redcom.com/products/government/slice-2100/

Multi-Technology Conferencing

REDCOM's Multi-Technology Conferencing gives you the ability to teleconference with a few, or hundreds, of people at a time. Conferencing is a powerful tool for operations, training, motivating, or educating, in applications that include medical, education, emergency response, government, and defense. Conference members can use mobile phones, IP phones, traditional telephones and radios. There are many advantages and capabilities gained by using a REDCOM switch for conferencing.

- Radio Push To Talk (PTT) signals can be transmitted through a conference
- The conference initiator has the option to join the conference
- Members can join as "listen only" participants
- The audio of one member can be isolated from other members
- Conferences can be password protected
- Members can be given priority status, with highest priority becoming the preferred voice heard

REDCOM's Multi-Technology Conferencing technology supports several conferencing styles. Any or all of these styles can be combined into a single conference.

- **Preset:** Rapidly establishes a conference with pre-defined members.
- **Meet-Me Type 1 – Station Number:** This Meet-Me conference is a conference that is associated with a station number. Any station user, attendant, or dispatch console user can access the Meet-Me conference capability.
- **Meet-Me Type 2 – Dial Code**: This Meet-Me conference is accessed by dial codes and can have many attributes, including caller screening.
- **Progressive:** A conference controller initiates a progressive conference call by dialing the conference dial code, then adds members one at a time. The conference controller can also specify the conference size.

- **Conference Chaining:** Multiple types of conferences are merged together to collectively form a single, larger capacity conference. Bridge elements can be in one geographic location or distributed globally.

The following modes are available on any conference type:

- **Loudest Party Talks:** The dominant audio source is dynamically selected and all other voices and sounds are excluded. The loudest talker will hear silence and all other conferees will hear just the voice of the loudest talker.
- **Additive:** This is a traditional phone conference where a conferee hears all voices (except their own) speaking within the conference.
- **Additive/Loudest Talks Conference:** This technology selects the loudest voices, a pre-selected group of voices, or a combination of both, as determined by the system administrator. Conferences can be programmed to allow n members of the total members in the conference to speak at one time.
- For all conference types, when Priority Talker is invoked, the conferences then include the talker's priority into the selection process.

For more information on REDCOM's Multi-Technology Conferencing, please visit: redcom.com/applications/conferencing/

Link Command System

REDCOM's Link Command System (LCS) provides operators with a complete, user-friendly overview of network services, REDCOM's LCS is a GUI call management system that delivers extensive call control, handling, directory assistance requests, and call queue management.

REDCOM LCS is a Java™-based attendant console application. The console operates on a protocol that runs over Ethernet between a REDCOM switch and a computer. Any standard phone, speaker phone, headset or softphone can be attached for operator use when answering calls.

For more information on REDCOM's LCS, please visit: redcom.com/products/government/link-command-system/

The REDCOM Advantage

Unlike other major telecommunications system manufacturers, REDCOM supports all our released software versions and does not require mandatory upgrades. REDCOM's systems are proven products that continue to grow and advance with the latest technology. REDCOM does not impose mandatory upgrades. REDCOM systems are designed and built to stringent standards which allow them to operate in diverse environments and under adverse conditions. REDCOM's systems provide a current platform from which you can plan growth, technical advancement, and implementation of Next Generation features and interfaces. All this is available while retaining customer investment on a proven, reliable platform. REDCOM's systems are the logical solution for your Emergency Command and Control Communications network requirements.

The convergence of TDM, radio and IP communications is fundamentally changing the Emergency Communications industry. There are a wide variety of applications demanding reliable interoperability. REDCOM solutions connect multi-technology networks delivering maximum interoperability. These networks and technologies include: SIP, V.150.1, T.38, IPv4, IPv6, SS7/C7, GR-303, V5.2, CAS, DTMF, MFC/R2, MF/R1, FGC, FGD, CLASS, ISDN PRI/BRI and Euro ISDN.

At the heart of REDCOM's softswitch solutions is the innovative TRANSip IP technology suite, based on the industry-standard Session Initiation Protocol (SIP). TRANSip consists of four functional core elements — a Call Controller, Media Gateway, Media Gateway Controller and Legacy Support — all housed in a single, integrated system for seamless interoperability. REDCOM's TRANSip technology suite allows IP and TDM networks to inter-operate.

About REDCOM Laboratories

REDCOM Laboratories, Inc. designs and manufactures the most reliable digital and IP-enabled telecommunications systems in the world. For more than 30 years, the military, emergency responders, carriers and utilities have relied on REDCOM for dependable performance. The most challenging conditions on earth are all home to REDCOM systems, including the Alaskan cold, South Pacific heat/humidity and the Middle East desert heat/sand.

But REDCOM equipment is not merely rugged, it sets THE standard for interoperability. REDCOM's integrated, industry standards-based architecture covers all the bases.

REDCOM is a proven manufacturer with industry-leading quality based on MIL, ISO and IPC standards that our customers can depend on to deliver on-time and on-budget. All products are designed and built at REDCOM's Victor, New York headquarters. This allows REDCOM to maintain strict quality control and seamless communication between our engineering staff and production teams.