

In·ter·op·er·a·bil·i·ty

| adjective |

A 21st Century Name for an Evolving Requirement in Ocean City, Maryland

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Use of the word *interoperability* clearly increased after September 11, 2001.

This term may have been used much earlier regarding other technology, but in 25 years of working in the Land-Mobile and Two-Way Radio fields, I don't remember hearing it used. Now, it seems to be the topic of many conversations, seminars, protocols, and funding requests. As I ponder this concept, I begin with the "Wikipedia" definition:

The condition achieved among communications-electronics systems or items of communications-electronics equipment when information or services can be exchanged directly and satisfactorily between them and/or their users.

The definition from "The Free On-Line Dictionary of Computing" probably hits closer to home for those of us who operate proprietary trunked radio systems:

The ability of software and hardware on multiple ma-



chines from multiple vendors to communicate.

My definition is less technical and reflects the Ocean City experience:

The ability to instantly, in real time, communicate with human resources from other agencies, departments, or areas with high quality and reliable service.

The Town of Ocean City realized the need to coordinate communications among responders from different departments long before *interoperability* became the label of choice.

The Ocean City government, with its array of employees and equipment, was challenged to evacuate the town in 1985 when Hurricane Gloria threatened the area. Every city department used radios with a different frequency in different bands that worked inde-

pendently of the others. A critique resulted in the 1992 purchase of an 800MHz trunked radio system that not only changed the way emergency responses were conducted, but also enhanced day-to-day effectiveness and efficiency. The new *system* was installed in 1993 and 1994, and allowed all departments a common set of standards, performance, and features. Each department had its own radio channel, now called *group(s)*. Not only could a user switch groups to call another department, but individual radio-to-radio private calls were also incorporated, as well as caller ID and ring alert. Common *Coordination Groups* were programmed into every radio and assigned when an event or response included users from multiple departments. A new feature, *System All Call*, allowed a dispatcher, or any authorized radio, the ability to simultaneously call every radio on the sys-

tem, regardless of department. Radios were interchangeable from department to department. If a few extra “Police” concho radios were needed for a special event, another department’s radios could be quickly re-programmed. The term *interoperability* has now expanded into many new meanings.

A trunked radio system consists of one or more repeater sites that have several licensed frequencies working as a pooled resource available to any authorized user of the system. The frequencies are dynamically assigned by system computers or controllers while transparent to the users.

This successful radio system provided internal *interoperability* and quickly raised standards and expectations. Now that we could easily communicate among all city departments, we quickly realized that communications with outside agencies were degraded and intermittent.

Our new system included an interface to conventional base stations enabling our dispatchers to *Console Patch* our calls to County, State, and Coast Guard agencies, operating on the low band or VHF band radio spectrum. The ability to communicate with a pre-planned list of agencies was achieved, but not to the elevated quality standard.

I pause to state an opinion that will hopefully help define *interoperability* as it evolves:

A nationwide effort is underway to patch together different radio technology types using several different vendor products. When two or more different technologies or systems are patched together, they do not become one system, but separate systems that have an umbilical connection. The quality and features of the newly-joined chain is normally no better than the weakest link. In other words, a radio system with interference or performance problems is not resolved by patching into another system. A digital system, with encryption, is no longer secure when patched to unencrypted digital or analog systems. Advanced features used on one system normally do not extend to users on another system. True interoperability will only be realized when all players operate on one system, or with a common set of standards.

Almost everyone is familiar with the term GIGO [garbage in/garbage out]. GIGO works in radio systems. When two or more different radio systems are tied together, the result is a combination of limitations inherited from each system, and sometimes, additional restrictions created within the design of the link itself.

After years of working through methods of linking different radios and users together, I am convinced that the highest level of quality is realized when all users are issued and operate radios on a common technology or system. This is evident as neighboring agencies often now work together to deploy compatible systems, and

even share resources. Ocean City, Maryland and Worcester County, Maryland are a good example. Both city and county governments deploy separately-owned compatible radio systems that connect together with a system-to-system network link. All features and options are extended seamlessly



across this link allowing users from both systems to communicate with ease. Radios include programming for both systems, allowing radios to operate on either system. This provides some level of *redundancy* in addition to *interoperability*.

Additional National Public Safety Planning Advisory Committee (NPSPAC) conventional channels are included in every Ocean City radio. These nationwide channels are allocated for mutual aid and *interoperability* among incompatible radios. A nationwide effort is underway to construct repeater coverage using these channels. Maryland is leading the way with projects like the Maryland Eastern Shore Interoperability Network (MESIN). Thanks to the efforts of Worcester County and federal grant funding, Ocean City radios can now *interoperate* with any other 800MHz radio user on a common conventional repeater system. The network interface also allows an audio interface to all local dispatch centers within the footprint. A console patch can complete a communications path to any resource within all local systems without regard to frequency or protocol.

MESIN provides interoperability to counties on Maryland's Eastern Shore using the 800 MHz NPSPAC mutual aid channels: 8Call, 8TAC-1, 8TAC-2, 8TAC-3, and 8TAC-4. MESIN uses conventional analog FM modulation because all currently-manufactured 800



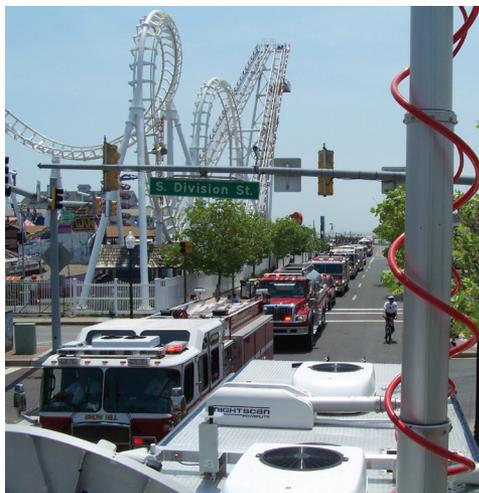
MHz radios can be programmed for conventional analog FM transmission and reception. MESIN provides public safety communications connectivity to 227 entities within the service area: 9 counties, 57 municipalities, 80 fire companies, 61 ambulance companies, 8 state agencies, 7 federal agencies, and 3 utilities.

MESIN is an IP-based network consisting of gateways, routers, and a fully-redundant switch. MESIN utilizes 12 tower sites throughout the Maryland Eastern Shore region, and provides common talk channels through high-powered, tower-mounted repeaters for disparate 800 MHz-equipped agency personnel at the scene of an incident. MESIN does not impose any additional load on the local public safety radio system because it does not operate on the normal operational channels.

Maryland Emergency Management Agency (MEMA) is the centralized dispatch and control network for MESIN mutual aid. Each participating county

transmission of voice, data, video, photo, and decision-making. This vehicle was designed to be a technology platform on wheels, and provides the ability to quickly move personnel and technology to the most effective location.

Designated OC-1, the vehicle includes a Stand Alone 4 Channel Trunked



monitors and controls the MESIN site located within its county. Mutual aid network users are automatically connected to legacy system users whenever the dispatch center activates the designated talk groups, and provides capabilities for cross-band inter-system operation.

A 2006 addition to the Ocean City communications effort is a self-contained Mobile Command Vehicle. As the 21st century has produced many new technology advancements, we have quickly come to demand the instant

Radio Site that can operate with, or in place of, the Ocean City Trunked System. More than 100 portable radios are stored onboard and ready for use. Charged batteries are also ready to issue during extended responses, and wall-mounted rack chargers can quickly recycle the discharged batteries.

Additional interoperability is provided by the ACU1000 Interconnect System. This system connects low

band, VHF band, UHF band, military band (all conventional and trunked), 800MHz band (analog and digital conventional and trunked), and wireless phones. Onboard programming hardware and software allow for field programming additions or changes to radios as needed.

The preferred method for achieving interoperability in Ocean City follows a guideline that will continue to be updated as necessary or appropriate. The Communications Section of our Emergency Plan is vital because pre-planning for different scenarios allows for an organized implementation during volatile circumstances. Having several different methods to provide interoperable communications allows for contingency procedures.

Now, having acquired technology to provide interoperability, we find it imperative to provide scheduled user training. In many scenarios, users are required to operate their radio on a different channel or with a modified procedure. The investment in technology is of little use if the radio user doesn't know the operational procedure. User training may be the subject of a future report. ★

For Further Information

http://www.macom-wireless.com/Channels/CHANNELS4_2.pdf

<http://www.gov.state.md.us/gohs/SIEC/mesin.htm>

<http://www.macom-wireless.com/news/pressdetail.asp?id=59>

<http://www.co.worcester.md.us/EmergencyServices/mesin.htm>

<http://www.jps.com/index.asp?node=88>

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