Communication is Key to Public Safety. While efficient communication is clearly important in routine day-to-day public safety operations, it is absolutely critical in emergency situations (caused by either man-made or natural disasters).

Disparate, non-interoperable communication equipment has caused first responders and public safety personnel great difficulty in communicating with each other. In some cases, police officers and fire fighters within the same municipality cannot even talk to each other -- in some cases this is even when their equipment was acquired from the same vendor. This problem has been around for quite some time, but became truly evident during the September 11 terrorist attacks. The 9/11 Commission Report names interoperability issues as a key factor in the deaths of at least 121 firefighters in the World Trade Center. When emergency personnel are not able to communicate seamlessly, there is far greater likelihood for property damage, injuries and deaths.

It has now been more than 5 years since September 11, 2001 and there is still many agencies have no real solution in place for interoperable communications among emergency personnel. Many government-funded research projects have been conducted. Most reports cite the need for standardized public safety equipment. However, total equipment standardization among all agencies will most likely never happen due to budget constraints and other issues. Communication hardware will continually evolve and become outdated. It may be unrealistic to think that all agencies could continually be using the same equipment going into the future.

In addition to the need for interoperable, live communications among response personnel, public safety institutions must be able to broadcast urgent alerts to individuals, target groups and mass citizenry in a timely manner. It is clear that efficient information distribution during disaster situations can most certainly save lives. In order to instantly alert people, it is important to have alerting systems that overcome barriers of disparate hardware, communication mediums and native language. Urgent alert systems cannot be dependent on any single device type or any single communication infrastructure.

Communities cannot wait; interoperability and alerting concerns need to be addressed now. Agencies need ways to bridge their communications and coordinate with other agencies on-demand. Fire departments, police departments, paramedics and other responders at any incident scene must be able to communicate seamlessly. Municipalities also need efficient systems in place for broadcasting urgent alerts to their public safety personnel and their citizens. These main objectives must be met in order that communities have the best possible chance of minimizing loss during emergency situations.

many of the communication problems with disconnected hardware that emergency personnel
face today, by providing live integration across: radios, phones (PBX, satellite, VOIP, and
cellular), computers, PDAs (such as Blackberry and Pocket PC), and Cellular/radio hybrid
devices. SmartMsg also provides other features for quick and efficient information exchange
between individuals and agencies and out to the public.

Live, real-time communication across all device types
Codespear's SmartMsg product provides live, real-time communication interoperability.
Multiple Radio systems of different brands/models/types as well as different frequencies can
be bridged together to support seamless inter-agency communication at incident scenes. In
addition to radios, other devices can also participate in this inter-agency communication,
such as: cellular phones, handheld devices (i.e. Pocket PC, SmartPhone), laptop computers
and cellular push-to-talk devices.

Alert Broadcast Notification
A SmartMsg system enables Public Safety authorities to get an urgent alert out to the proper
personnel and/or to private citizens as quickly as possible. A single alert can simultaneously
be delivered to any device type, reaching the proper recipients where ever they may be on
whatever device they are currently using, whether it's a cell phone, pager, radio, PDA,
computer workstation, etc. Urgent alerts can easily be delivered to groups based on
geographic location, profile, device type, or other criteria. The multilingual functionality of
the software enables automatic language translation of urgent alerts. Message templates
allow for pre-configured alerts that are ready to be sent as quickly as possible. Receipt and
acknowledgement data can be tracked for authorized personnel to immediately track
message response data. These features all provide a system ready for quick and efficient
emergency alert notification.

Benefits of a Software Solution
SmartMsg is a Software-centric solution, not reliant on any specific hardware. This affords
important advantages:

- Current hardware can be utilized. Leveraging current equipment investments, rather
  than discarding them, can make much more sense fiscally.

- The system is highly reliable because it is not dependent on any one individual device
  type or any single communication medium. Public Internet, WAN, 802.11b, VPN,
  Cellular, satellite, radio are all supported transports. These communication mediums
  can all be used in tandem and interchangeably.

- The Life span and flexibility of the system is not limited as communication equipment
  evolves. Over the years, as new hardware is rotated (older hardware replaced with
  new) a modular software solution does not become obsolete. Agencies are therefore
  not bound or limited by previous hardware purchases.

The SmartMsg application is created upon a distributed database and network architecture, which provides reliable high volume capability through built-in scalability, load balancing, redundancy, and automated fail-over / fail-back processing. Server backbone architecture relies upon WAN/LAN infrastructure using standard TCP/IP protocol. Secondary and escalated messaging communication functions are initiated with alternative communication protocols and methods including 802.11b/g, Cellular (SMS/Data/Voice), Satellite Access, Voice-Over-IP, VoIP SIP Dialing, and Two-Way Radios.

SmartMsg provides a secure, authenticated, and encrypted application that can be implemented completely behind an organization's firewall, can be hosted by Codespear, or can be a hybrid of the two.

SmartMsg Modules & Integration

The SmartMsg Architecture provides a Modularized "Plug-In" approach to achieve both specialized functionality and integration with other systems or devices. Modules include functional areas such as: Multi-Lingual support, Text-to-Speech functions, Devices, VoIP SIP Dialing, Radio Interoperability, and integration with industry standards, such as: Active Directory, HTML, XML, and SQL based integration options. Modules also exist for integration with 3rd party systems, such as E-team, RAMSAFE, CAPS, etc. This modular design allows for great flexibility and vast integration options.

SmartMsg Alert Notification Modes

SmartMsg can initiate alert notifications through pre-defined scenarios (templates), externally generated system events/codes, as well as ad-hoc intervention by an authorized user. Ad-hoc alerts can be generated from landline and cellular telephones, computer workstations, laptops, and other handheld PC devices that support authenticated TCP/IP access. Automatically-triggered alerts can be defined based on input from virtually any external system or device by way of specialized modules.

SmartMsg Administrator Tool

The SmartMsg Administrator Tool allows authorized users to send messages, create, modify & delete teams/groups, configure server settings and configure global settings & modules. The Administrator Tool also provides a view of all servers, users, client computers and devices, displaying on-line connection status. Remote administration is available over a LAN, WAN, VPN, Public Internet, Cellular, or Satellite connection. Administrator functions can be accessed through installed administrator software, or thru a secured Web Browser.

SmartMsg Client Application

The SmartMsg Windows Client can be installed on computer workstation to allow a user to send and/or receive alerts, configure his own device settings and participate in live chat sessions with other SmartMsg devices. A SmartMsg Client option is also available for PocketPC's, Blackberry's and secure web client in a standard Web Browser. It's important to note that although a computer workstation can be utilized to receive communications, it is not a requirement that software be loaded for each recipient. Alerts can be received on mobile devices, such as cellphones, pagers, radios, push-to-talk devices, and land-line phones independent of any client software being installed.

GIS Console

The SmartMsg GIS (Geographical Information System) Console is used with the SmartMsg system to send alerts based on geographical areas. The SmartMsg GIS Console allows for SmartMsg alerts to be sent to target areas, with the alert going out to all SmartMsg recipients within the target area coordinates. A user can choose an area on the map to send SmartMsg alerts. To select areas on the map the user can draw circles, rectangles, freeform areas, or select predefined map layers such as zip codes, countys, power grids, water supply lines, etc. A specific address on the map can also be pinpointed in order to send an alert to all recipients within a defined radius of that point.

Dispatch Console

The Dispatch Console is a client application used to facilitate and organize multiple communication groups, with the added ability to set audio options and audio playback for these groups. The software enables a dispatcher to communicate with multiple Talk Groups and Standby Channels simultaneously. The Dispatch Console is useful for live communications with large numbers of users instantly and simultaneously.

Scenario Manager

SmartMsg Scenario Manager is an application that allows an organization to define and automate communication processes to be used during events, emergency situations and training exercises. A "scenario" created within the application, can define an entire series of alerts and talk group initiation based on factors such as user input, response data, time limits, external data feeds, etc. For example, a scenario may define an initial urgent alert to go to various personnel and response groups. The application can then make decisions and then send additional alerts or bridge talk groups based on response data collected from the initial urgent alert. Scenario definition is very flexible and can be used to outline specifically what it is to happen during a particular event for the particular organization. Individual customers are able to customize the way the SmartMsg system works without the added time or expense of custom software development. Scenario Manager can be used to facilitate emergency procedures for situations such as building evacuations, chemical spills, security breaches, IT system outages, or any other type of incident or event that requires specific courses of action for notifying and connecting proper resources.

Utilizing an embedded Voice Over IP (VoIP) architecture, the SmartMsg application along with the Codespear Radio Interoperability Unit (RIU) allows for the simultaneous text and voice broadcast of alert notifications to Two-Way Radios, "Push-to-Talk" enabled devices (like Nextel and other supported Cell Phones), PC's, Phones (PBX, IP Based, Cell & Satellite), Pagers, and Wireless PDA's. SmartMsg provides for uniform alert notification across multiple devices and urgent command and control communication during incidents and emergencies. Redundant, mobile and wireless operation is incorporated, supporting multiple communications mediums and protocols.

This solution also allows live communication interoperability between Two-Way Radio Talk Groups, Push-to-Talk Groups, Phones, and PC's. Support is provided for radios from different manufacturers, across multiple bands/frequencies and pre-defined talk groups. A SmartMsg system can be configured with any combination of persistent ("always on") talk groups along with on-demand talk groups that can be either created or activated only when needed. For example, a city may configure its own disparate police and fire radio systems to always interoperate; while it may connect its police department with a neighboring city's police department only during incidents requiring that level of cross communication between cities.
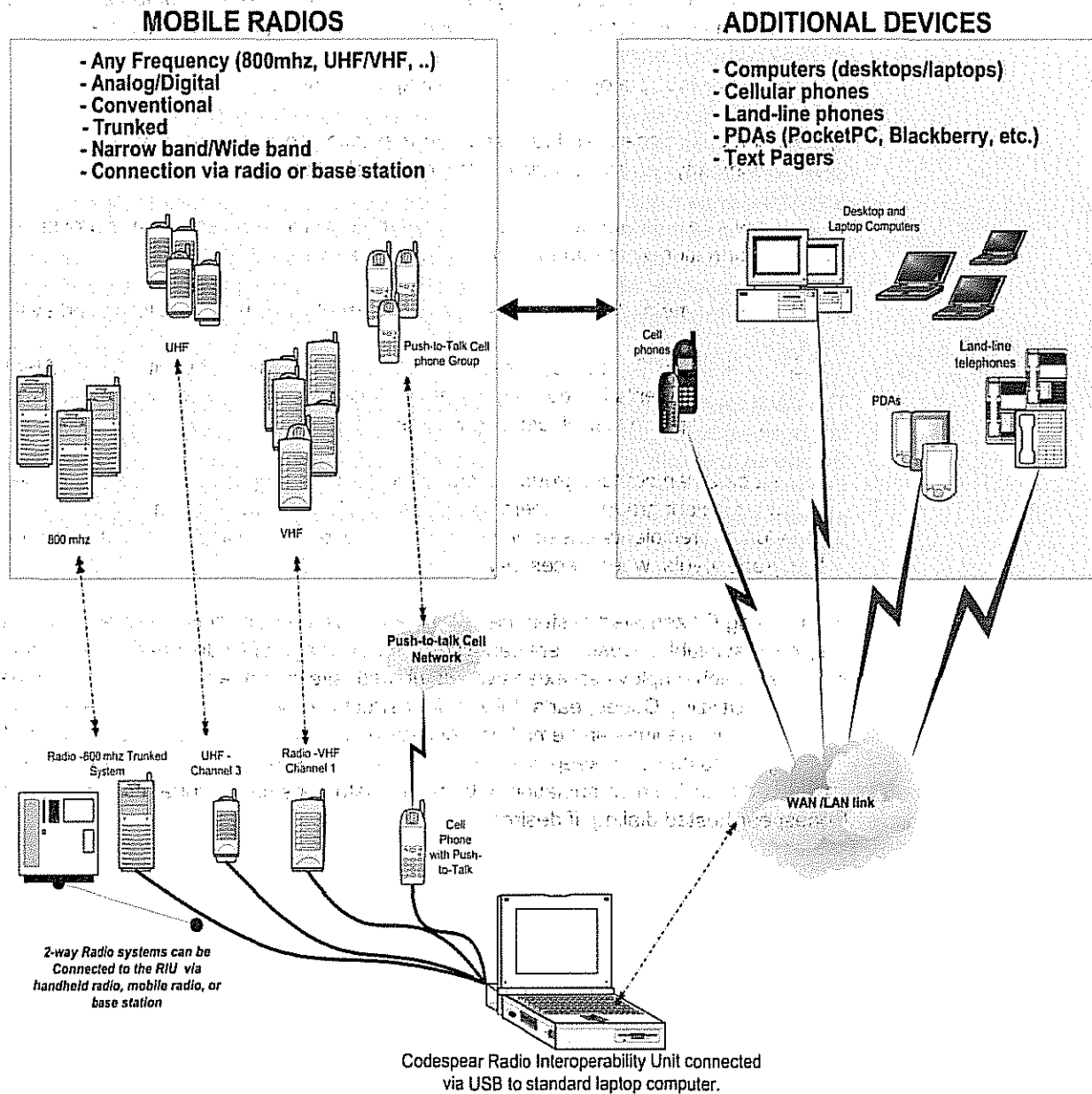
The Codespear Radio Interoperability Unit (RIU) provides ports for radios (and other push-to-talk devices) to be connected to a SmartMsg system. Once a radio is "Docked" into SmartMsg, the VoIP architecture effectively enables that radio as a virtual repeater, since that device can now communicate over a SmartMsg distributed server deployment. Radio systems that are hundreds, even thousands of miles apart can be bridged together, on demand, through an IP network.

The Radio Interoperability Unit is extremely portable and laptop-friendly. The unit weighs approximately 8 ounces and is about the size of normal paperback book. Its power requirements are extremely low, allowing it to be powered via USB connection to a laptop or stationary computer – without the need for a separate external power source. This allows instant radio interoperability without expensive, bulky, permanently-mounted systems.

Emergency situations often necessitate unplanned and even unusual locations for command and control operations. The very mobile nature of the Codespear RIU allows it be setup and operated on-the-fly from wherever it may be needed for an incident. The unit could be used from the back seat or trunk of a squad car (without the need for traditional vehicle trunk-mount), and can just as simply be operated sitting on a folding table in the middle of a field.

IP networks are utilized for communications over a SmartMsg backbone, allowing radio communication to be bridged very long distances. However, a standalone laptop, with connected RIU, can also function independently (when no IP connectivity is available) still providing local radio interoperability.

and redundant SmartMsg system to allow communication to a Cellular (push-to-talk) Talk Group and to three different Radio systems (A State Police Agency on 800 MHz trunk based system; a Municipal Police agency on a UHF system using Channel 3 and a local Fire Department on VHF Channel 1). Through the VoIP architecture the Radio Interoperability Module provides for communications interoperability between disparate Radios, Phones (PBX, IP Based, Cell & Satellite) and PC's, cellular radio devices, and other handheld devices.

MOBILE RADIOS

- Any Frequency (800mhz, UHF/VHF, ..)
- Analog/Digital
- Conventional
- Trunked
- Narrow band/Wide band
- Connection via radio or base station

UHF

Push-to-Talk Cell phone Group

800 mhz

VHF

ADDITIONAL DEVICES

- Computers (desktops/laptops)
- Cellular phones
- Land-line phones
- PDAs (PocketPC, Blackberry, etc.)
- Text Pagers

Desktop and Laptop Computers

Cell phones

Land-line telephones

PDAs

Push-to-talk Cell Network

Radio -800 mhz Trunked System

UHF - Channel 3

Radio -VHF Channel 1

Cell Phone with Push-to-Talk

WAN /LAN link

2-way Radio systems can be Connected to the RIU via handheld radio, mobile radio, or base station

Codespear Radio Interoperability Unit connected via USB to standard laptop computer.

The SmartMsg mass dialing module allows for alerting large numbers of people as quickly as possible. This provides municipalities, public safety agencies, universities, school boards and other organizations the ability to notify hundreds of thousands or more recipients during any urgent situation, such as evacuations, lock-downs, water contaminations, virus outbreaks – any situation in which timely mass notification is crucial. Recipients can be simultaneously contacted via email addresses, pagers, cell phones, landlines and computer pop-up alerts, as well as via broadcast equipment including sirens, loudspeakers, PA systems.

Agencies have multiple options for populating citizen alerting recipient databases, including:

1) Data can be imported (and refreshed) from existing contact databases, such as from telecom company records or existing student databases

2) Individuals can be allowed voluntary "sign-up" in which they register and provide their own contact information via designated web page portals.

3) The above 2 methods can also be used concurrently in the same citizen alert system.

The SmartMsg GIS Console application can be used in conjunction with Citizen Alerting in order to notify residents based on geographical aspects, such as proximity to an incident, zip code, relationship to water/electrical/gas lines, etc.

Recipient data can contain grouping information, allowing agencies to send alerts selectively based on recipient group membership. For example, a school system may group all student/parent recipients based on students' grade level, allowing alerts to be sent to only select grade levels, when necessary.

A SmartMsg Citizen Alert system can utilize any existing VoIP dialing system that a customer may have available. Customers can also take advantage of Codespear's hosted dialing services, which employs an extensive, distributed, site-redundant, high-volume phone dialing network. Utilizing Codespear's delivery infrastructure gives a customer access to large numbers of phone lines and email delivery systems during a crisis situation, while still allowing the customer to keep costs to a minimum. A SmartMsg system can also be configured to utilize a combination of both the customer's dialing infrastructure along with Codespear-hosted dialing, if desired.

Scenario Management – The Scenario Manager application provides for automating emergency and incident procedures. An agency is able to pre-define automatic procedures (scenarios) for various events based on its own particular needs. Scenarios may include any series of actions including broadcasting alerts, evaluating alert responses, pulling in data from external systems, creating talk groups, activating standby channels and more. Even non-technical staff can "program" with Scenario Manager, giving individual customers the ability to create a customized SmartMsg system without actual custom software development.

Full Communications Interoperability - Integrated Voice and Data Communication. PC's, Radio's and Phones (Cell, IP and PBX) can communicate seamlessly. Multi-Band Radio Interoperability with support for both one-way alerts and two-way communication.

Multi-Device Notifications and Communications – Fully integrated alert notification across PC's, wireless PocketPC, Blackberry, Cellular phones, Land line phones, pagers, video and radios.

Cross-Functional Communication and Alert Notification - Multi-Device/Multi-Network Secure Urgent Notification and secure messaging.

Multiple Implementation Options – Authenticated and Encrypted Application provides for Security of Confidential Data with both hosted and non-hosted options.

Distributed Messaging Architecture – Scalable, Redundant deployment with automated Fail-Over. Support for thousands of users across hundreds of servers.

Multiple Communication Mediums – Support for: Public Internet, WAN, 802.11b, VPN, Cellular, Satellite, and Radios. A highly-reliable system because it is not dependent on any one single communication media infrastructure.

Secure and Encrypted Communication - for Alert Notifications, Voice-Over-IP Communication, Radio Linked Talk Groups, and 2-way text or voice communication. Includes option for PIN-code authorization.

Active Directory / LDAP Integration - Single automatic Sign-On Authentication and User / Group Synchronization.

Multi-Lingual Messaging – Real-Time Translation for over 12 languages for Alert Notifications and Multi-Language secure messaging, with auto-translation between users of different native languages.

Text-To-Speech Conversion - Alerts & Two-Way Communication across Multiple Voice and Text Based Messaging Channels (e.g. typed message on PC can speak message to PCs, Phones, Radios, PA system).

Automated High Volume Phone Dialing - Integrated VoIP "SIP" based phone dialing reduces reliance on dialing capacity and traditional switched phone equipment.

Seamless Immediate Recovery –Network disruptions are handled automatically thus providing transparent recovery for users.

File Attachment & Multi-Media Support - SmartMsg Alerts can include File Attachments and Multi-

Pre-Defined Scenarios, Ad-Hoc, & System Automated Alert Notifications - SmartMsg Alerts can be initiated from Templates, Ad-hoc generation by an authorized user, or External System/Event Codes (via XML, HTML, SQL)

Custom Response Options - Provides for pre-Defined Data Entry Forms for Custom Responses, Real-Time Data Gathering, Data Export, & Acknowledgement Tracking Options.

Intelligent Message Routing and Escalation – Automatic routing and escalation of alert notifications, based on pre-established rules profiles (Rules can be criteria such as: user availability, days/times, non-response, message priority and alternate personnel coverage)

Authenticated Messaging System - Prevents Receipt of Unauthorized Outside Messages, SPAM, or Viruses into the SmartMsg Server.

Secure Messaging Between Multiple Agencies/Entities – Separate agencies and entities can instantly share alerts and initiate secure communications.

Real-Time User Status Indicators – User "Presence" tracked across connected devices (i.e. offline, online, busy, away)

Video Capability –Secure video conferencing and mobile video or picture viewing via handheld devices.

Electronic Whiteboarding –Enables viewing and editing collaboration on images such as maps, floor plans, diagrams, etc.

Automatic Alerts – Data from external systems activity provides for urgent alerts (e.g. National Weather Service, panic buttons, monitoring systems, etc.)

Dial-in Functionality – Authorized users can dial into a SmartMsg system via any land-line or cellular phone to perform such operations as: receiving/acknowledging alerts, sending alerts and joining or creating live talk groups

Sensor Interoperability Unit – Codespear's Sensor Interoperability Unit (SIU) hardware provides for connecting sensor equipment into a SmartMsg alerting system. This allows existing security/monitoring equipment to be "plugged into" the system and initiate SmartMsg alerts or procedure scenarios automatically based on triggering events, such as intrusion detection, motion detection, temperature threshold, etc.

communications interoperability is essential for public safety. It is important for everyday normal operations, special events and absolutely crucial for emergency/disaster situations. Today there is an abundance of communication devices available. Modern technology affords a wide array of devices to fit various communication needs. However, these devices must be leveraged effectively in order to facilitate public safety needs. Government personnel and emergency responders must be able to communicate seamlessly in order to protect assets, property, and human lives. SmartMsg is the cost-effective, reliable, secure communication solution that can provide what is needed today.

For More Information

For the latest information on Codespear and SmartMsg, please visit: www.federalsignalpublicsafety.com or www.codespear.com.

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