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The Virginia COMLINC System: Achieving Communications Interoperability

CAPTAIN H. WAYNE DUFF, JR. AND GIL ARMENDARIZ

SyTech's Radio Inter-Operability System (RIOS), the COMLINC solution connects 34 localities with the ability to communicate and share information seamlessly.

When an incident occurs it is vital that public safety agencies respond quickly with the proper personnel and equipment. It is essential that the interoperability system be extremely "user friendly" and intuitive. The Graphical User Interface (GUI) provided by the RIOS requires only three "clicks" of the mouse: (1) select the function, (2) select the radios to be patched and (3) confirm. When an emergency occurs, citizens expect their emergency calls to be answered and that emergency be handled in the most expeditious and professional manner possible. The general public does not worry if their emergency occurs in overlapping jurisdictions; they only know that when they call, they want their situation handled properly. This proper handling of emergencies must be at the top of our list when we as leaders in public safety strategically plan how to best deliver service. Rest assured that when Mr. John Q. Public calls 9-1-1, he will not be interested in explanations that the equipment is to difficult to use or that because jurisdictional boundaries that the emergency cannot be properly handled or that locality "A" has 800 Mhz radios and locality "B" has VHF radios. He expects public safety to provide the assistance he needs to address his emergency effectively and efficiently. As we debrief incident after incident, we always conclude there is a necessity and importance to the delivery of seamless emergency services. Today, more than ever, our citizens expect collaborative public safety service. This collaboration includes local, state and federal authorities in police, fire and emergency medical services. The word we use most when describing this need for collaboration is interoperability which is the ability to work together toward a common goal, and its main focus is the aspect of communications. To that end, communications interoperability is changing in an environment with strong expectations, evolving needs and the ever-developing technologies. The foundations of community policing are these types of collaboration and the establishment of partnerships in order to enhance public safety and quality of life. The lack of voice and data communications interoperability continues to present challenges for public safety responders as communication is the means of obtaining information that can mean the difference between life and death. Integration of information and communications is essential to the ability to achieve interoperability. **Figure 2, page 40** is a picture of a console at the Lynchburg, VA 9-1-1 center. The RIOS screen can be seen on the right.

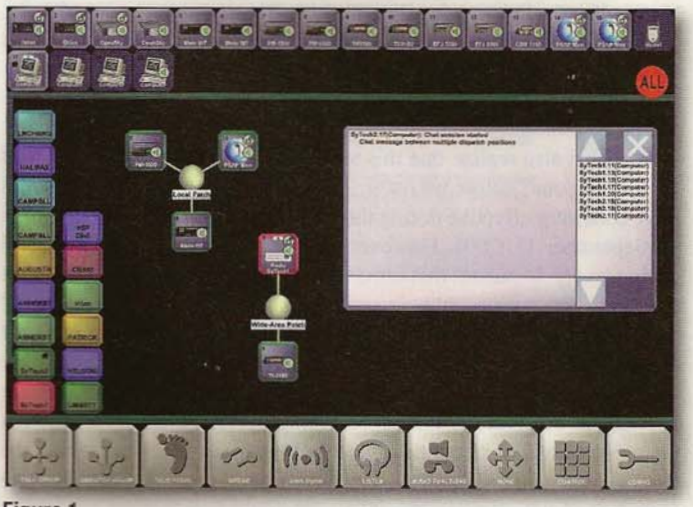

Figure 1
RIOS Graphical User Interface.

As leaders, we often remind ourselves and each other to slow down and examine the "big picture." We sometimes fall into the trap of narrowly focusing on our individual needs as opposed to interdisciplinary and/or regional needs. Therefore, we often design our systems to support the unique needs of each agency. This mindset unfortunately creates disparity which further complicates interoperability. For example, if one police department issues 40 caliber pistols and another department issues 9mm pistols, then ammunition is not interoperable between these two agencies. If one emergency medical service team is operating on an 800 MHz trunked radio system and another emergency medical service team from another jurisdiction arrives to assist and they are operating on an UHF frequency is there communications interoperability? The design and implementation of a communications system that provides seamless interoperability among agencies with disparate equipment becomes that much more complicated.

Resolving Interoperability Shortfalls

In an effort to enhance the effectiveness of public safety communication systems and to resolve interoperability shortfalls in the Lynchburg, VA and the Roanoke, VA Metropolitan Service Areas (MSA), the City of Lynchburg and the City of Roanoke received funding from the

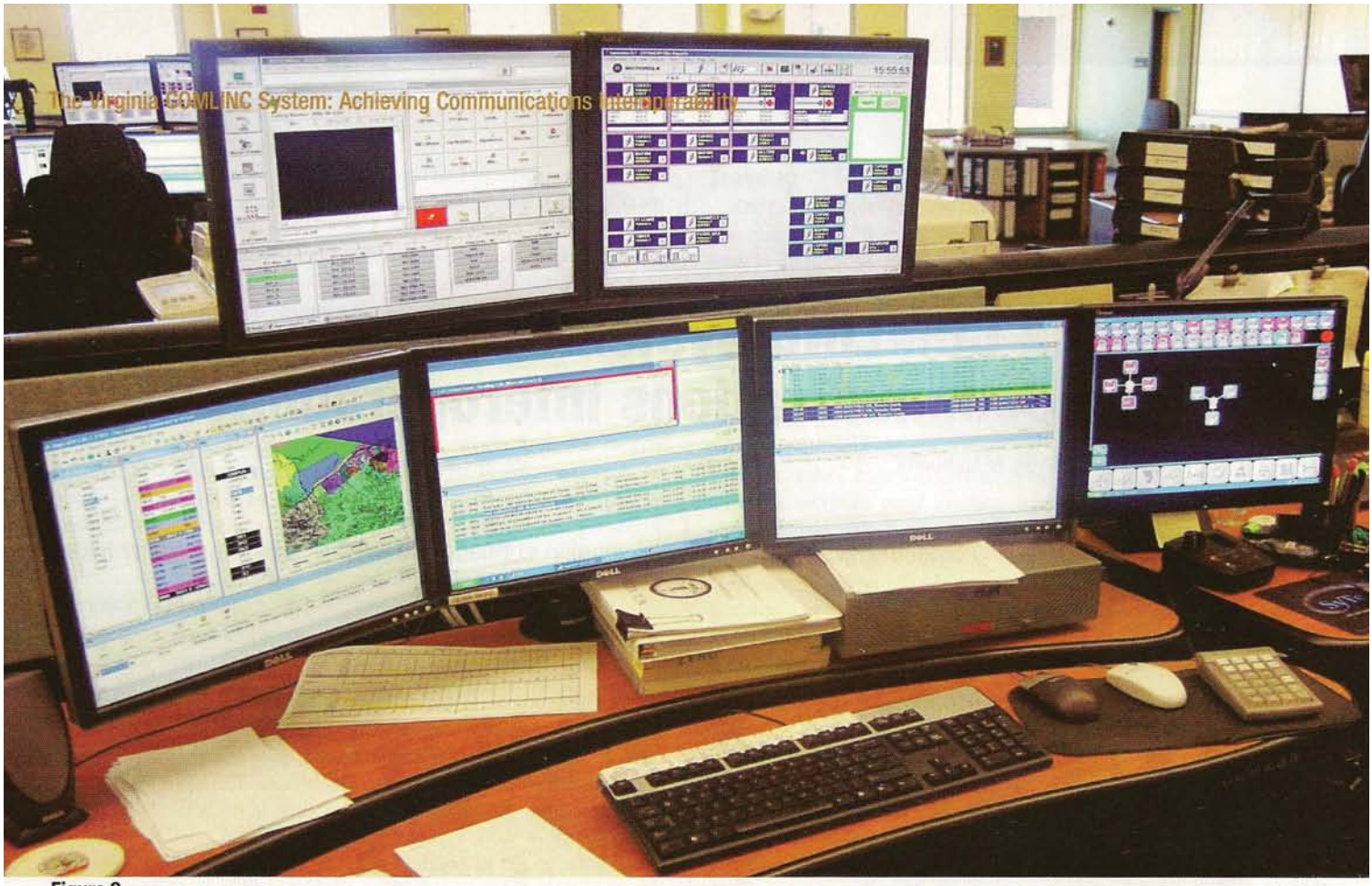

Figure 2
Lynchburg, VA 9-1-1 Center.

FY2005 Interoperable Communications Technology Grant provided by the United States Department of Justice Office of Community Oriented Policing Services (COPS). Furthermore the Virginia Department of State Police contributed the required matching funds for this grant program exemplifying another example of the strong partnerships that have made this project a success. The Lynchburg MSA has a population of approximately 240,000 and the Roanoke MSA has a population of approximately 290,000. This communications interoperability project began in 2005 and was completed at the end of 2008. This interoperability system is known as the Virginia Commonwealth Link Interoperability Communications (COMLINC) system. The time and effort expended to make this project a success demonstrates the complexity of communications interoperability. Using a competitive solicitation process, the SyTech (Alexandria, VA) Radio Inter-Operability System (RIOS) was selected over numerous systems due to the maturity of the system, operational features and competitive pricing. When implemented, the COMLINC solution will connect 34 localities (jurisdictions) with the ability to communicate and share information seamlessly. **Figure 3, page 41** is a geographical map of the 34 sites which will benefit from the COMLINC system.

The SyTech Radio Inter-Operability System (RIOS) provides the ability for connections to currently existing radio systems (base stations, land mobiles, portables, consoles, phones, etc.) and allows for connections amongst the communications centers using Voice over Internet Protocol (VoIP). In addition to providing communications interoperability the RIOS will also allow for radio dispatch operations. **Figure 1, page 39** is a display of the RIOS Graphical User Interface. As shown in the figure, the Icons at the top are connected radios in Lynchburg. The patches show a Local Patch and a Wide Area Patch. The window to the right of the display shows a Chat Session. Chat sessions maybe to other computers on the network or maybe text messages to and from cell phones.

Communicating Across Agencies

This exciting solution will benefit local, county, state, federal law enforcement agencies, universities, fire departments, schools, public works and rescue squads. As previously stated, all components of public safety must be able to communicate in order to deliver services to our citizens. Police personnel must be able to communicate with fire personnel. Fire personnel must be able to communicate with Public Works personnel. Each entity is a team member responsible for a segment of service that can only be delivered effectively and efficiently with well established partnerships.

We must also realize that this technology will be wasted if we wait for the "big one" before we use it. This communications solution would have been very effective during the tragic terrorist attacks on our nation on September 11, 2001. However, this technology will also be useful during a vehicle pursuit that crosses the county line. It will be useful at special events such as athletic competitions or visits from presidential candidates. Currently, several 24/7 RIOS systems have been installed and are operational in Virginia, Pennsylvania, Puerto Rico and other locations. A RIOS system operational in Fauquier, Warren and Clarke counties in Virginia reports that on average, interoperability is required between the various counties three to four times per week. Over the past several years, tragedies and disasters of great magnitude were experienced where more effective communications would have been

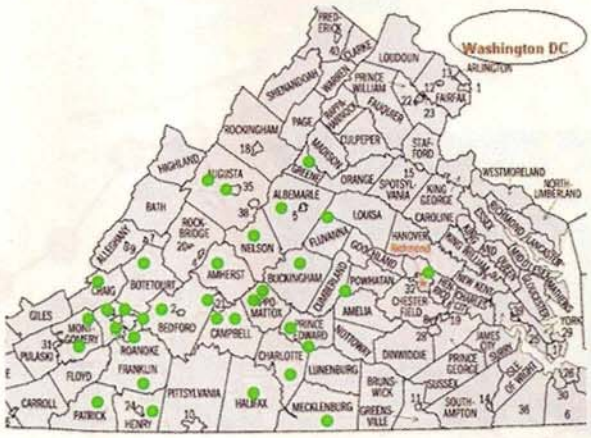

Figure 3:
COMLINC Interoperability Sites:

Augusta County	Waynesboro	Liberty U.	Roanoke City	Halifax
Greene County	Amherst	Lynchburg	Salem	VSP HQ
Buckingham	Appomattox	Botetourt	Vinton City	VSP Div 3
Farmville Town	Bedford	Craig	Patrick	VSP Div 6
Nelson County	Campbell	Franklin	Charlottesville	Fluvanna
Prince Edward	Charlotte	Montgomery	Henry	Virginia Tech
Staunton Town	Cumberland	Roanoke	Mecklenburg	

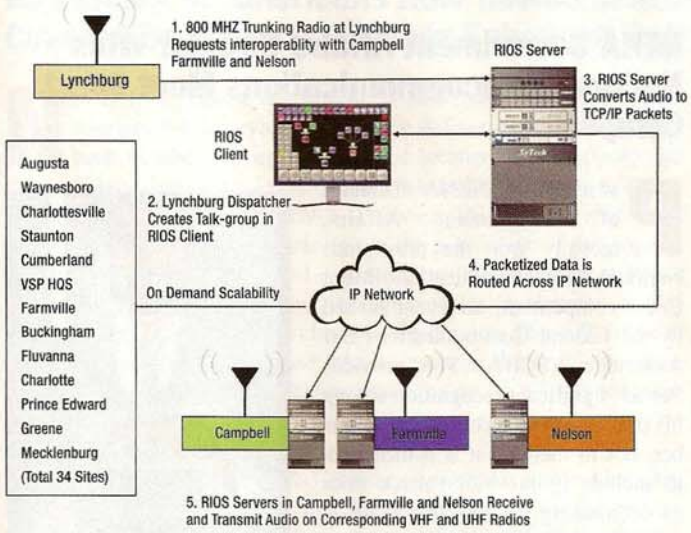

Figure 4
Command and data flow.
Figures courtesy of Sytech Corporation.

helpful. The unthinkable massacre at Virginia Tech on April 16, 2007 was a critical incident where interoperability was crucial. According to the Virginia Tech Shootings Review Panel Report—16 CHAPTER IX—one of the recommendations was the establishment of a county wide emergency medical services, fire and law enforcement communications center to address the issues of interoperability. It is hopeful that we never experience such a senseless tragedy again; however, this interoperability solution will allow more efficient and effective communication in any emergency or critical incident involving multiple jurisdictions or disciplines regardless of the radios issued to the first responders.

Making Connections

A major benefit to the state of Virginia is that the COMLINC system uses the existing radio systems. Inter-county connections are made using Voice over Internet Protocol (VoIP). The RIOS system supports the base station, mobile and portable radios in use throughout the counties. These various radios are controlled through use of tone, DC and even E&M. In a number of digital trunking sites (Motorola and M/A COM), wild card talk groups have been established on the dispatcher consoles to allow the dispatchers to make connections to other agencies or counties. The use of internet and microwave connectivity along with VoIP technology within the SyTech RIOS is an extremely cost-effective method of achieving full and total voice, and data and video interoperability. The 34 COMLINC sites in central Virginia have been completed at a cost of under $3 million. Indeed this technology could be extended throughout the U.S. at a fraction of the projected cost for achieving full and total interoperability within the next five years. **Figure 4** provides a description of the command and data flow when the operator completes a "patch" between multiple sites.

Delivery of public safety services is continuing to advance, and we must always capitalize on cutting edge technology. Citizen tax dollars must be used in the most cost effective way possible. The Virginia COMLINC program has proven to be a major success using a small fraction of the cost that it would have taken to upgrade all 34 jurisdictions with a trunking system. A conservative estimate is that an 800 Mhz trunking system to service all 34 jurisdictions would have cost upwards of $100 million. Using the COPS grant, the City of Lynchburg was able to implement radio and data interoperability for less than $3 million. Lynchburg and Roanoke MSA's will continue to upgrade respective radios systems and will continue to upgrade the RIOS system in order to maintain voice, data and video interoperability. **ENPM**

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