Maryland

Statewide Communications Interoperability Plan

Version 3.0

July 2008

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Record of Change

Change No.	Date	Description	Change Date	Signature
1	10/1/07	Draft 1.0 for PSIC review		
2	10/22/07	Draft 1.1 for limited release		
3	11/6/07	Draft 1.2 for limited release		
4	11/16/07	Draft 1.3 for limited release		
5	11/26/07	Draft 1.4		
6	11/29/07	Draft 1.5		
7	12/2/07	Draft 1.6		
8	12/3/07	Draft 1.7		
9	12/3/07	Draft 1.8		
10	12/3/07	Draft 1.9		
11	12/3/07	Version 2.0 for PSIC Grant Submission		
12	3/10/08	Version 2.1 for NTIA/DHS Revision Request		
13	7/28/08	Version 3.0 for scheduled review and for IECGP grant update.		

Executive Overview

Interoperability refers to the ability of emergency responders to work seamlessly with other systems or products without any special effort. Wireless communications interoperability specifically refers to the ability of emergency response officials to share information via voice and data signals on demand, in real time, when needed, and as authorized.

Interoperability is often thought of only in terms of technology, but it actually embraces three critical elements:

- People (human factors such as attitudes, training, capabilities, and experience)
- Processes (patterns, plans, procedures and problem-solving)
- Technology (the actual systems and equipment)

Stakeholders from government, industry, academia, and volunteer organizations recognize the need for interoperability and acknowledge its criticality. Although they agree on the need for interoperability, the scope and implementation requirements remain challenging, and both technical and political barriers encumber it.

Even if the State of Maryland had immediate access to the most robust, most advanced pieces of radio and data communications, interoperability cannot be solved with technology alone. It is through building good working relationships, common language and standard operating procedures that we will achieve a greater ability to interoperate. Technology that is put into place without people and processes and shared understanding of concept of operations often creates more barriers to effective communication.

The goal of this plan is to develop and implement a reasonable and feasible solution framework that provides statewide, secure, coordinated, real-time voice and data communications that can span jurisdictional and organizational boundaries. Over the next few years, Maryland seeks to bring about a phased approach of multiple technical solutions. This interoperable system will facilitate the sharing of emergency response and recovery information among system users and will significantly enhance not only operations during major events, but also will improve public safety during day-to-day routine operations.

The state recognizes the extensive existing investment in local communications infrastructure and realizes that there may be an opportunity to share technology while agencies and local jurisdictions may migrate to a statewide system as business needs and life cycle costs dictate. The future statewide radio system will simply be another robust tool in the interoperability toolbox. However, the more that we share

infrastructure, frequencies and channels, the stronger our tools will be and the better we can work together to serve the public need.

One of Governor O'Malley's top Homeland Security objectives is to achieve Level-4[1] interoperability in the near term, with the longer-range goal of achieving Level-6 radio interoperability within the first responder community throughout Maryland. The Maryland Statewide Communications Interoperability Plan serves as a high level roadmap to achieve this objective. State wide Level-4 attainment, simply put, is when fire fighters, emergency medical responders, police officers, deputy sheriffs, state troopers, public works and transportation officials and others can go anywhere in the state and have immediate radio communications with each other using their own equipment on designated channels. Ultimately, a Level-6 attainment will achieve seamless interoperability statewide by using standards-based shared-systems technologies.

Obstacles to radio communications interoperability have troubled the first responder community for decades. As the terrorist attacks of September 11, 2001, clearly demonstrated, first responders must have real-time radio communications across disciplines and jurisdictions. Radio interoperability in Maryland is particularly challenging because of its size and its geographic and demographic diversity. The Maryland plan employs a network approach using the demonstrated leadership at the state level through the Maryland Statewide Communications Interoperability Program (MSCIP) with the oversight body known as the Statewide Interoperability Executive Committee (SIEC) and adherence to the Department of Homeland Security's (DHS) national technical requirements for wireless public safety communications and interoperability. This plan promotes a collaborative approach with local jurisdictions, leveraging existing radio systems and builds on the existing public safety radio infrastructure in Maryland.

Maryland's Statewide Interoperability Executive Committee (SIEC) along with Maryland and Regional Interoperability Groups (i.e. Maryland Eastern Shore Interoperability Network (MESIN) group, the Central Maryland Area Regional Communications (CMARC) group, and others regional groups in Southern MD, Western MD and the National Capital Region (NCR)) will have the responsibility of developing and implementing regional strategies to provide radio communications interoperability within the regions in accordance with the technical requirements of this plan.

Certainly, there are several important Homeland Security initiatives throughout the state that require funding. However, to achieve statewide interoperability, it will be necessary for the jurisdictions to prioritize the expenditure of DHS, PSIC, IECGP and other grant funds on radio interoperability projects to ensure that the jurisdictions and regions attain interoperability.

[1] Maryland had adopted the Department of Homeland Security definitions for the six levels of interoperability.

In order to implement the Maryland Vision for interoperability, there are proposed initiatives that address four areas: Partnering, Capacity, Interoperability, and Information data sharing. There are actions that will address the short term, transition period and longer term as illustrated below.

Initiatives	Short Term 0-1 years	Transition Period 1-3 years	Long Term 3-6+ years
Partnering	**Local and state partnership on Concept of Operations (CONOPs) and Enterprise Architecture**	**Establish Formal Governance Structure for CONOPs & Enterprise Architecture**	**Implement CONOPs & Enterprise Architecture and sustainable maintenance and operations funding**
Capacities	**Enhance coordination on 700MHz Spectrum Release**	**Fund Build out and initiate early phases Statewide Wireless & Fiber Networks**	**Complete the build out of the Statewide Voice/ Data 700 MHz Network.**
Interoperability	**Initiate projects providing intra-jurisdictional IP/Systems connectivity and the construction of mutual aid channels.**	**• Establish Statewide Multi-band Mutual Aid Channels: Fixed & Mobile Applications** **• Initiate Statewide IP Based Communications System Procurement**	**• Migrate User Hardware to IP-based System** **• Rollout additional IP Based Services (video, encryption, talk groups, etc.)**

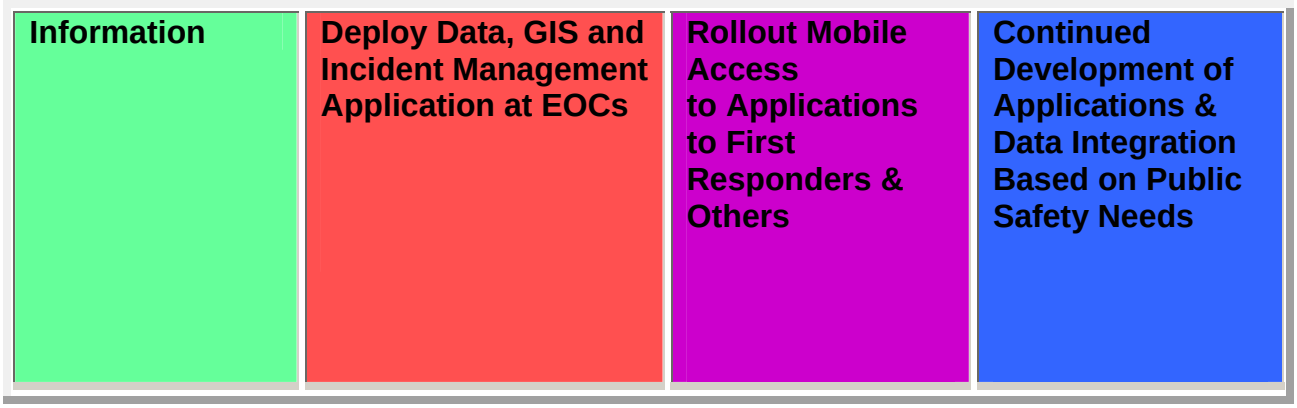

Figure A: Initiatives over time

There are several significant projects already in place within the state to address various aspects of our public safety communications goals. Future planning within the state relies upon these initiatives to achieve goals that support partnering, capacity, interoperability, information sharing, and positioning for the future.

Some County, Municipal, and especially State agency radio systems are older and do not use the same protocols (speak the same language) limiting their ability to interconnect. There are also system coverage limitations. Over the next 1 to 3 years it will be feasible to create a statewide multi-band mutual aid channel infrastructure by integrating the Central Maryland Area Radio Communication (CMARC), Maryland Eastern Shore Interoperability Network (MESIN), and Maryland Incident Management Interoperable Communications System (MIMICS) programs into a network of networks. The resulting architecture will provide near-term voice interoperability to a majority of the state jurisdictions and a significant majority of the population. Combined with the fiber and microwave infrastructure projects, this network would provide for the realization of a significant portion of our envisioned voice communications conceptual model. This integrated network will also serve as the foundation for the development of enterprise architecture for the remainder of the State, including the expansion of a Maryland voice and data intranet network.

The current partnering structure for public safety communications and interoperability in Maryland has been revised and formalized through executive order signed by Governor O'Malley on July 10th, 2008. At each level in the Governance structure, the primary goal is to coordinate efforts and reach consensus on efforts to achieve Maryland's vision for Interoperable Public Safety Communications systems across all levels of government.

The public safety community in Maryland has agreed that it is necessary to complete the build-out of the statewide infrastructure (i.e., towers, microwave, and fiber networks) and migrate applications running over it to an open, standards-based, system. A high capacity wireless and fiber infrastructure is a core element of a statewide interoperable system. Systems installed to date must be adapted to allow for the increased requirements of a statewide voice and data enterprise architecture. The infrastructure must be scalable and designed for high availability, stability, and quality

of service. A robust statewide system would provide a common platform to provide radio system coverage and wireless data to most corners of the State using State, County, and Municipal towers and system components.

This infrastructure will also support our migration to a statewide 700 MHz system, as the most feasible future technological option. Regular assessments should be planned, and adjustments made as needed of capabilities, technological changes, and requirements. To ensure the long-term viability of this network, sufficient *capacity* must be maintained, *open standards* must be embraced, and *maintenance* programs must be established. Technologies that enhance the efficiency and value of existing radio/frequency channels (i.e., provide more than one talk path per channel) must be evaluated and, if deemed of value, utilized.

Mobile data capability in the hands of responders will deliver improved public safety services and enhance the effectiveness and efficiency of the response and reduce the amount of voice traffic required to respond to some incidents. Data sharing initiatives will require significant bandwidth and the need will grow in the future as more individuals use the systems and become advocates for more information in a timely fashion.

There are efforts underway within the state to increase coordination and information flow during emergencies through the use of information technologies. Getting the right information to the right individuals at the right time is vital to achieve the best possible outcome. There are three facets to this effort including: 1) Improved information flow; 2) Data development; and 3) Tools for mining and viewing data.

The enhanced network capacity and interoperability achieved will provide the ability to more readily share available information. The data required to support these efforts must be identified, prioritized, secured, and, where necessary, developed. Steps towards this effort have been taken by surveying State agencies and local governments for data available to support coordination during emergencies. Data sharing initiatives include development of tools to help first responders and the emergency management community to make the most informed decisions possible. These tools include the Maryland Emergency Management Agency's (MEMA) deployment of open standards-based incident management software and Towson University's Emergency Management Mapping Application (EMMA) to emergency operation centers statewide. This type of information sharing allows information to be shared from operations centers through to field personnel as well as allow direct access by field personnel. The Maryland State Geographic Information Committee (MSGIC) has, and will continue to support our initiatives in the integration of geospatial data as it applies to public safety.

Current interoperability projects lay the foundation for state-of-the-art standards based, voice and data systems that will have the necessary capacity to meet operational needs. Planning has already begun in great detail for a statewide architecture using the new frequencies scheduled to become available following the vacancy of portions of the 700 MHz spectrum. To gather and maintain momentum moving forward, this plan

will be communicated and shared with a wide audience throughout the State. Through public discourse, as well as outreach to Public Safety organizations, Municipalities, and Counties, we will be able to engender the type of communications environment that will lead to a safer Maryland.

The vision for Maryland is an achievement of a statewide system that will support communications interoperability, and will facilitate real-time communications across boundaries of agencies, jurisdictions, levels of government, and ultimately, across State boundaries with Maryland's neighbors. Interoperable communications will ensure that Maryland's public safety providers can coordinate with one another, share information, and provide a consolidated response.

The long-term vision for facilitating public safety communications interoperability is to establish a statewide public safety communications system that will be standards-based, open architecture addressing the needs of all stakeholders from the enterprise level. It will allow the rollout of additional services such as short messaging, paging, mapping, and data.

Combined with the existing infrastructure in the state, Maryland will be able to call upon a wide variety of interoperable tools to achieve solutions for public safety whenever and wherever they require real-time reliable communication.

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1 Introduction

Enhancing public safety through communications technology is a top priority for the State of Maryland. Success in this endeavor will result from the coordinated efforts of state and local governments, first responders, and other agencies and organizations that have responsibility for emergency preparedness, prevention, response and recovery. Planning and development of a statewide system of interoperable public safety communications is at the core of this critical mission.

The goal of this plan is to develop and implement a reasonable and feasible solution framework that provides statewide, secure, coordinated, real-time voice and data communications that can overcome jurisdictional and organizational boundaries. This interoperable system will facilitate the sharing of emergency response and recovery information among system users and will significantly enhance not only operations during major events, but also will improve public safety during day-to-day routine operations.

State and local first responders, including law enforcement, fire service, emergency medical service, and hazardous materials personnel, are the foundation of effective and efficient emergency response and recovery. Other initial responders like transportation, public works and public health form a key part in statewide all-hazards approach to emergency management. State and local public safety personnel and agencies provide the first line of defense in protecting critical infrastructure and public health and safety. These personnel are the first to respond to an emergency and the last to leave the scene.

Experience has shown that these first responders require improved communications in both routine operations and during emergency responses. If the State and its partners are to improve interoperable public safety communications, numerous policy, procedural, operational and technical challenges must be met and obstacles must be overcome. This plan provides a solid framework for meeting those challenges and promoting successful achievement of a communications system where resources can be most effectively and safely deployed and put to work.

This plan is not a starting point, nor an end point. The important work began in 1999, with a state and local partnership to support the build out of local 800 MHz radio systems, at the same time constructing the infrastructure (i.e. towers, shelters and microwave relays) for a future statewide 700 MHz radio system. In 2003, a Governance Working Group (GWG) was formed, which established and oversaw the work of the Interoperability Project Team (IPT). It was through the IPT's 2005 report that Maryland's Statewide Interoperability Executive Committee (SIEC) was formed.

On July 10th, 2008, Governor O'Malley signed an executive order formally establishing Maryland's SIEC along with its Practitioner Steering Committee (PSC). The SIEC along with the PSC continue the vision and partnership necessary to carry out statewide

interoperability planning and coordination. This document reflects a snapshot in time of current achievements and foundational work along with a view towards an ambitious future. This document will become one iteration of many and the drafters of this plan see this process as an organic one. Over the next several months and years, through the input of a variety of sources, this plan will change. It is not intended as the final words of what will take place, but the beginning of a conversation with those throughout the state and region for whom the reliance on robust and effective communications is absolutely vital to the safety of the public at large.

2 Background

As a framework for assessing the varying levels of interoperability, the following definitions of interoperability (consistent with DHS project SAFECOM guidance) are offered:

Level-1: Interoperability-Swap Radios

The simplest and most basic level of interoperability is the physical exchange of radios with other agencies involved in an event. However, it is impractical for every agency to have extra radios on hand for each member of every other possible agency that could appear on-scene, especially for large-scale events.

Level-2: Interoperability-Talkaround or "Directed Net"

Talkaround provides interoperability where multiple radio users talk radio-to-radio on the same transmit and receive frequency in the conventional mode. In this situation, communications are tightly bound by the air interface: the same frequency is required and transmissions are digital-to-digital or analog-to-analog, not analog-to-digital.

Level-3: Interoperability-Mutual Aid

Radio operability allows radio communication by establishing Radio Frequency (RF) coverage. Operability of any radio device is limited to frequency band and coverage, without operability there cannot be interoperability. Mutual Aid channels establish RF coverage areas, which will typically be used exclusively by first responders for RF communication during special events.

Radio interoperability using the Mutual Aid coverage areas is established by ensuring the radios intended to interoperate are programmed with the frequencies of the Mutual Aid channels and by being within coverage of one of these channels. The radio user must know when to manually switch to the Mutual Aid channel and which one to switch to. This allows any VHF or 800 MHz user to travel to other similar VHF or 800 MHz band systems and communicate to other users and dispatchers operating on that system using these mutual aid frequencies in the conventional analog, clear voice mode. The same Level-3 Mutual Aid technology options are available for the UHF band.

Level 3: Mutual Aid

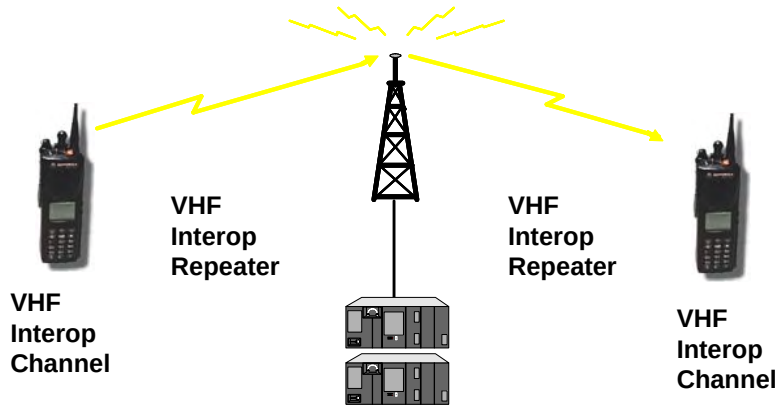


***Figure* 1-1: Level-3 Mutual Aid**

However, mutual aid channels provide interoperability only between radios within the same frequency band, i.e. VHF users can only talk to (or on) other VHF systems, therefore interoperability is limited.

Level-4: Interoperability – Operability Across Frequency Bands

Level-4 interoperability is achieved by linking all first responder radio systems. The SAFECOM 2004 Federal Grant Guidance describes multiple approaches for linking disparate networks.

Cross band repeaters retransmit signals input from one frequency band to an output in a different frequency band. Cross band repeaters range from simple devices supporting frequency transfers across two bands (e.g., UHF and VHF to more complex devices capable of bridging multiple frequency bands (e.g., UHF, VF Low Band, VHF High Band, and 800 MHz).

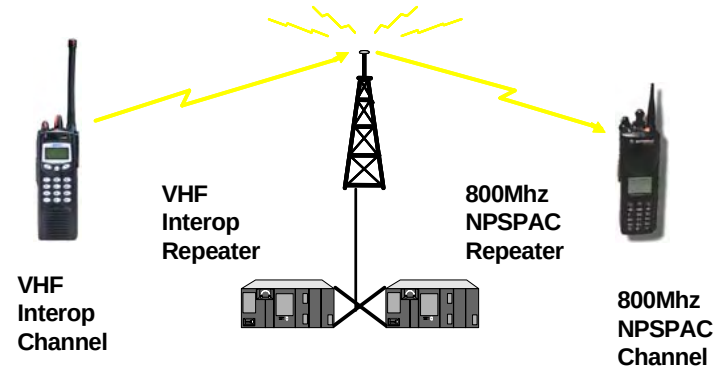


***Figure* 1-2: Level-4 Cross Band Repeaters**

Fixed or Mobile Deployable Network-to-Network Gateways – provide radio interoperability during missions requiring communications between diverse organizations using different radios and different frequencies. Network-to-Network gateways offer a standard way to link wireless infrastructures. Within minutes after arriving on the scene of an incident, a portable gateway can be quickly programmed to support the frequencies of participating agency radios. Many of these solutions also allow disparate networks to share data and provide a bridge to the public switched telephone network (PSTN).

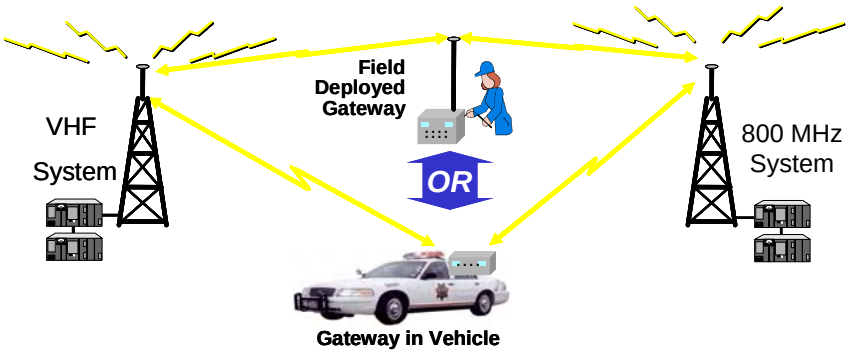


***Figure* 1-3: Level-4 Deployable Gateways**

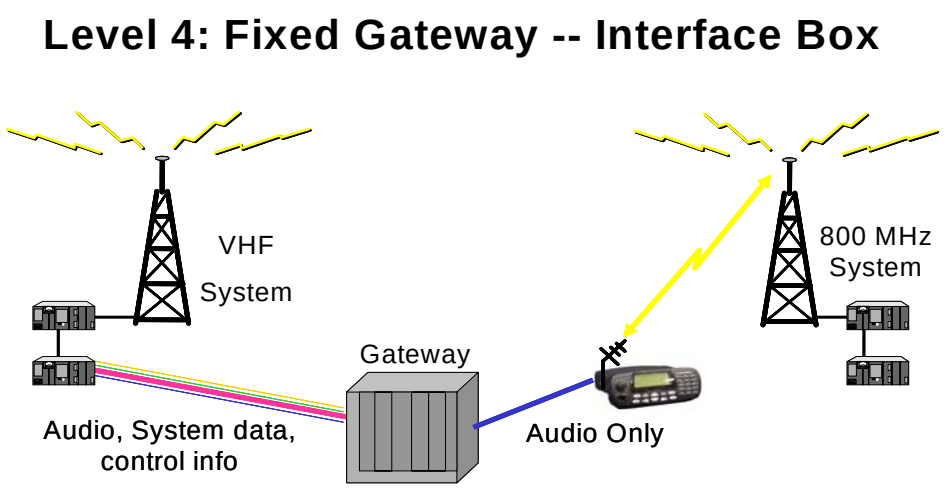


***Figure* 1-4: Level-4 Fixed Gateways**

IP (Internet Protocol) Network-to-Network Gateways – An IP packet-switched network gateway links legacy radio sites, systems and dispatch consoles over an IP standard transport. In addition to Level-4 capabilities, IP Gateways provide additional functionality through software and data services. An IP Network-to-Network gateway can leverage Commercial Off The Shelf (COTS) backbone equipment and can be scaleable to a large number of users. An IP network gateway should provide high availability and redundancy in its design.

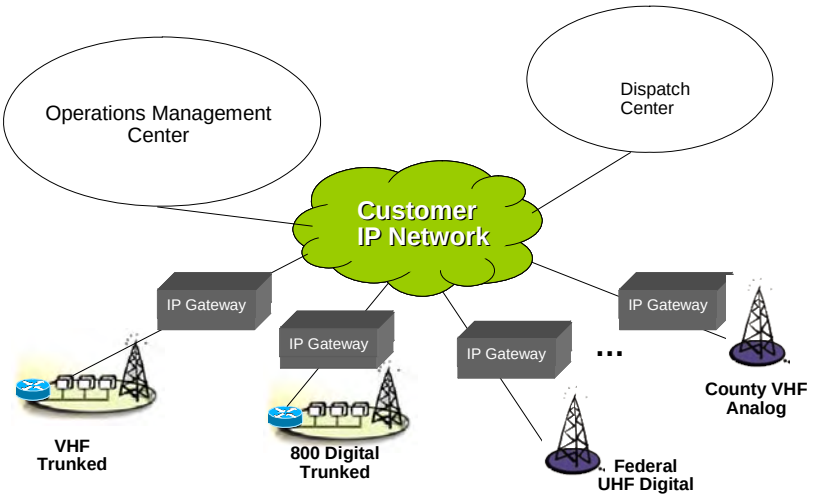


***Figure* 1-5: IP Gateway**

Level-5: Interoperability – System Specific Roaming

Sharing systems for first responder interoperability during special instances provides greater capacity and functionality than relying on dedicated Mutual Aid channels. When the radios or systems intended to interoperate are from the same manufacturer, full functionality is available radio to radio. When the radios and/or systems are from different manufacturers, interoperability is limited to a common capability (i.e. voice) for either radio-to-radio or system-to-system operation. Gateways can also be used to supplement system-to-system interoperability. Another option at this level could be the standards based system-to-system P25 Inter Sub System Interface (ISSI) standard when it becomes available.

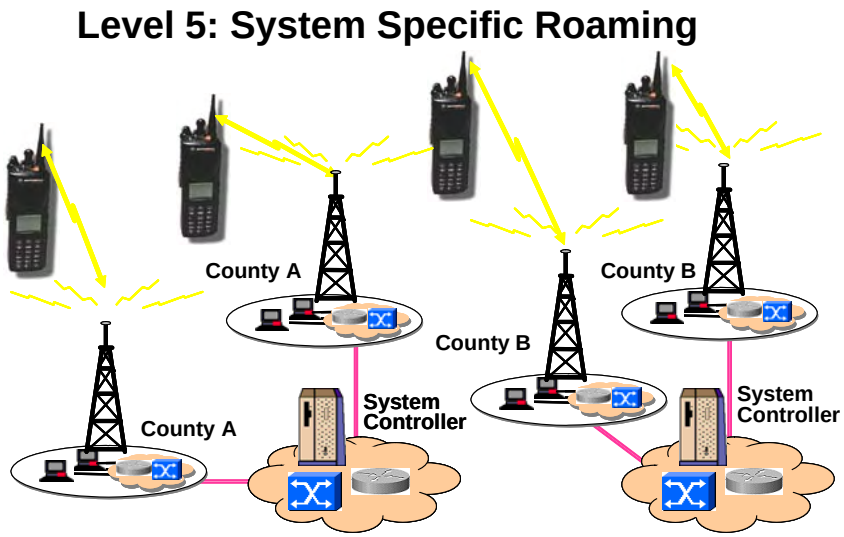


Figure 1-6: Level-5 System Specific Roaming

Level-6: Interoperability - Standards Based Shared Systems

Level-6: Interoperability uses shared systems that rely on open standard functionality for both over the air and wireless. In North America, there are two sets of open air interface standards for public safety radio communications, analog voice (TIA-603) and Project 25 digital radio standards defined as ANSI / ITA / EIA-102. The standards set the capabilities that are expected to be interoperable. A standardized ISSI insures that the set of air interface capabilities as well as wire line capabilities interoperate between systems regardless of the systems manufacturer or frequency band. However, these standards have not yet been determined.

Although it is Maryland's goal to attain Interoperability Level 6 as described above it is clear that provisions outlined in Levels 1–5 will continue to have a place in Maryland's plan to secure statewide interoperability.

The following table outlines where existing Maryland interoperability projects[2] reside:

Interoperability Levels	Interoperability Initiatives
Level 1	Radio Caches
Level 2	Individual Systems: Talk-a Round Applications
Level 3	Use of regionally networked National 800 MHz Mutual Aid Channels in place with the Maryland Eastern Shore Interoperability Network (MESIN), and Central Maryland Area Radio Committee (CMARC), as well as other efforts to cover the state with mutual aid channels, to include the TAC Stack effort to provide mutual aid channels in other bands.
Level 4	MIMICS, Deployable Gateways
Level 5	CMARC Regional Communications System
Level 6	Statewide 700 System

Level 6: Standards-Based Shared Systems

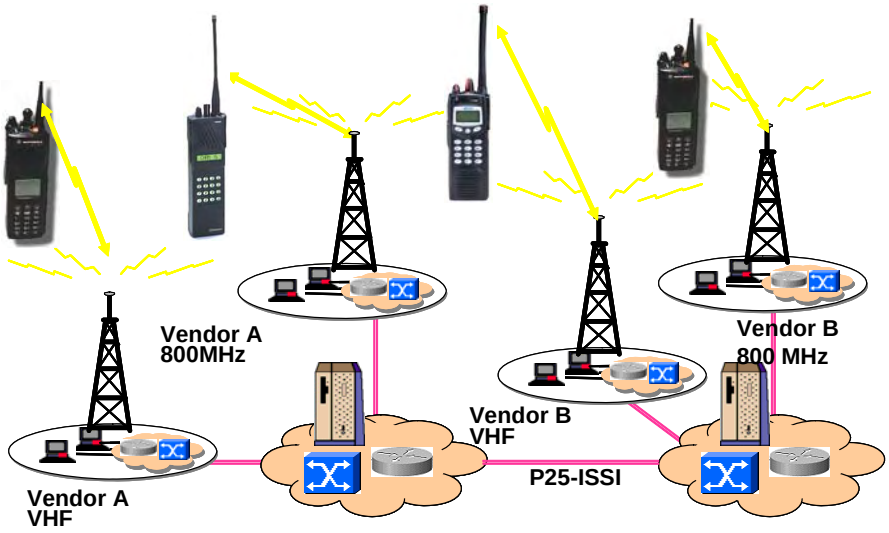


***Figure* 1-7: Level-6 Standards Based Shared Systems**

[2] See subsequent sections of this report for more detailed descriptions of the initiatives listed above.

History

Maryland Officials have long recognized the need for a statewide network to support emergency response for over 20 years. In the late 1980s, the goal was to construct a statewide 800 MHz system, but due to inability to obtain sufficient frequencies and funding, this goal was never fully achieved. The 800 MHz spectrum the State had acquired for that system was freed for use by the Counties and Municipalities to allow the upgrade of public safety communications infrastructure in many local jurisdictions.

During the late 1990's, the "Infrastructure Working Group" took up the charge of building a statewide communications network. This group outlined a strategy to build out a statewide infrastructure that would be available to support the deployment of a 700 MHz public safety network when the FCC was expected to make that frequency band available soon after the turn of the 21st century.

In 2003, the State of Maryland formed a Public Safety Communications Interoperability "Governance Working Group" (GWG) of State, County, and Municipal government officials to oversee the state's initiative to provide voice and data communications across agencies, departments, and government levels. In order to develop a comprehensive statewide plan, an Interoperability Project Team (IPT) consisting of professional public safety representatives from State, County and Municipal agencies support the GWG. This unique collaboration was brought about by cooperation between the Maryland Municipal League (MML), the Maryland Association of Counties (MACo), and State of Maryland agencies. The present day Statewide Communications Interoperability Plan (SCIP) is a direct result of the 2005 Report to the GWG on the IPT efforts, findings, and conclusions to date.

On July 10th, 2008, Governor O'Malley signed an executive order formally establishing Maryland's SIEC, along with its Practitioner Steering Committee (PSC). The current membership of these groups, serving as the successor group to the IPT and GWG have played a large role in forming this document as well.

In order to determine the status of public safety communications technology and interoperability within Maryland, the IPT conducted a User Needs Survey of key agencies, counties, and municipalities. Responses were received from 11 state agencies, all 23 counties, and 28 municipalities. Survey responses show that the need to improve communications interoperability, training, governance, security, and operational standards (including a common vocabulary) exists throughout Maryland, and that Agencies at all levels of government are attempting to address these needs in many ways. Survey analysis yielded the following concerns and challenges:

- Funding limitations hamper most agencies in improving systems
- Some existing systems have limited capability to be interoperable
- State agencies have older existing systems and will soon need to replace them
- Insufficient radio channels and system coverage limitations
- FCC authorized mutual aid channels are under utilized

- Lack of a common statewide public safety frequency band
- Requirement for a robust statewide infrastructure
- Limited use of wireless data systems

Recognizing the convergence of voice and data communications, the IPT's recommended long-term solution focuses on standards-based, open architecture systems. These systems must be secure and accessible by users from State, County, Municipal, and Federal agencies. Success will be enhanced by the continued cooperation and sharing of technological expertise by all stakeholders.

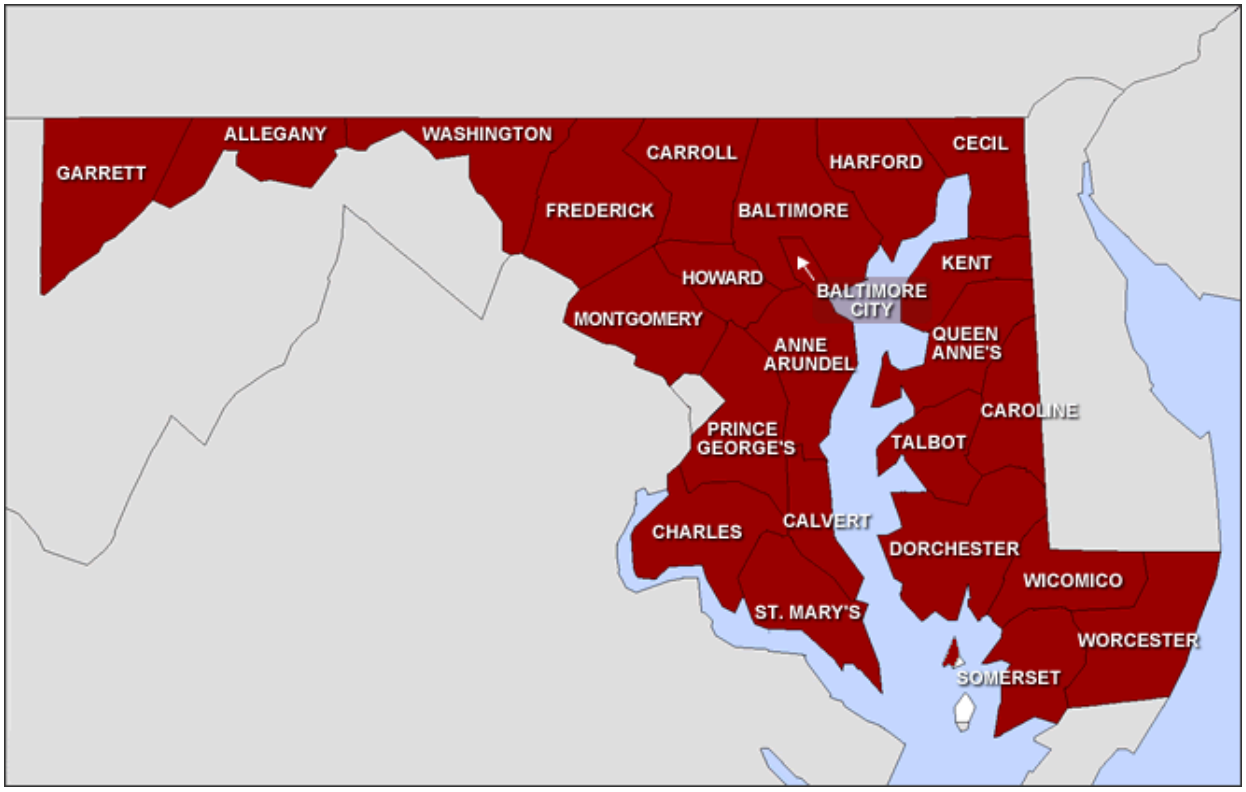
Beginning with the creation of the Statewide Interoperability Executive Committee (SIEC), the GWG along with the SIEC have taken many steps to advance the roadmap established in the 2005 IPT report.

The current partnering structure for public safety communications and interoperability in Maryland has been revised and formalized through an executive order signed by Governor O'Malley on July 10th, 2008. At each level in the Governance structure, the primary goal is to coordinate efforts and reach consensus on efforts to achieve Maryland's vision for Interoperable Public Safety Communications systems across all levels of government.

Whereas there has been a certain amount of membership changes in the past few years due to changes in administrations on both a state and local level, many of the key players involved in the 2005 report continue to drive interoperability efforts in Maryland to this day.

State Overview

Figure 2-1: Map of Maryland by county



Demographics, Climate and Geography

Maryland is a densely populated, but geographically small, state located in the center of the Atlantic Seaboard. Maryland does not border Canada or Mexico.

Maryland weather is typical for the Mid-Atlantic Region. The average temperature in the winter months is 35° F and in the summer is 74° F. The record high temperature of 109° F occurred in 1936. The record low 40° F degrees below zero occurred in 1912. The average yearly rainfall is 40.46".

Maryland's total area is 12,407 square miles (ranked 42nd out of the 50 states) but its over 5 million residents make it the 19th most populated state in the nation. Because the state is small, but the population is large, it is not surprising that Maryland is the 5th most densely populated state (542 people per square mile).

The highest point in Maryland is on Backbone Mountain at 3,360 feet above sea level. The lowest point in Maryland is sea level at the Atlantic Ocean. The State is approximately 250 miles long, and only 90 miles wide. A large portion of the square mileage in Maryland is covered by water (2,633 square miles).

Maryland shares land borders with Pennsylvania (North), West Virginia and Virginia (South and West), Delaware (North and East) and the District of Columbia (South). Maryland is also bordered by the Atlantic Ocean and the Chesapeake Bay. The Chesapeake Bay is 195 miles long and has coastlines in both Maryland and Virginia. Its width varies from 3 to 20 miles. It is approximately 1,726 square miles.

Maryland's largest city is Baltimore. A significant number of the State's largest communities are the surrounding suburban areas of the District of Columbia.

Political

The state legislative body is the Maryland General Assembly, which convenes in Annapolis each year for 90 days, unless the Governor calls a Special Session. The General Assembly typically acts on more than 2,300 bills including the debate and passing of the State's fiscal budget. The General Assembly has 47 Senators and 141 Delegates.

Maryland is divided into 24 political sub-divisions (23 counties plus Baltimore City). Councils or commissioners who are elected to 4-year terms govern most of the counties. Several counties have an elected county executive as well. The city of Baltimore, by Charter, is not part of any county and is governed by a mayor and a city council.

Infrastructure

With its proximity and access to the Chesapeake Bay, the Atlantic Ocean, Washington, D.C. and all of the east coast's major distribution routes, Maryland plays a vital role in transportation throughout the Eastern United States - and the Nation.

Maryland is home to one of the most important logistical highway networks in the country. Maryland's highway system is literally the crossroads of the Eastern United States including I-95, the key north-south highway in the east; I-70, one of the nation's primary east-west routes; two major metropolitan beltways; two tunnels and several major bridges including the 1,200 foot Francis Scott Key Bridge in Baltimore, and the four (4) mile Bay Bridge that crosses the Chesapeake Bay.

There are three major airports in the Baltimore-Washington area, including Baltimore/Washington International Thurgood Marshall Airport (BWI), Reagan National Airport (DCA) in Washington, D.C., and Washington Dulles International Airport (IAD) in northern Virginia. BWI Thurgood Marshall and Dulles are full-service international airports; Reagan National serves the eastern United States and Canada. In addition, Maryland offers seven regional airports with runways exceeding 5,000 feet that can handle corporate jets and prop-driven aircraft.

BWI is one of the fastest growing airports in North America, now handling over 20 million passengers annually. Some features of BWI Thurgood Marshall Airport and its services include:

- 52 air carriers (passenger, charter, and cargo) with approximately 650 daily scheduled passenger flights and 16 daily scheduled international non-stop flights;
- Accommodates approximately one-third of the passenger traffic in the Baltimore-Washington metro area;
- Handles over 575 million pounds (260,800 metric tons) of air cargo and mail a year;
- Offers 24-hour air-cargo services with 414,000 square feet (38,500 square meters) of cargo warehouse space, 24,000 square feet (2,200 square meters) of cold storage space, and a 17 acre (7 hectare) air cargo ramp;
- Cargo services include a Foreign-Trade Zone, convenient customs clearance, international banking, more than 100 freight forwarding and handling firms, and seven cargo airlines including six air freight carriers.
- Connects to Amtrak's Northeast Corridor route for access to major east coast cities such as New York, Philadelphia, and Washington.

The Port of Baltimore is one of America's busiest international deepwater ports, and a gateway between the United States and the international marketplace. Some features of the Port of Baltimore are:

- One of only two eastern U.S. ports with a main shipping channel that reaches a depth of 50 feet (15.2 meters)
- Closest east coast port to America's industrial center
- Serves more than 70 ocean carriers whose vessels make nearly 2,300 annual visits
- 23 million square feet of warehousing
- 12 million cubic feet of cold storage
- 2.7 million bushels of available grain storage
- Leading point of entry for foreign-made automobiles, and for the export of Roll-on/Roll-off (RO/RO) cargoes
- Modern container facilities, and special bulk facilities for steel, pulp, paper, ore, and coal
- Houses five public and 12 private terminals
- Every Port of Baltimore marine terminal is within one traffic light of an interchange connecting to I-95 and I-70, the north-south and east-west cargo throughways to the important Midwest and east coast consumer markets
- Just a short distance from I-83 and an easy connection to the Pennsylvania Turnpike

Maryland is home to some of the most important rail links in the country serving local commuter traffic, interstate travelers, and vital freight traffic. Each day, over 300,000 passengers ride the mass transit systems in the Baltimore area while interstate travelers use Amtrak's busiest rail routes.

Two (2) Class One rail carriers, CSX and Norfolk Southern, provide long haul freight services. These two carriers also connect with Canadian Pacific and Canadian National Railways, which serve Canada and further northern points. CSX moves approximately 800,000 carloads of various commodities and one million tons of metal products annually in Maryland, including steel and aluminum. It also handles nearly one million tons of chemicals in Maryland.

Short haul freight services are provided by five (5) Class Three rail carriers, Canton Railroad, Eastern Shore Railroad, Maryland and Delaware Railroad, Maryland Midland Railroad, and Patapsco & Back Rivers Railroad. Each serves regions of Maryland transporting various commodities such coal, stone, grain and soybeans, propane gas concrete, chemicals, clay, brick, fertilizer, paper, corn, gluten, mustard seed, lumber, paper products, wax, propane, and chemicals and foodstuffs.

Industry Strengths

Maryland boasts a high concentration of information technology companies and technically skilled professionals. Pioneering research in the University of Maryland System and Johns Hopkins Applied Physics Laboratory, and the presence of key federal agencies such as the National Institute of Standards and Technology, the National Security Agency and NASA's Goddard Space Flight Center bolster the state's IT profile. Maryland excels in the following sub-sectors: fiber optics, information security, satellite and wireless technology. The state is home to IT leaders such as Acterna, Aether Systems, Ciena, Corvis, Digex and Lockheed Martin.

Maryland is also recognized as a major hub of the bioscience industry. Over 300 bioscience companies are headquartered in the state, including some of the most innovative in the field: Celera, Human Genome Sciences, Digene, Gene Logic and MedImmune. Maryland is also home to federal research agencies such as the National Institutes of Health and the Food and Drug Administration. Furthermore, the state offers two world-class universities (Johns Hopkins University and the University of Maryland), major research institutions and the nation's leading hospital (Johns Hopkins Hospital).

Major Events

The Preakness Stakes is the second race of the Triple Crown and packs in an attendance of over 115,000 at the Pimlico racetrack. This is Maryland's signature sports event and is held on the third Saturday in May of each year in Baltimore. In 2005, Preakness day wagering totaled 88 million dollars and is considered an international sports event.

Additionally, there are several professional and collegiate sports teams that reside in Maryland and in the National Capital Region. Some of these teams include the Baltimore Ravens, Baltimore Orioles, Maryland Terrapins, Washington Redskins, Washington Nationals, Washington Wizards, Washington Mystics, Washington Capitals, D.C. United, and the Georgetown Hoyas. Events with these teams draw tens of thousands of spectators during events, in addition to the numerous concerts and conventions that draw millions of visitors.

Tourism

Drawing in over 20 million visitors a year, the tourism industry in Maryland exceeded $10 billion in economic impact in 2006. Employing over 100,000 people, Maryland's tourism industry generates over $2.2 billion yearly in federal, state and local taxes.

Emergency Risk Factors

Maryland's most significant natural risk of emergency is the landfall of a hurricane on its shores. The risk of harm from storms and flooding is significant because Maryland is a small, densely populated state. This results in dense population in areas where storms historically, and thus predictably, are likely to occur.

On September 19, 2003, Tropical Storm Isabel passed through extreme eastern Maryland, though its large circulation produced tropical storm force winds throughout the state. About 1.24 million people lost power throughout the state. The worst of its effects came from its storm surge, which inundated areas along the coast and resulted in severe beach erosion. In Eastern Maryland, hundreds of buildings were damaged or destroyed, primarily in Queen Anne's County from tidal flooding. Thousands of houses were affected in Central Maryland, with severe storm surge flooding reported in Baltimore and Annapolis. Washington, D.C., sustained moderate damage, primarily from the winds. Throughout Maryland and Washington, damage totaled about $820 million with only one fatality due to flooding.[3]

Maryland's population density is expected to increase in the coming years due to an expected influx of 28,000 households from the Base Realignment and Closure (BRAC) program. Dense population elevates the likelihood of loss of life and property from these events.

[3] For a mapping of hurricane landfalls in Maryland from 1851 to 2005, see http://www.csc.noaa.gov/hez_tool/states/maryland.html

For its size and population, Maryland also bears disproportionately significant risk exposure to the deliberate acts of terrorists. Maryland is home to critical facilities and assets that are obvious potential terror targets. The Port of Baltimore is one of the top ten busiest ports in the nation. Maryland contains one of the busiest flight paths in the world with three major international airports located within or adjacent to Maryland's borders. Interstate I-95, the main north-south highway on the East Coast, cuts through the State. Maryland is also home to many key federal agencies--including the National Institute of Health, the Food and Drug Administration, National Aeronautics Space Administration, a Federal Reserve branch, and the National Security Agency (NSA). In addition, the State contains key facilities and potential targets such as nuclear power facilities, numerous hospital and shock-trauma centers, public and private universities, national parks, a passenger cruise terminal, and rail assets relating to passenger, freight and food transport.

Emergency Management

MEMA – the Maryland Emergency Management Agency – was created by the Maryland legislature to ensure that the state is prepared to deal with large-scale emergencies. MEMA is responsible for coordinating the state response in any major emergency or disaster. This includes supporting local governments as needed or requested, and coordinating assistance with the Federal Emergency Management Agency (FEMA) and other federal partners.

While MEMA is part of the Maryland Military Department and under the authority of the adjutant general, during emergencies the governor may assume direct authority over the agency. In an emergency, the director of MEMA reports directly to the governor.

A key element of MEMA is the Maryland Joint Operations Center (MJOC), operated round-the-clock by National Guard and civilian personnel. It is the first joint civilian-military watch center in any state. In additional to serving as a communications hub for emergency responders statewide and supporting local emergency management, the MJOC monitors local, state, nation and international events and alerts decision-makers in Maryland when a situation warrants.

In times of disaster, the director of MEMA activates the State Emergency Operations Center (SEOC) to support local governments as necessary or requested. Representatives from state departments and agencies, as well as some federal agencies, the private sector and volunteer organizations, are present in the SEOC. Representatives have the authority to make decisions and allocate resources and funds necessary for emergency response. When the governor declares a state of emergency, MEMA coordinates efforts with FEMA to request a presidential disaster declaration and provide assistance to those impacted by the disaster. The MEMA staff of emergency management professionals number in excess of 70 people divided into three directorates – operations, technical support and administration. The Operations Division includes exercise and training, strategic analysis, regional programs, mitigation

and recovery and the domestic preparedness program. The Technical Support Division includes the Maryland Joint Operations Center, interoperability, information technology and communications. The administration directorate handles logistics, personnel, supplies and fiscal services. Other MEMA employees are involved in public information, planning, grants programs and administering the Citizen Corps.

The agency coordinates various federal programs, including the Homeland Security Grant Program, the Emergency Management Performance Grant and FEMA mitigation and recovery programs. Working with federal and local partners under the Chemical Stockpile Emergency Preparedness Program, the mustard gas stored at Aberdeen Proving Grounds was successfully neutralized in 2005. MEMA's authority derives from Article 14 of the Annotated Code of Maryland. This Article creates MEMA and authorizes the political subdivisions of the state to create emergency management offices of their own. Currently, there are 26 local emergency management offices in Maryland – all 23 counties, along with the City of Annapolis, Baltimore City and Ocean City. Article 14 also gives the Governor emergency powers – such as temporarily waiving state laws that may interfere with emergency response operations.

Through mitigation, MEMA strives to reduce or eliminate the impact of future disasters. Close coordination with other agencies may result in responsible land use, appropriate building codes, and suitable routes for hazardous material transportation. MEMA's research and action plans are pivotal in saving resources, funds and lives.

Regional Structures

Baltimore Urban Area Work Group

Created in 2003 to coordinate emergency preparedness activities in the Baltimore region, the Urban Area Work Group includes committees of fire, police, emergency medical services and public works personnel from BMC's member jurisdictions plus the City of Annapolis. In addition, each jurisdiction has hired an Emergency Planner and the Maryland Emergency Management Agency has assigned a coordinator for Central Maryland.

One of the UAWG's responsibilities is to assess the region's needs and recommend equipment acquisitions and projects that are eligible for federal reimbursement. The types of equipment that the UAWG has been able to secure thus far include:

- Radio communications - hardware and software;
- Web-based emergency communication system;
- Mobile emergency generators to serve as power backup for critical infrastructure; and
- Decontamination trucks for each jurisdiction.

The establishment of the Central Maryland Area Radio Communications system was one of the first priorities of the UAWG. Launched in 2005, the CMARC system provides five channels dedicated to regional mutual aid communications that any first responder can use in the event of a major public safety incident.

The UAWG also awarded grants for security improvements to schools and other facilities operated by nonprofit organizations and deemed to be at risk. In addition, the UAWG commissioned the region's public information officers to develop a campaign to promote household emergency preparedness.

National Capital Region (NCR)

The National Capital Region (NCR) was created pursuant to the National Capital Planning Act of 1952 (Title 40, U.S.C., Sec. 71). The Act defined the NCR as the District of Columbia; Montgomery and Prince George's Counties of Maryland; Arlington, Fairfax, Loudoun, and Prince William Counties of Virginia; and all cities now or here after existing in Maryland or Virginia within the geographic area bounded by the outer boundaries of the combined area of these counties, including the city of Alexandria.

Figure 2-2: National Capital Region

All-inclusive municipalities are considered part of the region.

The centers of all three branches of the U.S. federal government are in Washington, D.C., as well as the headquarters of most federal agencies. The NCR also serves as the headquarters for the World Bank, the International Monetary Fund, and the Organization of American States, among other international (and national) institutions.

Three major airports serve the NCR, two of them located in suburban Virginia and one located in Maryland. The Capital Beltway creates an artificial boundary for the inner suburbs of Washington and is the root of the phrase "inside the Beltway." The NCR is also bisected by the Potomac River. Major interstates include: I-66, I-295, and I-395. The Washington area is also serviced by the Washington Metropolitan Area Transportation Authority (WMATA) public transportation system, which operates public buses (Metrobus) and the region's subway system (Metrorail). Many of the jurisdictions around the region also run public buses that interconnects with the Metrobus/Metrorail system. Additionally, Union Station is a critical transportation hub that interconnects Metrorail, MARC and Virginia Rail Express (VRE) commuter trains, and Amtrak intercity rail.

NCR Interoperability Status

The NCR's regional public safety communications partners include the State of Maryland (SIEC), the Commonwealth of Virginia (SIEC), Washington Metropolitan Area Transit Authority (WMATA), Metro Washington Airports Authority, more than 30 Federal law enforcement agencies operating in the region, and many more. With more than 35,000 radios in the region, and with many independent governments, and numerous individual public safety radio systems, in a small area; the NCR is one of the most complex interoperability environments in the country.

Currently, all local first responders in the NCR can communicate either by direct or patched communications. It is anticipated that by 2012 patched communications will no longer be required for local NCR first responders as all will communicate by direct communications. Communications with state and federal first responders will still require patching or issuance of "cache" 800 MHz radios.

Accomplishments in voice interoperability include:

- 800 MHz interoperability exists throughout the region
- District of Columbia tri-band radio network enables interoperability with WMATA and regional Federal agencies using both Ultra High Frequency (UHF) and Very High Frequency (VHF) systems.
- Interoperability gateways are deployed throughout the region to connect disparate radio systems for use during regional events and missions
- NCR Radio Cache - 1,250 radio cache in the 800 MHz band was established to improve preparedness of the region
- Police Mutual Aid Radio System (PMARS) and Fire Mutual Aid Radio System (FMARS) – police and fire mutual aid radio systems exist to provide greater connectivity between the region's dispatch centers.
- Upgrades and implementation of radio systems within subway tunnel system
- Washington Area Warning Alert System (WAWAS) established to convey warnings and situational awareness on a 24-hour basis

- Communication Asset & Survey Mapping Tool (CASM) – database and mapping tool containing all interoperable voice communication assets in the region.

The NCR is one of the most advanced data interoperability regions in the country. Accomplishments in data interoperability include:

- 12 site wireless broadband network in the District of Columbia to provide interoperable multi-media (video, messaging, data exchange, imaging, etc.) capabilities
- Capital Wireless Information Net (CapWIN) provides data interoperability and a national model for governance by establishing desktop and mobile text messaging and access to multiple law enforcement databases throughout the NCR
- Regional Incident Communication and Coordination System (RICCS) provides additional data communications via pager, cell phone and web for efficient information dissemination for emergency events

Collaboration with Maryland's Interoperability Effort

To encourage collaboration between the statewide effort and the NCR, one of Maryland's Interoperability Coordinators serves as Maryland's representative on the National Capital Region Regional Programmatic Working Group for Interoperability (RPWG-I).

Membership on the RPWG-I includes representatives from Maryland, Virginia, D.C. as well as Montgomery County, MD and Fairfax County, VA to ensure a coordinated approach between the UASI projects and individual jurisdiction plans.

2.1.1 NIMS/Multi-Agency Coordination System (MACS)

The National Incident Management System (NIMS) provides a consistent nationwide template to enable all government, private sector and nongovernmental organizations to work together during domestic incidents. The Federal Homeland Security Presidential Directive #5 (HSPD-5) requires Federal departments and agencies to make the adoption of NIMS by State, Tribal and local organizations a condition of eligibility for Federal preparedness grants, contracts and other activities. Jurisdictions can comply in the short term by adopting the National Incident Command System. Other aspects of NIMS require additional development and refinement to enable compliance at a future date.

The State of Maryland is presently NIMS compliant. Maryland began compliance with the Federal Homeland Security Presidential Directive #5 (HSPD-5) by adopting the National Incident Management System (NIMS). On March 4th, 2005, Executive Order

01.01.2005.09 established NIMS as the state standard for emergency management, directed all state agencies to adopt NIMS in cooperation with local jurisdictions and selected the Maryland Emergency Management Agency (MEMA) to coordinate and facilitate ICS/NIMS training throughout the state. MEMA along with jurisdictional EMA's have been instrumental in transitioning the state to plain language communications and achieving common terminologies for an all-hazards emergency response approach.

In the adoption and implementation of the NIMS/Incident Command System (ICS), Maryland has identified the following 10 Core Disciplines required to have training and implement ICS to communicate priorities, plans and actions:

- Fire Service
- Hazardous Material Personnel
- Emergency Medical Services
- Emergency Management
- Law Enforcement
- Public Works
- Government Administration
- Public Safety Communications
- Health Care
- Public Health

The NIMS Implementation strategy for Maryland has been developed through a collaborative effort by several State agencies including the Maryland Emergency Management Agency, Maryland Department of Health and Mental Hygiene, Maryland Department of the Environment, Maryland Department of Transportation, Maryland Fire and Rescue Institute, Maryland Police and Correctional Training Commissions, Maryland Institute for Emergency Medical Services Systems (MIEMSS) and Maryland Occupational Safety and Health. The Strategy provides recommendations and guidance to develop a NIMS ICS training plan and to help training personnel determine who requires training and at what level. The Maryland Emergency Management Agency is the lead Agency for this effort in Maryland.

The operational model that exists in Maryland defines the role of the various functional groups and physical systems involved (*See figure 9 below*). It emphasizes center-to-center; field-to-field; and center-to-field communications. Public safety communications centers serve as focal points for incident resolution and communication. Operations centers communicate with each other as well as with field personnel to gather information about a given incident. After analysis, Emergency Operations Centers (EOCs) provide guidance or support to the field personnel for coordinated incident response. EOCs concurrently serve as a focal point for providing critical information and guidance to the public.

Communication between EOCs and field personnel typically involves both voice and data, and communications can occur over one or more subsystems depending on the configuration of the infrastructure and distance between the incident and the operations

center. At the operations center, all the communications are processed through the incident management system, which logs all information, records communications, and supports analysis of the data gathered from the incident.

The Maryland operational model (see below) envisions the Incident Management System tools (i.e. WebEOC, EMMA) providing a "common operating picture" to both the public (see right side of graphic) as well as the first responder community (see left side of graphic); This will be accomplished through the use of various applications over radio, microwave and fiber based networks.

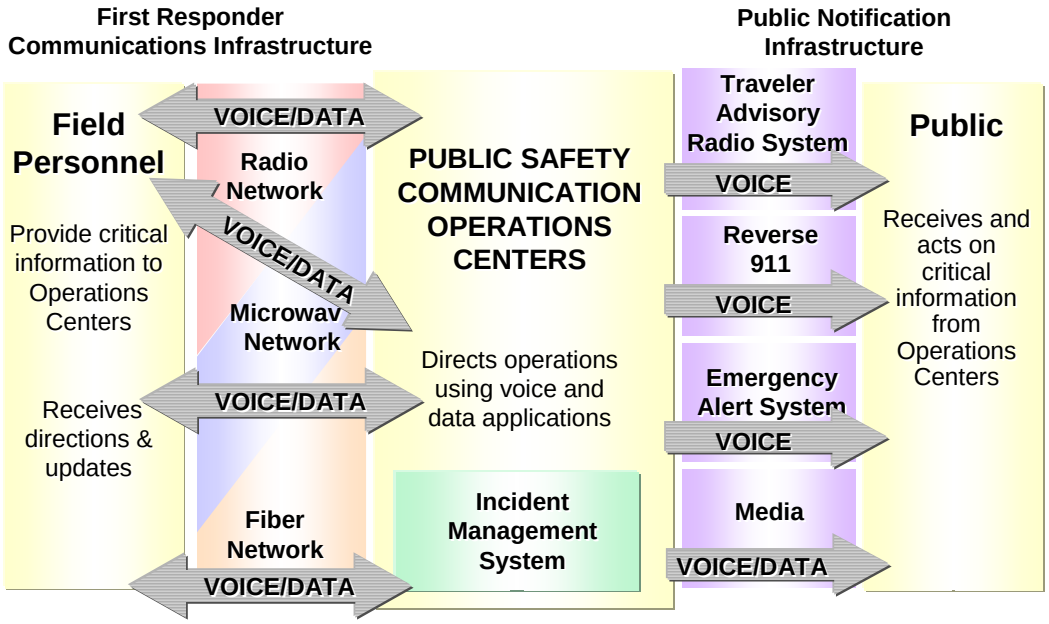


Figure 2-3: Operational Model

A major HAZMAT incident, a terrorist incident, whether suspected or confirmed, and literally any other community-wide event will most likely necessitate the establishment of a Multi-Agency Coordination System (MACS). In Maryland, the first and primary component element of a local MACS will be the local EOC, however, with major event, the Statewide EOC (SEOC) located at MEMA Headquarters will often come into play. The command and management component of NIMS includes the incident command system, the multi-agency coordination system, and the public information system. The multi-agency coordination system in Maryland is a combination of facilities (SEOC and local EOCs), equipment, personnel, procedures, and communications integrated into a common system (NIMS) with responsibility for coordinating and supporting incident management activities. Key players with roles in ICS, EOC operations and other vital support functions in the nuances and functions of establishing and operating within a MACS are all trained at the highest levels of the ICS system. All multi-agency coordination system personnel who are charged with coordinating and supporting incident management activities during an emergency/disaster have benefited from this training.

Following tactical exercises[4] that involved both the Baltimore Urban Area and the National Capital Region's Urban Area, in January 2007, scorecards were given by DHS to evaluate, among other concerns, integration of NIMS/ICS into emergency management. Although TICP validation exercise participants showed an understanding of SOPs, the Baltimore UA had been implementing National Incident Management System (NIMS)/Incident Command System (ICS) for only 6 months.

During the exercise, the participants displayed a familiarity with ICS and unified command protocols and procedures (e.g., unified command established with law enforcement, fire, and hazardous materials agencies), but had specific difficulties with NIMS/ICS (e.g., Communications Unit Leader not actively involved in coordination of incident communications, ICS Form 205 not distributed). Since then, MEMA (statewide) and the Baltimore UA have continued basic and advanced training and exercises on SOPs (including communications unit implementation consistent with the TICP) to ensure that all participating first responder agencies attain and maintain NIMS/ICS compliance.

At the time of the TICP validation exercise for the NCR UA, the National Incident Management System (NIMS)/Incident Command System (ICS) had been in place for more than one year and was used with proficiency, particularly by the fire community. NIMS/ICS was effectively used during the TICP validation exercise, including a successful deployment of the Communications Unit and Communications Unit Leader (COML). The COML was able to efficiently deploy multi-agency resources and coordinated by radio and face-to-face with command and general staff. The NCR area is committed to integrating the COML position into its response structure and officials have indicated that they hope to be actively involved in the development of this training curriculum. Following these exercise, the NCR has continued basic and advanced training and exercises on SOPs (include communications unit implementation consistent with the TICP) to ensure that all participating first responder agencies attain and maintain NIMS/ICS compliance

The Maryland SCIP promotes and supports the use of National Incident Management System (NIMS) through anticipated synchronization with Maryland's "Statewide Homeland Security Strategic Plan" and the action plans contained therein.

The Maryland NIMS approach promotes NIMS compliance through multi-disciplinary working groups and committees that ensure all aspects of NIMS remain at the forefront during strategic planning. As discussed in section 4.4 the Exercise and Training Integration Committee (MD ETIC) is used as a governance group. It was established in July of 2004 initially to ensure statewide NIMS compliance. By December of 2004, the Committee expanded its mission, which is now:

[4] Both the UASI regions in the state of Maryland performed TIC exercise in September 2006. The results are documented and may be accessed at http://www.dhs.gov/xlibrary/assets/grants-scorecard-report-010207.pdf.

To build and support a self-sustaining statewide exercise and training program that strengthens Maryland's all-hazards preparedness capabilities as defined by the National Preparedness Goal.

The committee membership includes operations, supervisory, and senior leaders representing the core response disciplines from local, State and Federal government. The MD ETIC focuses on implementing activities and initiatives to ensure integrated and effective exercise and training-related activities throughout the State.

MEMA is responsible for monitoring NIMS compliance for local, state, and government agencies. Policies and procedures are in effect to track and report NIMS compliance activities for all governmental response, emergency preparedness and incident management organizations. Maryland has identified a NIMS coordinating officer to be the central point of contact for all NIMS related questions or concerns. Maryland has also identified NIMS points of contact throughout state agencies and local jurisdictions. The state utilizes the federal NIMSCAST system to track compliance within all levels of government. NIMS implementation progress is measured at all levels of government by MEMA.

NIMS compliance stipulations are also incorporated into sub grantee contract language and are part of sub grantee monitoring. Eligibility to receive federal preparedness funding in FFY 2008 is contingent upon state and local jurisdictions meeting NIMS implementation requirements.

Needs assessments are conducted annually to identify training needs, to include Incident Command System (ICS) training. These assessments, as part of the annual Three Year Exercise and Training Plan process, helped to identify training needs and fill those gaps to ensure NIMS compliance. To ensure individuals receive the appropriate level of training, the Training and Exercise Branch of MEMA developed the Maryland Emergency Management Agency's NIMS-Compliant Training Reference Chart[5]

All resources throughout Maryland are typed according to the NIMS Resource Typing Guidelines. Typed resources are located electronically within WebEOC©. These typed resources are updated regularly. MEMA provides quarterly reminders to state agencies and local jurisdiction to update the statewide resource list. An annual comprehensive review is also conducted through MEMA.

All Emergency Operations Plans (EOP) have been reviewed and updated to be NIMS compliant. MEMA and ETIC continue to be available to assist state agencies and local

[5] See appendix ___ MD NIMS Reference Chart

jurisdictions in the review and update of any EOP.

Maryland continues to promote the use of mutual aid agreements. Maryland is a member of the Emergency Management Assistance Compact (EMAC) which is a congressionally ratified organization that provides form and structure to interstate mutual aid. In addition to EMAC, Senate Bill 239 established the Maryland Emergency Management Assistance Compact (MEMAC), which authorizes jurisdictions within Maryland to adopt the Compact for the purpose of providing intrastate mutual aid between jurisdictions in Maryland during an emergency. The implementation of a statewide interoperable communications system would foster mutual aid and allow for a more seamless transition of resources to those jurisdictions in need in times of an emergency.

The role that Public Safety Interoperable Communications (PSIC) funded equipment will play in enabling or improving NIMS compliance will be to further the interoperability of all agencies and jurisdictions that are awarded PSIC funding. This role is critical to the replacement of old technology that is in use throughout the state at all levels of government. Modern equipment will facilitate the interagency communications that NIMS procedures seek to standardize by enabling better use of the Incident Command System.

Local jurisdictions, as well as state government agencies, are responsible for following requirements:

1. Adopt NIMS for all government departments and agencies.
2. Manage all emergency incidents in accordance with the Incident Command System.
3. Coordinate and support incidents through the use of Multi-Agency Coordination Systems.
4. Communicate information to the public through a Joint Information System and Joint Information Center.
5. Establish the communities' NIMS compliance baseline.
6. Coordinate Federal preparedness funding to implement the NIMS.
7. Revise and update standard operating procedures to incorporate the NIMS.
8. Participate in and promote mutual aid.
9. Complete the IS-700 course.
10. Complete the IS-800 course.
11. Complete the ICS 100 course.
12. Complete the ICS 200 course.
13. Incorporate NIMS into training and exercises.
14. Participate in all-hazards, multi-jurisdictional/discipline exercise based on the NIMS.
15. Incorporate corrective action into response plans and procedures.
16. Inventory response assets to conform to resource typing standards.

17. Ensure relevant national standards are incorporated into equipment acquisition programs.
18. Apply standard terminology across the public safety sector.

The state of Maryland and MEMA are responsible to local entities for the following support and leadership:

- Monitoring formal adoption of NIMS.
- Communicating implementation requirements.
- Measuring progress.
- Facilitating reporting.
- Ensuring federal preparedness funding is linked to satisfactory progress.
- Including implementation compliance reviews in audits.
- Monitoring and assessing outreach efforts across the state.

The state of Maryland is committed to ensuring NIMS compliance and training are at the forefront of our strategic planning efforts.

2.1.2 Regions/Jurisdictions[6]

For much of Maryland, local government typically is county government. Twenty-three counties and Baltimore City make up the twenty-four main local jurisdictions found in Maryland. Baltimore City, although a municipality, has been considered on a par with county jurisdictions since the adoption of the Maryland Constitution of 1851.

Local government is found in Maryland's 23 counties. For Maryland counties, three forms of government exist: county commissioners, code home rule, or charter.

County Commissioners

Under the county commissioners form of government, the General Assembly is authorized to legislate for the county. While a board of county commissioners exercises both executive and legislative functions defined by State law, and may enact ordinances, its legislative power is limited to those areas authorized by the General Assembly, enabling legislation, or public local laws (Code 1957, Art. 25). Eight counties operate in this fashion: Calvert, Carroll, Cecil, Frederick, Garrett, St. Mary's, Somerset, and Washington.

[6] See *http://www.msa.md.gov/msa/mdmanual/01glance/html/county.html* for list of counties and localities within counties.

Code Home Rule

Since 1915, counties have had the option of governing under code home rule, which enables them to exercise broad local legislative authority (Chapter 493, Acts of 1965, ratified Nov. 8, 1966; Const., Art. XI-F). Six counties have chosen to adopt code home rule government: Allegany (1974), Caroline (1984), Charles (2002), Kent (1970), Queen Anne's (1990), and Worcester (1976).

Charter

The charter government separates the executive branch from the legislative branch (Chapter 416, Acts of 1914, ratified Nov. 2, 1915; Const., Art. XI-A). Most typically, it consists of a county executive and a county council. Charter government covers nine Maryland counties: Anne Arundel (1964), Baltimore (1956), Dorchester (2002), Harford (1972), Howard (1968), Montgomery (1948), Prince George's (1970), Talbot (1973), and Wicomico (1964).

Municipal Government

Some 157 towns and cities (including Baltimore City) have their own governments. Created by State, county and municipal governments, special taxing districts exist in Montgomery County as well.

Figure 2-4: Regional Map of Maryland

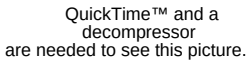


Figure 2-5: Map of Planning Regions

The following table provides a list of the regions within the state, jurisdictions and/or counties that comprise the entire state, and emergency response agencies included in each region, county or jurisdiction.

Table 2-3 Regions/Jurisdictions/Agencies

Region	*Jurisdiction*	*Agency*	*Name*	*Title*	*Phone*
Western	ALLEGANY COUNTY	**EMA**	Dick Devore	DIRECTOR	(301) 777-5908
Northern	ANNAPOLIS CITY	**EMA**	Ed Sherlock	DIRECTOR	(410) 216-9167
Northern	ANNE ARUNDEL COUNTY	**EMA**	Tom Wilson	DIRECTOR	(410) 222-0600
Northern	BALTIMORE CITY	**EMA**	James Clack	DIRECTOR	(410) 369-6175
Northern	BALTIMORE COUNTY	**EMA**	Mark F. Hubbard	DIRECTOR	(410) 887-5996
Southern	CALVERT COUNTY	**EMA**	John Fenwick	DIRECTOR	(410) 535-1623
Eastern	CAROLINE COUNTY	**EMA**	Brian Ebling	DIRECTOR	(410) 479-2622
Northern	CARROLL COUNTY	**EMA**	William Hall	DIRECTOR	(410) 386-2455

Eastern	CECIL COUNTY	**EMA**	Richard Brooks	DIRECTOR	(410) 996-5350
Southern	CHARLES COUNTY	**EMA**	Bill Stevenson	DIRECTOR	(301) 609-3402
Eastern	DORCHESTER COUYNTY	**EMA**	Wayne Robinson	DIRECTOR	(410) 228-1818
NCR	FREDERICK COUNTY	**EMA**	John Markey	DIRECTOR	(301) 694-1746
Western	GARRETT COUNTY	**EMA**	Brad Franz	DIRECTOR	(301) 334-7619
Northern	HARFORD COUNTY	**EMA**	Richard Ayers	DIRECTOR	(410) 638-4900
Northern	HOWARD COUNTY	**EMA**	Joe Herr	DIRECTOR	(410) 313-6004
Eastern	KENT COUNTY	**EMA**	Sue Willits	DIRECTOR	(410) 778-3758
NCR	MONTGOMERY COUNTY	**EMA**	Bruce Romer	DIRECTOR	(240) 777-2300
Eastern	OCEAN CITY	**EMA**	Joe Theobald	DIRECTOR	(410) 723-6616
NCR	PRINCE GEORGES COUNTY	**EMA**	Reginald Parks	DIRECTOR	(301) 583-1899
Eastern	QUEEN ANNE'S COUNTY	**EMA**	John Chew	DIRECTOR	(410) 758-4500
Southern	SANT MARY'S COUNTY	**EMA**	Dave Zyleck	DIRECTOR	(301) 475-4200
Eastern	SOMERSET COUNTY	**EMA**	Steve Marshal	DIRECTOR	(410) 651-0707
Eastern	TALBOT COUNTY	**EMA**	Ed Mulikin	DIRECTOR	(410) 770-8160
Western	WASHINGTON COUNTY	**EMA**	John Latimer	DIRECTOR	(410) 313-2930
Eastern	WICOMICO COUNTY	**EMA**	Sandy Silva	DIRECTOR	(410) 5484921
Eastern	WORCESTER COUNTY	**EMA**	Teresa Owens	DIRECTOR	(410) 6321311

2.1.3 UASI Areas/TIC Plans

Maryland contains one complete UASI (Baltimore Urban Area) and also contains a portion of a second UASI - the National Capital Region. Between these two areas, the Baltimore Urban Area and Maryland's portion of the NCR count for almost three-fourths of the entire statewide population. The Baltimore Urban Area includes Baltimore City, City of Annapolis, and the Counties of Baltimore, Anne Arundel, Carroll, Harford, and Howard. The National Capital Region (NCR) consists of 6,000 square miles including and surrounding the District of Columbia. In Maryland, the counties of Prince Georges and Montgomery are considered to be within the NCR.

Baltimore UASI and CMARC

One of the three prominent regional projects underway to facilitate interoperability in Maryland is centered in the Baltimore UASI. The Central Maryland Area Regional Communications System (CMARC) has deployed infrastructure in the central Maryland area for region-wide use of the national calling and tactical 800 MHz channels (8TAC). These channels provide another "layer" of communications interoperability for central Maryland emergency services providers. All CMARC dispatch centers and field providers will have the ability to receive and transmit on the National Calling Channel (NCC) and all National Tactical Channels (NTACs). Communications on the NCC and any NTAC will be governed by protocols adopted by the CMARC Oversight Committee. The CMARC project service area is shown in the diagram below.

Map showing Baltimore UASI and the CMARC area.

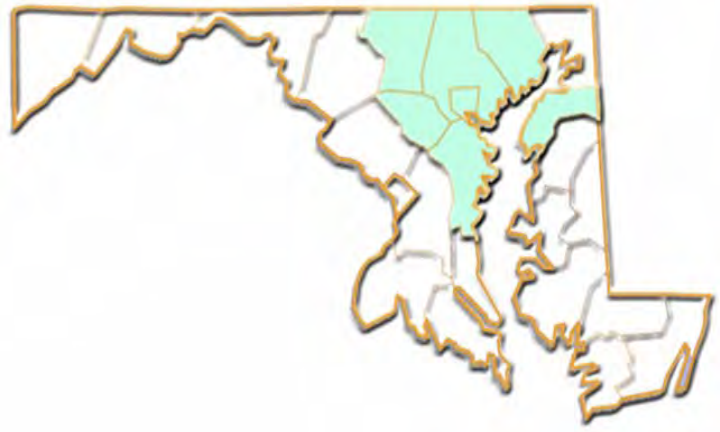


Table 2-4 UASI Areas/TIC Plans

UASI Area	*Regions / Jurisdictions*	*TICP Title/ Completion Date*	*POC Name*	*POC Email*
Baltimore Urban Area	Baltimore City, City of Annapolis, and the Counties of Baltimore, Anne Arundel, Carroll, Harford, and Howard.	Baltimore Urban Area Interoperable Communications Plan[7] Completed 4/2006 Revised 10/2007	Chief James S. Clack, Baltimore City Fire Department	firemarshal@baltimorecity.gov
National Capital Region	Montgomery and Prince Georges Counties	National Capital Region (NCR) Tactical Interoperable Communications Plan[8] Completed 4/2006	Captain Eddie Reyes, Alexandria Police Department	Eddie.reyes@alexandriava.gov

[7] See appendix for attached TICP documents
[8] ibid.

The creation of a TIC Plan was a requirement of the Department of Homeland Security's (DHS), Office for Domestic Preparedness (ODP), 2005 Urban Area Securities Initiative (UASI) Grant Program. However, public safety agencies in Maryland have a long history of collaboration in the use of regional communications resources, demonstrated by protocols and agreements supporting Mutual Aid M/A requirements and by the successful collaborations of local, county, state and federal agencies. These plans were completed in advance of the September 2006 exercises that tested these plans and tactical interoperable communications.

Baltimore Urban Area TICP

The Baltimore UA TICP was done in accordance with the Maryland Emergency Operations Plan; Emergency Support Function (ESF) 2, Emergency Communications. For the purposes of the Baltimore Urban Area TICP, the following entities represent state and local shareholders in the plan:

Emergency Management Agencies representing:
Anne Arundel County
Baltimore City
Baltimore County
Carroll County
Harford County
Howard County

Law Enforcement providers for:
Anne Arundel County
Annapolis City
Baltimore City
Baltimore County
Carroll County
Harford County
Howard County

Fire/EMS providers for:
Anne Arundel County,
Annapolis City,
Baltimore City,
Baltimore County,
Carroll County,
Harford County and
Howard County;

Health Department using wireless public safety radio systems in:
Anne Arundel County
Baltimore City

Baltimore County
Carroll County
Harford County
Howard County

Department of Public Works and utilities using wireless public safety radio systems in:
Anne Arundel County
Baltimore City
Baltimore County
Carroll County
Harford County
Howard County

And the Maryland Emergency Management Agency. Providers at the State and Federal levels often use 800 MHz radios to access the wireless public safety radio system of the local jurisdiction and would be covered by the TICP as well.

The Baltimore Urban Area Working Group (BUAWG) By-Laws provide the specific governance structure that oversees interoperable communications policy for the Baltimore UA. These governance documents were officially adopted on June 7, 2005. The Baltimore Metropolitan Council, the BUAWG, and the Central Maryland Area Radio Communications (CMARC) Oversight Committee have worked diligently in the development and implementation of this effort. A clearly defined set of procedures for the use of the 800 MHz NPSPAC Call and Tactical radio channels for communications between radio users on different 800 MHz radio systems in this area has been adopted and incorporated into the Baltimore UA TICP.

CMARC is a standing committee as defined by Article V of the By-laws for the Baltimore Urban Area Working Group. The CMARC Committee is responsible for developing, overseeing and implementing the TICP on behalf of the BUAWG. Other responsibilities of CMARC, as found in Article V, Section 3 include:

1. Perform assessments of the region's homeland security capabilities;

2. Submit recommendations and develop spending initiatives to increase the region's collective homeland security capabilities;

3. Implement initiatives approved by the Executive Committee;

4. Develop strategic or operational plans;

5. Share information and best practices;

6. Engage in collaborative planning for training, exercising, and equipping personnel in relevant disciplines; and,

7. Perform tasks assigned to them by the Executive Committee.

CMARC committee meetings are held on the first Wednesday of each month at the Maryland Emergency Management Agency. The meetings are open to members from any agency at any level of government with a need for public safety radio interoperability. Voting members include participants from the agencies listed below. The BUAWG Chair appoints the chair of the CMARC Committee. Currently, Harford County serves as Chair. The Chair is responsible for scheduling and overseeing committee meetings and producing minutes of the meetings. Two subcommittees report to the CMARC Chair. The first subcommittee is responsible for technical issues related to system design and implementation. Howard County chairs this subcommittee. The second subcommittee is the User's Group. This subcommittee is responsible for needs analysis and the development and implementation of operating procedures. This committee includes public safety representatives from all BUAWG member jurisdictions and agencies.

Primary BUAWG membership includes:

* Fire and Police – City of Baltimore. The Fire Chief chairs the Governance Group.

* Fire and Police – City of Annapolis. Representatives serve as members of the Governance Group and handle assignments as delegated.

* Fire, and Emergency Management – Anne Arundel County. Representatives serve as members of the Governance Group and handle assignments as delegated

* Fire, Police and County Administration – Baltimore County. Representatives serve as members of the Governance Group and handle assignments as delegated

* Emergency Services – Carroll County. Representatives serve as members of the Governance Group and handle assignments as delegated

* Emergency Services – Harford County. Representatives serve as members of the Governance Group and handle assignments as delegated. Harford County chairs the subcommittee responsible for interoperable radio communications via use of shared channels. The point of contact for this committee is Emergency Services Manager Ernie Crist (T/P 410-638-4900 or e-mail elcrist@co.ha.md.us).

* Fire and County Administration – Howard County. Representatives serve as members of the Governance Group and handle assignments as delegated

* Baltimore Metropolitan Council. Representatives serve as members of the Governance Group and handle assignments as delegated. They also facilitate regional agreements.

* State of Maryland – Representatives from the Maryland Emergency Management Agency provide technical assistance. Representatives of the Department of Transportation handle assignments as delegated.

The Governing Body developed the Baltimore UA TICP will revise the document to include contact lists, Appendices, and other related materials annually or as revisions are necessary. As to inventory control and maintenance of equipment including the tower sites, each of the participating jurisdictions is responsible for equipment in their respective jurisdiction.

NCR TICP

For purposes of the NCR TICP, the NCR is defined as the District of Columbia; Frederick, Montgomery and Prince George's Counties of Maryland; Arlington, Fairfax, Loudon, and Prince William Counties of Virginia; and all cities now or here after existing in Maryland or Virginia within the geographic area bounded by the outer boundaries of the combined area of said counties. The NCR TICP is intended to document what voice interoperable communications resources are available within the NCR Urban Area, who controls each resource, and what rules of use or operational procedures exist for the activation and deactivation of each resource.

The NCR TICP provides the local, state, and Federal public safety agencies serving the NCR with a reference document and guide to use when interoperable communications are required to support emergency operations. The guide includes voice interoperability solutions, Points Of Contact (POC) for learning about or participating in the solutions, POCs for gaining permission to access each voice interoperable communications approach, communication agency contact information, and examples of MOUs/MAAs/SOPs as starting points for the appropriate stakeholders in developing policies and practices that best meet their needs.

The Regional Programmatic Working Group for Interoperability as directed by the Senior Policy Group (SPG) will oversee and maintain the NCR TICP. It will be reviewed every six months to update procedures and policies; it will be updated as needed to reflect the changing inventory and POCs in the region. In addition to providing this information, the NCR TICP strongly recommends to the participants in each solution that they test plans, procedures, and equipment periodically to ensure proficiency in deploying the various interoperability solutions.

The April 2006 NCR TICP is the first phase in which Law Enforcement and Fire and Rescue agencies are addressed. Future phases will include additional public safety agencies, such as Emergency Management, Transportation and Health and additional jurisdictions that are contiguous to the NCR, as well as how the region intends to address the challenges of data communication interoperability. Further, it is the intention to post the *National Capital Region Tactical Interoperable Communications Plan (NCR TICP)* within the framework of the Communication Asset Survey and

Mapping tool or a NCR Portal so that it can be accessed in tactical situations.

For the purposes of developing the Tactical Interoperable Communications Plan, the NCR believes that it is vital that all likely emergency responders in the NCR region be included in the Phase one of the NCR TICP. Within each jurisdiction, the primary public safety agencies – law enforcement, fire, and emergency medical service are represented. A complete list of included agencies is shown below:

CITY OF ALEXANDRIA, VA
Alexandria Fire Department
Alexandria Police Department
Alexandria Sheriff's Office

ARLINGTON COUNTY, VA
Arlington Co. Sheriff
Arlington Co. Fire Dept.
Arlington Co. Office of Emergency Mgmt
Arlington Co. Police Dept.
Arlington Co. Public Safety Emergency Communications Center
City of Falls Church Police Dept.

DISTRICT OF COLUMBIA
DC Fire and EMS Dept. (F/EMS)
DC Office of Unified Communications (OUC)
Metropolitan Police Dept. (MPD)

FAIRFAX COUNTY, VA
City of Fairfax Fire Dept.
City of Fairfax Police Dept.
Fairfax Co. DIT Radio VA
Fairfax Co. Fire and Rescue
Fairfax Co. Police Dept.
Fairfax Co. Sheriff
George Mason Univ. Police Dept. (VA)
Town of Vienna Police Dept.

FREDRICK COUNTY, MD
Brunswick Police Dept.
Frederick City Police Dept.
Frederick Co. Fire and Rescue Dept.
Frederick Co. Sheriff's Office
Thurmont Police Dept.

LOUDOUN COUNTY, VA
Leesburg Police Department

Loudoun Co. DIT Radio (VA)
Loudoun Co. Fire Rescue and Emergency Mgmt.
Loudoun Co. Sheriff's Office
Middleburg Police Dept.
Purcellville Police Dept.

MONTGOMERY COUNTY, MD
Chevy Chase Village Police
Gaithersburg City Police
Montgomery Co. Dept. of Police
Montgomery Co. Sheriff's Office
Montgomery Co. Fire & Rescue
Montgomery Co. Radio Communications Services
Rockville City Police
Takoma Park City Police

PRINCE GEORGE'S COUNTY, MD
Berwyn Heights Police Dept.
Bladensburg Police Dept.
Bowie State Univ. Police Dept.
Capitol Heights Police Dept.
Cheverly Police Dept.
Cottage City Police Dept.
District Heights Police Dept.
Edmonston Police Dept.
Fairmount Heights Police Dept.
Forest Heights Police Dept.
Glenarden Police Dept.
Greenbelt City Police Dept.
Hyattsville Police Dept.
Landover Hills Police Dept.
Laurel Police Dept.
Morningside Police Dept.
Mount Rainier Police Dept.
Prince George's Co. Police Dept.
Prince George's County Fire & Rescue Dept.
Prince George's County Sheriff
Riverdale Park Police Dept.
Seat Pleasant Police Dept.
Takoma Park City Police
Univ. of MD - College Park Police Dept.
University Park Police Dept.
Upper Marlboro Police Dept.

PRINCE WILLIAM COUNTY, VA
Manassas City Fire Dept.

Manassas City Police Dept.
Manassas Park City Fire Dept.
Manassas Park City Police Dept.
Prince William Co. Public Safety Communications
Prince William County Fire Dept.
Prince William County Police Dept.
Town of Dumfries Police Department
Town of Haymarket Police Department
Town of Occoquan Police Dept.
Town of Quantico Police Department

STATE OF MARYLAND
Maryland National Capital Park Police (MNCPP) Mont. Co. Div.
Maryland National Capital Park Police (MNCPP) Prince George's. Co. Div.
MD State Police - Barrack B Frederick Frederick County Police
MD State Police - Barrack N Rockville Montgomery County Police
MD State Police - Barrack O Hagerstown Washington County Police
MD State Police - Barrack L Forestville (MD) Prince George's County Police
MD State Police - Barrack Q College Park (MD) Prince George's County Police

STATE OF VIRGINIA
VA State Police Div 7
VA State Police Div 7 - Area 10 Loudoun
VA State Police Div 7 - Area 11 Prince William
VA State Police Div 7 - Area 45 Arlington/Alexandria
VA State Police Div 7 - Area 48 Alexandria/Fairfax
VA State Police Div 7 - Area 9 Fairfax

FEDERAL GOVERNMENT
ATF NCR Police
FBI NCR Police
Federal Protective Services NCR Police
US Park Police NCR Police
US Capitol Police District of Columbia Police

AUTHORITIES
Metropolitan Washington Airports Authority (MWAA)
Radio Dept. DC/ Arlington/ Loudoun Public Safety
MWAA Fire Dept. DC/ Arlington/ Loudoun Fire
MWAA Police Dept. DC/ Arlington/ Loudoun Police
Metro Transit Police (WMATA) NCR Police

The development, maintenance and implementation of the NCR TICP is the responsibility of the Metropolitan Washington Council of Governments' Joint Police and Fire Communications Committee with oversight from the NCR Regional Programmatic

Working Group for Interoperability.

The leadership of the District of Columbia, the State of Maryland, the Commonwealth of Virginia, area local governments, and the Department of Homeland Security's Office for National Capital Region Coordination (ONCRC) are working in partnership with non-profit organizations and private sector interests to reduce the vulnerability of the National Capital Region (NCR) from terrorist attacks.

These partners have established a governance structure to guide homeland security work in the NCR. Several of the key committees are listed below.

Senior Policy Group (SPG)

The Governors of Maryland and Virginia, the Mayor of the District of Columbia, and the Advisor to the President for Homeland Security established a NCR Senior Policy Group (SPG) to provide continuing policy and executive level focus to the region's homeland security concerns. The SPG was also designed to ensure full integration of NCR activities with statewide efforts in Virginia and Maryland. Its membership was and is comprised of senior officials of the four entities, each with direct reporting to the principals. The SPG was given the collective mandate to determine priority actions for increasing regional preparedness and response capabilities and reducing vulnerability to terrorist attacks.

This group provides the overall direction for implementation within the National Capital Region. Any regional Memorandums of Understanding or Mutual Aid Agreements will be implemented at this level.

The COG Joint Police and Fire Communications Subcommittees with coordination from the NCR TICP governance groups oversees the following responsibilities:

- Establishing and managing interoperable communications working groups
- Maintaining and updating the NCR TICP
- Adopting final solutions and directing implementation
- Establishing training recommendations in support of the NCR TICP
- Creating chains of command for interoperable communications including trained COML (COML)
- Executing Memoranda of Understanding and Sharing Agreements for interoperable communications
- Notifying agencies of regular interoperable equipment/solutions, testing and assisting agencies with test evaluation and the dissemination of results
- Continual re-evaluation of regional requirements as technology evolves and circumstances dictate

2.2 Participating Agencies and Points of Contact

Between the assistance of the SIEC, PSC, Federal, Multi-State, State, Local and non-governmental partners, input and assistance for the SCIP has been provided at all levels of government. Additionally, earlier drafts of the SCIP were made available to all working partners and many took the opportunity to make comments and include substantive changes.

The SCIP in various draft forms has been distributed with direct solicitations for comments to the widest range of public safety participants imaginable. Cross-disciplinary representation includes communications professionals from Law Enforcement, Fire/Rescue/Hazmat (career and volunteer), Emergency Medicine, Emergency Management, Military, Transportation, Public Health, Environmental Management, Private Industry, Common Carriers, Non-Governmental Organizations, University experts, and private consultants.

On July 10th, 2008, Governor O'Malley signed an executive order formally establishing Maryland's SIEC, along with its Practitioner Steering Committee (PSC). The current membership of these groups, serving as the successor groups to the IPT and GWG have played a large role in forming this document as well.

Currently, the membership in the new SIEC and PSC has yet to be formalized. Until formal membership in the new SIEC/PSC structure has been nominated and confirmed by federal, state, local and non-profit agencies, the following members and frequent participants in the former SIEC (who were all nominated by their respected federal, state, local, and non-profit agencies as well) have been involved with providing assistance to the drafters of the SCIP as interim members of the PSC. Whereas some have been more instrumental than others, all have been involved to some extent.

Table 2-6 Interim PSC Members and Participants

Name	Agency	Email	Member Type
Xavier Dashiell	US Army National Guard	xavier.dashiell@us.army.mil	Military
Becky Black	Maryland Assoc of Counties	beckyb@mdcounties.org	MACO
Bill Ryan	Anne Arrundel County	wryan@aacounty.org	MACO
Brian Muser	MEMA	bmuser@MEMA.state.md.us	State
Capt Stephen Lating	DGS	slating@dgs.state.md.us	State
Chris Holland	MTA	CHolland@mtamaryland.com	State
Clay Stamp	MIEMSS	cstamp@miemss.org	State
Craig Fetzer	SHA	CFetzer@mdot.state.md.us	State
Craig L. Meier	Baltimore PD	Craig.Meier@BaltimorePolice.org	Municipal
Dan Meyerson	University of MD	dmeyerson@mdot.state.md.us	Staff
Denis McElligott	DBM	dmcellig@dbm.state.md.us	State
Ed Ryan	DNR	gryan@dnr.state.md.us	State
Edith Chapman	Prince Georges County	eechatman@co.pg.md.us	MACO

Ellis Kitchen	DBM	ekitchen@dbm.state.md.us	State
Frank Muller	Cecil County	fmuller@ccgov.org	MACO
Richard Brooks	Cecil County	rbrooks@ccgov.org	MACO
Gary Simpson	City of Annapolis	gssimpson@annapolis.gov	MML
Greg Urban	DBM	gurban@dbm.state.md.us	State
Hank Black	MEMA	hblack@mema.state.md.us	State
J.D. Ervin	Pocomoke City	pcpdchief@verizon.net	MML
James Peck	Maryland Municipal League	jimp@mdmunicipal.org	MML
John Chew	Queen Anne's County	jchew@qac.org	MACO
Joe Kroboth	Washington County	jkroboth@washco-md.net	MACO
John "Jerry" Ralston	Allegany County	jcralston@allconet.org	MACO
John Donohue	MIEMSS	jdonohue@miemss.org	State
John Moss	City of Bladensburg	jmoss@bladensburg.net	MML
Joseph Ruff	MDTA	JRuff@mdta.state.md.us	State
Ken Born	DBM	kborn@dbm.state.md.us	State
Lloyd Martin	Ocean City	lloydm119@cs.com	MML
Lt. Dana Whitt	MDTA	dwhitt@mdta.state.md.us	State
Lt. Kevin Anderson	MDTA	kanderson@mdta.state.md.us	State
Lt. Richard J. Williams	Charles County	Williamsrj@ccso.us	Municipal
Martin Flemion	Laurel	mflemion@laurel.md.us	MML
Mathew Candland	Town of Sykesville	town@sykesville.net	
Michael Bennett	MSP	mbennett@mdsp.org	State
Pete Loewenheim	Washington County	ploewenheim@washco-md.net	MACO
Randy Waesche	Carroll County	rwaesche@ccg.carr.org	MACO
Robert Brady	Calvert County	bradyrc@co.cal.md.us	MACO
Russ Yurek	SHA	RYurek@mdot.state.md.us	State
Steve Williams	Dorchester County	swilliams@docogonet.com	MACO
Teresa Owens	Worcester County	towens@co.worcester.md.us	MACO
Tom Mattingly	St Mary's County	tom_mattingly@co.saint-marys.md.us	MACO
Tom Miller	MIEMSS	tmiller@miemss.org	State
Vernon Herron	Prince Georges County	vrherron@co.pg.md.us	MACO
Walt Gillette		walt@gmpexpress.net	
Warren Campbell	MEMA	wcampbell@mema.state.md.us	State
Wayne McBride	Prince Georges County	wmcbride@co.pg.md.us	MACO

As part of the solicitation process for local projects, the following representatives have been influential in the PSIC grant process as well as being available for assistance and comments on the SCIP:

Table 2-7: PSIC Points of Contact

Name	Juristiction	E-Mail
Dick DeVore	ALLEGANY COUNTY	ddevore@allconet.org
Edward Sherlock	ANNAPOLIS CITY	eps@annapolis.gov
Bill Ryan	ANNE ARUNDEL COUNTY	wryan@aacounty.org
William Goodwin	BALTIMORE CITY	william.goodwin@baltimorecity.gov
Mark Hubbard	BALTIMORE COUNTY	tbrush@baltimorecountymd.gov
John Fenwick	CALVERT COUNTY	fenwicjr@co.cal.md.us
Brian Ebling	CAROLINE COUNTY	bcebling@emerg.caroline.md.us
William Hall	CARROLL COUNTY	whall@ccg.carr.org
Richard Brooks	CECIL COUNTY	richard.brooks@ccdps.org
Don McGuire	CHARLES COUNTY	mcguire@govt.charlesco.md.us
Steve Williams	DORCHESTER COUNTY	swilliams@docogonet.com
Jack Markey	FREDERICK COUNTY	jmarkey@fredco-md.net
Brad Franz	GARRETT COUNTY	gcem@garrettcounty.org
Mitch Vocke	HARFORD COUNTY	wmvocke@co.ha.md.us
Joe Herr	HOWARD COUNTY	jherr@howardcountymd.gov
Greg Bird	KENT COUNTY	gbird@kentgov.org
Gordon Aoyagi	MONTGOMERY COUNTY	gordon.aoyagi@montgomerycountymd.gov
Joe Theobald	OCEAN CITY	jtheobald@ococean.com
Vernon Herron	PRINCE GEORGE'S COUNTY	vrherron@co.pg.md.us
John Chew	QUEEN ANNE'S COUNTY	jchew@qac.org
David Zylak	ST. MARY'S COUNTY	david.zylak@co.saint-marys.md.us
Steve Marshal	SOMERSET COUNTY	smarshall@co.somerset.md.us
Ed Mulikin	TALBOT COUNTY	mullikin@talbotcogov.org
Joe Kroboth	WASHINGTON COUNTY	jkroboth@washco-md.net
Sandy Silvia	WICOMICO COUNTY	ssilvia@wicomico.org
Teresa Owens	WORCESTER COUNTY	towens@co.worcester.md.us
Lt. Timothy Seipp	CITY OF ANNAPOLIS	Tseipp@annapolis.gov

Finally, the important contributions of leadership, support and guidance from the former Governance Working Group (GWG) cannot be adequately expressed.

Table 2-8: Former GWG and Interim SIEC Members

Region	*Jurisdiction*	*Agency*	*Name*	*Title*
Statewide	**Executive Branch**	**Governor's Office**	**Andy Lauland**	**Governor's Advisor on Homeland Security**
Statewide	**Agency**	**Maryland State Police (MSP)**	**Col. Terry Sheridan**	**Superintendent of State Police**
NCR	**Montgomery County**	**County Council**	**Marilyn Praisner (Deceased)**	**Council Member**
NCR	**City of Laurel**	**Mayor's Office**	**Craig A. Moe**	**Mayor**
Southern	**Charles County**	**Sheriff's Dept.**	**Frederick E.**	**Sheriff**

			Davis	
Eastern	**Chestertown**	**Mayor's Office**	**Margo G. Bailey**	**Mayor**
Central	**City of Annapolis**	**Annapolis Fire Department**	**Edward P. Sherlock**	**Chief**
Eastern	**Chesapeake Beach**	**City Council**	**Stewart Cumbo**	**Council Member**
Central	**Baltimore City**	**Baltimore City Fire Department**	**William Goodwin**	**Chief**
Statewide	**Agency**	**Maryland Institute for Emergency Medical Services Systems**	**Dr. Robert Bass**	**Director**
Statewide	**Agency**	**Department of Budget and Management (DBM)**	**Elliot Schlanger**	**Chief Information Officer**
Statewide	**Agency**	**Maryland State Fireman's Association (MSFA)**	**Chief Pete Mellits**	**Maryland Director, Eastern Division**
Statewide	**Agency**	**Maryland Emergency Management Agency (MEMA)**	**John Droneburg**	**Director**

2.3 Statewide Plan Point of Contact

There are two POCs serving as statewide plan coordinators. One primary and one secondary:

Primary Contact
Name: John Contestabile
Title: Director, Office of Engineering and Emergency Services
Agency: Maryland Department of Transportation (MDOT)
Phone: 410-865-1120
E-mail: jcontestabile@mdot.state.md.us

Secondary Contact
Name: Clay Stamp
Title: Deputy Director
Agency: Maryland Institute for Emergency Medical Services Systems (MIEMSS)
Phone: 410-706-2599
E-mail: cstamp@miemss.org

As part of the executive order, signed on July 10th, 2008, Governor O'Malley named John Contestable to be the full-time interoperability Director for Maryland as well as the Director of Maryland's Statewide Communication Interoperability Program (MSCIP).

2.4 Scope and Timeframe

In achieving an overarching view of managed interoperability projects in the state of Maryland, ten initiative areas have been enumerated among the key goals in working towards a statewide communications system. Progress will need to be made across each of these areas in the next few years in order to meet the goals enumerated in subsequent sections of the SCIP. At present, there is ongoing work in each of these initiative areas by the lead and support agencies/personnel.

State Interoperability Work Plan			
Initiative	**Lead Agency/ Personnel**	**Support Agency/ Personnel**	**Action Items/Deadline**
1) PSIC Grant Activities	Maryland Emergency Management, Mr. Gary Harrity	MSP, DNR, DBM MDOT, SHA	Received final approval of Investment Justifications. Monitor and track spending, to ensure following of grant guidance and reporting requirements until and through close out date 9/30/10
2) Statewide Communications Interoperability Plan (SCIP)	Daniel Meyerson, MDOT	SIEC	SCIP version 2.1 accepted by PSIC grant reviewers. Version 3.0 was created for scheduled update and continued revisions of SCIP will follow yearly.
3) 700 MHz RFP	Department of Information Technology (DOIT), Edward Bannat	RFP Evaluation Team	700MHz RFP Completed and released to public on July 9th, 2008. Once proposals are received, they will be evaluated and an award is anticipated for 1st quarter, 2009.
4) 700 MHz Preliminary Design	DOIT, Greg Urban	SIEC Technical Committee	Completed.
5) Public Outreach	Clay Stamp, MIEMSS	SIEC/GWG	Meetings have been ongoing and have reached every county, the legislature as well as regional and representative groups.
6) 700 MHz Financing Plan	Andy Lauland, GOHS	John Contestabile	Develop Options, Develop Meeting Schedule
7) Administrative	John Contestabile, MDOT	Kevin Davis, MSP	Identify: office space, administrative support, consultant support
8) 700 MHz License Coordination	DOIT, Greg Urban	SIEC Technical Committee	Coordinate with Delaware, Pennsylvania, Washington DC, Virginia, and West Virginia. Ongoing.
9) Tower Infrastructure	DBM, Denis McElligott	Craig Fetzer, Tom Miller, SIEC Technical Committee	Continue to execute development plans
10) Legislation	John Contestabile, MDOT	Governor' Office of Homeland Security	An Executive Order formally establishing the SIEC and creating a Project Management Office was signed on July 10th, 2008

Table 2-9: Interoperability Work Plan

2.4.1 Public Safety Interoperable Communications Grant (PSIC)

On September 30, 2007, the Public Safety Interoperable Communications (PSIC) Grant Program awarded $968,385,000 to fund interoperable communications projects from

the 56 States and Territories. The awards will help state and local first responders improve public safety communications during a natural or man--made disaster.

Maryland's allocated portion of this grant is $22,934,593

Initial applications for this grant were submitted on August 22nd, along with developing a governance structure for evaluating grant proposals. Proposals were submitted to the Statewide Interoperability Executive Committee (SIEC) for review. The SIEC and the Governance Working Group (GWG) evaluated these proposals and made recommendations to the Governor's Homeland Security Advisor and Maryland State Police for final approval.

Investment justifications were incorporated into the PSIC final application as well as the SCIP. The final application deadline was December 3rd, 2007. Investments will be tracked to ensure compliance of grant and reporting guidelines by the State Administrative Agent (SAA) along with the Maryland Statewide Communications Interoperability Program's (MSCIP) Program Management Office (PMO) until the grant period closes on September 30th, 2010.

2.4.2 Statewide Communications Interoperability Plan (SCIP)

Following the submittal of a draft (version 1.0) of the SCIP for review, the revision process now calls for collecting information, meeting with and vetting the SCIP with a variety of jurisdictions, organizations and managing groups. Version 2.0 of the SCIP will be completed by the December 3rd deadline for PSIC grant applications.

Following the submission of the SCIP for the December 3rd PSIC application deadline, the SCIP will continue to evolve in Maryland. Part of the intended outreach program designed to engender support for statewide interoperability efforts, is the plan to reach out to local jurisdictions. Within six months of the final PSIC application submission, statewide coordinators anticipate meeting with representatives from every county to acquire feedback and information regarding interoperability needs, planning and future outlook. It is anticipated that the SCIP undergo yearly updates, which shall be driven by the GWG and the SIEC.

Version 3.0 will be a 6 Month review to incorporate county feedback. This will be completed by July 21st, 2008.

Version 4.0 will be a comprehensive review and update of plans, including goals accomplished through the use of PSIC funds and status updates of the statewide 700 MHz radio system. This will be completed by July 21st, 2009.

Version 5.0 will be a comprehensive review and update of plans, including goals accomplished through the use of PSIC funds and the overall result of the PSIC program in Maryland and the region. This will include updates on the 700 MHz radio system as well as significant updates on data interoperability. This will be completed by September 30th, 2010.

Further full-version updates of the SCIP will be developed yearly by September 30th, or as needed.

2.4.3 700 MHz Request for Proposals (RFP)

Beginning in 2007, representatives from MdTA, SHA, MIEMSS, DNR, MSP, DBM, DHMH, Baltimore County, Prince George's County, Queen Anne's County, Washington County and a private consultant have been meeting to develop an RFP for the anticipated statewide 700 MHz radio system.

Substantial work has been completed on scope of work, incorporating system functional requirements, developing and incorporating equipment functional requirements and proposal evaluation criteria.

The RFP was completed and released to the public on July 9th, 2008. Once proposals are received, they will be evaluated by a team of evaluators and an award is anticipated for 1st Quarter, 2009.

2.4.4 700 MHz Preliminary Design

Following receipt of a draft preliminary design plan from a consultant, work is completed on the final version of a preliminary design plan as well as a Statewide Interoperability Radio System Position Paper.

The anticipated Phase 1 build out of the new statewide radio system will be Northern Central Maryland in the Maryland Transportation Authority (MdTA)[9] operational area/CMARC (Central Maryland Area Radio Communications System) footprint. The anticipated Phase 2 of build out will be Eastern Shore/MESIN (Maryland Eastern Shore Interoperability Network) footprint with gap filling for areas of insufficient coverage that still exist for Phase 1. It is presently undecided whether Phase 3 will be Southern or Western Maryland.

Phase 1 should be available upon the release of 700 MHz frequencies following the anticipated transition to digital television in February of 2009.

[9] MdTA provides policing services for all airport, port and rail facilities in Maryland. Their involvement in statewide interoperability plans demonstrates a clear representation of communications needs for aiport, port and rail for both passenger and freight needs.

2.4.5 Public Outreach

The following are the goals and objectives for moving toward and eventually attaining the statewide interoperability goal outlined by the Governor:

Goal One:

Develop a campaign to reach all government and non-government agencies and organizations to ensure the statewide communications interoperability strategy gains appropriate input from stakeholders.

Goal Two:

Educate all government and non-government pubic safety stakeholders as to what statewide voice and data interoperability means for Maryland, and communicate the consensus built interoperability strategy through public meetings, strategic planning forums, and with the use of educational materials.

- Objective: Distribute well-defined information on lessons learned, best practices, challenges and opportunities, and other matters to:
  - Local and state public safety responders and organizations.
  - Regional representatives.
  - State representatives.
  - Executive Committee and Advisory Group members.
  - Other key stakeholders and decision makers.

Goal Three:

Design communications tools for statewide interoperability that will allow for the placement of documents and educational materials as well as to provide a platform for online collaboration.

- Objective: Design and post a web site dedicated to statewide interoperability.
- Develop educational and support materials and power point presentations.

Goal Four:

Promote regional communications and interoperability by building cross-discipline and jurisdictional relationships.

- Establish regional interoperability working groups.

- Populate the regional interoperability working groups with discipline diversity.

Target Audience:

The outreach effort will target all government and non-government public safety agencies and organizations in Maryland.

2.4.6 700 MHz Financing Plan

As mentioned above Maryland is in the process of developing a 700 MHz Request for Proposals (RFP) for a statewide 700 MHz communications system to be released in early 2008. The RFP will call for proposals that include a phased implementation approach to the construction of the statewide system.

Several Maryland State agencies have identified funding for a phase one of the proposed 700 MHz statewide communications system. They include the Maryland Transportation Authority, the State Highway Administration, the Maryland Transit Administration and the Maryland Aviation Administration that will represent several thousand users on the system. The funding identified by the state agencies listed above coupled with PSIC funds total more than 90 million dollars.

The SIEC and PSC are aware that there is no long-term funding plan in place for future statewide interoperability efforts. However, Governor O'Malley has selected Interoperability as one of his top priorities and the GWG and SIEC can anticipate significant support from the Governor's office in terms of funding requests and budget priorities.

Presently, we are developing long term funding strategies and meeting schedules for financial planning. This has involved members of the Department of Budget and Management, the Governor's Office along with members of the Maryland Legislature.

2.4.7 Administrative Plans

On July 10th, 2008, Governor O'Malley signed an executive order establishing Maryland's Statewide Communications Interoperability Program (MSCIP) along with a Project Management Office (PMO) for the management of a variety of interoperability projects. The state of Maryland is in the process of setting up a funding structure with consultant and staff support. This administrative structure will utilize the SIEC and PSC governance structure and will involve local and state agencies participation in statewide solutions to interoperability; including the construction of a statewide 700 MHz communications system.

The statewide office will have responsibility for all aspects for public safety communication interoperability to include:

- Application and implementation of the Public Safety Interoperability (PSIC) grant.
- Annual update and refinement of the Statewide Communications Interoperability Plan (SCIP).
- Coordination and oversight of the state 700 MHz RFP process.
- Financial planning for continued investment in radio and data systems.
- Oversight of construction and implementation activities for various projects
- Liaison with effected communities (Information Technology, Chief Information Officers, the National Capital Region, Regional Interoperability groups' etc.).
- Advocacy and outreach to the myriad of partners involved.

2.4.8 700 MHz License Coordination

In order to successfully develop a radio frequency channel plan for a statewide system, Maryland will coordinate licensing with surrounding states and jurisdictions. Maryland is presently reaching out for talks with Delaware, Pennsylvania, Washington DC, Virginia, and West Virginia. Maryland's partners in Region 20 planning have been key in developing frequency band plans along with sharing of information in anticipation of and in response to FCC rulings.

2.4.9 Tower infrastructure

One of the major components of the statewide 700 MHz radio system is the use of existing tower infrastructure for a starting point with upcoming and future build outs to complete statewide coverage. We continue to execute development plans for tower projects in the works as well as updating a master tower inventory list.

2.4.10 Legislation

It is vital that the governing bodies that have been driving the interoperability effort receive the official support and formal status needed in order to continue with future efforts. On July 10th, 2008, Governor O'Malley signed an executive order formalizing the interoperability governance structure for Maryland that includes both a Statewide Interoperability Executive Committee (SIEC) along with a Practitioner Steering Committee (PSC).

By the legislation session beginning in 2008, we anticipate having legislation enacted to ratify the executive order which established the SIEC and the PSC as formally recognized groups with a defined mandate.

3 Methodology

3.1 IPT Report

The Governor's Office of Homeland Security, the Maryland Association of Counties (MACo) and the Maryland Municipal League (MML) have been working together on the issue of interoperability since the December 2003 creation of the Public Safety Communication Interoperability Governance Working Group (GWG) and an "Interoperability Project Team" (IPT). Through the collaboration of the GWG and IPT, Maryland created its first Statewide Communications Interoperability Plan (SCIP), which was last revised in February, 2005.

The Maryland Statewide Interoperability Executive Committee (SIEC) was officially convened in March of 2005 to continue the work of the IPT in conceptualizing and planning for statewide interoperable public safety communications and information sharing. The SIEC, which continues to meet on a monthly basis, plans to facilitate the completion of the plan and oversee the implementation of a statewide voice and data network for public safety communications.

Maryland's Municipalities, Counties, and State Agencies have developed a concept and vision for public safety communications and interoperability. The envisioned long-term solution calls for a new state-of-the-art statewide 700 MHz unified system supported by the statewide private network, which consists of a shared public safety microwave infrastructure and "NetWork Maryland's" fiber backbone.

Maryland's Department of Budget and Management (DBM), through its contracted consultant, began revising the statewide plan in accordance with the PSIC Grant and Department of Homeland Security (DHS) published guidance. Concurrently, Maryland's Emergency Management Agency (MEMA) has requested an evaluation of Maryland's SCIP from the DHS Office of Grants and Training (G&T). Upon receipt of comments and critiques from the DHS G&T Office, consultants from both MEMA and MDOT have been incorporating those additions into the SCIP revisions.

To ascertain the status of technology and the degree of interoperability within the State of Maryland, the IPT developed a Users Needs Survey, which was distributed beginning in May of 2004. Utilizing various methods, including fax, e-mail, and U.S. Post, the surveys were distributed to approximately 200 State and local agencies. The IPT worked closely with various organizations and groups to ensure a wide geographic distribution throughout the State and input from all political tiers.

The surveys were collected through July 2004. Each agency responding to the initial survey was sent a follow-up survey with the specific goal of determining the degree to which respondents were utilizing existing mutual aid frequencies in the various public safety communications bands. The total number of surveys collected is shown in Table 3-1.

Table 3-1 Survey Response Rate Statistics

Number of Responses					
	Sent	**Received**	**Response Rate**	**Follow-up**	**Response Rate**
Municipalities	160	28	16%	8	32%
Counties*	24	24	100%	18	75%
State Agencies	30	11	37%	2	18%
Total	**213**	**60**	**28%**	**28**	**47%**

** Including Baltimore City*

Despite the fact that the overall response rate was approximately 28%, Maryland was able to get information from all counties in the state. Additionally, not all state agencies operate on radio communications and many municipalities were simply included in the county survey response. One county provided two separate responses, one for each of the two radio systems it operated, causing the anomaly of the received responses being more than the sent surveys. The follow-up survey saw a return rate of approximately 47%. However, because radio systems in Maryland on the local level are run on a county-by-county basis, the response was significant enough to display trends for each geopolitical subdivision and it is the consensus of the IPT that additional surveys would not alter but follow the trend of the data already provided. These survey responses, in addition to input received from members of both the IPT and the GWG, as well as from regional partners allowed the state to generate a comprehensive picture of interoperability needs.

In working towards a statewide 700 MHz radio system, a multi-jurisdictional, multi-disciplinary team was brought together to help generate a functional requirements document in order to general a formal request for proposals (RFP). The consultant that has been assisting this team in generating the functional requirements also generated an inventory of radio assets statewide[10].

Within the next few months of developing the SCIP, there will be discussions with a variety of agencies and jurisdictions to further expand the range of input that is brought to bear.

[10] See Appendix for PowerPoint User Agency Inventory

3.2 Strategic Technology Reserve

The State of Maryland is seeking a waiver on the presumptive Strategic Technology Reserve [STR] funding because a number of "reserve" capabilities currently exist in the state of Maryland. The following is a brief description of some of these assets and capabilities.

The National Capital Region (NCR) Radio Cache[11] consists of 1,250 portable radios and ancillary support equipment. Additionally, each cache has two disposable batteries and two rechargeable batteries per radio and the capability of recharging a third of its batteries simultaneously. All equipment is stored in three individual, self-contained, field deployable, caches. The radios are programmed to affiliate with the fourteen 800 MHz Public Safety Radio Systems operating in the region. They are capable of communicating with all Law Enforcement and Fire and Rescue agencies within those systems. The three radio caches are located, maintained, and managed in the following jurisdictions: Montgomery County, Maryland with 500 radios, Fairfax County, Virginia with 500 radios, and the District of Columbia with 250 radios.

In addition to containing portable radios, each radio cache contains tactical audio gateways that permit interoperability with municipalities not operating on 800 MHz systems. There are portable repeaters that can be used on the RINS or 8TAC channels for localized operations. Additionally, special equipment to support in-building or below-grade/tunnel communications is included in each cache. Finally, each cache has the capability to reprogram its radios during emergency events to meet unanticipated communication requirements.

The NCR Radio Cache was paid for through a Department of Homeland Security Urban Area Security Initiative (UASI) grant in excess of $5 million. It is available to support public safety communications within the National Capital Region for emergency and/or scheduled events. Within two hours of receiving an emergency deployment request, the radio cache would be en-route, to the requesting agency, with a support staff that includes a NIMS qualified Communications Unit Leaders (COML) and communications technicians (COMT).

Deployments for scheduled events would be requested in advance and approved by the Fire Chief from the jurisdiction from which the radio cache will be deployed. Radios and support equipment (e.g. batteries and chargers) would typically be issued, in bulk, to a representative of the requesting agency several days prior to the event, unless the request specifically addressed support personnel. A request for tactical repeaters and gateway devices would involve a planning meeting with the cache manager or COML to review an event's communications plan (ICS 205). Once the plan is approved, the need to deploy one or more personnel to maintain the equipment during the event would be assessed.

[11] See appendices for NCR TICP to refer to radio cache deployment.

In addition, part of the NCR's STR includes interoperability gateways.

- Raytheon JPS Communications, ACU-Tactical: Capable of providing up to three gateways utilizing up to six different subscribers. Able to manually compensate for audio delays associated with trunked radio systems
- Communications-Applied Technology, Incident Commanders' Radio Interface (ICRI): Capable of providing up to four gateways utilizing up to 10 different subscribers. Equipped with 3000' of cable to overcome difficult coverage areas (below ground subway systems)
- FutureCom, portable vehicle repeater system

An addition portion of the NCR's capabilities include the Prince George's County's mobile RF Site on Wheels (SOW). The SOW consists of a trailer, antenna mast and antennas, generator, low-tier spare radios and base stations programmed with the National 800 MHz Call and Tactical Channels (8CALL90, 8TAC91, 8TAC92, 8TAC93 and 8TAC94) that are interoperable with the NCR radio cache.

In the greater Baltimore region, the Central Maryland Area Radio Communications (CMARC) Committee was formed to oversee implementation of short and long-range plans to deploy communications infrastructure to make use of the common National Calling and Tactical Channels for regional mutual aid incidents. The infrastructure can be used by any public safety agency (as defined by the FCC) from any level of government (Local, State) as well as Federal agencies involved in protection and response efforts. CMARC infrastructure includes a mobile RF Site on Wheels (SOW). The SOW consists of a trailer, antenna mast and antennas, generator, low-tier spare radios and base stations programmed with the National 800 MHz Call and Tactical Channels (8CALL90, 8TAC91, 8TAC92, 8TAC93 and 8TAC94) as well as selected public safety frequencies for CMARC jurisdictions; high-band frequencies including VTAC10, VTAC11, VTAC12, VTAC13, VTAC 14, VFIRE, VMED and VLAW. Additionally, there are control stations programmed with operational and mutual aid talk groups for all Central Maryland jurisdictions. A Memorandum of Agreement for Use of the CMARC Site on Wheels is in place. The purpose of the document is to provide guidelines and operating procedures for use of the SOW to include the general cost of repair, replacement and/or upgrades to the RF and trailer equipment.

The CMARC group also maintains a radio cache along with additional deployable technologies. By the end of 2007, CMARC's radio cache should be approximately two hundred radios valued at $625,000. Additionally, CMARC's SOW will be equipped with the Motobridge network management system. It will be delivered early 2008 and the approximate cost of the mobile RF site is $600,000.

Additionally, available throughout the state are twenty-eight mobile command vehicles of differing capabilities. Through the use of MOUs signed between the Maryland Emergency Management Agency [MEMA], state agencies and local jurisdictions, MEMA and the State Emergency Operations Center (SEOC) is the central dispatch

organization for all mobile command vehicles in the event of a large scare or multi-jurisdiction event that requires special communications functionality.

These mobile command units range in size from converted ambulances and Ford Excursions to fifty-six foot, fully autonomous communication centers. The variety of communications tools available to these vehicles is comprehensive. Whereas not every vehicle includes every measure of functionality, among the capabilities measured are VHF-Lo, VHF-Hi, UHF, 800 MHz, LAN (local area network) capabilities, radio integrators (ACU-1000 type devices), video conferencing, portable cell transmission, workstations, satellite communications, and deployable times under two hours for any request. Typically if an agency or jurisdiction would require additional communications resources, a request would be submitted to the SEOC through Maryland's WebEOC statewide emergency software system. The SEOC would determine which command vehicle should be deployed based on capabilities requested, location, deployment time and availability.

The following agencies/jurisdictions have mobile command communications vehicles that can be dispatched locally, or through MEMA's State Emergency Operations Center:

Table 3-2 Mobile Command Vehicles

Maryland Command Vehicles										
Jurisdiction	VHF-Lo	**VHF-Hi**	**UHF**	**800**	**V-Conf.**	**LAN**	**Cell**	**Sat. Ph.**	**Work Sta.**	**Turn Out**
State- MdTA Police	Y	N	N	N	N	Y	X	X	5	60
State- National Guard	Y	Y	Y	Y	N	Y	Y	Y	8	60
MSP - Truck 1	Y	Y	Y	Y	Y	Y	Y	Y	12	90
MSP - Truck 2	Y	Y	Y	Y	Y	N	Y	N	Open	60
MSP - ECV 1	Y	Y	Y	Y	Y	Y	Y	Y	2	60
MSP - Truck 3	Y	Y	Y	Y	Y	N	Y	N	4	60
Maryland Transit Admin.	Y	N	Y	N	N	N	Y	N	4	120
Talbot County	Y	Y	Y	Y	N	Y	Y	Y	2	30
Howard County PD	N	N	N	Y	N	N	Y	N	4	60-90
Cumberland PD	Y	Y	Y	Y	N	Y	Y	N	3	60
Howard County Fire	N	N	N	Y	N	N	Y	N	7	60
PG County - PSC 1	Y	Y	Y	Y	Y	Y	Y	N	6	25
PG County - PSC 2	N	Y	Y	Y	N	Y	Y	N	8	25
Frederick PD	Y	Y	Y	Y	N	Y	Y	N	5	60
Frederick County Sheriff	N	N	N	Y	N	Y	N	N	4	30
Carroll County-OPSSS	N	N	N	Y	N	Y	Y	N	6	45
Ocean City	Y	Y	Y	Y	Y	Y	Y	Y	7	30
Harford County	Y	Y	Y	Y	N	N	Y	N	4	60

EOC										
Garrett County	N	Y	N	N	N	Y	Y	N	2	40
Worcester County	N	Y	N	Y	N	Y	Y	N	1	15
Harford County Sheriff	N	N	Y	Y	N	Y	Y	N	11	30
Queen Anne's County	Y	Y	Y	Y	N	N	Y	Y	1	60
Baltimore County EOC	Y	N	N	Y	N	N	Y	N	4	30
Annapolis City EOC	N	N	N	Y	Y	Y	Y	Y	5	60
Anne Arundel County	Y	Y	Y	Y	Y	Y	Y	Y	13	60
Montgomery County	N	Y	N	Y	N	Y	Y	N	6	60
Baltimore City EOC	N	N	Y	Y	N	Y	Y	N	6	30
Washington County	N	N	N	N	N	N	N	N	4	Unk

A complete list of costs for each vehicle is not available, however, a small sampling does include $1,200,000 for Maryland Transit Administration's (MTA) vehicle, $1,200,000 for Maryland Transportation Authority's (MdTA) vehicle and $1,400,000 for Maryland State Police's (MSP) largest vehicle.

Additionally, MEMA has purchased a number of multimode phones (analog/digital/satellite) with a car kit. These phones were distributed to MEMA leadership and regional administrators as well as installed the car kits. MEMA also distributed 8 satellite phones to the Governor's Office for Homeland Security for their distribution to select Cabinet officers. Finally MEMA installed a fixed satellite phone with external antenna at the Maryland Joint Operational Center (MJOC) and the Governor's mansion.

These phones and car kits each cost approximately $1,500. Over the past few years, MEMA has bought over 18 phones and 10 car kits for a total of $42,000 of personally deployable satellite phones. MEMA pays $40/month for 40 minutes of service per phone/month for $8,640 in recurring fees per year.

The total approximate investments of the radio caches, deployable towers, mobile command vehicles, and personal satellite communications demonstrate that these investments in Maryland exceed the minimum allocation for a strategic technology reserve. Maryland continues to acquire and maintain significant deployable communications resources in the event of catastrophic loss of communications and believes that it is in the state's best interest to utilize the full PSIC grant funding for investment projects that are enumerated in the PSIC investment justification application and not be required to spend additional funds on a strategic technology reserve.

3.3 Local Government Interoperable Needs

The methodology and processes utilized by the state to produce this statewide communications interoperability plan closely followed the SAFECOM methodology that calls for a locally driven approach. A key factor in Maryland's future communication planning is the continued support of local projects and infrastructure with a view of what would work best for a common integrated approach.

Local and municipal government representatives play key roles in every major interoperability committee and decision making body in the state. From the SIEC and the PSC to the 700 MHz functional requirements committee and the 700 MHz RFP team, the state of Maryland realizes that in public safety, all emergencies are local. Without listening to the needs and concerns of local government public safety, the state cannot truly respond to the needs of its citizens.

All local, state, federal, and non-governmental public safety agencies were offered an opportunity to participate in the development of the SCIP, and share in the benefits of, the future statewide 700/800 MHz public safety radio system. Their contributions to past efforts were, and will continue to be, important to statewide success. This plan includes strategies to further local, and other state and non-state agency participation through regional and statewide planning and coordination activities as identified below.

3.4 Tribal Government Interoperable Needs

As published in the U.S. Department of the Interior Bureau of Indian Affairs' 2003 ***American Indian Population & Labor Force Report*** (available online at http://www.doi.gov/bia/laborforce/2003LaborForceReportFinalAll.pdf) the State of Maryland does not include within its borders any federally recognized tribal entities.

3.5 Non-Governmental Organizations

Public safety non-governmental organizations, emphasizing those that are critical providers are also involved in policy development and outreach efforts. Presently, these NGO's include, but are not limited to: hospitals, volunteer fire companies, utilities, Radio Amateur Communications Emergency Services (RACES), the American Red Cross and passenger/freight railroad, port facilities and mass-transit entities. They are involved through public meetings and exercises, interactive Web-based information, media and public awareness efforts, legislative outreach and collaborative activities with partners and stakeholders.

The SIEC continues to solicit their participation in other such initiatives. Additionally, the SIEC Outreach Program will be addressing their needs where they will be documented through workshop and regional interoperability executive committees.

The mission of the Maryland State Firemen's Association (MSFA) is to serve, promote, advocate and represent the interest of all the volunteer fire, rescue and emergency

medical services companies, departments and individual members in Maryland. MSFA is available to assist in all aspects of their needs and activities, including management, administration, budget, operations and logistics. With nearly 400 volunteer fire, rescue and emergency medical services organizations in the state of Maryland, MSFA's membership and responsibilities truly cover every corner of Maryland. MSFA has direct representation on the SIEC and through their executive committee have ratified support for the future of interoperable communications as detailed in this SCIP.

The American Red Cross chapters throughout Maryland as well as the United States provide emergency assistance to victims of disasters regardless of the type or size. There are eight chapters in Maryland providing these services 24 hours a day, seven days a week.

In the event the state of Maryland activates the State Emergency Operations plan (under the direction of MEMA), the ARC will support the Maryland Department of Human Resources as a mass care/emergency assistance service provider within Emergency Support Function (ESF-6). The ARC will establish its own operations headquarters to support these activities utilizing the local resources of the chapters in Maryland as well as securing material and human resources from our national organization as well.

The ARC has its own internal communication system and will communicate to state agencies via the ARC representative(s) assigned to Maryland's state emergency operations center. This communications system was successfully utilized during the Hurricane Isabel response as well as the response to Hurricane Katrina in 2005.

The All Hazards Consortium (AHC) is a 501(c)3 organization guided by state government and comprising public and private sector stakeholders focused on regional homeland security and emergency management collaboration within the mid-Atlantic region and surrounding states. This is a unique regional model for regional public/private collaboration. Conceptualized in 2003 by the states of Virginia, Maryland, and the District of Columbia, the AHC was created to provide a framework to engage partners within state and local government, business, and higher education to share information and collaborate on potential regional requirements, studies, projects, and solutions. Member states include Delaware, District of Columbia, Maryland, New Jersey, New York, North Carolina, Pennsylvania, Virginia, and West Virginia. The consortium also includes Federal agencies in support of the states and private sector firms, higher education, and nonprofit organizations.

On May 31, 2007, the AHC sponsored a Public Safety Communications and Interoperability Workshop, representing the Mid-Atlantic States/Jurisdictions of Delaware, District of Columbia, Maryland, New Jersey, New York, North Carolina, Pennsylvania, Virginia, and West Virginia. Following this meeting, a white paper was

generated[12] that identifies several key public safety communications and interoperability requirements and provides recommendations to help resolve current issues.

The AHC, through its member states and their supporting Federal, private, and academic partners, all share a sincere desire to protect citizens and communities while working in concert with their respective neighbors. Believing and understanding that "catastrophic events know no boundaries," the AHC is an important coalition used to share the collective voices of federal, state, and local governments as well as private and academic entities with the focus of providing safety and protection of their citizens.

In the future as consideration is given to the state SIEC membership as well as the possibility of establishing regional SIECs, non-governmental organizations will be considered for direct representation.

Presently, we are in constant communication with the American Red Cross (ARC) to ensure that collaboration in the event of emergency situations is assured. Additionally, there is a place for the ARC in MEMA's Statewide Emergency Operations Center (SEOC) where emergency management officials throughout the state can interact directly with the ARC and the ARC can be kept informed of the most up to date emergency information.

Following the July 10th, 2008 executive order which formalizes interoperability governance in Maryland, the newly formed SIEC and PSC will include representation from a wide range of non-governmental organizations.

- Maryland State Firemen's Association
- Maryland Metro Fire Chiefs Association
- Maryland Sheriffs Association
- Maryland Chiefs of Police Association
- Maryland Fraternal Order of Police
- Professional Firefighters of Maryland
- State Law Enforcement Officers Labor Alliance
- American Federation of State, County and Municipal Employees of Maryland
- Maryland Municipal League
- Maryland Association of Counties

3.6 SIEC Outreach Plan

The SIEC's collaborative planning effort will continue to encourage local cross-jurisdictional and cross-disciplinary participation for development of the statewide plan through a detailed outreach and public affairs plan. The outreach plan will facilitate an

[12] See attached AHC Interoperability White Paper in appendix C

environment of collaboration, unity, and action among partners, stakeholders, influencers, and policy makers by providing a venue for open communications and information sharing. SIEC staff will actively participate with organizations and groups such as:

- Regional Emergency Managers meetings.
- The Region 20 Regional Planning Committee (RPC).
- Urban Area Security Initiative (UASI).
- Regional Interoperability Committees
- And other organizations interested in improving public safety communications.

The Outreach Plan includes a set of goals, objectives, key messages, and list of target audiences. The plan is designed as part of a long-term effort for outreach and stakeholder communications in support of stated SIEC and SCIP goals and objectives. The plan proposes outreach activities that include public meetings and workshops, interactive web-based information, media and public awareness efforts, legislative outreach, and collaborative activities with partners and stakeholders. This is the SIEC's approach for sustaining local participation after the initial SCIP is completed.

The Outreach Plan, SIEC staff briefings and the statewide workshops ensured that the requirement for inclusion of the communications needs of the non-governmental organizations and tribal government entities were included in the planning processes.

The Maryland Interoperability Outreach plan has been developed to identify goals and objectives in the effort to ensure all Maryland stakeholders project consensus driven strategies regarding voice and data interoperability.

3.6.1 Background

In 1999 a legislative task force was convened in the State of Maryland that brought together representatives from both state and local governments to address radio communications/interoperability issues. Specifically, the state not being in a position to act on allocated 800 MHz radio frequencies agreed to let those licenses go to local jurisdictions to allow them to proceed in building new radio communication technology solutions. Additionally, the state agreed to begin a process to construct a statewide infrastructure in partnership with local governments in preparation for the future construction of a 700 MHz statewide communications system.

Since 1999 many local jurisdictions around the state have completed the construction of 800 MHz radio communications systems. Additionally, since that time the state of Maryland has embarked upon an aggressive partnership with the local jurisdictions in building out a statewide system of connectivity using both microwave and fiber solutions.

The infrastructure partnership has lead to creative relationships in the acquisition, construction, and maintenance of the statewide public safety communications network.

In 2003, the Governors Office of Homeland Security in conjunction with the Maryland Association of Counties, and the Maryland Municipal League formed a communication interoperability Governance Working Group (GWG) comprised of senior elected and appointed officials from both state and local agencies and organizations. The GWG appointed an Interoperability Project Team (IPT). After extensive input from the broad range of representation the IPT developed the "Interoperability Project Team Report" which became the 2005 State of Maryland Communications Interoperability Plan and submitted to the Department of Homeland Security.

In 2005 the GWG created a State Interoperability Executive Committee (SIEC) as required by the Federal Communications Commission (FCC). This group was populated with representatives from state, county, and municipal governments. The group was created to serve as a statewide collaborative platform for interoperability planning and coordination.

In 2007 the Governor of Maryland listed communications interoperability as one of his twelve priority goals of his administration. As a result he directed the Superintendent of the Maryland State Police to lead an effort to ensure first responders in every region in Maryland have access to a fully digital, trunked radio system which all response partners can access in order to transmit and receive voice and data.

On July 10th, 2008, Governor O'Malley signed an executive order giving formal status to the SIEC and the PSC as well as creating a Project Management Office to build on past interoperability successes and enhance efforts to ensure the state move in unison toward an interoperability solution for both voice and data for the first responder community.

Maryland along with the other states is the recipient of an interoperability grant from the federal government known as the Public Safety Interoperability Communications Grant. As part of this grant states must update the state communications interoperability plans (SCIP) and then in a collaborative manner identify interoperability projects for funding.

3.6.2 Outreach Strategy

The following are the goals and objectives for moving toward and eventually attaining the statewide interoperability goal outlined by the Governor:

Goal One:

Develop a campaign to reach all government and non-government agencies and organizations to ensure the statewide communications interoperability strategy gains appropriate input from stakeholders.

Goal Two:

Educate all government and non-government pubic safety stakeholders as to what statewide voice and data interoperability means for Maryland, and communicate the consensus built interoperability strategy through public meetings, strategic planning forums, and with the use of educational materials.

- Objective: Distribute well-defined information on lessons learned, best practices, challenges and opportunities, and other matters to:
  - Local and state public safety responders and organizations.
  - Regional representatives.
  - State representatives.
  - Executive Committee and Advisory Group members.
  - Other key stakeholders and decision makers.

Goal Three:

Design communications tools for statewide interoperability that will allow for the placement of documents and educational materials as well as to provide a platform for online collaboration.

- Objective: Design and post a web site dedicated to statewide interoperability.
- Develop educational and support materials and power point presentations.

Goal Four:

Promote regional communications and interoperability by building cross-discipline and jurisdictional relationships.

- Establish regional interoperability working groups.
- Populate the regional interoperability working groups with discipline diversity.

Target Audience:

The outreach effort will target all government and non-government public safety agencies and organizations in Maryland.

3.7 PSIC Grant Consideration Methodology

In order to ensure that this methodology considers PSIC grant requests in support of the statewide planning effort, the governor appointed the superintendent of State Police to lead the statewide interoperability effort. MEMA has been designated the State Administrative Agent (SAA) and selected and chartered the State Interoperability

Executive Committee (SIEC) to serve as the coordination point for the review, prioritization and selection of project proposals for the PSIC grant requests.

3.8 TICP Incorporation

This SCIP incorporates the highly detailed tactical communications planning that is ongoing in both the Baltimore Urban Area and the National Capital Region. Both TICPs are incorporated into the SCIP directly or by reference to ensure synchronization of the plan, ensure attainment of plan goals and objectives, and to elicit continued coordination. Additionally, key participants in both the drafting of each TICP as well as direct leadership during the tactical exercises have given feedback on draft versions of this SCIP.

The TICP process contains an interoperability assessment component that evaluates interoperability plans and issues Tactical Interoperable Communications Scorecards that assess and evaluate Governance, Standard Operating Procedures (SOP), and Usage elements of the TICP against the SAFECOM Interoperability Continuum. The on-going reassessment of TICP goals and objectives provide for the realignment or adjustment of these plans to compensate for identified scorecard deficiencies or unforeseen variances in the plans.

The SIEC envisions the establishment of Regional Interoperability Executive Committees (RIC) in order to encourage interoperability improvement and synchronize state and regional planning. These planning entities will, among other things, address the requirements of the TICP scorecards by improving governance and refining SOPs.

Establishing an RIC creates an organized process for synchronizing the existing local and regional communications strategies in order to identify longer-term interoperability goals across multiple jurisdictions and levels of government. Regional organizations can facilitate interoperability by adopting the detailed work of the TICPs and tailoring that information for local use during training and incident response.

The Outreach Plan and RIC model will enhance the SIEC's ability to foster cooperation, coordination and strategic planning among cross-jurisdictional and cross-disciplinary public safety organizations and emergency response organizations.

4 Current Statewide Assessment

4.1 Spectrum Diversity

Maryland Exhibits Significant Radio Spectrum Diversity. The diagram below represents radio spectrum usage throughout Maryland for the various radio frequencies typically available to public safety agencies.

Results reveal that survey respondents throughout Maryland are nearly evenly distributed across the various public safety bands with no dominant band evident and no common band available.

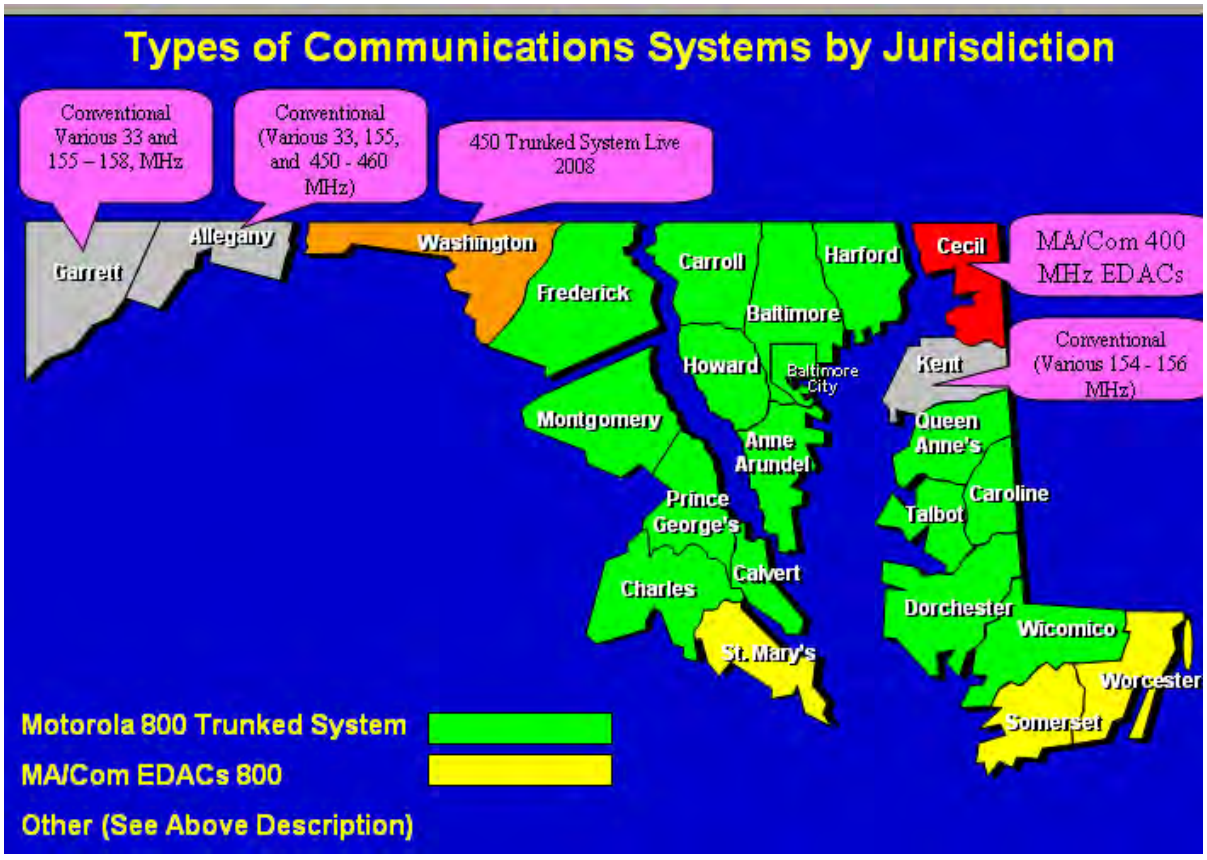


Figure 4-1: Types of Communication Systems by Jurisdiction

State Agencies Radio Systems Descriptions	
State Agencies	**General Description**
Maryland State Police	Conventional/Analog, (Primary 39 MHz, Portable 150 MHz, and 450 MHz)
Natural Resources Police	Conventional/Analog, (Various 150 MHz Zoned Statewide
Maryland Transportation Authority Police	Conventional/Analog, (Various 450 MHz)
Department of General Services	Conventional/Analog, (Various 150 MHz
MIEMSS	Conventional/Analog, (Various 44 and 460 MHz)
Maryland Department of the Environment	Conventional/Analog, 150 MHz)
Maryland Transit Administration	Conventional/Analog, (Various 150, and 490 MHz)
Department of Public Safety and Corrections	Conventional/Analog, (Various 37, 150, 450 MHz)
State Highway Administration	Conventional/Analog, (Various 47 MHz)

Table 4-1 State Agency Communications Systems

There are many operational and communication stovepipes in Maryland that do not contribute to the easy sharing of information among functionally disparate agencies or between the political tiers of government. Agencies with public safety responsibilities at the state, regional, county, and municipal level recognize the need to collaborate and share information more effectively and more efficiently. They recognize that commitments, or mutual aid agreements, to share information require tools to facilitate that communication and sharing. At all levels of government in the State, there are active efforts to identify, create, and implement systems and tools to facilitate better public safety communications and interoperability. This is true for both voice and data. Following are descriptions of some of the most prominent and promising efforts.

Voice Communication and Interoperability Efforts

Ubiquitous, immediate, clear, and reliable voice communications are the lifeline of public safety personnel. In response operations or mutual aid situations responding agencies must be able to communicate with one another, commanders must be able to communicate with their people in the field, and field personnel must be able to communicate with one another.

As evidenced in the Interoperability Survey results, most counties have built, or are in the process of building, countywide radio networks, which facilitate interoperability at the county level. As often noted in interoperability studies interoperability needs to be extended to cross borders at all levels. There are three prominent multi-county/regional projects largely completed in the state to facilitate interoperability: MIMICS; MESIN; and CMARC. A new program (TAC-Stack) is under review for implementation to support short term to interim interoperability.

4.1.1 TAC-Stack[13]

TAC-Stack is a concept and methodology to provide basic radio interoperability to all first responders that may normally operate in the 800 MHz, UHF, VHF or other designated frequencies assigned for public safety activities. Using nationally dedicated interoperability channels in each of the primary frequency bands provides additional radio channel capacity during mutual aid operations. Utilizing these Nationwide Interoperability Channels, the original repeater stack concept has evolved into a device referred to as the "TAC-Stack" or "Band Bridge." This device would be capable of linking together multiple frequency bands independent of the subscriber equipment manufactures protocol. As 700 MHz systems and hardware begin deployment, the 7TAC interoperability channels could also be incorporated into any existing TAC-Stacks that are in service.

TAC-Stacks would be deployed throughout the State in such a manner as to provide good local radio coverage with consistent performance between each frequency band, while maximizing the frequency reuse of these frequencies. A design allowing for frequency reuse in mind provides the benefit that multiple unrelated incidents are able to operate simultaneously utilizing these mutual aid devices while minimizing self-interference. With similar radio coverage footprints for each mutual aid frequency band, all responders working together in a given area should be able to communicate consistently on scene with their normally assigned radio. Operationally, it is expected a first responder would establish contact on a "call channel" and then is directed to the TAC channel assigned to the incident. At no time does the responder have be aware of their frequency band, since all responders are directed to the same TAC channel designation and the TAC-Stack makes the cross connection (band bridge) between the frequency bands. The responders do not have to be concerned with the frequency band they or their allied agency members are utilizing.

This concept works with existing Maryland interoperability projects such and MESIN, MIMICS (ACU 1000) and CMARC that are implementing the 800 MHz National Channels providing additional radio channel capacity in that band. Adding the UTAC and VTAC channels – or any other identified mutual aid channels – would enhance sites now being developed with the 800 MHz National Channels as part of these existing projects. When completed, first responders from multiple agencies would be able to intercommunicate independent of their radio's operating frequency band.

As illustrated in *Figure* 4-2, any single TAC channel can be considered a group of base stations interconnected with multiple bi-directional ports. An input to any port translates into an appropriate output at each of the other assigned ports. Each port could be another on-site base station or connection into a larger transport network as represented by the cloud in *Figure* 4-2. The larger wide area network could be 4-wire DS0 (voice), VoIP or a combination of all methods.

[13] The TAC-Stack concept is a result of work Alan Kealy of DNR at the time along with others. *See appendix document TAC-Stack white paper.*

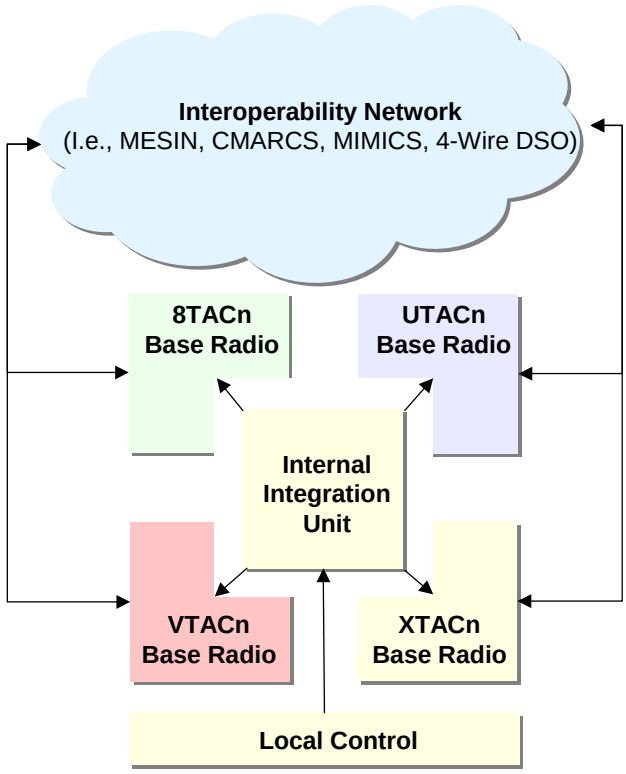


Figure 4-2: TAC Stack Single Channel Relationship (RF and power connections not shown)

Other than the remote control activating or deactivating any tactical channel via the *Internal Integration Unit* (IIU), each TAC-Stack could operate independently of any gateway or other network patching devices. Local receive and transmit audio (VF) would be interconnected between the various radios via a local signal distribution buss and control mechanism contained within the IIU. This additional control provides benefits such as fast switching times between channels and the ability to function as a "band bridge" if the network is not available. Any TAC-Stack could also be controlled via radio commands, thus functioning without any network interface. The Internal Integration Unit is not a standard commodity, but rather a combination of off-the-shelf components configured for this specific application.

4.1.2 Maryland Incident Management Interoperable Communications System (MIMICS).

MIMICS is a Maryland State Police initiative being designed to supply connectivity between public safety communications systems throughout the State. This connectivity is supported through the use of computer controlled audio interconnect[14] switches at 21

[14] An interconnect takes the audio signal from a radio transmission and retransmits it on a different radio channel or system.

fixed locations statewide. The MIMICS currently has in-place a significant Interconnect system of ACU-1000's enhanced by the wide area interoperability systems (WAIS). There are also mobile interconnect switches that can be transported to an incident scene.

Additional funding is being sought for radio equipment to implement a TAC-Stack concept at each MIMICS location. The TAC-Stack will provide localized radio coverage to enable the 'fish out of water' responder to access and communicate over the mutual aid channels. *Figure* 4-3 illustrates the basic concept of the ACU-audio interconnect solution. The interconnect solution provide a bridge between systems using different technologies or different frequencies. But, only users operating within the coverage area of their systems (able to reach back to the tower that provides them a signal) can be interconnected in this way. The ACU provides connection to disparate technologies *in a specific coverage area* but does not increase system coverage or capacity. Therefore, if responders from another county, region, or state are involved in an incident they have no means of communicating with their local peers because they do not have any signal in that area.

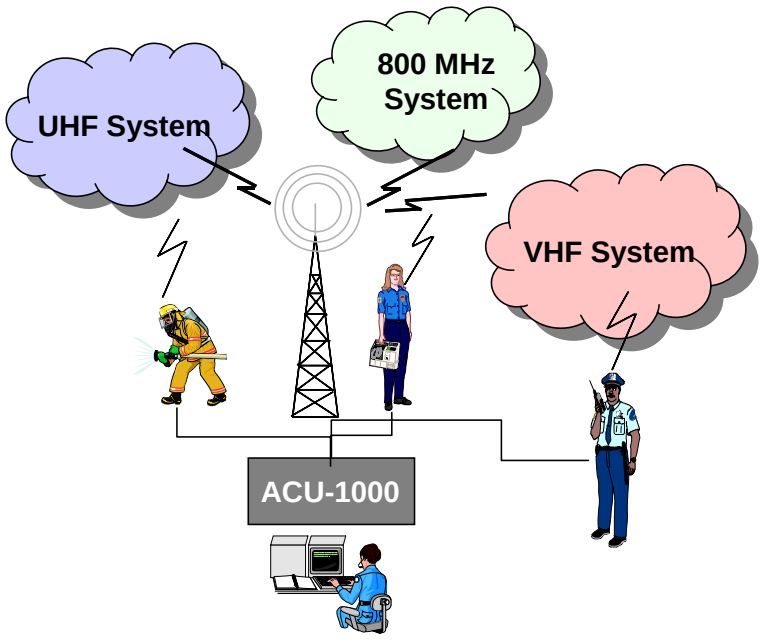


Figure 4-3. Basic Interconnect Solution Concept links disparate systems in a common coverage area

Figure 4-4 illustrates how responders from area B are unable to coordinate with their peers at a site because they are outside of their coverage area (B) and do not have radio signal.

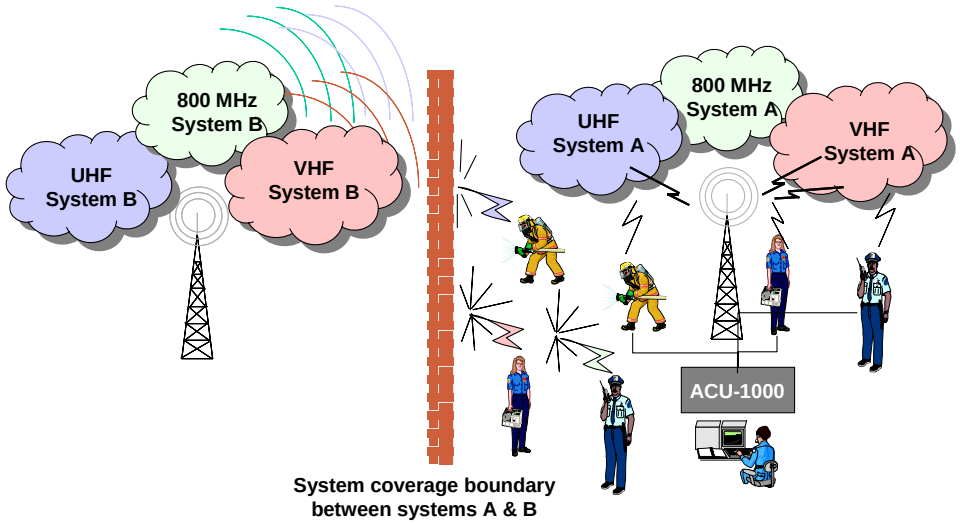


Figure 4-4. ACU does not provide signal coverage to non-local responders

The TAC-Stack would provide real synergy to this solution by providing for a localized 'coverage cloud' whereby responders from outside the coverage area could connect via their mutual aid channels AND the ACU-1000 interconnect to communicate on-scene with their local counterparts.

MSP officers have been provided with XTS 5000 800 MHz portables and in-vehicle 700 MHz crossband repeaters to support statewide 800 operations on county systems.

Table 4-2 illustrates how MIMICS addresses the public safety communications and interoperability challenges identified in the survey. As indicated, MIMICS has been funded by federal grants; facilitates interoperability between existing legacy systems, leverages mutual aid channels to provide additional capacity and expands the coverage area for beyond previous boundaries.

Challenges	MIMICS Meeting the Challenge
1- Funding Limitations	Provides for the enhancement of public safety interoperability through federal grant funding.
2- Existing older technologies	Allows for the existing legacy systems throughout the state to interoperate with newer systems by enabling cross-band inter-system communications. Additional funding will also provide for the replacement of some aging equipment.

3- Insufficient Radio Channels & System Coverage Limitations	Indirectly creates additional spectrum availability when providing mutual aid channels for communications interoperability (assumes TAC Stack implementation).
4- FCC Authorized Mutual Aid Channels are Under Utilized	Potentially provides for the implementation of mutual aid frequencies with TAC Stack implementation.
5- Lack of a Common Statewide Public Safety Frequency Band	No direct impact.
6- Need for a Robust Statewide Infrastructure	Intends to use statewide infrastructure provided by other programs.
7- Limited Use of Wireless Data Systems	No direct impact.

Table 4-2 How MIMICS addresses the public safety communications and interoperability challenges

4.1.3 Maryland Eastern Shore Interoperability Network (MESIN)

MESIN provides public safety communications connectivity to twelve designated mutual aid sites throughout the Eastern Shore, nine (9) County Dispatch Centers, Ocean City Dispatch, MEMA, and three State-Owned ACU-1000 sites. The project utilizes National Public Safety Planning Advisory Committee (NPSPAC) mutual aid frequencies combined with an IP based network consisting of gateways, routers, and a fully redundant switch. Mutual aid network users are automatically connected to legacy system users whenever the dispatch center activates the designated talk groups and provide capabilities for cross-band inter-system operation. This approach leads to enhanced interoperability and improved effectiveness for Maryland eastern shore public safety organizations.

The Maryland Eastern Shore Interoperability Network will provide public safety communications connectivity to 227 entities within the service area shown in *Figure* 4-5.

- 9 counties
- 57 municipalities
- 80 fire companies
- 61 ambulance companies
- 8 state agencies
- 7 federal agencies
- 3 utilities.

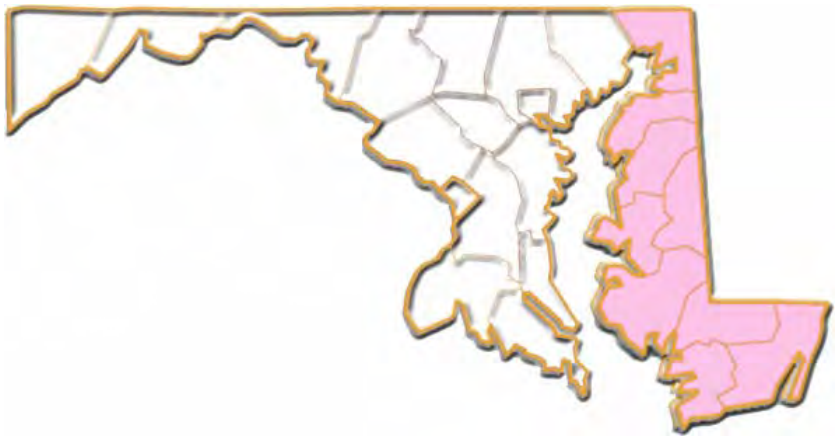


Figure 4-5: MESIN System Coverage

Table 4-3 illustrates how MESIN addresses the public safety communications and interoperability challenges identified in the survey. As indicated, MESIN has been funded by federal grants; facilitates interoperability between existing legacy systems, leverages mutual aid channels to provide additional capacity and expands the coverage area for beyond previous boundaries.

Challenges	MESIN Meeting the Challenge
1- Funding Limitations	Provides for the enhancement of public safety interoperability through Federal grant funding.
2- Existing older technologies	Allows for the existing legacy systems in the service area to interoperate with newer systems by enabling cross-band inter-system communications.
3- Insufficient Radio Channels & System Coverage Limitations	Indirectly creates additional spectrum availability by providing mutual aid channels for communications interoperability within the service area.
4- FCC Authorized Mutual Aid Channels are Under Utilized	Provides for the implementation of the NPSPAC mutual aid frequencies in the service area.
5- Lack of a Common Statewide Public Safety Frequency Band	No direct impact.
6- Need for a Robust Statewide Infrastructure	Intends to use statewide infrastructure provided by other programs.
7- Limited Use of Wireless Data Systems	No direct impact.

Table 4-3. How MESIN addresses the public safety communications and interoperability challenges

4.1.4 Central Maryland Area Regional Communications (CMARC) System

The Central Maryland Area Regional Communications System has deployed infrastructure in the central Maryland area for region-wide use of the national calling and tactical 800 MHz channels (8TAC). These channels provide another "layer" of communications interoperability for central Maryland emergency services providers.

All CMARC dispatch centers and field providers have the ability to receive and transmit on the National Calling Channel (NCC) and all National Tactical Channels (NTACs). Communications on the NCC and any NTAC will be governed by protocols adopted by the CMARC Oversight Committee. MEMA serves as the control point for the National mutual aid channels and will monitor the NCC at all times.

CMARC Members include representatives from all jurisdictions in the Baltimore Metro Statistical Area, as well as representatives from various county, state and federal agencies. The CMARC project service area is shown in *Figure* 4-6.

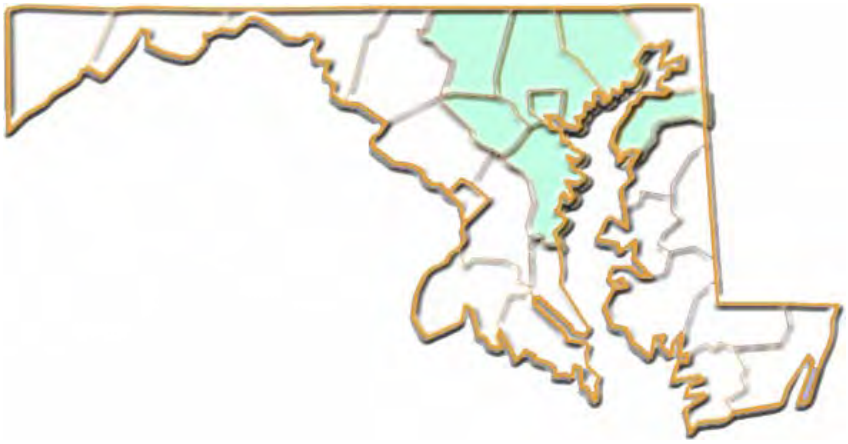


Figure 4-6. CMARC System Coverage

Table 4-4 illustrates how CMARC addresses the public safety communications and interoperability challenges identified in the survey. Like MESIN, CMARC has been funded by federal grants; facilitates interoperability between existing legacy systems, leverages mutual aid channels to provide additional capacity and expands the coverage area for beyond previous boundaries.

Challenges	CMARC Meeting the Challenge
1- Funding Limitations	Provides for the enhancement of public safety interoperability through Federal grant funding.
2- Existing older technologies	Allows for the existing legacy systems in the service area to interoperate with newer systems by enabling cross-band inter-system communications.
3- Insufficient Radio Channels & System Coverage Limitations	Indirectly creates additional spectrum availability by providing mutual aid channels for communications interoperability within the service area.
4- FCC Authorized Mutual Aid Channels are Under Utilized	Provides for the implementation of the NPSPAC mutual aid frequencies in the service area.
5- Lack of a Common Statewide Public Safety Frequency Band	No direct impact.
6- Need for a Robust Statewide Infrastructure	Intends to use statewide infrastructure provided by other programs.
7- Limited Use of Wireless Data Systems	No direct impact.

Table 4-4: How CMARC addresses the public safety communications and interoperability challenges

4.1.5 NPSPAC Interoperability

4.1.5.1 CMARC Mutual Aid

The 800 MHz interoperability channels may be used for day-to-day interagency coordination, for urgent or emergency mutual aid situations, for task force teams or for other purposes where coordination among jurisdictions on separate 800 MHz systems is necessary.

Radio interoperability for mutual aid situations that are limited in scope and geography can generally be handled via use of shared talkgroups and shared radios. The 800 MHz interoperability channels (known as 8CALL and 8TAC) are most applicable to situations that:

- involve responders from jurisdictions that do not have talkgroups or radios on the radio system of the jurisdiction experiencing a need for interoperable communications; and/or,

- require an improvement in wireless radio coverage in the area of the incident experiencing a need for interoperable communications; and/or,
- have escalated to the point where additional wireless communications channels are need by the jurisdiction experiencing a need for interoperable communications.

There are five 800 MHz mobile relay frequency pairs that the FCC has assigned exclusively for interoperability communications between radio users on different 800 MHz radio systems. One of these frequency pairs is reserved by the FCC as a calling channel, and the other four are reserved for intercommunications between radio users. The calling channel is named 8CALL and the other four channels are named 8TAC1, 8TAC2, 8TAC3, and 8TAC4. In addition, four direct channels and frequencies are available for interoperability purposes. The direct channels are: 8TAC1 D, 8TAC2 D, 8TAC3 D, 8TAC4 D. In the future, 6 additional direct channels may be available for interoperability. They are: RINS1, RINS2, RINS3, RINS4, RINS5, RINS6.

There may also be two (2) Command Net talkgroups for each participating jurisdiction, available for inter-agency communications. These talkgroups utilize the radio system infrastructure of the local jurisdiction. Personnel trying to establish unified command may direct responding commanders to these talkgroups as needed.

The 8CALL and 8TAC radio frequencies are in the NPSPAC band of 800 MHz frequencies and mobile and portable radios must be able to function in compliance with NPSPAC specifications to use these channels.

Commanders will need to evaluate the incident and operational needs and request the use of 8CALL or 8TAC as appropriate. Generally, these channels shall not be used for interoperability between radio users who are on the same radio system infrastructure (unless one of the conditions in B-1 applies)

Command Net talkgroups may be used for incident command events. However such use will require the use of resources on the local jurisdiction's radio system. The use of these talkgroups will be limited to the coverage area of that radio system. The channel names and frequencies for these talk groups are as followed:

Channel Name:	**Base TX**	**Mobile TX**
8CALL	866.0125	821.0125
8TAC1	866.5125	821.5125
8TAC2	867.0125	822.0125
8TAC3	867.5125	822.5125

8TAC4	868.0125	823.0125
RINS1	868.5125	823.5125
RINS2	866.8375	821.8375
RINS3	867.2375	822.2375
RINS4	867.4875	822.4875
RINS5	867.8625	821.8625
RINS6	867.7625	822.7625

4.1.5.2 NCR Shared Channels

"Shared channels" refer to common frequencies or channels (such as those of a participating agency) that have been established and are programmed into radios to provide interoperable communications among agencies. Shared channels and shared systems are the only types of interoperable communications equipment that are always available because they are included and always operational in each piece of equipment. Specific shared interoperable communications channels available within the region are listed in the NCR TICP.

The NPSPAC channels are five nationwide channels reserved exclusively for public safety agencies that use 800 MHz radios. These channels allow public safety first responders to achieve instant interoperability across the country. In the National Capital Region, NPSPAC Regional Planning Committee 20 oversees the use of NPSPAC channels and ensures that the FCC rules and regulations are adhered to.

These five NPSPAC channels consist of one "call in" channel and four tactical channels. With the rebanding transition, it is expected that NPSPAC will be relocated from its current position of 821-824 MHz to 806-809 MHz. The NPSPAC channels allow first responders using 800 MHz radios to deploy to an area where there is an 800MHz system and switch to the NPSPAC mutual aid channel and achieve instant interoperability with first responders using this frequency range. During national mutual aid situations NPSPAC channels allow first responders to deploy to other metropolitan areas and by using the NPSPAC channels, they can use their own radios to communicate.

4.1.6 Data Communications Related Projects

Although mobile data is more widely used in metropolitan areas, many portions of the state would benefit by such technology. One reason for this is lack of funding. Private wireless data systems are relatively expensive and use of commercial wireless survives for mobile data may not provide public safety users the coverage they require. Mobile data is also an area of public safety communications that is rapidly developing and new options are emerging all the time. Overall, public safety users are just starting to see the utility and financial benefits/cost savings potential of mobile data.

As with public safety voice communications, interoperability and adherence to standards is critical to allow data access, management, and sharing. CapWIN is a significant mobile data option for Maryland. However, before considering the options for moving data to support public safety and emergency response efforts, it is important to establish the data.

4.1.6.1 Emergency Management Mapping Application (EMMA)

EMMA is a web-based mapping application that enables emergency management personnel to display relevant geospatial information before, during, and after an incident occurs. EMMA has an open architecture and includes features that enable emergency responders to identify incident locations, generate location-specific reports, visualize incident locations via a map, perform site-specific analysis, and coordinate response efforts. EMMA provides basic and advanced tools for map visualization, location analysis, and report generation.

Interoperability Benefits

EMMA provides the following interoperability benefits:

- Identification of Incident
- Creation of Location Report
- Visualization of Incident Location
- Spatial Analysis of Affected Area
- Coordination of Response
- Connection to Other Systems, and Tools for Data Exchange.

Table 4-5 illustrates how EMMA addresses the public safety communications and interoperability challenges identified in the survey. EMMA has been funded by federal grants and will enhance collaboration and emergency response operations through availability of geographical data and access to incident management information.

Table 4-5: How EMMA addresses the public safety communications and interoperability challenges

Challenges	EMMA Meeting the Challenges
1- Funding Limitations	No direct impact.
2- Existing older technologies	No direct impact.
3- Insufficient Radio Channels & System Coverage Limitations	No direct impact.
4- FCC Authorized Mutual Aid Channels are Under Utilized	No direct impact.
5- Lack of a Common Statewide Public Safety Frequency Band	No direct impact.
6- Need for a Robust Statewide Infrastructure	No direct impact.
7- Limited Use of Wireless Data Systems	Provides the mechanism for the exchange of geospatial data among first responders and can serve as a mapping component of any IMS system. Makes incident management information more readily available at reduced costs to the State.

4.1.6.2 Maryland Emergency Geographic Information Network (MEGIN)

MEGIN is a central portal for geographic data, directing users to a distributed network of data and application assets. The implementation of MEGIN will establish a statewide GIS data clearinghouse modeled after similar operational implementations of metadata services linked to distributed map-serving technology. MEGIN will expand upon existing funded efforts and will be built from the Maryland Mapping Resource Guide (MMRG) and EMMA.

Throughout Maryland, local, regional, and state agency data and application assets abound. Participants in the MEGIN system use EMMA and a variety of desktop clients and methods to access these distributed datasets using thin clients such as common Web browsers, free data viewers, or robust desktop GIS and analysis applications. MEGIN will ensure that emergency responders are aware of available data resources when needed. Recognizing that every emergency incident is unique, MEGIN will provide a mechanism for turning data into information and place that data in relationship to the landscape, providing a “Common Operating Picture”. This common picture turns data into information, information into knowledge, and knowledge into coordinated action.

Table 4-6 illustrates how MEGIN addresses the public safety communications and interoperability challenges identified in the survey. As with EMMA, MEGIN has been funded by federal grants and will enhance collaboration and emergency response operations through availability of geographical data and access to incident management information.

Table 4-6: How MEGIN addresses the public safety communications and interoperability challenges

Maryland's Challenges	MEGIN Meeting the Challenges
1- Funding Limitations	No direct impact.
2- Existing older technologies	No direct impact.
3- Insufficient Radio Channels & System Coverage Limitations	No direct impact.
4- FCC Authorized Mutual Aid Channels are Under Utilized	No direct impact.
5- Lack of a Common Statewide Public Safety Frequency Band	No direct impact.
6- Need for a Robust Statewide Infrastructure	No direct impact.
7- Limited Use of Wireless Data Systems	Provides the mechanism for the exchange of geospatial data among first responders and can serve as a mapping component of any IMS system. Makes incident management information more readily available at reduced costs to the State.

4.1.7 Infrastructure Related Projects

Neither voice nor data applications/communications would be available to public safety organizations, and personnel without a communications backbone and infrastructure. Whether a local Municipal Police Department, a shared County radio system, or a statewide agency system, all communications flow over a backbone or infrastructure. The IPT has identified two significant infrastructure projects underway, and nearly complete, that can be leveraged: Net.Work.Maryland and the Statewide Wireless Infrastructure Project.

4.1.7.1 Net.Work.Maryland

There are several wide area networks in operation across the state of Maryland serving specific purposes. These networks have become bandwidth-constrained and are in need of higher capacity solutions to enable newer, multimedia applications that incorporate voice, video and data transmissions. Rural areas have suffered from a lack of adequate bandwidth and/or higher costs for bandwidth than their urban counterparts.

In 1998, the Legislature passed legislation creating the Task Force on High Speed Network Development to examine the need for and development of a high-speed backbone network for Maryland. The backbone is a standards-based network infrastructure, developed, designed, engineered and implemented by and for the State. The network infrastructure was named Net.Work.Maryland.

The backbone network will be a combination of state-owned fiber optic networking and leased circuits, which will ultimately interconnect health, business, education, government, and public access via a high speed, standards-based network of networks.

Net.Work.Maryland manages bandwidth utilization by employing Asynchronous Transfer Mode (ATM). ATM gives Net.Work.Maryland the ability to divide the backbone into multiple Permanent Virtual Circuits (PVC's), each of which can be assigned to a separate user or user community. This design strategy allows deployment of multiple logical networks and individual management of the data requirements of these logical networks over the common physical backbone. The effect of the strategy is to allow each user or user community to have just the bandwidth, management, and services required for their unique needs.

Table 4-7 illustrates how Net.Work.Maryland addresses the public safety communications and interoperability challenges identified in the survey. Net.Work.Maryland's primary contribution is providing a fiber optic statewide backbone that can provide redundancy to the wireless infrastructure and will support data transit to first responders.

Table 4-7 How Net.Work.Maryland addresses the public safety communications and interoperability challenges

Maryland's Challenges	Net.Work Maryland Meeting the Challenge
1- Funding Limitations	No direct impact.
2- Existing older technologies	No direct impact.
3- Insufficient Radio Channels & System Coverage Limitations	No direct impact.
4- FCC Authorized Mutual	No direct impact.

Aid Channels are Under Utilized	
5- Lack of a Common Statewide Public Safety Frequency Band	No direct impact.
6- Need for a Robust Statewide Infrastructure	Provides a fiber optic based statewide backbone network providing redundancy and robustness when combined with the Statewide Wireless Infrastructure Project.
7- Limited Use of Wireless Data Systems	Provides the mechanism for the efficient terrestrial transport of data for delivery to first responders. Makes incident management information more readily available at reduced costs to the State.

4.1.7.2 Statewide Wireless Infrastructure Project

The State has been actively engaged in addressing the need for a statewide infrastructure to support the envisioned statewide wireless public safety communications system. In anticipation of the release of frequencies in the 700 MHz spectrum which will enable the achievement of an interoperable statewide radio system, the State has funded and constructed several towers with microwave links. The infrastructure is estimated to be 60% completed as of the writing of this report.

In the 1999 legislative session, a summer study project was ordered to examine the use of NPSPAC channels. A Joint Subcommittee report, *"Beyond 800 MHz -The Next Generation Public Safety Communications System"* was prepared as a result of the study. Based on the report findings the following recommendations were made:

- Fund a ten year program to construct all of the necessary towers, shelters, emergency generators, and digital microwave needed to implement a statewide communications system in the new 700 band
- Form partnerships with Maryland counties to reduce the number of towers and overall cost
- Make use of the new towers and microwave to improve the existing communications systems until a new system is available.

An "Infrastructure Committee" was formed to oversee the project. The committee is comprised of the Communications Directors of the major state public safety agencies: SHA, MIEMSS, MSP, DNR, MEMA, DHMH, DBM, DPSCS, and MPT to name the major partners. All of the 24 jurisdictions are invited to participate as equal partners. This committee was affiliated with the SIEC, upon its creation, as the "Technical Sub-Committee" to the SIEC.

Table 4-8 illustrates how the Statewide Wireless Infrastructure project addresses the public safety communications and interoperability challenges identified in the survey. A statewide infrastructure and system would help produce significant savings to the State through economies of scale it would enable. It is expected to facilitate system coverage limitations by enabling a converged statewide radio system. Its primary contribution is in providing a statewide backbone for transport of voice and data communications.

Table 4-8: How the Statewide Wireless Infrastructure Project addresses the public safety communications and interoperability challenges

Challenges	Statewide Infrastructure Project Meeting the Challenge
1- Funding Limitations	Indirectly address this challenge by providing for economies of scale with the cooperative nature of the project.
2- Existing older technologies	No direct impact.
3- Insufficient Radio Channels & System Coverage Limitations	Indirectly addresses this challenge by providing potential future transmission sites for new radio systems as they are developed.
4- FCC Authorized Mutual Aid Channels are Under Utilized	No direct impact.
5- Lack of a Common Statewide Public Safety Frequency Band	Does provide infrastructure to support a system when a band is made available.
6- Need for a Robust Statewide Infrastructure	Provides a microwave based statewide backbone network providing redundancy and robustness when combined with Net.Work.Maryland.
7- Limited Use of Wireless Data Systems	Provides the mechanism for the efficient terrestrial transport of voice and data for delivery to first responders.

4.1.8 Challenges and Needs

There are many projects and programs underway within the State of Maryland that address various aspects of interoperable communications for public safety as discussed in the preceding Section. Table 4-9 illustrates these projects in conjunction with the Challenges Maryland faces. The challenges are:

1. Funding limitations exist for most public safety agencies.

2. Maryland must deal with the existing older technologies.

3. Public safety agencies have insufficient radio channels and system coverage limitations.

4. FCC-authorized mutual aid channels are under utilized.

5. Maryland lacks a common statewide public safety frequency band.

6. Maryland requires a robust statewide infrastructure.

7. Maryland public safety agencies are limited users of wireless data systems.

8. Maryland public safety agencies are limited in their ability to share secure and reliable data for real time, inter-regional and cross-ESF communications.

Programs reviewed are listed in the left hand column. Challenges are listed across the rows. Bullets indicate where ongoing programs address the specific challenges. Where a program does not significantly address a Challenge, that cell is marked with a red X.

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Table 4-9 Ongoing Projects Address Maryland's Public Safety

Communications & Interoperability Challenges

Programs	Maryland's Challenges						
	Funding	Old Technology	Radio Channels & System Coverage	Mutual Aid Channel Utilization	Common Statewide Frequency Band	Statewide Infrastructure	Wireless Data
DMIS	●	X	X	X	X	X	●
CapWIN	●	X	●	X	X	X	●
MESIN	●	●	●	●	X	●	X
CMARC	●	●	●	●	X	●	X
MIMICS	●	●	●	●	X	●	X
EMMA	X	X	X	X	X	X	●
MEGIN	●	X	X	X	X	X	●
Net.Work Maryland	X	X	X	X	X	●	●
Statewide Infrastructure	●	●	●	X	●	●	●
DEH/NCRnet	X	X	X	X	X	●	●

● Indicates that this program addresses the challenge

X Indicates that this program does not impact or address the challenge

As is illustrated in above, the ongoing projects address some of the challenges, but there remain gaps to be addressed:

- **Lack of Funding:** Most of the programs underway are already funded; this alleviates the need to acquire more funds for those projects. Some of these projects however, require additional funding to provide for complete build-out or additional capabilities. Funding will dictate the pace and scope of the enterprise architecture construction. This SCIP outlines a common approach and direction to interoperability that must be followed by local, county, and state agencies to ensure that funds spent contribute to real interoperability solutions.
- **Dealing with Older Technology:** Several key programs being implemented address the limitations of mixed technology and specifically older technologies through the use of audio level interconnect. It can be anticipated that there will always be some issue associated with incompatible or diverse aged equipment.

- **Channels & Coverage:** About half the programs currently underway are or can be used to address the challenges associated with channels and lack of coverage. Through the implementation of mutual aid frequencies or providing of physical infrastructure to support additional sites and coverage, most programs provide the momentum to address this challenge.
- **Under utilization of mutual aid channels:** The MESIN and CMARC programs make direct use of mutual aid channels to provide interoperability among public safety providers. A full analysis of which mutual aid channels are required in each specific locality for local interoperability and which are needed to ensure remote interoperability must be completed to determine the most effective implementation path.
- **Common Statewide Frequency Band:** There is a real need to address the problems created by lack of public safety spectrum. Efforts to obtain 700 MHz frequencies for the enterprise architecture are being pursued with the utmost diligence. Maryland will optimize the use of funds provided for this migration and move as many agencies to the higher spectrum bands as possible. The result of this migration will provide more features and capabilities for the users while allowing for a simplification of the audio level interconnect network.
- **Robust Statewide Infrastructure:** Several of the projects underway contribute toward the statewide infrastructure development either directly or depend on its availability. In order to ensure a strong foundation is available for the enterprise architecture it will be necessary to conduct focused planning to ensure proper consideration has been made to support the architecture. Ultimately, Maryland must complete an infrastructure providing the "four R's" (Reliability, Robustness, Resiliency, and Redundancy) necessary to support public safety communications. Additionally, establishing a fair governance structure to ensure that municipal, county, and state agency requirements are equally met is necessary to establish true statewide interoperability.
- **Use of Wireless Data:** Several of the projects underway contribute infrastructure to support or environments for the use of wireless data. Data can be utilized to alleviate the pressure on crowded voice systems, acquire critical information necessary to support the missions of first responders, and improve efficiency of incident mitigation.

4.1.9 800 MHz Re-banding

Pursuant to Docket WT 02-55, the Federal Communications Commission (FCC) entered into an agreement with Sprint/Nextel to migrate public safety radio systems in the 800 MHz radio band to other frequencies within that same frequency band. The problem was created because commercial cellular communications occupy (occupied) frequencies adjacent to public safety frequencies, increasing the risk of harmful interference with public safety communications. The frequency shift and migration program (referred to as "re-banding") relocates public safety radio operations and commercial cellular communications to frequencies far enough apart to reduce the risk of interference. The FCC designated four nationwide "Waves" (Wave 1 – 4) and two

"Stages" to accommodate the scheduling and coordination of re-banding activities. These waves are based on geographically defined regions across the United States, with Wave 1 going first and Wave 4 being last. Wave 4 includes those areas that are subject to the coordination and negotiation of frequency assignments along border regions with Mexico and Canada.

Stage 1 involves those channels located in the lower end of the 800MHz spectrum (channels 1 – 120), which must be cleared to allow National Public Safety Planning Advisory Committee (NPSPAC) licensees to be moved into that portion of the spectrum, away from cellular and other commercial wireless service providers. This migration affects the State of Maryland as the state was included in Wave 1.

Narrow Banding Of Frequencies below 512 MHz

The GWG and SIEC attempt to foster the widest dissemination of all information concerning the 2003 Federal Communications Commission's (FCC) mandate that requires all public-safety systems operating in bands below 512 MHz to transition from traditional 25 kHz-wide channels to more spectrally efficient 12.5 kHz channels by January 1, 2013.

Any applicable agencies are aware of the FCC requirement to migrate to 12.5 kHz and are managing the transition at the appropriate levels in accordance with their organizational governance structure and funding levels.

Maryland is also aware of the FCC's announced recommendation regarding the transition to the P25 Phase II 6.25 kHz bandwidth should technology mature prior to the 2013 deadline. Many experts have assessed this future requirement and determined that migration cost and organizational impact are impossible to predict in the absence of standard 6.25 kHz technology.

The GWG/SIEC encourage all applicable agencies to consider the FCC intent toward 6.25 kHz bandwidth migration when planning and purchasing 12.5 kHz bandwidth technology. All concerned should monitor the maturity of 6.25 kHz technology and, when appropriate, purchase 12.5 kHz technology that is upgradeable to 6.25 kHz technology. Agencies considering the migration to 6.25 kHz should also consider the potential impact of system coverage in their planning efforts.

An important deadline influencing planning decisions January 1, 2011, after which:

- The FCC will not grant applications for new voice operations or applications to expand the authorized contour of existing stations that use 25 kHz channels. Only narrowband authorizations will be granted.

- The FCC will prohibit manufacture or importation of new equipment that operates on 25 kHz channels. This will reduce the availability of new equipment

for legacy radio systems and will affect how agencies maintain and upgrade older systems.

The State of Maryland has entered in to four (4) Frequency Reconfiguration Agreements (FRA) with Sprint-Nextel and is in the planning phase of its final agreement. In the Region 20 area, (Maryland, District of Columbia and Northern Virginia), frequency reconfiguration is a very complicated project. Due to the number of seamlessly interoperable 800 MHz communications systems, it is necessary to reconfigure the entire region as one entity. This situation is, we believe, unique to the frequency reconfiguration project and requires careful planning and execution. For these reasons, the Region 20 area has not completed many FRA's and has not reconfigured any systems in the NPSPAC frequency band.

4.1.10 Governance Structure

Maryland has developed a governance structure that facilitates the development of statewide, locally driven interoperability plans that meet the needs of public safety first-responders. The Statewide Interoperability Executive Committee (SIEC) is comprised of senior elected and appointed officials from non-governmental, municipal, county, and state government and all fields of public safety. The SIEC's responsibility is to provide policy-level advice regarding public safety communications interoperability, and to promote the efficient and effective use of resources for matters related to public safety communications and interoperability.

At the time of the PSIC grant, the current SIEC was known as the Governance Working Group (GWG) and decisions regarding the PSIC grant were made under the following governance structure:

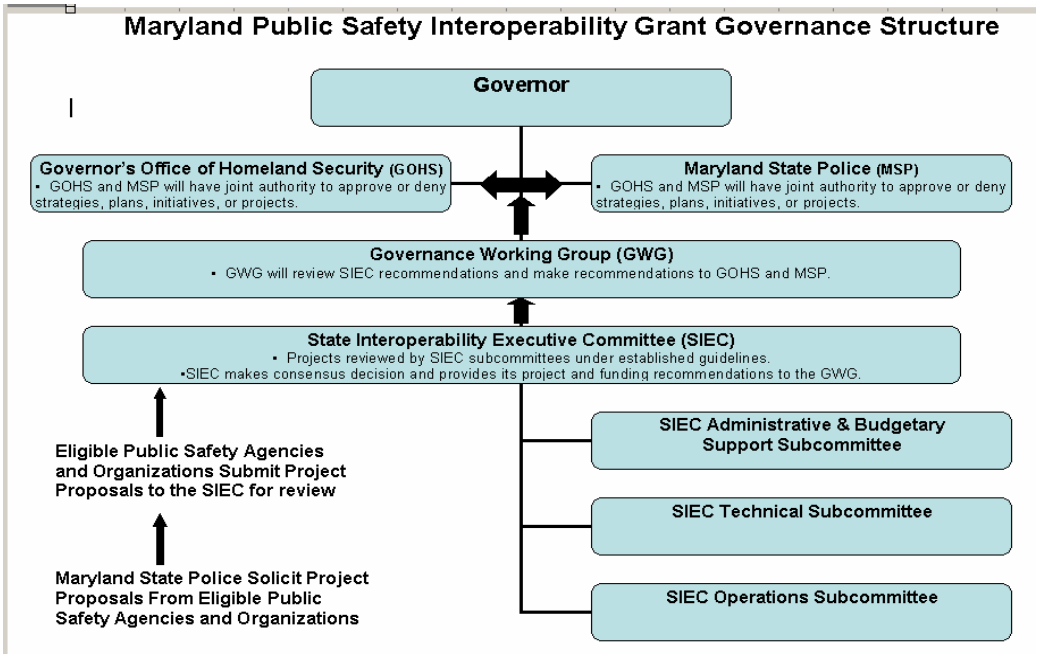

Figure 4-7: PSIC Grant Governance Structure

On July 10th, 2008, Governor O'Malley signed an executive order that vested formal authority with the SIEC for policy-level guidance for statewide interoperability issues. In addition, by the legislative session for 2008, the SIEC should achieve additional formal authority through a legislative bill as well. Presently, the SIEC meets bi-annually, is in the process of revising meeting schedules, and is chaired by Colonel Terry Sheridan, Superintendent of the Maryland State Police.

The Practitioner's Steering Committee (PSC) was formed at the request of the Governor to provide recommendations and advice to the SIEC and the Governor's Office of Homeland Security (GOHS) on all matters pertaining to Communications Interoperability, including assessment, acquisition, standardization, planning, management, use, and oversight of communications. The PSC is also comprised of senior communications practitioners from non-governmental, municipal, county, and state government from all fields of public safety. The PSC includes the following three permanent sub-committees that provide the subject matter expertise required to implement adopted public safety communication and interoperability projects: 1) Administrative and Budgetary Support Subcommittee, 2) Technical Subcommittee, and the 3) Operations Subcommittee.

Additionally, the PSC serves as a common ground for communications practitioners throughout the state. The PSC is also responsible for arranging and supporting meetings between local and state entities as well as assisting in drafting a variety of MOUs to advance communications sharing and interoperability. These agreements have ranged from exchanging codes to share frequencies in times of emergencies to agreements that provide for sharing of tower infrastructure. This collaborative approach has served Maryland very well over the past several years.

The PSC has the same formal authority as the SIEC and was established in the same executive order. In addition, by the legislative session for 2008, the PSC should achieve additional formal authority through a legislative bill. Presently, the PSC meets monthly on the 2nd Friday of every month and is chaired by John Contestabile, the State Interoperability Director.

The Governor has selected Colonel Sheridan, the Superintendent of the Maryland State Police (MSP) and Andrew Lauland, the director of the Governor's Office of Homeland Security (GOHS) as the persons to supervise and champion the cause of interoperability throughout the state. The Superintendent of MSP has named John Contestabile of the Maryland Department of Transportation, and Clay Stamp of the Maryland Institute for Emergency Medical Services Systems (MIEMSS) as the direct points of contact for interoperability in Maryland.

For the PSIC grant, the SIEC had responsibility for soliciting project proposals from all eligible public safety agencies and organizations. All project proposals were submitted to the SIEC for review. The SIEC used a competitive process to select and prioritize projects. The SIEC subcommittees reviewed each project against a set of priorities

and criteria that were previously developed during an SIEC work group session. All decisions and actions taken by the SIEC required a consensus of members. After all submissions were scored and ranked, the SIEC submitted its project and funding recommendations to the GWG.

The GWG reviewed all PSIC recommendations received by the SIEC and submitted its recommendations to the leadership of MSP and the GOHS for final approval. MSP and GOHS, acting jointly on the authority of the Governor, had the final authority to approve and/or deny strategies, plans, initiatives, or projects submitted under the PSIC grant. Upon approval, the project initiatives were submitted to the Maryland Emergency Management Agency, acting as the State Administrative Agent (SAA), for inclusion in the PSIC investment justification.

In future grant cycles, the new PSC will take a more active lead over the new SIEC in soliciting, evaluating and seeking consensus on grant projects than in the past. For the IECGP grant, the PSC reached consensus on the division of funds between interoperability regions and felt that it was in the best interest of each region to decide upon their own funding needs across the two priority areas of Governance and Planning/Coordination/Exercises.

An additional important factor of the executive order was to formalize regional structures as a best practice for future planning[15]. Some interoperability planning regions have well-established governance structures for their region and have been operating very effectively for years. These regions felt that these funds would be better spent on tactical planning protocol development or training and exercise events, whereas other regions needed to establish the formal regional governance structures that would help provide unity of purpose and guidance to their area's efforts.

The next phase for the advancement of governance issues in Maryland is the staffing and support of the Program Management Office (PMO). In establishing Maryland's Statewide Communications Interoperability Program (MSCIP) under executive order, the PMO is the office responsible for active implementation and management of statewide projects that benefit voice, data and information interoperability. The PMO will be responsible for managing the construction of the statewide 700MHz radio system, a statewide Computer Aided Dispatch/Records Management System (CAD/RMS) and coordination/integration of stateside Closed Circuit Television (CCTV) resources. Until the PMO is integrated into a state agency budget, it will require contracted project management and technical support in order to continue developing the SCIP and ensuring that statewide project goals are achieved. For the short term, this will be achieved through the Interoperable Emergency Communications Grant Program (IECGP).

[15] See *Figure* 2-5, Map of Interoperability regions. Infra p. 28.

4.2 Technology

Current Technologies

The State engaged an independent consulting firm to gather and evaluate the data that provided the basis for the information contained in this document. The consultant conducted detailed interviews with the State's stakeholder agencies and evaluated the gathered data. After the data was compiled, organized, and evaluated, an initial set of functional requirements was developed. The State then conducted several meetings wherein multiple major stakeholders and the consultant discussed, modified, and refined the list of functional requirements. The functional requirements contained in this document are a direct result of that process.

State of Maryland agencies currently conduct communications operations on the VHF Low, VHF High, and UHF frequency bands. Certain counties and municipalities within the State operate also on the 800 MHz frequency band, and at least one county has begun implementation of a 700 MHz radio system. Discrete frequencies, users, and operational groups for stakeholder agencies can be found in Appendix B. The state owns, maintains, and operates multiple microwave and fiber optic transport systems.

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Table 4-10: State agency subscriber (user radio) quantities

State Agency Name	User Radio Quantities	Number of Users[16]
Dept. of Juvenile Services	471	2,650
Dept. of Corrections	3,498	8,577
Emergency Management Agency	55	100
Upper Maryland Eastern Shore Radio Consortium	1,852	?
Dept. of State Police	4,000	?
Dept. of Natural Resources - Forest Service	155	?
Dept. of Natural Resources - Natural Resources Police	882	?
Dept. of Natural Resources - Park Service	1,358	?
Institute for Emergency Medical Services Systems	1,904	?
Dept. of Transportation - Maryland Port Administration	282	290
Dept. of Transportation - Maryland Aviation Authority	693	?
Dept. of Transportation - State Highway Administration	2,958	3,200
Dept. of Transportation - Maryland Transportation Authority	800	?
Dept. of Transportation - Maryland Transit Administration	1,201	?
Dept. of Transportation - Motor Vehicle Administration	112	90
Dept. of Transportation – Headquarters	20	?
	20,241	

Public Safety Intranet (PSI-Net)

Agencies of the State of Maryland and many of the County jurisdictions have cooperated in the installation of a statewide digital microwave system. The microwave is used to provide connectivity between the County 9-1-1 PSAP locations and the many radio communications towers throughout the State. Bandwidth on the microwave is used to provide point-to-point connectivity for the State and County radio systems. The infrastructure includes towers, shelters, generators, and digital microwave. This infrastructure serves the State agencies as well as the County public safety communications systems.

In 2001, the Maryland Institute for Emergency Medical Services Systems (MIEMSS) proposed a model to use some existing T-1 bandwidth on the digital microwave to serve public safety data communications needs. The model proved out and MIEMSS secured the use of four T-1's out of the 28 available across each microwave path.

[16] Not all agencies were able to provide user information, however no definitive one-to-one correlation exists between the number of users and the quantity of radios. As an example, in certain instances one radio can be shared among users on three different shifts. The salient parameter for the purpose of planning and designing the new radio system is the number of radios the new system must accommodate in a worst case scenario.

The network design uses three core routers that serve as a distributed hub for the entire State. These core routers are installed at MIEMSS, at the Maryland Emergency Management Agency's Statewide Emergency Operations Center (MEMA SEOC), and at the State Highways Administration (SHA) Communications tower at Rt-40 West and I-695. All routers in the system will connect to at least two of these primary sites.

Since the initial system was installed, several key systems have been added. The first is the MESIN network on the Eastern Shore. This network provides the connectivity between the PSAPS and the interoperability 800 MHz channels located at 12 tower sites covering the Eastern Shore of Maryland. The second system using PSI-Net is a like network called CMARC and does the same task as MESIN for the Baltimore region.

MIEMSS is also installing a VOIP telephone network that will replace the existing analog EMSTEL voice network that connects medical resources through out the state. The Department of Health and Mental Hygiene (DHMH) has joined the MIEMSS VOIP network to provide connectivity to the 24 county health departments.

The following County 9-1-1 centers are now or will be connected to the PSI-Net:

9-1-1 Center Public Safety Intranet Connectivity

Centers Connected	Centers to be Connected
Allegany County 9-1-1	Calvert County 9-1-1
Anne Arundel County 9-1-1	Caroline County 9-1-1
Baltimore City 9-1-1	Charles County 9-1-1
Baltimore County 9-1-1	Frederick County 9-1-1
Carroll County 9-1-1	Kent County 9-1-1
Cecil County 9-1-1	Mongomery County 9-1-1
Dorchester County 9-1-1	Prince Georges County 9-1-1
Garrett County 9-1-1	Queen Anne's County 9-1-1
Harford County 9-1-1	Saint Mary's County 9-1-1
Howard County 9-1-1	Somerset County 9-1-1
Talbot County 9-1-1	Washington County 9-1-1
Worcester County 9-1-1	Wicomico County 9-1-1

Table 4-11 PSAP Connectivity

The following State agencies are connected:

- Maryland Institute for Emergency Medical Services Systems (MIEMSS)
- State Highway Administration (SHA)
- Maryland State Police (MSP)

- Department of Natural Resources (DNR)
- Maryland Emergency Management Agency (MEMA)
- Maryland Transit Administration (MTA)
- Maryland Port Administration (MPA)
- Department of Health and Mental Hygiene (DHMH)

The PSI-Net is a closed Wide Area Network (WAN) available only to public safety providers. The security model calls for each user to provide encryption and decryption of any critical data that will cross the network.

To improve reliability, multiple microwave paths are used to provide more than one path to each physical router. All of the microwave paths use monitored hot standby radios. A system design was used to provide 99.998% path availability.

For network monitoring, a program that constantly checks each IP device is in place at MIEMSS. Failures are detected and proper staff is notified by e-mail and pager. A second independent monitoring system is provided by SHA and is managed by a private company under contract.

Future products that can use this network include a statewide backup VOIP telephone network, Web-EOC application, Facility Regional Emergency Database (FRED), County Hospital Alert Tracking System (CHATS), and online network management.

There is ample capacity on the PSI-Net to support the future statewide 700 MHz public safety radio system. This system will use PSI-Net for the backhaul connectivity throughout the state.

Table 0-12 Shared System/Types and Agencies

Region	***Jurisdiction***	***System***	***Agency***
Central Maryland	Baltimore City, City of Annapolis, and the Counties of Baltimore, Anne Arundel, Carroll, Harford, and Howard.	Central Maryland Area Radio Communications System (CMARC). 800 MHz mutual aid system	Multi-disciplinary. Law Enforcement, Fire/rescue, Emergency Medicine, Transportation and others.
Eastern Maryland	Ocean City and the Counties of Cecil, Kent, Caroline, Dorchester, Talbot, Queen Anne's, Somerset, Wicomico and Worcester.	Maryland Eastern Shore Interoperability Network (MESIN). 800 MHz mutual aid system.	Multi-disciplinary. Law Enforcement, Fire/rescue, Emergency Medicine, Transportation and others.

Maintenance / Service of Systems

Table 4-13 POCs for Maintenance/Service of Systems

System	Agency	Name/Title	Contact
State and local systems	Department of Budget and Management	Bob Krysiak, Contract Manager	410-260-7179
State and local systems	Department of Budget and Management	Mike Balderson, Order Fulfillment	410-260-7549
State and local systems	Department of Budget and Management	Dennis McElligott, Technical Assistance	410-260-0875
State and local systems	Department of Budget and Management	Director of the Office of Information Technology (OIT) Procurement Liaison Office (PLO)	oitplo@dbm.state.md.us

In Maryland, many service and maintenance contracts are enabled through a statewide procurement process. The Maryland Department of Budget and Management (DBM) maintains an online library of procurement and maintenance contracts on their web site[17], so that other state agencies as well as local jurisdictions may enjoy an expedited and cost-effective procurement process for communications maintenance and purchasing.

Some state agencies and some local jurisdictions retain separate maintenance contracts as well as retaining in-house technicians for maintenance, but the bulk of these maintenance contracts are retained through DBM.

Future Implementation

Traditionally, jurisdictions and agencies have built standalone systems meeting their individual agency needs. However, the deployment of independent non-integrated systems throughout the State (owned and operated by State, county, and local agencies) has created situations which hamper cross-jurisdictional, and cross-discipline (police, fire, EMS, transportation, etc.) communications. In Maryland, radio communication interoperability among state agencies and localities is hampered by the use of different operating frequency bands, technologies, and system architectures. These systems are generally voice only and do not support mobile data applications. Since many state agency voice systems will need to be replaced within the next five years as they reach their end of life-cycle and to meet the FCC narrow banding deadline, the State of Maryland desires to implement an enterprise solution for a

[17] http://www.dbm.maryland.gov

statewide, wireless radio system that supports operable and interoperable public safety voice and low speed data communications.

The State and other units of local government own and operate wireless systems employing frequencies ranging from the VHF low band through the 800 MHz band for mobile communications and in the microwave radio frequency bands for point to point and/or point to multipoint communications. The State also owns, maintains, and operates multiple microwave and fiber optic backhaul transport systems. Any proposed system is expected to utilize this existing backhaul network to maximize the State's investment in this network.

A variety of conventional and trunked voice radio technologies are used by the agencies, some of which are based on proprietary technology. Operating in mixed bands and utilizing proprietary technology has negative impacts on operability and interoperability at all levels of government.

The radio spectrum usage throughout Maryland is distributed across the various public safety bands with no common band available for a statewide communications network except for 700 MHz. Discrete frequencies, users, and operational groups for stakeholder agencies can be found in Appendix B.

The primary land mobile radio frequency infrastructure for new equipment must operate in the 700/800 MHz bands on frequencies available to and licensed by the State of Maryland or any of its public safety partners. System architecture must allow for multiple band operations or overlay systems where desired by user agencies to accommodate unique coverage requirements within certain geographic areas, or during migration periods. Multiple band operations or overlay systems cannot be used as an approach to providing the system coverage required in an area or region.

Future CASM Use

The SIEC has adopted a strategy that will eventually lead to the statewide use of the Communication Assets and Survey Mapping (CASM) tool to establish a baseline for multi-jurisdictional/multi-agency interoperability. CASM has been adopted by portions of jurisdictions in Maryland, such as the National Capital Region (Washington, DC and environs) as a valuable tool for charting first responder communications assets.

The CASM tool, provided by the DHS Interoperable Communications Technical Assistance Program (ICTAP) can be used to inventory the communications assets in the state. However, CASM data collection and display capabilities are currently limited to land mobile radio (LMR) voice interoperability. The CASM tool is a Web-based tool that agencies can use to store the interoperable communications equipment inventory and current radio communications infrastructure information. This collected data will reside in a secure database that will be accessible through WebEOC for access by authorized participating agencies and jurisdictions. As part of the strategic planning process regional efforts are occurring to document technology gaps in infrastructure, communications operability and interoperability.

Continuing Support for Legacy Systems and Interfaces to Disparate Systems

Plans for support to legacy systems are detailed in the SCIP's discussion of continued support and integration of local and regional 800 MHz systems, as well as the integration of VHF/UHF systems through Tac-Stack and other communications integrators.

The State of Maryland (State) recognizes the importance of real time voice and data communications operability and interoperability for public safety agencies across the various disciplines of public safety, levels of government, and across our neighboring States. First-responders must be able to communicate with each other to provide immediate and coordinated assistance in times of emergency. Otherwise, lives and properties may be lost unnecessarily.

The State of Maryland intends to purchase an integrated statewide wireless communications system that will provide State, local, and regional public safety first responders' real time operable and interoperable voice and data services that support Day-to-Day, Mutual Aid, and Task Force operations. The system shall be highly reliable, fault tolerant, spectral efficient, easily scalable, and meet the operational expectations for public safety first responders. The system will utilize a common infrastructure and operate within the 700/800 MHz band of frequencies allocated to and licensed by the State of Maryland or any of its public safety partners. It shall provide a minimum of 97% reliability across 95% of the defined coverage areas that include Maryland's land area, all jurisdictions and waterways. The implementation of the system will incorporate a phased deployment methodology.

Migration Plan

Consultants hired by DBM have developed a current inventory of public safety communications assets across the state. After conducting a requirements analysis of several architectures, they chose an approach that is standards-based and uses shared infrastructure to develop a statewide interoperable public safety communications system.

The Migration Plan provides a high-level approach for planning the transition of the current agency-based public safety mobile radio systems to a standards-based, frequency-independent, and multiple subsystems technology architecture. The Migration Plan furthers this effort by developing actionable strategies to bridge existing systems with gateways and cross band patches while deploying the first phase of a P25 700 MHz statewide interoperable public safety communications system.

The migration plan for moving from existing technologies to newly procured technologies focuses on the following activities as part of the detailed design and implementation process:

- Reconfirm the capabilities and gaps related to interoperability between state agencies and local/federal agencies. (Done)

- Prioritize those gaps through representation from state, local, and federal agencies. (Done)

- Identify technology solutions that can provide the most benefit in the shortest amount of time. The most likely technologies to provide this kind of a solution are gateway-based, and include a range of hardware and/or software-based capabilities. (Done)

- Choose a pilot area, then procure and implement the proposed solution. (Pilot area selected, RFP released and procurement process has begun)

- Assess the results of the pilot, modify as required and deploy statewide as funding becomes available.

This approach will maximize the ability to improve interoperability with the local, non-governmental and federal agencies. It is anticipated that a pilot system could be operational and running by February, 2009, when television broadcasters vacate spectrum in the 700 MHz range.

Implementing a 700/800 MHz system such as described in these plans is an arduous task even under the best conditions. Undoubtedly there will be many technical, operational and funding challenges to overcome along the way. These will be further complicated by various resource and process issues that will surface when the agencies transition from their existing independent modes of operation to the more centralized system-management approach.

4.2.1.1 Statewide Communications System Requirements

While the proposed “Request for Proposals”, expected to be released in early 2008, does not specify a particular solution, the proposed 700 MHz statewide radio system would be anticipated to be an APCO Project 25 Phase 2 digital trunked public safety radio system. All interfaces — including protocols (e.g. message definitions) and physical connections — to any system shall be open standard and non-proprietary and comply with the minimum requirements of the APCO Project 25 Phase 2 specifications for subsystem and inter system communications standards.

The system shall be a statewide wireless network that allows any participating local, state or federal agency to utilize a state-of-the-art voice and data radio communications system. The system shall utilize a dedicated backbone to interconnect dispatch centers, base stations and other network components to provide high-reliability interoperable services to its users. Basic benefits of the new system shall include:

1. Wide-area portable in building communications throughout the State.

2. Interoperability among all participants — in accordance with their level of authorization,

3. Interoperability with others using specifically-designated interoperability/mutual aid channels as well as specifically designated talk groups.

4. Networking systems to other systems by means of appropriate inter/intra-system network interfaces.

The radio network shall provide public-safety and public-service agencies with communications solutions to serve the residents of the State of Maryland well into the foreseeable future. High level goals of the system would include:

1. A multi-agency land mobile radio (LMR) network accessible by state, county and local public-safety and public-service agencies, with availability for use by federal agencies. It would support at least 100,000 unique addresses and support at least 5,000 talk groups

2. Portable in-building statewide coverage throughout the system.

3. Individual Agency Autonomy

4.2.1.2 Multi-faceted state-of-the-art communications system

The proposed system would have the following characteristics:

1. Integrated Voice and Data
    a) End to End IP with Ethernet Interface
    b) Simultaneous Voice and Data Support
    c) Low-Speed Mobile Data
    d) Automatic Vehicle/Vessel Location (AVL)
    e) Computer Aided Dispatch/Record Management System (CAD/RMS) interface
2. Compliance with APCO Project 25 Phase 2 standards (ANSI/TIA/EIA-102 series) as required by the FCC Rules in no event longer than four (4) years from the date of contract award.

3. Digital trunked mode of operation
4. Fault-tolerant backbone architecture
5. Phased Implementation by Region
6. System Architecture Design available to the State
7. Secure over-the-air programming (OTAP)
8. Secure encrypted communications with over-the-air re-keying (OTAR) capability
9. Uninterrupted roaming throughout the system when required and authorized
10. Augmented radio coverage (by both extending the network as well as unit to unit coverage) through the use of vehicular repeaters, microwave linking, fiber optic networking, and supplemental radiating systems.
11. Direct radio-to-radio operation
12. The system design shall be modular to permit enhanced coverage for portable and in-building operation, and increased capacity as a result of increased number of units for currently participating agencies and for additional participating agencies as they migrate to the system.
13. Interoperability:
    a) Interoperability with all participating agencies
    b) Incorporation of mutual-aid channels on the bands used by the local system
    c) Support the P25 common air interface for voice
    d) Support networking with legacy systems
    e) Support the interlinking of Systems at the Console to Console level
    f) Interface to Local Government Radio Systems
14. End-to-End IP Networking

4.2.1.3 Frequency Plan

1. Utilize frequencies currently licensed or available to public safety.
2. Provide integration and control with existing communications systems
3. Formal statewide frequency plan must be created and maintained

4.2.1.4 Operational Concepts

1. The technical operation of the backbone network is the responsibility of State Project Manger, also providing day-to-day operational control over the backbone network.

2. There shall be a consolidated approach to backbone network management and maintenance.

3. The designated state agency shall operate and provide management of backbone network technical facilities and maintenance control. Operational management of the use of the system (e.g. talk-group and encryption key assignments) will rest solely with the agencies using the system following predefined plan requirements.

4. Operations of the network infrastructure are transparent to the user community.

4.2.2 The State shall be subdivided into at least four (4) implementation regions and sub regions as tentatively defined below:

4.2.2.1 Region 1 – Greater Baltimore

a) Anne Arundel County
b) Baltimore County
c) Baltimore City
d) Carroll County
e) Cecil County
f) Fredrick County
g) Harford County
h) Howard County

4.2.2.2 Region 2 – Eastern

a) Caroline County
b) Dorchester County
c) Kent County
d) Queen Anne's County
e) Somerset County
f) Talbot County
g) Wicomico County
h) Worcester County

4.2.2.3 Region 3 – NCR and Southern

a) Calvert County
b) Charles County
c) Montgomery County
d) Prince George's County
e) Saint Mary's County

4.2.2.4 Region 4 – Western

a) Allegany County
b) Garrett County
c) Washington County

4.3 Standard Operating Procedures

It is the goal of the SIEC and the PSC to develop a library for the collection of SOPs that shall serve as an online reference point for public safety personnel throughout the state. This collection of resources will be integrated through the WebEOC software interface. Certain SOPs already exist and are heavily utilized through WebEOC software, but future plans include an increased use and distribution of these procedures and guidelines.

Table 0-14 SOPs/Agencies and Points of Contact

SOP Name	*Agencies Included*	*Disciplines Included*	*SOP Location**	*Frequency of Use*
NPSPAC Interoperability	Eastern Shore Region, Central Maryland Region, National Capital Region, and other independent agencies not included within these jurisdictions.	Multi-disciplinary. Law Enforcement, Fire/rescue, Emergency Medicine, Transportation and others.	Maryland Joint Operations Center (MJOC) at MEMA and through WebEOC online resources.	24-hour monitoring at the MJOC.
Mobile Command Post / Unit Mobilization	Federal, state and local agencies.	Multi-disciplinary. Law Enforcement, Fire/rescue, Emergency	Maryland Joint Operations Center (MJOC) at MEMA and	Regular exercises as well as when mobile command vehicles are requested

		Medicine, Transportation and others.	through WebEOC online resources.	
NCR Radio Cache Deployment	Federal, state and local agencies operating in the National Capital Region (MD, DC, VA)	Multi-disciplinary. Law Enforcement, Fire/rescue, Emergency Medicine, Transportation and others.	Maryland Joint Operations Center (MJOC) at MEMA, WebEOC online resources, and PSAPs in Montgomery County, MD; Washington, D.C.; Fairfax County, VA.	Regular exercises, scheduled large-scale public events, and when additional subscriber unit deployment is requested.
Central Maryland Radio Tower "Site on Wheels" (SOW)	Primarily through central Maryland agencies, but available for statewide deployment.	Multi-disciplinary. Law Enforcement, Fire/rescue, Emergency Medicine, Transportation and others.	Maryland Joint Operations Center (MJOC) at MEMA and through WebEOC online resources.	Regular exercises as well as when portable tower use is requested for restoration of downed communications.

The primary objectives of these SOPs are:

- To achieve interoperability with all participating state, county, local, and federal government agencies, as well as volunteer fire and EMS agencies.
- To develop and use partners to construct, maintain, upgrade, and enhance a single, but redundant, radio/emergency communications network, sharing costs and resources while providing added value for all users.
- To improve operational efficiency of the various communication systems in place.
- To improve radio spectrum efficiencies.
- To support the Tactical Interoperable Communications Plans. This plan's purpose is to support both the Baltimore TICP and the NCR TICP through on-going innovative assessment and analysis, assurance of gateways, and a tested management plan that sets standards for future interoperable growth.

- To support the local and regional 800 MHz systems. This plan's purpose is to address the near and mid-term user and system lifecycle issues, along with potential funding considerations to achieve the objectives.

- To support a Statewide Communications Interoperability Plan. The plan's purpose is to achieve interoperability on a regional, State, or Multi-State level, in support of federal efforts to establish integrated regional systems.

Information Sharing

Much of the procedures and operating guidelines for activation and deployment of communications resources is managed through information sharing. The vision for public safety communications entails bringing mobile data access to public safety agencies and personnel statewide. Mobile data capability in the hands of first responders will increase their capabilities and reduce the amount of voice traffic required to respond to most incidents. The conceptual model for public safety data is based on how the data should flow to the first responder.

The value of data is directly related to the ability of users to find and process it in a timely manner. Maryland's Information Management conceptual model defines the functional components necessary to make data valuable to the first responder. *The data subsystem must provide access to an array of data repositories at all levels of government.* Data must be presented so as to offer actionable information to a variety of responders relative to a given incident. The collaboration of these various individuals and agencies provides for the optimum resolution to any incident.

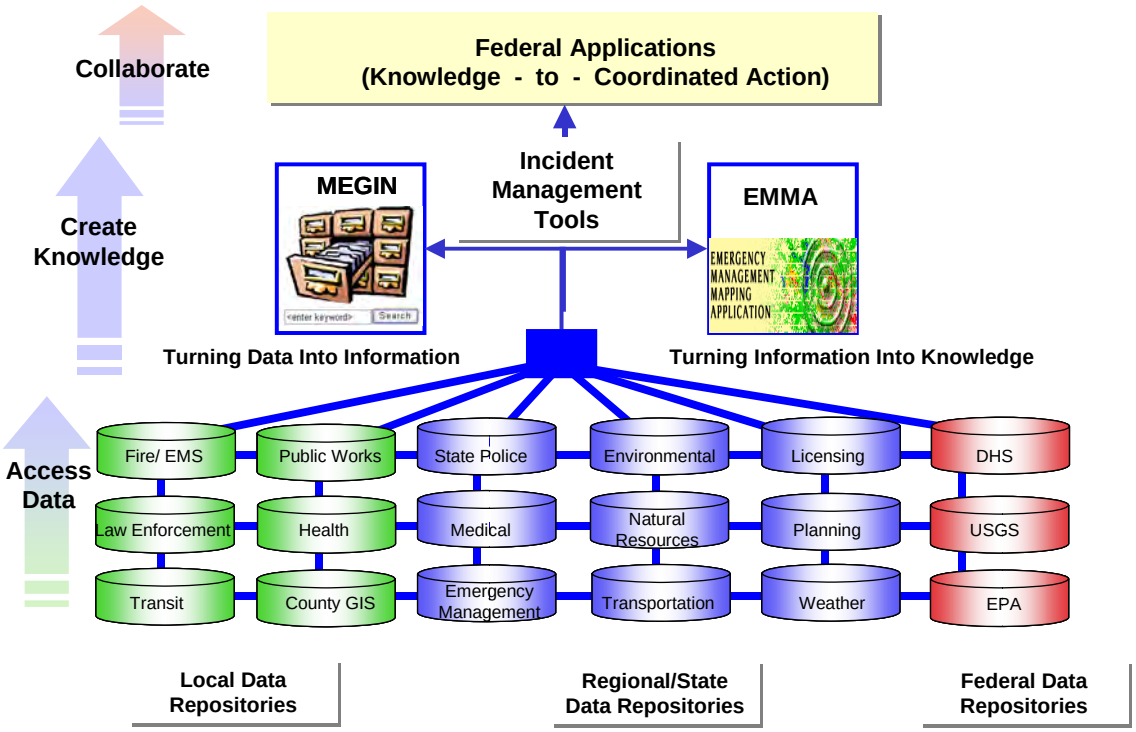

Figure 4-8 Vision for Information Sharing

The Long-term solution for data involves implementation of the statewide enterprise system for public safety communications. The vision for data provides for a converged voice and data network allowing the presentation and manipulation of data by first responders through the same radio subsystem using standards-based incident management systems. In the long-term, the governance body will support continued rollout of mobile data through the statewide infrastructure. Specific data resides in multiple databases or other repositories established by functional agencies, Municipalities, Counties, the State, or Federal entities (pictured along the bottom). Emergency Management Mapping Application (EMMA), Maryland Emergency Geographic Information Network (MEGIN), and Incident Management tools (i.e. WebEOC emergency management software) can be used to reach out and bring together the data elements to create useable, actionable information. This information can then be shared using a suite of tools to ensure a common understanding of the environment and collaborate.

WebEOC is a web based emergency management communications system that provides cost effective, real time information sharing by linking municipal, county, state, and national emergency managers to facilitate decision-making and resources allocations in emergency situations. WebEOC incorporates user-friendly pop-up windows to enable emergency managers to effectively coordinate response to localized incidents, regional events, statewide emergencies, and national disasters. Access to WebEOC can be initiated by any computer operating Windows 2000 with a Internet or Intranet TCP/IP connection utilizing a standard browser such as Internet Explorer 6.

A number of additional applications are embedded in WebEOC to provide emergency managers with critical information necessary to effectively respond to emergency situations. These currently include direct access to NOAA National Weather Service forecast and alert information by State & County. WebEOC also provides direct access to the State's Emergency Management Mapping Application (EMMA) which provides the ability to create a variety of maps essential for conducting and supporting emergency operations when multiple agencies are involved.

WebEOC is monitored 24/7 by the Maryland Emergency Management Agency (MEMA) Maryland Joint Operations Center (MJOC) located at the State Emergency Operations Center (SEOC) at Camp Fretterd in Reisterstown. Individual accounts are maintained for emergency managers representing state agencies, local jurisdictions, and other supporting emergency management entities. In the event of a declaration of disaster, or an activation of the SEOC,

WebEOC is the primary mechanism for requesting and sharing statewide resources. Two major examples include radio traffic on 800 MHz mutual aid channels and deployment/sharing of mobile communications command vehicles.

Both the Baltimore UA and the NCR UA have well developed SOPs to handle a variety of emergency incidents. Baltimore incorporated previously existing polices and procedures (e.g., 800 megahertz [MHz] shared system SOPs and mutual aid channels SOPs) into their TICP. The Baltimore UA took many steps to disseminate these SOPs to participating organizations (e.g., distributed directly to all included organizations and dispatch centers, distributed at the TICP Workshop). The UA documented a training process in their TICP; however, the schedule is date specific and is undergoing changes to include a regular training interval.

The policies for use of the NCR UA shared systems, as well as the Metropolitan Interoperability Radio System (MIRS) fixed gateway system and NCR radio cache, are long established and were effectively documented in Section 3 of the NCR Tactical Interoperable Communications Plan (TICP). The NCR UA used the TICP as an opportunity to enhance some of these policies and to disseminate them to all included agencies. The UA also undertook an aggressive effort to document communications assets in the area through the use of the CASM tool.

Mutual Aid Channels

In order to provide consistent, reliable, and expeditious processing of 2-Way Radio Traffic on the NPSPAC allocated 800MHz Interoperability Channels, the Emergency Management Operations Supervisors shall be responsible to ensure that all communications involving NPSPAC allocated channels are handled in accordance with this guideline.

Procedure:

1. All available NPSPAC allocated interoperability channel modules shall be on and operational 24/7 with an adequate audio level to be monitored by MJOC personnel at all times.

2. NPSPAC allocated 800MHz channels within Maryland are managed multiple ways:
    a. MESIN Project – Maryland's Eastern Shore
    b. CMARC Project – Central Maryland
    c. MWCOG – National Capital Region
    d. Independent – Jurisdictions operating their own equipment without statewide coordination.

3. MESIN
    a. The Maryland Emergency Management Agency shall be responsible to monitor the NPSPAC 800MHz Calling Channel via the MESIN system. All communications shall be acknowledged, given disposition, and documented within WebEOC's Daily Log.
    b. In the event that a repeater must be activated:
        i. Notification shall be made to the jurisdiction having authority over the repeater site that their repeater is being activated. Notification may be made via the MESIN-1 Talkgroup or via telephone.
        ii. The appropriate repeater shall be activated using the MESIN DPS Telecom interface.
        iii. An announcement shall be made over Maryland NAWAS that a NPSPAC 800MHz repeater has been activated. The notification shall include the location and channel activated as well as the jurisdiction having responsibility for communications on that channel.
        iv. The same procedure shall be followed in reverse at the conclusion of the event requiring the repeater's use.

    c. The Maryland Joint Operations Center shall initiate a connectivity test of the MESIN system utilizing the MESIN-1 Talkgroup two times per day at 10:00 hrs and 22:00 hrs. as operational necessity permits

        i. The Roll Call for the connectivity test shall include:
            1. Cecil County
            2. Kent County
            3. Caroline County
            4. Dorchester County
            5. Talbot County
            6. Queen Anne's County
            7. Somerset County
            8. Wicomico County

9. Worcester County
10. Ocean City

ii. Any station that fails to acknowledge roll call shall be contacted by telephone to determine the reason that the test was not acknowledged and a retest with that station shall be executed.
iii. The results shall be recorded within WebEOC's Daily Log.

d. Any problem or outage with the MESIN system shall be referred to the MEMA Communications Officer, MEMA Radio Technician, and the Emergency Management Planner of Worcester County Communications.

4. CMARC
   a. The Maryland Emergency Management Agency shall be responsible to monitor the NPSPAC 800MHz Calling Channel via the CMARC system. All communications shall be acknowledged, given disposition, and documented within WebEOC's Daily Log.
   b. Repeaters shall be activated in accordance with available guidance until such time that the MOTOBridge interface becomes available.

CMARC Mutual Aid Channels Procedures and Operating Protocols:

1. Coordination Responsibilities of the Control Point

a. The Maryland Emergency Management Agency (MEMA), via the Maryland Joint Operations Center, will serve as the control point for the National mutual aid channels.

b. The National 800 MHz Calling Channel (8CALL) will be monitored by staff at MEMA at all times.

c. After receiving a request for activation, MEMA will assign one or more of the four 8TAC's to the incident. This information will be communicated to the dispatch center coordinating the incident.

d. MEMA will announce over the National Warning System in Maryland (MD NAWAS) to all monitoring agencies that the 8CALL, an 8TAC (or 8TAC's) has/have been activated for (type of incident) at (location of incident and jurisdictions involved).

e. When an 8TAC is activated, MEMA will coordinate the activation of appropriate repeaters. When the incident has stabilized, repeaters no longer in use serving the area of the incident will be deactivated.

f. At the conclusion of the incident, MEMA will make an announcement over Maryland NAWAS canceling the use of the 8TAC(s).

2. Responsibilities of Field Providers and the Local Dispatch Center

a. During emergency situations the lead/home jurisdiction will serve as the communications manager and will coordinate the use of local communications resources and the use of national channels assigned by MEMA.

b. Emergency services providers can activate use of a National tactical channel via one of two means:

* Calling their respective dispatch center and requesting activation. The local dispatch center will then call MEMA (via the NAWAS phone or 8CALL or local console intercom or other wireless mode); or,

* If out of range of their dispatch center, requesting activation by MEMA via 8CALL.

c. Communications on the 8TAC channels assigned by MEMA will be the responsibility of the dispatch center or local command personnel/communications manager in charge of the incident.

d. The dispatch center or command personnel controlling the incident may request the use of additional 8TAC's. The intended use of each 8TAC will be clearly designated.

e. At the conclusion of the incident, the dispatch center coordinating the incident will advise MEMA, and deactivate any and all repeaters under their control.

NCR NPSPAC Rules of Use

The Interoperability Channels in the region will be reserved for inter-communication in situations requiring the coordination of multiple public safety entities. They shall not be used for administrative or intra-agency communications unless so directed during a major emergency disaster situation.

The field unit notifies the PSAP for assignment of a NPSPAC channel. Each National Communication PSAP should know where the local mutual Aid TAC repeaters are within their jurisdictional responsibility and what area(s) they cover. This will become most important if a second mutual aid incident arises. Coordination between dispatchers to select the right 8-TAC channel is vital to each specific incident. These 8-TAC channels usually cover smaller areas (i.e., a county/city area in comparison to State mutual aid channels). There are not as many overlapping repeaters on these 8-

TAC channels such as those of the State 8-CALL and 8-TAC1 channels. Each county/city that implemented 8-TAC2, 3, and/or 4 has control of them. They are not controlled by the state. Each County/city dispatch center controls the Enable and Disable function in its console and has the responsibility to Enable and Disable them at the console level.

Unless otherwise directed, all repeaters need to be in the Disabled mode at all times. Units transmitting on mutual aid channels will be heard by the PSAP servicing the operational area.

This is due to the console design. When two or more field units are in close proximity, NPSPAC frequencies may be used in Direct or Talk-Around mode. When two or more field units need to talk to each other but are not in range of one another, the servicing dispatcher must enable the local repeater to provide two way communications between the field units.

If a moving incident takes units into an area where coverage loss will negatively impact operations, an agency helicopter equipped with an 800 MHz public safety radio system can be requested to assist ground units in maintaining communications with the servicing dispatcher.

The helicopter can access NPSPAC frequencies and operate in *direct* (or *talk-around*) mode.

Because of its extended range, the helicopter can act as a mobile repeater, relaying communications between ground units and the local dispatch center dispatcher on a designated 8- TAC channel. The *Direct* (or *talk-around*) mode should only be used on the 8-TAC channels.

When used in an operation, the region's dispatch centers need to be notified, thru PMARS and FMARS.

Examples of Proper Use of the Interoperability Channels:

- As working channels for multiple fire departments fighting a fire together.
- For coordination during a police chase through multiple jurisdictions where the agencies have no other communications link with each other.
- For Communications during extended joint operations between multiple police agencies such as drug operations, riots, etc.
- For coordination during recovery operations after a disaster such as a hurricane when local, state, and federal officials require a common communications link.

Examples of Improper Use of the Interoperability Channels:

- To support the administrative functions of a fire department which has a mutual aid agreement with an adjacent fire department to provide "move up" capability when a fire unit leaves its own coverage area.
- To provide an extra working channel for a public safety agency supporting a

special event.
- To provide a surveillance channel for use between members of the same public safety agency

NPSPAC Procedures

This section contains the step by step process for use of NPSPAC Interoperability CALL and Interoperability TAC Channels.

1) 8-CALL Procedures:
a. 8-CALL shall be left in the repeater Disabled mode.
b. Any 800 MHz radio user may hail on 8-CALL.
c. It will be the responsibility of the primary PSAP to respond to the unit that is calling in the cluster.
d. 8-CALL shall be monitored 24 hours a day, 7 days a week by the primary 800 MHz system users.
2) 8-TAC1 Procedures:
a. 8-TAC1 should be in the repeater Disabled mode.
b. When a unit hails on 8-CALL and it is determined that a large-scale (or multi-cluster) mutual aid incident is going to take place and no other communications channel is appropriate or available, the dispatcher will advise the units involved to select 8-TAC1.
c. The PSAP may enable the 8-TAC repeater as required for unit-to-unit communications.
d. When the incident is over or requires communications through another cluster, PSAPs in the area of operation will coordinate the activation and deactivation of repeaters under their control as necessary to meet operational requirements.
e. The PSAP shall coordinate in advance with the surrounding primary PSAP when the moving incident is anticipated to require communications on 8-TAC1 in the surrounding cluster.
f. The field unit notifies PSAP, once the assigned 8-TAC channel is no longer needed.
g. The PSAP ensures the repeater is disabled and makes it available for the next assignment.
h. Direct (or talk-around) communications on 8-TAC1 may be used when two or more units are in close proximity of each other.

3) 8-TAC2, 3 and 4 Procedures
a. 8-TAC2, 3, and 4 should be in the repeater Disabled mode.
b. When a unit hails on 8-CALL, the dispatcher will advise the units involved to select the appropriate 8-TAC channel.
c. The PSAP may enable the assigned 8-TAC repeater as required for unit-to-unit communications.
d. When the incident is over or requires communications through another cluster, the PSAP will disable the repeater in conjunction with the surrounding PSAP Enabling their repeater.

e. The PSAP shall coordinate in advance with the successive primary PSAP when the moving incident is anticipated to require communications on and 8-TAC channel in the surrounding cluster as necessary.
f. PSAP controls the activity for the duration of the incident on the 8-TAC channel assigned.
g. The field unit notifies the PSAP once the assigned 8-TAC channel is no longer needed.
h. The PSAP ensures the repeater is disabled and makes it available for the next assignment.
i. Direct (or talk-around) communications on 8-TAC1 may be used when two or more units are in close proximity of each other.
PSAP – disable the repeaters when the incident is done and notify the surrounding PSAPs.

If you are monitoring the mutual aid channels and you can hear units communicating, do not hesitate to ask the units to identify themselves if you are unaware of authorization to use the channel(s). If you do not get a response, ask again. If you continue to hear communications, call your surrounding PSAPs to identify the use of the mutual aid channel(s) where communication may be bleeding over. Officer safety may be compromised if the channel(s) are inadvertently disabled or otherwise altered. If unauthorized traffic is being passed, the primary or back-up

NCR Radio Cache SOPs

For a radio cache to be an effective shared resource, it should have the following characteristics:
• Be fully charged and maintained, ready for deployment at all times
• Include extra charged batteries/replacement batteries and chargers for extended deployments
• Personnel available to transport the radios to the incident scene
• Available technicians for on-scene support during the deployment
• Radios should be labeled with the owning agency and frequency, band and system protocol
• Radios not included in the authorized cache list will need to be labeled by the owning agency with the above information prior to deployment.
• Check-out and tracking procedures are used during the incident to ensure the radios are properly returned to the cache following the incident

Cache Provider Responsibilities

The area agencies operating 800 MHz radio systems have provided radio ID numbers for each radio in the cache. This allows the radios to be programmed with the same talk groups that are presently shared for interoperable communications between these agencies.

Radio cache equipment is programmed with compatible 800 MHz radio system talk groups, responsible parties for the caches are

Cache Providers

NCR RADIO CACHE - Fairfax County
Wes Rogers
(571) 238- 5865 (cell)
(703) 876- 4903 (office)

NCR RADIO CACHE -
Montgomery County (MD)
John Freeburger (240) 832-9993

NCR RADIO CACHE -
Washington, DC
Demetrios "Jim" Vlassopoulos (202) 345-6596

Rules of Use

The agencies included in the NCR TICP should conform to the following rules of use for their swap / cache radios:

1. **National Incident Management System**: Use of an Incident Command System compliant with the National Incident Management System is required for use of any regional interoperability resource.

2. **Plain language**: All Communications shall be in plain language. Radio codes, acronyms and abbreviations are to be avoided as they may cause confusion between agencies. Additionally, it should be understood that plain words such as "help", "assistance", "repeat" and "back-up" may have different operational meanings to different agencies. The word "Help" should be used alone unless in the context of a life-threatening situation. Requests for assistance or backup should clarify the reason for the request.

3. **Unit Identification**: Agency name or identifier should precede unit identifier.

NCR Radio Cache Request

Requests for deployment of the National Capital Region (NCR) Radio Cache may be made for Emergency Incidents or Scheduled Events with a deployment request form.

Emergency Requests for deployment of the NCR Radio Cache to an Emergency Incident must be initiated by the NCR/COG jurisdiction's communications center. It is each agency's responsibility to maintain appropriate internal procedures to ensure that

requests are only passed on from the communications center if the request originated from, or was approved by, a person with the authority to accept fiscal responsibility for the NCR Radio Cache deployment costs. A request from a participating agency's communication center for deployment of the NCR Radio Cache is acceptance of fiscal responsibility for the cost of any damaged or lost equipment.

The requesting agency's communications center will contact the Fairfax County PSCC (for Virginia agencies) or the Montgomery County ECC (for Maryland/DC) and request the deployment of the cache using the NCR Radio Cache Request Deployment Form.

The NCR Radio Cache Emergency Request Deployment Form must be completely filled out to insure timely fulfillment of the deployment request. Voice requests (via either telephone or radio) for deployment of the NCR Radio Cache are also acceptable. When a voice request is received the information contained on the NCR Radio Cache Emergency Request Deployment Form will be solicited from the requesting agency to insure timely accurate deployment of the cache.

Once confirmation has been made that a cache will be delivered to the requesting jurisdiction, the requesting jurisdiction's radio cache manager must complete the following procedures to inform all regional players about the status of the radio cache.

When the Radio Cache has been deployed for an emergency incident, the requesting agency should contact DC EMA, the host center for RICC's to have them send a page through RICC's to the following groups:

R-ESF 2: Communications
R-ESF 4, 9 and 10: Firefighter, HazMat, Urban Search and Rescue
R-ESF 5: Information and Planning
R-ESF 13: Law Enforcement

The page should include the number of radios deployed from which cache (Montgomery and/or Fairfax), what event and dates the cache will be deployed (if available).

As a back up only, if DC EMA is unable to make a page, then the RICC's Coordinator at Metropolitan Washington Council of Governments may be contacted.

On receipt of an Emergency Request for the NCR Radio Cache the host agency (Fairfax or Montgomery) will deliver up to 500 radios to the requested location. The designated contact at the requesting agency will be contacted within 30 minutes at the contact number given, or via radio, by the host agency NCR Radio Cache Manager acknowledging receipt of the Emergency Deployment request. The NCR Radio Cache will depart the storage location within two hours of the request being received. Once the cache has departed, the host agency NCR Radio Cache Manager will notify the incident contact of an estimated time of arrival.

The host agency receiving the request for the NCR radio cache will notify the other NCR radio cache of the deployment. The decision on whether to send more than 500 radios from the remaining radio cache will rest with the Fire chief of that cache. The Fire Chief will evaluate the situation and make that decision using intelligence gathered.

If the initial request is for more than 500 radios then the host receiving the initial request will also initiate consultations with the other NRC Radio Cache host agency. The final determination as to whether or not to release some or all of the radios from the second NCR Radio Cache lies with the two host Fire Chiefs. The requesting agency will receive notification of the status of their request for radios in excess of 500 within two hours of the initial request being made.

The Radios will be returned to the host radio cache site within 72 after the recovery phase of the incident.

Scheduled events

Application for deployment of the NCR Radio Cache for scheduled events should be initiated no later than 30 days and no more than 120 days prior to the event. There will be some events that will require last minute request, i.e. State funerals, protests. The request will be made directly to and be granted by the Fire Chief of the jurisdiction of the host radio cache using the NCR Radio Request Form. The request will be granted by the priority of the request and by date the request was received. Once an application has been approved, the requesting jurisdiction is responsible for pick and return of the requested radios. Inventory and inspection will occur on return of the radios and any lost or damaged radios will be billed to the jurisdiction returning the radios per the MOU in place. For scheduled events no more than 250 radios will be loaned out from each cache for a total of 500 radios. Any radios loaned for scheduled events will be subject to recall for a higher priority emergency incident.

Request Priorities for Scheduled Events

Priority One:
Scheduled Events with the potential for significant public safety impact which include recall of off duty personnel (i.e., IMF, National Mall July 4th Celebration, and Presidential Inaugurations) these may be last minute i.e. State funerals.

Priority Two
Community events where large support staff from various jurisdictions are participating (i.e., Police Week, National Fallen Firefighters Memorial)

Radio Cache Activation

On receipt of an Emergency Request for the NCR Radio Cache the host agency (Fairfax, Montgomery or (DC)) will deliver up to 500 (250) radios to the requested location. The designated contact at the requesting agency will be contacted within 30 minutes at the contact number given, or via radio, by the host agency NCR Radio Cache Manager acknowledging receipt of the Emergency Deployment request. The NCR Radio Cache will depart the storage location within two hours of the request being received. Once the cache has departed, the host agency NCR Radio Cache Manager will notify the incident contact of an estimated time of arrival.

The host agency receiving a request for the NCR Radio Cache deployment will notify the other NCR Radio Cache host agency of the deployment. On receipt of this notification, the host agency for the second NCR Radio Cache will not release the cache to any requesting agency, the second host radio caches' Fire Chief will make the decision on whether to hold or send additional radio caches based on intelligence gathered by the host Chief.

If the initial request is for more than 500 radios, then the host receiving the initial request will also initiate consultations with the other NRC Radio Cache host agencies to determine whether to release more than 500 radios to the requesting agency. The final determination as to whether or not to release some or all of the radios from the additional NCR Radio Caches lies with the three host Fire Chiefs. The requesting agency will receive notification of the status of their request for radios in excess of 500 within two hours of the initial request being made.

Radio Cache Deactivation

The Incident Commander determines when the regional interoperability asset is no longer required. The Incident Commander or Logistics Section Chief will be responsible for coordinating the return of cache radios to the Radio Cache Technician on-scene.

The Radios will be returned to the host radio cache site within 72 hours after the incident is over.

At the end of the incident, the Radio Cache Technician will be responsible for taking an inventory of all radios returned to the cache. Before leaving the incident scene, the technician will determine if any radios have not been returned to the radio cache and note the user and/or agency to which the radio was distributed. This information will be provided to the Incident Commander or Logistics Section Chief. If the missing radios can not be recovered at the incident scene, the technician will provide this information to the Radio Cache Manager for resolution.

Problem Resolution

Agencies using radio caches may report any problems with the specific radio cache to

the NCR Radio Cache manager from which the cache was obtained.

NCR Radio Cache manager from which the cache was obtained will be responsible for ensuring effective resolution to problems that exist with interoperability resources.

Mobile Command Units (MCU)

In order to provide standardized guidance for processing and follow-up regarding requests for assistance of State Agency Mobile Command Units (MCU), the Emergency Management Operations Officer Supervisor shall be responsible to ensure that all mission requests are handled in accordance with this guideline. It is not the intention of this guideline to be in conflict with the roles, responsibilities, or authority of the State Agencies, Local Governments, Maryland Public Safety/Emergency Services Departments, or Local Jurisdictions Emergency Management policies.

Procedure:

1. The primary method for receiving requests for Mobile Command Units shall be via a Local Jurisdiction PSAP or Emergency Management office.
    a. If monitoring an incident and the Emergency Management Operations Officer Supervisor (EMOOS) recognizes the potential for assistance from a State Agency or Local Jurisdiction MCU, the EMOOS may contact the Emergency Manager from the incident jurisdiction and recommend MCU support.
2. Upon the MJOC receiving an official mission request:
    a. The Supervisor will determine the nature of the need and review information contained in the request to determine the ability of a State Agency's MCU to meet the needs of the request.
    b. The request shall be forwarded in whole to the MCU "Contact Notification Point" in the WebEOC MCU file.
        i. Notification will only be considered final when a "voice-to-voice" contact has been made.
        ii. Should the request be specific to a State Agency; the Emergency Management Operations Officer Supervisor may at their discretion process the request directly to the Agency POC for processing.
    c. The request shall be forwarded to the MEMA Duty Officer for information only.
    d. The request shall be entered into WebEOC's "Daily Log" or if specific to an incident it will be entered in the "Incident Log".
3. In order to ensure that Maryland is providing the highest level possible of mission support to requesting Jurisdictions the MCU Board of WebEOC shall be reviewed regularly to determine if any changes in MCU status or equipment need to be updated.

4.4 Training and Exercise Plan

The training and exercise plans that focus on interoperability will be dovetailed into the State's training and exercise program. It will build on resources, tools, and programs that already exist. These current capabilities include the Exercise and Training Integration Committee, the annual Training and Exercise Planning Workshops and subsequent Three Year Exercise and Training Plan, current capability based planning initiatives, the Homeland Security Exercise and Evaluation Program (HSEEP) to include the Corrective Action Program, and current programs to train and exercise components of the Statewide Communications System.

4.4.1 ETIC:

The Exercise and Training Integration Committee (MD ETIC) is a statewide governance group that was established in July of 2004 initially to ensure statewide NIMS compliance. By December of 2004, the Committee expanded its mission, which is now:

> *To build and support a self-sustaining statewide exercise and training program that strengthens Maryland's all-hazards preparedness capabilities as defined by the National Preparedness Goal.*

The committee membership includes operations, supervisory, and senior leaders representing the core response disciplines from local, State and Federal government. The MD ETIC focuses on implementing activities and initiatives to ensure integrated and effective exercise and training-related activities throughout the State. The committee utilizes a Program-based Implementation Plan and Improvement Plan to meet goals and objectives. The committee also helps to coordinate exercise evaluation and training-related activities and provides outreach to jurisdictions and agencies to ensure support and participation. The ETIC will be used to provide guidance and coordination for all interoperability training and exercises. It will also assist in the coordination of training and exercise activities.

4.4.2 Three Year Exercise and Training Plan:

Maryland uses a comprehensive capabilities-based training and exercise planning process. This three year training and exercise plan incorporates the needs identified by state and local stakeholders. Documented needs are based upon recent investments such as equipment, plan revisions, and training as well as after action reports and improvement plans. Each identified need is linked to one of the 36 Homeland Security Target Capabilities. Workshops are conducted in every region and for state and federal partners. These workshops foster regional based exercises that evaluate capabilities such as interoperable communications. Annually a statewide workshop is held to discuss and approve the draft three-year plan. Each exercise and training identified in Maryland's Three Year Exercise and Training Plan is linked to one of the Governor's 12 Core Goals and the National Preparedness Goal's Priorities. Training and Exercises dealing with interoperable communications are identified and color-

coded in the plan. A copy of Maryland's Three Year Training and Exercise Plan is attached.

4.4.3 Homeland Security Exercise and Evaluation Program:

All exercises conducted in Maryland, to include interoperable communications exercises utilize The Homeland Security Exercise and Evaluation Program (HSEEP) construct. Exercises being conducted throughout Maryland among State, local, and private sector response partners will use the HSEEP model. To facilitate the use of the HSEEP among partners the Maryland Emergency Management Agency (MEMA) Training and Exercise Branch conducts a three-day HSEEP course. This course originated in 2005 and has evolved to include new guidance and exercise tools developed by the Department of Homeland Security. MEMA's Exercise and Training Branch also assists in the development, delivery, and evaluation of exercises for those jurisdictions or state agencies not comfortable with using the HSEEP model.

As with all HSEEP based exercises, After Action Reports will be developed upon completion of the exercise to document lessons learned and recommendation for improvement. All exercise will also incorporate these lessons learned by focusing on agency and jurisdiction improvement plans. These improvement plans will outline corrective action to be taken, identify a time for completion and a responsible party. These corrective action plans can be uploaded into the DHS CAP system located at www.hseep.dhs.gov.

4.4.4 Capabilities Based Planning Process:

Exercising and training and State Communications Interoperability Plan will augment the State's current capabilities based planning process. Capabilities based planning links resource allocation to the capabilities that are must urgently needed to perform a wide range of assigned missions. Therefore, exercises and training no longer are conducted to prepare for a particular threat but to train and exercise to specific capabilities that can be applied to multiple hazards.

4.4.5 Scheduled Exercises:

Multiple components of the statewide communications system are exercised on a regular basis. Those exercise programs are listed in *Figure* 4-2. Many of these systems are included in larger local or statewide exercises. These larger exercises provide opportunities for multiple systems to exercise together. A list of these scheduled exercises is included as part of the Three Year Exercise and Training Plan.

As part of the SCIP, Maryland will exercise statewide interoperability at least annually and will begin the program with a seminar scheduled for fourth quarter 2008 and a functional exercise for third quarter 2009.

Table 4-15 Exercise Program for Component Systems

System	Exercise Frequency	Point of Contact
CMARC	Monthly	Ernest Crist, Harford County OEM
MESIN	Twice Daily	Teresa Owens, Worcester County OEM
MIMICS	Quarterly	Michael Bennett, MSP
Network Maryland	Quarterly	Gregory Urban, DBM
CapWIN	Quarterly	Bill Henry, CapWIN
WebEOC	Bi-monthly	Barbara Roccaldo, MEMA
GuardNet	Weekly	Todd Wilkinson
RACES	Monthly	Hank Black, MEMA
EMMA/MEGIN	Exercised with WebEOC	Barbara Roccaldo, MEMA
FRED	Quarterly	John Donohue, MIEMSS
HF Radio	Monthly	FEMA initiated, Charlie Simpson, MEMA
NAWS (Regional, MD)	Twice Daily	FEMA initiated, Charlie Simpson, MEMA
WAWS (NCR)	Twice Daily	HSDCEMA initiated, Charlie Simpson, MEMA
CWIN	Monthly	DHS, Charlie Simpson, MEMA
STU Phones	Twice Monthly	DHS, Charlie Simpson, MEMA
SVTC	Weekly	Charlie Simpson, MEMA
EAS	Twice Daily	Charlie Simpson, MEMA
SCIP	Annually	Daniel Meyerson, MDOT

4.4.6 Scheduled Training

Multiple components of the statewide communications system are trained on a regular basis. Those training component specific programs are listed in *figure* 4-2. This does not include NIMS training which is discussed in section 5.5. Certifications and student transcripts are developed and logged by the hosting agency.

Training will be provided to pre-identified Communications Unit Leaders once developed and approved by FEMA. Communication Unit Leader Training will be provided to those whose responsibilities include the range of duties of subordinate positions within the unit as outlined in NIMS. The Communications Unit Leader will have a working knowledge of the entire response system to include dispatch centers, emergency operations center, department operations centers, resource coordination centers, and other multi-agency coordination entities activated during a crisis. Technical aspects of communications equipment deployment, including system design, radio frequency coverage, interference and spectrum management issues and procedures are also essential.

As part of the SCIP, Maryland will train response partners on the plan and all new components of the system within 60 days of implementation.

Table 4-16 Training Program for Component Systems

System	Training Frequency	Methodology	Point of Contact
CMARC	Upon hire and refresher training annually	Classroom	Ernest Crist, Harford County OEM
MESIN	Upon hire and refresher training annually	Classroom	Teresa Owens, Worcester County
MIMICS	On the Job	Classroom	Michael Bennett, MSP
Network Maryland	On the Job	Classroom	Greg Urban, DBM
CapWIN	Quarterly	Classroom	Bill Henry, CapWIN
WebEOC	Monthly User Course, Monthly Refresher Course	Classroom	Lauren Holley-Allen, MEMA
GuardNet	On the Job	On the Job	Todd Wilkinson
RACES	On the Job	On the Job	Hank Black
EMMA/MEGIN	Covered within WebEOC Training	Classroom	Lauren Holley-Allen
FRED	Semi-Annual Train the Trainer	Classroom	John Donohue, MIEMSS
HF Radio	On the Job	On the Job	FEMA initiated, Charlie Simpson, MEMA
NAWS (Regional, MD)	On the Job	On the Job	FEMA initiated, Charlie Simpson, MEMA
WAWS (NCR)	On the Job	On the Job	HSDCEMA initiated, Charlie Simpson, MEMA
CWIN	On the Job	On the Job	DHS, Charlie Simpson, MEMA
STU Phones	On the Job	On the Job	DHS, Charlie Simpson, MEMA
SVTC	On the Job	On the Job	Charlie Simpson, MEMA
EAS	Quarterly	Classroom	Hank Black
SCIP	Annual Plan Training	Classroom	Daniel Meyerson

4.5 Usage

At the state level, the SIEC has included an aggressive outreach component. Every locality across the state has been made completely aware of the importance of interoperability, as well as the statewide interoperability vision and its eventual capabilities.

On local levels, interoperability is addressed during joint exercises, radio committee meetings, and training sessions (especially for supervisors). In addition, real-world events, such as major sporting events, festivals, concerts, protests and large-scale incidents such as the DC Sniper attacks and Hurricane Isobel, remind leaders of the importance of interoperability and forced agencies to explore continual improvements. Designated frequencies, cross-band monitoring, and radio frequency integrators are common means of interoperability where conventional infrastructure cannot support cross-jurisdictional or inter-agency communications.

Interoperability is a daily necessity between agencies in every area of the state. Moreover, interoperability is a daily necessity between jurisdictions in some heavily populated areas, such as the NCR where there is frequent cross-jurisdictional response to traffic accidents, fires and other incidents. In Western Maryland, counties and municipalities require interoperability with their public safety counterparts in Pennsylvania and West Virginia. Further revisions of the SCIP will include more details regarding regional partnerships in Western Maryland.

In Eastern Maryland, counties and municipalities require interoperability with their public safety counterparts from Virginia and Delaware. Through coordination with our eastern shore partners, the following are the jurisdictions that will be able to be programmed into the Delaware's ReCom 800 MHz Consolettes:

- Queen Anne's County, Maryland – Digital SmartZone™
- Caroline County, Maryland – Digital SmartZone™
- Talbot County, Maryland – Digital SmartZone™
- Maryland State Police – UMDES 800 MHz Digital Talkgroup
- Harford County, Maryland – Digital SmartZone™
- Conectiv – Analog SmartNet™
- Motiva – 800 MHz Analog

Cecil County and Maryland are currently operating in Low Band. Cecil County is considering an upgrade to VHF trunking. A plan can be developed once their intentions are finalized.

The following are the known jurisdictions that will be able to be programmed into the KentCom 800 MHz Consolettes:

- Queen Anne's County, Maryland – Digital SmartZone™
- Caroline County, Maryland – Digital SmartZone™

- Talbot County, Maryland – Digital SmartZone™
- Maryland State Police – UMDES 800 MHz Digital Talkgroup
- Worcester County, Maryland – Conventional 800 MHz
- Town of Ocean City – Conventional 800 MHz (Also currently permanently cross patched to DSP)
- Wicomico County, Maryland – Analog SmartNet™
- Dorchester County, Maryland – Digital SmartZone™ (New Motorola System)
- Conectiv – Analog SmartNet™

The following are the known jurisdictions that will be able to be programmed into the SusCom 800 MHz Consolettes:

- Queen Anne's County, Maryland – Digital SmartZone™
- Caroline County, Maryland – Digital SmartZone™
- Talbot County, Maryland – Digital SmartZone™
- Maryland State Police – UMDES 800 MHz Digital Talkgroup
- Worcester County, Maryland – Conventional 800 MHz
- Town of Ocean City – Conventional 800 MHz (Also currently permanently cross patched to DSP)
- Wicomico County, Maryland – Analog SmartNet™
- Dorchester County, Maryland – Digital SmartZone™ (New Motorola System)
- City of Salisbury – Analog SmartNet™
- Conectiv – Analog SmartNet™

Through good working relationships and existing partnerships, Maryland has shared system keys with surrounding jurisdictions. This agreement allows Delaware's radios to work on systems in Maryland and allows radios from Maryland to operate on Delaware's system. The following are the Delaware agencies and the quantity of their radios that work on other systems:

- Maryland
  - Queen Anne's, Caroline, and Talbot Counties - Upper Maryland Eastern Shore (UMDES)
    - DSP - 401 radios
    - Kent Fire/EMS - 527 radios
    - Sussex Fire/EMS - 759 radios
  - Dorchester County, Maryland
    - DSP - 399
    - Sussex Fire/EMS - 759
  - Wicomico County, Maryland
    - DSP - 412 radios
    - Sussex Fire/EMS - 759 radios
  - Worcester County, Maryland
    - Sussex Fire/EMS - 759 radios
  - Ocean City, Maryland
    - Sussex Fire/EMS - 759 radios

- DSP - 1 radio at OC patched to the Maryland System

The following are the agencies and the quantity of their radios that work on Delaware's systems:

- Dorchester County, Maryland - 477
- Wicomico County, Maryland - 61 radios
- Queen Anne's, Caroline, and Talbot County, Maryland - Upper Maryland Eastern Shore (UMDES) - 913 radios

At local levels, the incident commander is typically responsible for issuing requests for escalation and outside support. In localities where interoperability is limited, the usual practice is to contact 911 or the dispatch center during relatively minor instances. Most incident commanders request on-scene patching equipment, if needed. In response to larger incidents requiring a wider-area response or State participation, the incident commander contacts an emergency-services official, who in turn notifies the State and other jurisdictions through the Maryland Joint Operations Center (MJOC) at MEMA.

The number of times that interoperability is used for regional incidents varies greatly across the State and from year to year. Arguably, the most frequent need for interoperability occurs during major weather events. Maryland is prone to winter storms that cause widespread power outages, usually necessitating a regional response. Activation of the State Emergency Operations Center (SEOC) is a standard response for a storm of any signification magnitude.

Mutual aid agreements are common for specific events and incidents in many locales. For instance, agencies across the eastern shore have mutual aid agreements with each other and with agencies in Delaware and Virginia. Maryland's counties in the NCR have mutual aid agreements with their counterparts in DC and Virginia and counties in western Maryland have mutual-aid agreements with their public safety counterparts in Pennsylvania and West Virginia.

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5 Strategy

The following vision, mission, goals, objectives and strategic initiatives are designed to represent Maryland's All Hazards Incident Planning for public safety communications. There are several keys to improving emergency response communications throughout the state by continuing and enhancing Maryland's tradition of collaborative planning, partnerships and information sharing.

All funding sources available will be considered for use to purchase the equipment and support the planning, coordination and training programs that are necessary to improve interoperable communications within Maryland. PSIC funded equipment will be used to support the improvement of interoperability with agencies and jurisdictions throughout the state to serve both the largest number of Maryland's citizens as well as the areas that have traditionally had to stretch budgets in order to achieve communications goals.

PSIC grant funded equipment purchased in compliance with this SCIP will support and improve interoperability in the state by directly supporting the goals and objectives of this SCIP. The most important elements of infrastructure purchasing will include radio towers, the electronics needed for these towers, along with microwave and fiber connections for backhaul of voice and data into the state's public-safety intranet. Other key elements of data interoperability will involve important fiber and data project collaboration with Maryland's regional partners in the NCR, pilot programs involving data routing in mountainous western Maryland and feasibility studies to determine the most beneficial and effective ways to expand already existing regional radio systems into areas that will benefit from mutual aid talk groups and increased regional interoperability.

5.1 Interoperability

The vision for Maryland statewide voice and data public safety communications and interoperability include:

- Open architecture (i.e. P25 compliance, open data platforms, etc.)
- Converged voice and data communications
- Leverage available funding from all sources (State, Local, Federal, and Private)
- Leverage and enhance statewide cooperation
- Leverage public and private resources and data
- Maximized use of existing systems and technology
- Multiple layers of voice and data communication channels to enhance the ability to communicate during significant emergency response situations
- Access to voice and data networks to comply with defined security requirements
- Recommend and adopt procedure and protocol guidelines

Recognizing the convergence of voice and data communications, the envisioned long-term solution for public safety communications focuses on implementation of

standards-based, open systems. These systems will be secure and accessible by users from Municipal, County, and State agencies. Success will be enhanced by the continued cooperation and sharing of technological expertise by all stakeholders within an ongoing and open governance structure.

The vision and conceptual models for public safety communications are based on the five key concepts:

- Interoperability
- Partnering
- Capacity
- Information Sharing
- Positioning for the Future.

The IPT created and adopted conceptual models for voice communications (see *Figure* 5-1), data (see *Figure* 5-2), governance (see *Figure* 4-7), and operations (see *Figure* 5-6) that will guide Maryland to build public safety communications capabilities that address these concerns and challenges. The models help define short and long-term objectives and actions to achieve them, while striving to maximize the leverage obtained from ongoing projects and activities.

The Vision for each of these concepts is detailed in the following Sections.

Interoperability Vision

The vision is achievement of a statewide system that will support communications interoperability, and will facilitate real-time communications across boundaries of agencies, jurisdictions, levels of government, and ultimately, across State boundaries with Maryland's neighbors. Interoperable communications will ensure that Maryland's public safety providers can coordinate with one another, share information, and provide a consolidated response.

The long-term vision for facilitating public safety communications interoperability is to establish a statewide public safety communications system that will be standards-based, open architecture addressing the needs of all stakeholders from the enterprise level. It will allow the rollout of additional services such as short messaging, paging, mapping, and data.

Partnership Vision

The proposed partnering structure will support the implementation of public safety communications plans statewide, facilitate communications, mediate disputes, ensure oversight, explore technical options, and track finances for public safety communications. This partnering structure will provide administrative, technical, and operational efficiencies in designing, procuring, implementing, and maintaining a statewide public safety communications infrastructure and network. It will:

- Provide economies of scale in procurements
- Sustain the commitment, vision, and direction of the effort over the long term
- Assist in bridging organizational boundaries
- Help in obtaining a fair share of Federal grant funds for public safety communications and interoperability voice and data projects.

Maryland's partnering structure provides a forum to address cross-regional (both internal to Maryland as well as external between Maryland and other Regional organizations, States, Counties, or Municipalities) issues by bringing together technical and elected leadership and by converging potentially fragmented efforts. Projects with statewide scope need a partnership forum such as this to facilitate program and project management.

Membership & Responsibilities

Membership in each level of the partnering structure consists of representatives from Municipalities, Counties, and State agencies.

The **Statewide Interoperability Executive Committee** (SIEC) is comprised of senior elected officials from Municipal, County, and State government. The Governor will appoint state agency representatives and local, municipal and non-governmental organizations will appoint their own representatives. The Superintendent of the State Police will chair the SIEC. The SIEC meets at least two times per year. Additional meetings may occur as needed in order to resolve critical issues that may arise.

The SIEC is responsible for:

- Overall policy guidance regarding public safety voice and data communications interoperability
- Advocacy for adopted public safety communications interoperability voice and data projects
- Provide leadership in obtaining necessary legislation and funding for these projects.

The Practitioner Steering Committee (PSC) reports to the SIEC. The PSC is comprised of senior appointed officials from State, County, Municipal and non-governmental agencies. Maryland's Interoperability Coordinator chairs the PSC. The PSC meets monthly. Additional meetings may be required to resolve critical issues that may arise. The PSC will be responsible for:

- Overall program management oversight
- Continuing the planning process to ensure the 'Vision' for public safety communications interoperability and conceptual frameworks outlined in this document are carried out
- Tracking grant funds
- Managing standards compliance.

Subcommittees: Three subcommittees report to the PSC. Membership in the Subcommittees will be broadly inclusive. Each subcommittee has an appointed Chair and a Vice Chair who will serve staggered two-year terms. The subcommittees provide support to the PSC in their areas of expertise to facilitate implementation of adopted public safety communications and interoperability projects. The subcommittees are responsible for coordination and facilitation. Project management and implementation activities will be the responsibility of the sponsoring agencies represented on the subcommittee. Subcommittees meet at least monthly.

Administrative & Budgetary Support (ABS) Subcommittee: The ABS Subcommittee is responsible for:

- Tracking applicable grants and other funds
- Drafting, analyzing, ensuring legal sufficiency and facilitating the execution of applicable MOU's
- Administrative actions required to facilitate the various projects adopted

Technical Subcommittee: The Technical Subcommittee is responsible for the oversight and monitoring of

- Engineering design
- Specifications
- Procurement
- Construction
- Maintenance

Operations Subcommittee: The Operations Subcommittee is responsible for:

- Establishing protocols & procedures for using these systems
- Definition of how organizations coordinate (to align with the National Incident Management Structure)

Proposed Processes

All applicable and appropriate Emergency Public Safety Voice and Data Communications and Interoperability projects are presented to the partnering structure for vetting to identify synergies, opportunities for partnering, economies, and funding possibilities. Applicable and appropriate projects would include: programs or projects related to homeland security/emergency public safety communications or interoperability of voice and data that would impact or affect the operations of emergency response, emergency management, public safety organizations beyond the confines of a municipality. Additionally, public safety communications and interoperability voice and data projects that seek funding from the State or Federal grants would be included in this category. Projects should contribute to achieving the 'Vision' for public safety communications and interoperability, or at a minimum be compliant with the established criteria and standards. Ideally, all applicable projects

should be at least registered with the PSC to maintain the Maryland Public Safety Communications and Interoperability Assets and Capabilities Database. The Steering Committee will provide recommendations to the SIEC for final approval, determinations and/or funding.

Approval of a project or initiative is proportional to the amount of funding to be provided through the partnering structure. That is, if this structure is authorized to manage and allocate state and federal grant funds to projects that further interoperability, the Group can require minimum criteria and standards be followed as a condition for funding. If a project is outside the scope of the group's purview and does not require approval for funding through the Group, then review and comments will be advisory only.

The vision for partnering and governance anticipates that the SIEC, PSC, and the Subcommittees will strive to work toward consensus both in their internal interactions as well as interactions between the Committees. This does not mean that unanimity will prevail, but that these Committees and their members work cooperatively and collaboratively allowing for open discussion and ample consideration of differing views. All decisions should be reached at the lowest applicable level in this partnering structure to first achieve the greatest common good for the citizens of Maryland and secondly, to respect the inherent autonomy of each agency and jurisdiction. In cases where a Committee is unable to achieve consensus on an issue - that issue will be raised to the next applicable level for adjudication or guidance as appropriate.

Beyond the technology challenges of creating and benefiting from a standards-based, Interoperable, statewide public safety communications system are the human challenges that must be overcome. The hurdles of the human challenge require that the public safety stakeholders from Municipalities, Counties, and the State partner to successfully achieve the Vision. Partnering will ensure alignment among stakeholders to realize and leverage the benefits of the emerging capabilities and system. Partnering will enable coordination, sharing, and realization of synergies by directing scarce resources in a coordinated manner. Partnering will require compromise from all sides. Partnering necessitates a fair and equitable governance structure, clear well-defined goals, and utilization of constraints and incentives to ensure achievement of the common good.

Capacity Vision

The long-term success and achievement of both the public safety voice and data systems are directly linked to the availability of a statewide backbone and infrastructure subsystem. The efficiency or optimization of any infrastructure or backbone network can be measured using Reliability, Robustness, Resiliency, and Redundancy.

In the long-term, the state envisions achieving increased capacity through completion of the statewide infrastructure begun in 1999. The governance body will oversee implementation of the statewide 700 MHz public safety communications system.

Budget will include revenue for Operations and Maintenance as well as establish a fund for technology refreshment and replacement.

Figure 5-1 illustrates the Vision for the Statewide Public Safety Communications System. It is an extension of the radio subsystem conceptual model with the addition of an interface to wired services such as the public telephony network (POTS - Plain Old Telephone Service) and the connection of the backbone network to the internet via the required security firewall. *Figure* 5-1 simultaneously illustrates the transition from the "As Is" to the "To Be" public safety communications environment:

- The "As Is" public safety communications environment (bottom block) where personnel communicate using incompatible disparate radio systems, satellite and cellular phones, specialized mobile radios (such as Nextel), and the Plain Old Telephone (landline System (POTS). In the "As Is" communications environment Mutual Aid/Tactical channels are available in most radio bands that allow users operating in those bands to talk between systems operating in those bands. This does not facilitate communication between systems operating in differing bands (for instance VHF to UHF communications).
- In the next block up, the short term vision for achieving interoperability is illustrated using the Audio Interconnect (ACU-1000) to bridge communications between systems operating in different bands or using unlike technologies.[18] Additionally, this illustrates the implementation of the TAC-Stack which will provide 'islands' of coverage that enable responders outside the boundaries of their system's service (or coverage) area to communicate using their Tactical channels.

[18] See MIMICS project description.

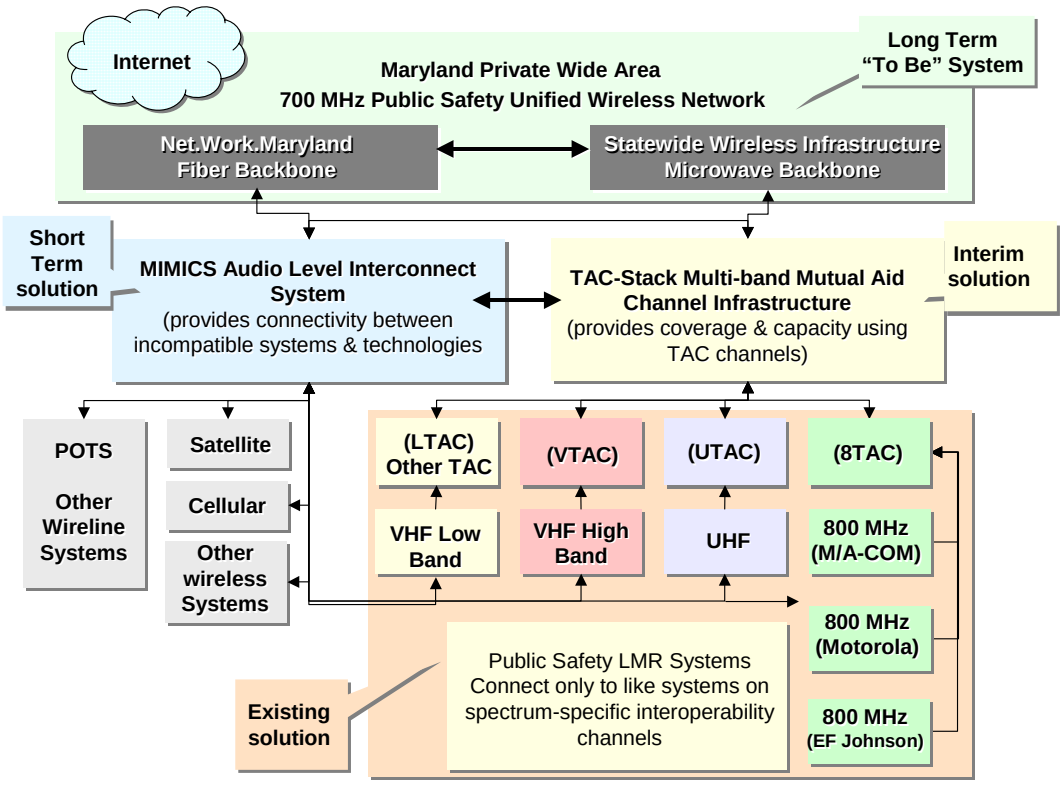

Figure 5-1: Vision for the Statewide Public Safety Communications System

- The "To Be" Interoperability Vision is indicated in the topmost block wherein the state will implement a single statewide system operating in the 700 MHz spectrum to enable voice and data communications and interoperability statewide.

Information Sharing Vision

The vision for public safety communications entails bringing mobile data access to public safety agencies and personnel statewide. Mobile data capability in the hands of first responders will increase their capabilities and reduce the amount of voice traffic required to respond to most incidents. The conceptual model for public safety data is based on how the data should flow to the first responder.

The value of data is directly related to the ability of users to find and process it in a timely manner. Maryland's Information Management conceptual model defines the functional components necessary to make data valuable to the first responder. *The data subsystem must provide access to an array of data repositories at all levels of government.* Data must be presented so as to offer actionable information to a variety of responders relative to a given incident. The collaboration of these various individuals and agencies provides for the optimum resolution to any incident.

The Long-term solution for data involves implementation of the statewide enterprise system for public safety communications. The vision for data provides for a converged voice and data network allowing the presentation and manipulation of data by first responders through the same radio subsystem using standards-based incident management systems. In the long-term, the governance body will support continued rollout of mobile data through the statewide infrastructure. *Figure 5-2* illustrates the Vision for Information Sharing. This illustrates how an Incident Commander might effect collaboration and effective action. Specific data resides in multiple databases or other repositories established by functional agencies, Municipalities, Counties, the State, or Federal entities (pictured along the bottom). Emergency Management Mapping Application (EMMA), Maryland Emergency Geographic Information Network (MEGIN), and Incident Management tools (i.e. WebEOC emergency management software) can be used to reach out and bring together the data elements to create useable, actionable information. This information can then be shared using a suite of tools to ensure a common understanding of the environment and collaborate.

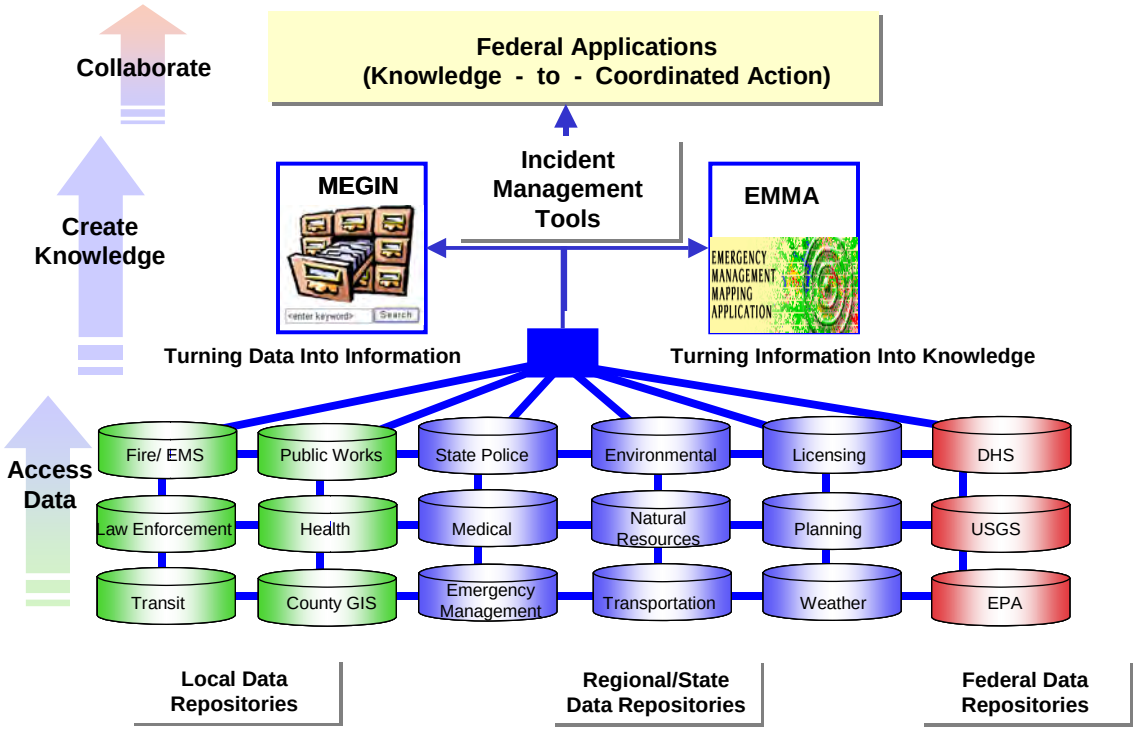

Figure 5-2. Vision for Information Sharing

WebEOC is a web based emergency management communications system that provides cost effective, real time information sharing by linking municipal, county, state, and national emergency managers to facilitate decision-making and resources allocations in emergency situations. WebEOC incorporates pop-up windows to enable emergency managers to effectively coordinate response to localized incidents, regional events, statewide emergencies, and national disasters. Any computer operating Windows with an Internet or Intranet TCP/IP connection utilizing a standard browser can initiate access to WebEOC.

A number of additional applications are embedded in WebEOC to provide emergency managers with critical information necessary to effectively respond to emergency situations. These currently include direct access to NOAA National Weather Service forecast and alert information by State & County. WebEOC also provides direct access to the State's Emergency Management Mapping Application (EMMA) which provides the ability to create a variety of maps essential for conducting and supporting emergency operations when multiple agencies are involved.

WebEOC is monitored 24/7 by the Maryland Emergency Management Agency (MEMA) Maryland Joint Operations Center (MJOC) located at the State Emergency Operations Center (SEOC) at Camp Fretterd in Reisterstown. Individual accounts are maintained for emergency managers representing state agencies, local jurisdictions, and other supporting emergency management entities. In the event of a declaration of disaster, or an activation of the SEOC, WebEOC is the primary mechanism for requesting and sharing statewide resources.

Working in conjunction with the MJOC is the Maryland Coordination and Analysis Center (MCAC). Internally, MCAC has Watch Section and a Strategic Analysis Section.

The Watch Section's mission is to provide support for federal, state and local agencies involved in law enforcement, fire, emergency medical service, emergency response, public health and welfare, public safety and homeland security in Maryland. They receive and process suspicious activity tips, requests for information and requests for service. The watch section monitors all available intelligence resources –monitoring for significant, noteworthy or high profile events/activities to determine any and all impact to the State of Maryland. Additionally, they coordinate Maryland law enforcement resources, disseminate and communicate intelligence information to local, state, and federal entities.

The mission of the Strategic Analysis Section (SAS) is to provide strategic analysis to better focus the investigative activities being conducted by law enforcement agencies within the state and to better enable public health and safety agencies to perform their important protective functions. The SAS synchronizes/harmonizes intelligence products to reduce duplicate and contradictory reporting, Identify patterns and trends specific to Maryland for Maryland, and identify patterns and trends within Maryland and disseminate to national homeland security entities.

Dissemination for both sections occur through e-mail, JRIES/LEO/RISS, facsimile distributions, text paging, telephone (landline), radio (uhf/vhf, 800Mhz, etc.), Secure Telephone Unit/Fax (STU), and updates to the EMMA GIS system.

Both the MCAC and MJOC play critical roles in the collection and dissemination of information in improving data interoperability statewide and beyond.

The Department of Health and Mental Hygiene (DHMH) Office of Preparedness and Response conducts enhanced surveillance using the Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE). ESSENCE is a near real time, web based surveillance system that collects electronic data from multiple data sources, including emergency department visits to sentinel Maryland hospitals and over the counter medication sales from sentinel pharmacies in Maryland jurisdictions. These data are categorized into eleven syndrome groups and statistical techniques detect aberrations in the expected level of disease.

Public health epidemiologists review ESSENCE data daily and suspicious patterns of illness are investigated to determine their significance as a potential public health threat. ESSENCE provides a regional perspective that allows epidemiologists to compare local information to trends in neighboring counties to help identify any unusual events. Epidemiologists communicate with local health departments and hospital infection control practitioners to obtain more information on suspicious cases to help in the determination of whether a public health response is required.

Data Exchange Hub (DEH) and National Capital Region fiber optic network infrastructure (NCRnet)

Effective emergency preparation, response and recovery require that MD and regional responders have the ability to interoperate during everyday and mass events. Effective data interoperability occurs when emergency responders, using their routine operational systems, have a common regional incident operating picture, situational awareness, can send/receive data notifications, manage resources, etc. The DEH/NCRnet projects address these needs by implementing application and network infrastructure to enable responders to link their operational systems to their partners' systems.

The DEH/NCRnet project:

1. Adopts Advanced IT Solutions – The DEH SOA operates over the NCRnet fiber network – allowing reusable interoperability services development to initiate and manage communications among jurisdictional ESFs. With the ESB technology, agencies avoid establishing point-to-point communication links. Instead, agencies develop standards-based connections to reusable core services, rapidly enabling interoperability. This infrastructure is critical for leading edge IT communications including Voice and Radio over IP.
2. Improves Spectrum Efficiency – The DEH/NCRnet integrates with communications systems across MD, ensuring that timely, relevant data routs to appropriate command-control entities. This design reduces transmissions of redundant and poorly targeted information. Reducing exponential information transmissions yield significant reductions in spectrum use.

3. Uses Cost-Effective Measures – SOA promotes the reuse of services that can be shared among multiple entities. Circumventing point-to-point interfaces reduces the associated costs to design, develop and maintain these connections. The advanced fiber optic-based NCRnet infrastructure provides sufficient network capacity into the foreseeable future.

Metropolitan MD being part of one of 7 UASI Tier 1 Areas at the highest risk of terrorism attacks and at significant risk for natural and manmade disasters, its emergency response communications system must be fully interoperable.

As NIMS provides a common framework for emergency responders from different ESFs and jurisdictions to work together under a single Incident Command structure, the DEH/NCRnet provides a common interoperability framework to enable communications among disparate communications systems. The investment will help build an enhanced SOA/ESB development infrastructure that improves command and control interoperability, for all hazards, across all participating cross-jurisdictional ESF agencies. By developing the enhanced development infrastructure, expanding MD NCRnet links, and establishing appropriate governance processes, an increasing number of MD and NCR agencies will participate and connect their communications systems, expanding interoperability and achieving a more efficient response. The development of pre-positioned communications services on the DEH/NCRnet will also enable rapid deployment and connectivity for existing reserve communications equipment.

The anticipated next phase of data interoperability in the NCR will provide the application and network infrastructure necessary to allow secure, non-commercial access to critical regional communications systems and to facilitate real time, inter-regional, and cross-ESF communications.

The expected outcomes of this new phase of data interoperability development will be 1) an enhanced data exchange environment,

2) integrated emergency exchanges between DC ESFs and other regional ESF partners,

3) new policies to govern the infrastructure, and

4) dedicated fiber optic connections.

The DEH/NCRnet initiatives are providing data-focused interoperable communications improvements in the following 3 project categories:

1. Technical Infrastructure – Advanced Service Oriented Architecture (SOA) and Enterprise Service Bus (ESB) for standard and open system information exchanges.
2. Governance – Regional governance capabilities:

a. Policies
b. Processes/Tools/Guidelines
c. Enterprise Architecture Models
d. Assessments

3. Interoperable Exchanges – Prototype and operational exchanges:
    a. Resource Typing
    b. NCR Crisis Information Management System (CIMS)
    c. NCR Fire Incident Mapping
    d. Computer Aided Dispatch (CAD) to CAD Interoperability (Design Only)

The DEH/NCRnet initiative is a component of the NCR Interoperability Program (NCRIP) - overseen by a multi-jurisdictional governance structure represented by all ESFs. The structure, supported by all 23 jurisdictions of the tri-state NCR, ensures that DEH/NCRnet activities align with the objectives of the diverse stakeholders and the tri-state, multi-jurisdictional governments supported by the initiative.

The program is setting governance standards for regional data communications interoperability. The following standards are being developed to guide interoperability:

a. Policies – Draft IT Security, Data and IT Service Management (ITSM)
b. Processes/Tools/Guidelines – Risk Management Review Process, Security Risk Assessment Tool, NCR IT Guidelines, Jurisdictional System Requirements, and NCR Development Toolkit
c. Enterprise Architecture Models – Draft NCR Metamodel and Three Year DEH SOA Roadmap recommendation
d. NCRnet Policy Documents: IP Routing Policy; IP Addressing Scheme; and Statement of Operational Need

The program is also working closely with the NCR Interoperability Council (IC) and its working groups to expand interoperability agreements (MOUs), SOPs, and training for agencies across the NCR.

POSITION FOR THE FUTURE

Maryland's combined Vision for achieving an effective public safety and homeland security infrastructure relies on taking coordinated action across several initiative areas. Current interoperability projects lay the foundation for state-of-the-art standards based voice and data systems that will have the necessary capacity to meet operational needs. The Vision established and laid out in this document provides a basic framework or roadmap for achieving statewide interoperable voice and data in Maryland.

5.2 Vision

The vision for Maryland is an achievement of a statewide system that will support communications interoperability, and will facilitate real-time communications across boundaries of agencies, jurisdictions, levels of government, and ultimately, across State boundaries with Maryland's neighbors. Interoperable communications will ensure that Maryland's public safety providers can coordinate with one another, share information, and provide a consolidated response.

The long-term vision for facilitating public safety communications interoperability is to establish a statewide public safety communications system that will be standards-based, open architecture addressing the needs of all stakeholders from the enterprise level. It will allow the rollout of additional services such as short messaging, paging, mapping, and data.

Combined with the existing infrastructure in the state, Maryland will be able to call upon a wide variety of interoperable tools to achieve solutions for public safety whenever and wherever they require real-time reliable communication.

5.3 Goals, Objectives and Strategic Initiatives

The "Engineering Master Plan" is focused on providing the roadmap or guidance for action to achieve the Vision. It outlines goals and objectives, and a series of steps or initiatives to be carried out or to achieve those goals and objectives. The Master Plan identifies what needs to be done and a timeframe for doing it (Short term, Interim, and Long Term). It helps determine priorities in implementing change. The Master Plan provides a framework to support decisions on how to allocate resources, address challenges, and take advantage of opportunities that arise along the way. It establishes initiatives, supports setting priorities and identifying obstacles and opportunities that may limit or enable accomplishment of the mission.

This Section addresses the recommended initiatives (Short term, Interim, and Long Term) to achieve the Objectives established in the Vision for Public Safety Communications organized in the following areas:

A. Interoperability
B. Partnering
C. Information Sharing
D. Capacity
E. Positioning for the Future

These five areas are closely interlinked, and progress must be made in each area to assure that the Vision is achieved.

5.3.1 SHORT TERM ACTION PLAN

The Short term is defined here as 0-1 years. The Short-term focus is taking steps and making necessary preparations that will position the State for the Future.

A. Interoperability – Short Term

The State needs to continue supporting, encouraging, and facilitating projects already underway to achieve interoperability. It is also important at this time to make plans for projects to support interoperable public safety communications between different jurisdictions, Municipalities, Counties, and State agencies that will assure viable coordination, command, and control for multi-jurisdictional Task Force efforts, special events, or emergency response efforts. Short-term action must support communications across agency or jurisdictional boundaries, across language or code barriers, incompatible transmission technologies, and multiple frequency bands.

Beyond enhancing the availability and utility of mutual aid channels, short-term action cannot realistically address the coverage barrier that prevents responders from using their own native equipment in jurisdictions outside the coverage footprint of their own radio systems. Within the next year the State's objective is to increase or maximize interoperable communications using already available systems, equipment, and funding.

1) Standards & Criteria for Acquisition of New User Equipment.

The State, Counties, Municipalities, and agencies currently utilize a wide variety of communications systems and equipment of various vintages from different manufacturers. Much of the public safety communications equipment is proprietary and does not readily support interoperable communications. The Federal Government and the SAFECOM Statement of Requirements advocate migration to non-proprietary standards-based communications systems and equipment. Currently the only standard (advocated by SAFECOM and DHS) is the APCO Project 25 standard.

In the next year, the State must promote cooperative efforts between and among state agencies, Counties, and Municipalities to agree on standards and an approach to facilitate acceptance and adherence to those standards. It will be necessary to obtain stakeholder agreement that for procurements, other than replacement of any grandfathered equipment, any new wireless systems or equipment purchased will be non-proprietary standards-based in accordance with the agreed upon set of standards. Establishing incentives for compliance and disincentives for non-compliance are helpful but success will rely on obtaining buy-in from all stakeholders.

The State will work closely with all stakeholders to identify criteria for public safety communications equipment to ensure greater utility through features that allow users to select a different frequency or operate on multiple bands so that they can effectively ‘join’ a network outside the coverage of their own system. The State will establish a

program of reviews and incentives to support compliance with the established standards and criteria. The criteria will be forward leaning to ensure reusability of user equipment in the long-term public safety communications system.

Objectives

- **Identify requirements-based standards for all public safety communications equipment:** The State must identify those standards that meet the requirements and promote achievement of the 'Vision' for technical architecture for public safety communications and interoperability. Agreed upon standards for equipment and systems should:

  - Be compliant with technical requirements such as Project 25
  - Be identified for all architecture components
  - User equipment – i.e. mobile, and portable radios, mobile data devices
  - Systems equipment, infrastructure, hardware, software, etc.
  - Include standard interface definitions and target dates for their implementation
  - Address requirements from the NIMS program.

- **Identify incentives for standards compliance:** The SIEC must draft a proposition regarding the accepted standards and need for compliance:

  - Encourage compliance through conditional funding, system inclusion standards, and legislative mandate
  - Ensure all state supported funding efforts relating to public safety are conditionally dependent on adherence to the developed standards
  - Identify and provide assistance in obtaining grants and funding sources for meeting the requirements
  - Encourage legislative support of standards
  - Develop sufficient formal legislative support of the envisioned technical architecture for public safety communications interoperability to ensure long-term system success.

- **Identify system and equipment purchases that will and will not fall within these guidelines.**
- **Provide monitoring through leadership.**

2) Public Safety Database[19]

To move toward achieving its objectives of statewide public safety communications and interoperability it is necessary that the State, agencies, Counties, and Municipalities to firmly establish the "As Is" -- know what the existing assets are, their location, status, age, ownership, etc. The State needs to support the ability to identify and forecast public safety communications requirements including the real projected needs for communications and coordination under a variety of scenarios, and develop a realistic assessment of any shortfalls in meeting these needs in order to ensure that these are addressed. Public Safety communications services are provided by many agencies that have various assets (personnel and equipment) throughout the State. Ensuring that these assets are accounted for in the planning process for public safety communications and interoperability and have the ability to communicate with one another and work together smoothly means knowing what is available.

Establishing a web based database for public safety agencies will enable and enhance the ability of the State to achieve it goals through leveraging existing assets and ensure that all the citizens of Maryland benefit from enhanced public safety and homeland security capabilities. This requires that the State take action over the next year to create a dynamic, secure repository of public safety and homeland security related resources.

Objectives

The proposed database must:

- **Identify, or define, the public safety population**: It will be necessary to develop a clear picture of all public safety providers including the non-traditional entities such as utilities. Data fields should include: Organization, size, location, etc.
- **Inventory assets:**
  - Infrastructure
  - Systems
  - User equipment
  - Dispatch
  - Communications centers

- **Be accessible to responding agencies preferably through the incident management systems used on a daily basis.**

[19] Although much of the work in compiling accurate surveys of infrastructure and radio assets is now complete, most of the remaining work lies in enabling a web portal with access for the public safety community in Maryland. See appendices for inventory of assets.

- The web based public safety asset tracking tool needs to allow each participating agency to dynamically update their capability, assets and needs as necessary.

- **Be secure:** The database and its data should comply with established physical and information security standards as applicable to public safety and the specific types of data resident within the database, and in transit to and from the database.

- **Be fully accessible by appropriate agencies via a universal and commonly accessible method such as a secure intranet or internet portal:** The database should be a common repository to facilitate coordination, sharing of data, and planning but should provide virtual privacy to each participating agency requiring permissions from data owners for sharing and access.

- **Database requirements available to user community via web:** It will be necessary for the SIEC/PSC to establish standards and requirements to guide development of the database and communicate those guidelines and system requirements to the user community.

3) Gateways to Facilitate Inter-System Communications.

In the current environment, public safety providers use proprietary communications equipment and systems of various vintages, from various manufacturers. Facilitating communications between these systems is not a simple matter. There are several efforts completed to facilitate inter-systems communications using Gateway technology (i.e., the ACU-1000). In the short term, this is the fastest and surest method to support communications between agencies and entities using incompatible communications equipment.

The Maryland State Police have installed a statewide network of ACU-1000s in their MIMICS program. This program addresses the basic short term vision identified for interoperability by providing bridges between incompatible systems to facilitate interoperability and collaboration on an as needed basis for task force or special events. MIMICS goes beyond this basic requirement by providing network of these bridges and management. Further, the MSP has plans of incorporating the TAC-Stack program (which would provide for additional coverage and capacity) into the MIMICS program.

The MIMICS project has already established gateways across the entire state and will contribute many of the functional elements necessary to achieve the envisioned public safety communications and interoperability technical architecture.

- An IP Based Proprietary Audio Level Interconnect System (JPS)

  - 800 MHz Radio Interfaces
  - UHF Radio Interfaces
  - VHF High Band Radio Interfaces
  - VHF Low Band Radio Interfaces

- Connectivity to the Statewide Microwave Infrastructure
- Connectivity to the MESIN Project
- TAC-Stack implementation
- 700/800 MHz radios for MSP

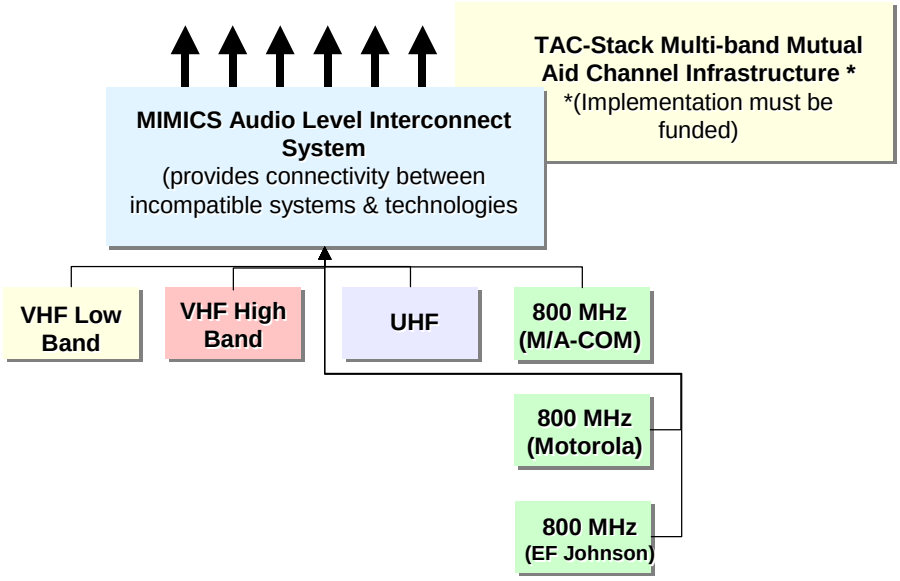

Figure 5-3 MIMICS Project Functional Elements

As *Figure* 5-3 illustrates, MIMICS provides many of the core components necessary to achievement of the envisioned public safety communications voice architecture.

Objectives:

- **Review the Engineering Plan for the MIMICS system and determine the potential for scope changes that increase support for the envisioned technical architecture.**

  - Complete an engineering review of the existing design to determine if additional coverage or channels may be required to support potential future users and develop a program to provide future expansion.

- **Review the engineering plans for the regional radio systems to determine solutions for interconnection with the MIMICS system.**

- Review the regional system architecture for each participating agency to determine optimum technical interconnect and operational coordination method for inclusion in the MIMICS system.

- Develop technical and operational standards for MIMICS system inclusion.

♦ **Complete a study of MIMICS service areas to determine TAC-Stack component demand and feasibility. (In preparation for achieving Interim Vision elements)**

- Local coverage analyses: Complete a coverage analysis of the existing design to determine TAC channel requirements for each local jurisdiction.
- Spectrum surveys for each of the local geographies to determine TAC-Stack implementation priorities.

♦ **Develop phased program for TAC-Stack development in each local geography**

- Prioritize the technical component installations to meet the immediate needs first (day to day interoperability)
- Develop plans for complete Stack build-out to meet long-term requirements (fish out of water situations).

4) Expand Coverage & Capabilities of Regional Systems.

The State needs to work with Regional consortia, counties, municipalities, and State agencies that have already implemented, or are in the process of implementing systems to facilitate interoperable communications. Although CMARC and MESIN are using different vendor technologies to support interoperability – both rely on utilization of Internet protocol that will be the basis of the State's long-term envisioned solution for public safety communications interoperability.

In the next year the State can study the feasibility of expanding these systems to include additional counties. The State should also study the feasibility of linking these two systems to quickly provide interoperable communications to the majority of the State.

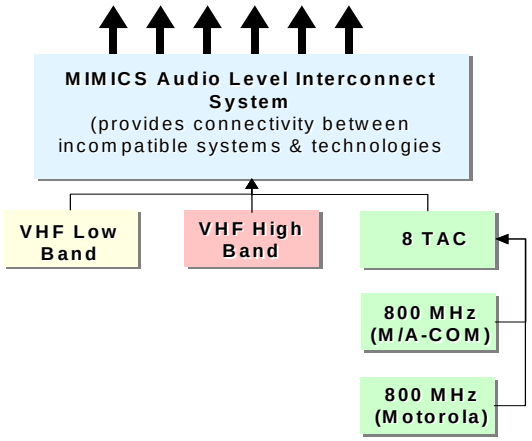

Figure 5-4 MESIN Project Functional Elements

As illustrated in *Figure* 5-4, the capabilities introduced through implementation of MESIN will create a number of the functional elements found in the technical architecture for the project service area. It will provide:

- 8TAC Mutual Aid Deployment
- IP Based (MA/COM) Proprietary Audio Level Interconnect System
- 800 MHz Radio Interfaces
- VHF High Band Radio Interfaces
- VHF Low Band Radio Interfaces
- Connectivity to the Statewide Microwave Infrastructure
- Connectivity to the MIMICS Statewide Audio Level Interconnect System.

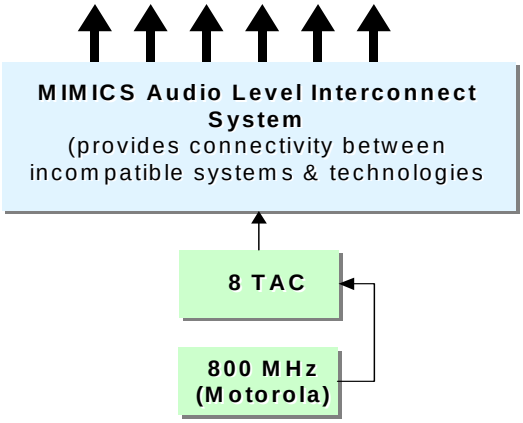

Figure 5-5 CMARC Project Functional Elements

Likewise, as illustrated in *Figure* 5-5, the CMARC project will also create a number of the functional elements found in the technical architecture for its project service area (refer to *Figure* 3-2). The project will provide the following elements:

- 8TAC Mutual Aid Deployment

- An IP Based Proprietary Audio Level Interconnect System (Motorola)
- 800 MHz Radio Interfaces
- Connectivity to the Statewide Microwave Infrastructure.

Objectives:

- **Review the Engineering Plan for each system and determine the potential for scope changes that increase support for the technical architecture.**
  - Complete an engineering review of the existing design to determine if additional coverage or channels may be required to support potential future users and develop a program to provide future expansion.
- **Review the engineering plans for the regional radio systems to determine solutions for interconnection with the other systems.**
  - Review the regional system architecture for each participating agency to determine optimum technical interconnect and operational coordination method for inclusion in the appropriate system
  - Develop technical and operational standards for system inclusion.

B. Partnering-Short term

Ensuring the participation and support of all stakeholders in the planning, oversight, and implementation process will help to ensure success as well as foster collaboration and interoperability between organizations. The State is in the process of facilitating the evolution of a governance structure in the SIEC and PSC that continues the State, County, and Municipal partnerships developed in the GWG and SIEC. This partnering will increase efficiency, provide economies of scale and help in obtaining federal grant funds. Such partnering will also ensure a workable governance structure to oversee and manage change.

Beyond the technology challenges of creating and benefiting from a statewide public safety communications system are the human challenges that must be overcome. The hurdles of the human challenge require that the public safety stakeholders from Municipalities, Counties, and the State partner to successfully achieve the Vision. Partnering will ensure alignment among stakeholders and to realize and leverage the benefits of the emerging capabilities and system. Partnering will enable coordination, sharing, and realization of synergies from wisely directing scarce resources in a coordinated manner. Partnering will require compromise from all sides. Partnering will necessitate a fair and equitable governance structure, clear well-defined goals, and utilization of constraints and incentives to achievement of the common good. The focus for the short term is to develop and foster partnerships and relationships between Municipal, County, and State entities begun in the SIEC and GWG and now carried through to the SIEC and PSC.

Objectives:

- **Governance Structure**: Formalize and refine membership and role of a Public Safety Communications Interoperability Committee to guide.
- **Complete an operational systems model for the technical architecture developing appropriate standards.**
  - Conduct a detailed assessment of roles, responsibilities, and requirements taking into consideration the role played by non-traditional public safety entities such as utilities.
- **Develop a standard operations procedure (SOP) day-to-day, tactical, and mutual-aid communications.**
  - Develop a Concept of Operations (CONOPS) to govern how entities will operate, with whom they will communicate, and how that can be achieved most effectively based on the assessment and the various standards guidelines such as NIMS. The Concept of Operations will aid in partnering and collaboration. A detailed operational model is dependent on the technology employed in building the system and the operational methods and requirements of the various agencies utilizing the system. To facilitate the development of this model it will be necessary to conduct a detailed study of these methods and requirements. Maryland has developed a general model to define the role of the various functional groups and physical systems involved. This general model is shown in *Figure* 5-6.
- **Develop a program for optimizing system control and operation.**

  - Identify any functional gaps in coordination
  - Identify areas where there is excessive redundancy.

- **Develop a Memorandum of Understanding that could be utilized as a baseline with all stakeholders.**

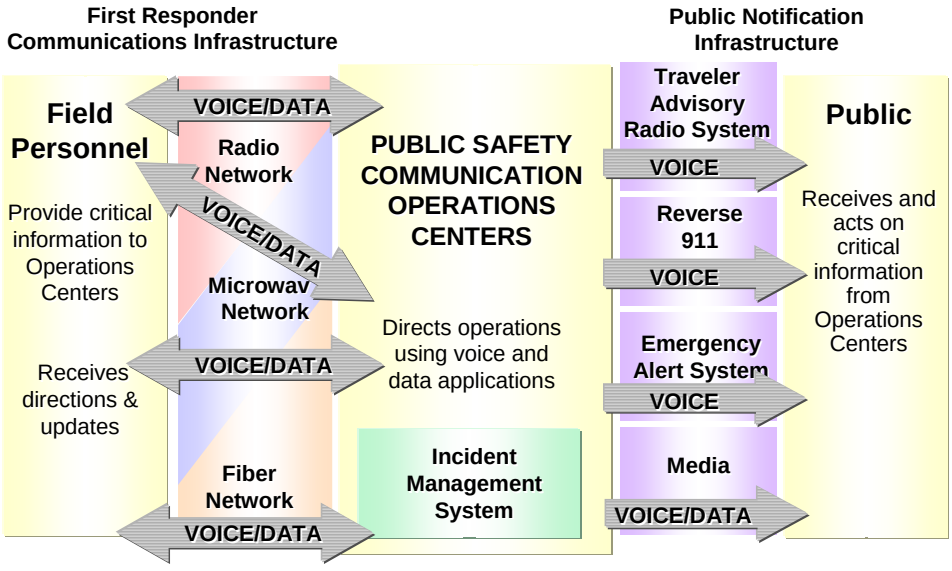

Figure 5-6: Operational Model

In Maryland's Operational model, the public safety communications centers (i.e. EOCs – shown in the center of the graphic) serve as focal points for incident resolution and communication. Operations centers communicate with field personnel to gather information about a given incident. After analysis, the EOC provides guidance or support to the field personnel for coordinated incident response. The EOC concurrently serves as a focal point for providing critical information and guidance to the public.

C. Information Sharing-Short Term

Mobile data capability in the hands of first responders increases their responsiveness and reduces the amount of voice traffic required to respond to most incidents. Current data projects focus on fixed operations centers and data availability. The value of data is directly related to the ability of users to find and process it in a timely manner. The data and Information Management conceptual model defines the functional components necessary to make data valuable to the first responder. The data subsystem must provide access to an array of data repositories at all levels of government. Data must be presented so as to offer actionable information to a variety of responders relative to a given incident. The collaboration of these various individuals and agencies provides for the optimum resolution to any incident. Short Term goals and objectives for information sharing are designed to provide immediate increases in first responder use of data systems.

Objectives:

- **Develop standards for data storage/access (data dictionaries), interfaces (protocols and software platforms) and delivery methods (last mile technologies).**

  - Develop hardware and software standards for data subsystem components.

- **Deploy messaging capabilities and Incident Management applications to facilitate collaboration at EOCs using applications such as WebEOC and EMMA.**

  - Continue IMS component development based on forecasted user needs and periodic requirement determinations.

- **Support our Interoperability Partners in the NCR with the Data Exchange Hub (DEH) and NCRnet.**

D. Capacity-Short Term

The long-term success and achievement of both the public safety voice and data systems are directly linked to the availability of a statewide backbone and infrastructure subsystem. The existence of a high capacity terrestrial infrastructure is a critical core element of a statewide interoperable system. Maryland's plan adapts existing systems

that have been installed to date to allow for the increased requirements of the technical architecture for public safety communications and interoperability. To meet the objectives for statewide public safety communications and interoperability, Maryland is working to identify and commit the resources to complete the statewide infrastructure backbone of towers and microwave network. This infrastructure will ensure system availability and is designed to support plans for the 700 MHz system so that it can quickly be implemented once the frequencies are released.

Since 1999, the State Wireless Infrastructure Committee (and now, the technical subcommittee of the PSC) has been planning, overseeing, implementing, and administering the basis of a statewide infrastructure by constructing towers throughout the State. In the short-term, the State will support, fund, and encourage continuation of this effort under the governance of the new SIEC. The Statewide Wireless Infrastructure Program will provide the core foundation component of the envisioned public safety communications and interoperability technical architecture. The Statewide Wireless Infrastructure will allow for the immediate interconnection of public safety communications architecture components over significant distances at very high speeds via microwave. The existing structure locations serve as communications consolidation points. Each structure serves as an integration point in the overall public safety communications architecture. A short-term benefit of the statewide wireless infrastructure is the potential availability of support structures for the short-term architecture objectives.

A detailed analysis of the statewide wireless infrastructure project was created through the assistance of a consultant and a multi-jurisdictional, multi-disciplinary project team, to ensure that the network is sized and configured to support the envisioned public safety communications and interoperability architecture. This analysis was used to create a project implementation plan, and was used in the development of a request for proposals (RFP) for network additions or modifications to support the envisioned 700 MHz system. Backbone architectures typically experience longer life cycles than the systems they support so design considerations must also be made to ensure the long term availability of this resource while adjusting to the technological changes which have occurred since its inception in 1999.

The SIEC and PSC will collaborate to establish program and project management for the continued build out of the infrastructure.

Combined with the capabilities provided through Net.Work.Maryland, this will provide the backbone and infrastructure subsystem for a statewide public safety communications system as envisioned. The continued deployment of Net.Work.Maryland can be leveraged to provide an enterprise backbone for many State public safety communications projects. The Net.Work.Maryland infrastructure can be utilized to support the immediate interconnection of the envisioned public safety communications architecture components over significant distances at very high speeds via fiber. This network also can provide access to many of the data resources necessary to support first responders. Combined with the Statewide Wireless

Infrastructure Project, Net.Work.Maryland can add communications path redundancy to the envisioned public safety communications technical architecture while creating technical and physical path diversity.

Short Term capacity objectives will ensure that the foundation exists to support the information transportation requirements of the envisioned public safety communications technical architecture.

Objectives:

- **Conduct detailed analyses of the two backbone projects to move forward in leveraging them in support of the IPT's vision for statewide public safety communications.**
  - Determine optimum interconnect methods between the two transport networks to increase redundancy and robustness of both networks. This will have a positive impact on all systems utilizing either backbone architecture.
  - Develop phased interconnection program to enhance both network's reliabilities

- **Verify the ability of the infrastructure and Net.Work.Maryland to support the bandwidth and coverage requirements of any proposed statewide, converged voice and data system.**
  - As a detailed design of the technical architecture is identified through the selected 700MHz system vendor, the State needs to determine the backbone transport requirements.
  - Ensure the backbone architectures (Net.Work.Maryland and Statewide Wireless Infrastructure) can support the bandwidth requirements of the envisioned public safety communications technical architecture as well as other future or current systems.
  - Forecast bandwidth backhaul requirements for the technical architecture and ensure sufficient capacity remains available based on the preliminary design
  - Conduct periodic reviews of the bandwidth requirements and capacity to allow for required system capacity increases in a timely fashion.

- **Support and encourage continuation of infrastructure development under the governance of the new SIEC.**
  - Continue to develop partnering agreements to increase the system coverage and capacity throughout Maryland and beyond its borders where appropriate.
  - Based on previously developed standards, create a program for new agencies and systems to be integrated into the technical architecture.

- **The governance body will collaborate to establish program and project management for the continued build out of the infrastructure.**

E. Position For The Future

Maryland needs to ensure that it is well positioned for the future. Current interoperability projects lay the foundation for state-of-the-art standards based voice and data systems that will have the necessary capacity to meet operational needs. Short-term action needs to ensure that governance structures, funding, legislation, and plans are in place to ensure that over the next few years activity to achieve interoperability is more coordinated and moving toward the achievement of a common goal.

Planning for 700 MHz Statewide System

Planning has been completed for the statewide architecture using the new frequencies that are scheduled to become available. This plan will provide additional urgency to release these frequencies and allow for adjustments to the core subsystems in a timely and cost effective manner.

Accelerated preparation must occur to make use of the new 700 MHz public safety frequencies when they are made available. The 700 MHz frequencies necessary may be available as early as February 17, 2009. On Sept. 28, 2004 a U.S. Senate amendment was approved as part of S. 2845--the National Intelligence Reform Act--requiring broadcasters to clear 24 MHz of spectrum currently used for analog TV channels 63, 64, 68 and 69. The State's goals and objectives as laid out for: Interoperability; Partnering; Information Sharing; and Capacity lay the foundation for supporting the envisioned public safety communications and interoperability architecture.

Objectives:

- **Complete detailed Planning and Engineering for a statewide public safety communications and interoperability architecture using the new 700 MHz frequencies**[20].

  - A verified and updated inventory has been completed of dispatch centers, towers, shelters, generators, and fencing around tower/shelter/generator facilities that may be used for this new system. This included information on:
    - Dispatch centers geographical location, age, condition, HVAC size, electrical service size, and space available for new consoles

[20] See Appendices for draft channel plan, functional requirements and system implementation plan.

  - Tower age, type, geographical location, height above ground, antennas by location on each tower leg, and condition
  - Shelters age, type, condition, HVAC size, electrical service size, and space available in shelter for new equipment
  - Generators age, size, and type
  - Fencing age, type, and condition
- The conditions for the use of the 700 MHz channels have been reviewed
- Developed a plan for using the interoperability channels in the 700 MHz band
- Consultants have developed a potential channel plan for the statewide 700 MHz channels taking into account traffic loading and usage of these same channels by States adjacent to Maryland
- Members of the SIEC and PSC have undertaken efforts to build support from key stakeholders: agency executives and staff, the Governor's office, Legislature and the Budget Office
- The Department of Information Technologies (DOIT) with a development team has prepared an RFP with detailed requirements, system performance standards, and criteria for evaluation of responses.
- SIEC and PSC leadership has identified the most appropriate sources of capitol funding for phase 1 of this project

5.3.2 INTERIM ACTION PLAN

Interim action takes place between one and five years. In the Interim period, it will be necessary to further consolidate activities to achieve interoperability and improve public safety communications. In the short term, the State will have identified the best of breed models for interoperability, established a firm picture of the "As Is" and taken steps to facilitate coordinated movement toward achievement of the envisioned "To Be".

A. Interoperability -Interim

In the interim action plan, the State envisions expanding upon and leveraging existing capabilities while increasing coverage, or system accessibility for public safety and emergency response personnel to eliminate the 'fish out of water' situation where the only way for support personnel to communicate in emergencies is for the host jurisdiction to provide radios from a cache. This expansion will widen the opportunities for interoperability from planned events and emergency collaboration toward the goal of day-to-day interoperability.

1) Statewide Mutual Aid Infrastructure

The State plans to create a statewide multi-band mutual aid channel infrastructure by integrating the CMARC, MESIN, and MIMICS programs into a network of networks. This would offer the following benefits:

- A statewide audio level interconnect capability (leveraging the network of MIMICS gateways)
- Statewide support of TAC-Stack functionality
- 8TAC/NPSPAC system deployment in the CMARC, and MESIN service areas
- Proprietary IP-based audio level interconnect capabilities in each of the respective service areas (this provides a diversity for including other jurisdictions until standards are available which provide interoperability amongst the different manufactures).

The resulting architecture would provide mid term interoperability to a majority of the State's geographic area and a significant majority of the population. When combined with the statewide wireless infrastructure fiber and microwave infrastructure projects, this integrated network would enable realization of a significant portion of the envisioned technical architecture for public safety communications & interoperability. The integrated network as illustrated in *Figure* 5-7, would also serve as the foundation for the long-term technical architecture expansion through out the remainder of the State.

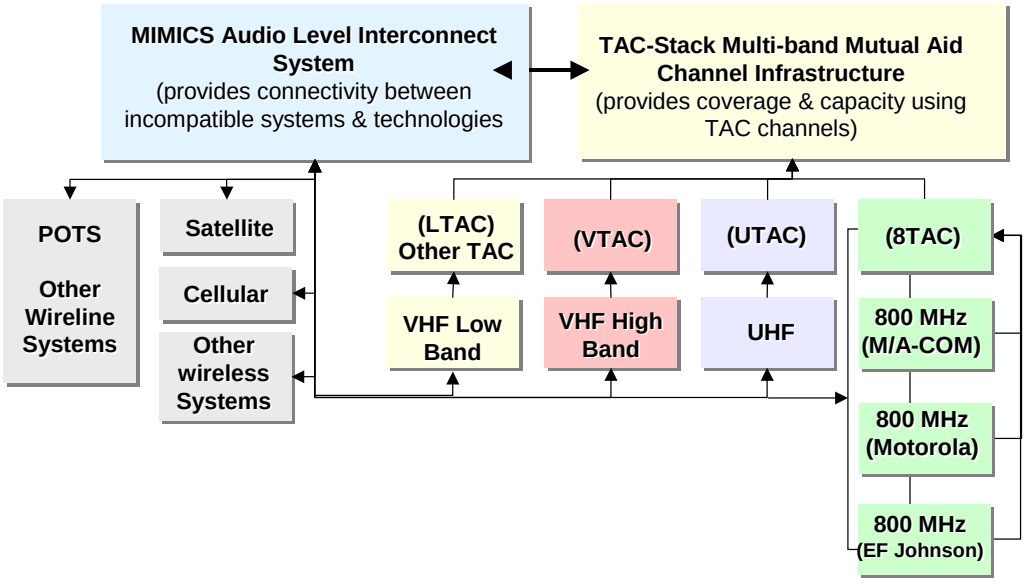

Figure 5-7 Integrated Network Functional Elements

Objectives:

- Continue development of interconnections within the plan for each system to increase support for the technical architecture
- Complete plans for robust, redundant system interconnections between all the major regional communications systems (CMARC, MESIN)

2) TAC-Stack Implementation

Realizing the significant investment in communications assets and the typical usage cycles for this equipment, the State plans to continue implementing 'stacks' of mutual aid channels throughout the State where appropriate by tying together the different mutual aid channels: VTAC, UTAC, and 8TAC/NPSPAC. These TAC-Stack systems would be strategically located throughout the State where justified by need. The State also plans to create one or more mobile TAC-Stack units that could be deployed to support incident response demands.

TAC-Stack Objectives:

- **Continue planning, development, implementation, and deployment of TAC-Stack providing increased coverage and channel/band capacity where needed.**
  - Based on the regional demands and availability of funding, optimize TAC-Stack deployment by maximizing area coverage, mutual aid channel re-use, and availability for day-to-day interoperability.

- **Develop a mobile TAC-Stack capability for incident response.**
  - Until a complete statewide architecture is available, create mobile TAC-Stack support platform(s) to provide incident coverage or additional coverage in under built areas.

B. Partnering-Interim

In the interim action plan, the State will formalize a governance structure that continues and expands upon the State, County, and Municipal partnerships already underway. This partnering will increase efficiency, provide economies of scale and help in obtaining additional federal grant funds.

Objectives:

- **Create a formal group charged with the management of the technical architecture to increase efficiency and provide economies of scale.**
  - Continue development of formal oversight bodies.
  - Seek legislation establishing authority

- **Obtain additional funds through partnering and grant activity.**

C. Information Sharing-Interim

The interim action plan for Information sharing is the rollout of mobile data access to public safety personnel. It will be necessary to facilitate data transport – possibly using the Net.Work.Maryland intranet infrastructure. This will enable a greater degree of security since data will be traveling on a private State-owned system and will not be relying on the public Internet. It will also be necessary to address data standards, data dictionaries, meta-data, and facilitate horizontal fusion of data using XML or some other tagging and sorting system to make the right data available quickly to responders and decision makers in a form that they can utilize and that will enable and facilitate greater coordination or activity, early awareness of potential man-made threats, and enhance sharing of communications and situational awareness in emergency response activities.

Objectives:

- Large-scale rollout of mobile data access to public safety personnel.
- Continue resource development to facilitate data transport – using the Net.Work.Maryland intranet infrastructure.
- Complete data standards, data dictionaries, meta-data and data interfaces for widespread compatibility.

    - Facilitate horizontal fusion of data.

D. Capacity-Interim

In the interim action plan, through the oversight and management of the governance body, and in collaboration with County and Municipal government, the State will continue to fund the build out of the statewide wireless infrastructure, the microwave and fiber networks. This funding will include budget for operations and maintenance: routine inspections, painting, mowing of grass, replacement of parts, and stockpiling of critical spares. In the interim period, the governance body, in cooperation with the selected 700MHz system vendor, will conduct a detailed coverage study and assessment to assure the optimum placement of towers to ensure statewide coverage and quality of service. This will also assist in ensuring that the network is robust and the design includes redundancy so that there is no single point of failure.

Interim capacity plans are designed to ensure that the infrastructure development progresses to support and enhance the envisioned public safety communications technical architecture.

Objectives

- **Obtain funding to include budget for operations and maintenance: routine inspections, painting, replacement of parts, and stockpiling of critical spares.**
    - The State needs to take action to establish guidelines and standards that will ensure consistent and appropriate maintenance of the public safety

communications technical architecture to ensure maximum life cycle productivity from the system and each of it's components
- Develop preliminary maintenance budget requirements and begin development of ongoing funding solutions.

- **Conduct a detailed coverage study and assessment to assure the optimum placement of towers to ensure statewide coverage and quality of service for the planned implementation of the 700 MHz system[21].**
  - As part of the detailed 700 MHz design, determine optimum locations for towers to be included in the public safety communications technical architecture
  - Provide contingencies and cost/ benefit analysis for existing locations to optimize funding dollars
  - Based on the preliminary system design, determine optimum support structure locations
  - Develop incentives for use of optimum locations and existing assets in close proximity.

E. Positioning for the Future

Interim actions should position the State to immediately capitalize on release of the 700 MHz frequencies to quickly deploy a statewide IP-based voice and data. The deployment of TAC-Stack capabilities will increase system capacity and coverage to ensure that there are no 'fish out of water' in emergency response situations. The IP and bridging technology will ensure that all existing systems and networks can be integrated into the network. The Governance structure will assure operational as well as technical standards and plans are in place to move to the long-term vision.

5.3.3 LONG TERM ACTION PLAN

In the long term (2010-2020), the State anticipates implementing a statewide 700 MHz digital voice and data network run by the cooperative efforts of a Governance Board composed of State, County, and Municipal officials as well as by functional experts.

A. Interoperability-Long Term

Current interoperability projects lay the foundation for a state-of the-art standards based voice and data system that will have the necessary capacity to meet operational needs. Planning in detail for a long-term statewide architecture using the new frequencies that are scheduled to become available in the 700 MHz band must be

[21] A draft tower plan is has been created, however, vendors that submit proposals will have additional input into locations based on the RF engineering and signal propagation of their own proposed equipment.

concluded. The existence of this plan will provide additional urgency to release these frequencies and allow for adjustments to the core subsystems in a timely and cost effective manner.

Objectives currently underway:

- **Complete detailed design for a standards-based; open architecture statewide 700 MHz public safety communications system.**

  - System design of potential final technical architecture has been completed
  - Developed preliminary 700 MHz statewide system design based on forecasted requirements.
  - Optimized preliminary design to utilize existing Maryland assets.
  - Begin all spectrum related planning and licensing when appropriate.
  - Publish technical & financial requirements for system implementation
  - Identify foundation components and begin the legislative and administrative processes (licensing and permitting) required for the successful and timely completion of the project.
  - Develop operational concept.
  - With the release of the 700 MHz RFP on July 9th, 2008, the procurement process has begun and an award is expected to be made during 1st Quarter, 2009.

B. Partnering-Long Term

In the long-term, the governance body will support the implementation of public safety communications plans statewide. The governance body will facilitate communications, mediate disputes, ensure oversight and explore technical options as well as track finances for public safety communications. Long term goals and objectives for partnering are focused on ensuring elected official support for continued implementation of public safety communications plans statewide.

C. Information Sharing-Long Term

Long-term solutions for data involve implementation of the statewide enterprise system for public safety communications. The IPT's long-term vision for data provides for a converged voice and data network allowing the presentation and manipulation of data by first responders through the same radio subsystem using standards-based incident management systems. In the long-term, the governance body will support continued rollout of mobile data through the statewide infrastructure. It will be necessary to continue the interim efforts toward data standardization, cataloging, and utility through development and implementation of applications. Reliance on the Enterprise Architecture and Concept of Operations should facilitate this effort.

Long Term information sharing recommendations are designed to provide ubiquitous data availability and management through the technical architecture. Long-term recommendations include:

- Implementation of the converged statewide enterprise system for public safety communications allowing the presentation and manipulation of data by first responders through the same radio subsystem.
- Development and implementation of standards-based incident management systems.
- Complete rollout of mobile data through the statewide infrastructure.
- Continue the mid term efforts toward data standardization, cataloging, and utility through development and implementation of applications.

D. Capacity-Long Term

In the long-term, the SCIP envisions achieving increased capacity through completion of the statewide infrastructure begun in 1999. The governance body will oversee implementation of the statewide 700 MHz public safety communications system. Budget should include revenue for Operations and Maintenance as well as establish funding for technology refreshment and replacement.

To ensure successful realization and long-term viability of this network, it will be necessary to maintain sufficient network capacity. The State will need to embrace open standards and establish maintenance programs.

Objectives:

- **Budget should include revenue for Operations and Maintenance.**
- **Establish a fund for technology refreshment and replacement.**
  - As part of the detailed 700 MHz design, optimum locations for towers will have been included in the technical architecture
  - Provide contingencies and cost/ benefit analysis for existing locations to optimize funding dollars.

5.3.4 Summary of the Proposed CMARC Trunking System

The Baltimore Urban Area Workgroup (BUAWG) is comprised of the Cities of Annapolis and Baltimore and the Counties of Anne Arundel, Baltimore, Carroll, Harford and Howard. In 2001 the BUAWG created a subcommittee called Central Maryland Area Radio Committee (CMARC) to address one of the most pressing public safety issues, wireless communications interoperability. The subcommittee planned and implemented a system, the Central Maryland Area Radio Communications System also called CMARC. This system consists of 28 tower sites and 9 dispatch centers including a control point at the Maryland Emergency Management Agency {MEMA}) with infrastructure to utilize the National 800 MHz Calling and all 4 Tactical channels. The system is also expandable to include any of the mutual aid channels from any

band. Each dispatch center is able to manage system resources using a sophisticated, computerized network management system. The CMARC system provides regional coverage (encompassing all BUAWG jurisdictions and soon to expand into Frederick County) and enables communications with any subscriber radio programmed with the 800 MHz nationwide channels designated for public safety communications interoperability.

The majority of the CMARC member agencies operate 800 MHz trunked systems utilizing National Public Safety Planning and Advisory Committee (NPSPAC) channels. Federal and regional NPSPAC regulations mandate that a system licensee also operate on these channels. The CMARC group, which provides interoperability over a population base of more than 2.6 million people, almost half of Maryland's population, has found that as planned by the Federal and regional regulations these 5 channels are the single common communications thread among all 800 MHz users.

The message content on the National 800 MHz Calling and Tactical channels is regulated for only non-regular emergency communications. Neighboring agencies that regularly assist each other on assignments may not use these channels for Mutual Aid. CMARC members regularly assist each other, roam into neighboring jurisdictions and participate in regional task forces. The 800 MHz utilization, within many local systems, has become the regular operational system for some state agencies (MIEMSS and MSP) and is growing within others (DNR, Fire Marshall, MDOT and SHA).

Federal and regional NPSPAC regulations mandate the radio coverage of a system not to exceed, but for a short distance, the geographic area of the licensee. This coverage restriction affects not only the regional task forces, but normal activities like an ambulance transport to a regional trauma center.

The proposed system is a wide area radio network of multiple cells or zones. The sites are equipped with varying numbers of channels based on the number of radios deployed within a given sector. Both 700 and 800 MHz frequencies can be used for the channels in the system. All of the sites are under the control of a primary network control node. The control node manages trunking features, call processing functions and the routing of audio from site to site based on talkgroups in the network. The control node will also manage the programming of mobiles and portables. Additional control nodes can be added to the system for enhanced redundancy as the network expands to accommodate additional agencies.

The proposed system leverages the existing CMARC infrastructure of 28 RF sites, and 9 regional dispatch centers by adding equipment and radio frequencies. This amounts to trunked, simulcast radio communications throughout the region. The fleet map database would determine which sites or cells are activated by pre-designated talkgroups.

There is an existing P-25 system serving the BWI Marshall Airport and could serve as the initial prime site. The statewide 700 MHz frequencies could be available now,

mixed with existing local agency 800 MHz frequencies while additional 700 MHz band frequencies will be available after Feb 2009.

In accordance with Dept of Homeland Security guidelines, this system will be based on radio technology that complies with all adopted Project 25 open standards. This enables true interoperability in the region as the jurisdictions in the region have embraced P25 for their radio system technology. In addition, CMARC members, and state agencies have begun purchasing P25 capable radios to be used on their own and neighboring systems. Compliance with P25 will enable competitive procurement from a number of manufacturers.

Presently, each of the six jurisdictions within the CMARC region operates an 800 MHz radio system of one of three different Motorola system generations. Each of these systems has a different but similar roadmap/timeline for replacement or upgrade. In addition, several state agencies have a need to upgrade their existing system by improving coverage or compliance with new FCC regulations. A common wide area trunked simulcast P25 network not only provides enhanced communications to all participants, but also becomes an efficient economical public investment due to the synergies achieved by shared investment in one integrated infrastructure. Every agency can maintain local control of their users and needs. The result is that each agency can have independence while enjoying a regional system of interoperability.

This solution can truly be a collaboration of multiple state and local government agencies within the region. Every existing and future member of CMARC and the participating state agencies can directly benefit from this system. CMARC has an existing governance structure for this proposed system, although expansion and legislation is anticipated.

The implementation of this system can begin, as was done in the original CMARC system, with an initial deployment providing on-street coverage within the Baltimore Beltway area (I-695). In later phases additional sites can be added to provide expanded radio coverage over the entire region to provide for enhanced in-building penetration.

The phased deployment outlined below follows the initial deployment steps of the CMARC system for national interoperability.

1. Construct the initial sites within the I 695 Beltway and link into the existing P25 System Master Site at BWI Marshall Airport which has two sites. The existing CMARC dispatch centers can access the system with control stations on the CMARC MotoBridge system.

2. Add sites to provide a greater coverage footprint over the necessary coverage area.

3. Add additional channels to support the audio traffic demands of each jurisdiction within the coverage cells or zones.

4. Replace outdated subscriber radios and add more users.

5. Add enhanced dispatch capabilities to each dispatch center should they integrate their daily operations into this system.

6. Implement interoperable data communications as equipment is available.

The proposed solution can serve as the foundation for normal operations and interoperability with all state and local agencies located within the coverage area. The proposed system is capable of expanding beyond the Central Maryland region to provide radio coverage over the entire State of Maryland and even beyond. A statewide system enhances interoperability since local jurisdiction boundary lines and single tower coverage will no longer be a constraint, and seamless roaming will be achieved. The system is not designed with the unique needs of one agency in mind.

Expansion of the BWI system to within the I 695 Beltway and a site near Annapolis along with PSIC funds and existing state funds will provide the immediate needs of several state agencies and CMARC members and provide an excellent demonstration and launch platform for a greater statewide radio communications system.

Expected Timeline For Completion of Project 25 Phase 2 Standards

- April 2007 - High Level P25 Phase 2 attributes approved (2-slot TDMA, 12 Kbps, extended 9.6Kbps control channel, etc)
- April 2009 - TDMA Task Group expected to complete all required TDMA documents[22]
- April 2010 - TIA/TR8 Committee formally publishes standard. Review and Comment period completed.

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[22] Just to complete the TDMA portions the following documents must be created:

- Dual Rate Vocoder
- Two-Slot TDMA Common Air Interface (CAI)
- Additions to the Phase 1 Trunking Standards for Phase 2
- Additions to the Phase 1 Encryption Standards for Phase 2
- Two-Slot TDMA CAI Measurement Methods
- Two-Slot TDMA CAI Performance Recommendations
- Two-Slot TDMA CAI Conformance Tests
- Two-Slot TDMA CAI Interoperability Tests

- 2011/2012 - Vendors shipping fully compliant products based on published standard

BWI Migration Issues to P25, Phase 2

- The Gold Elite consoles can migrate to Phase 2 through a software upgrade in the existing Motorola Gold Elite Gateway. The simulcast controllers and voting comparators will have to be replaced to migrate the system to Phase 2
- The STR base stations cannot be upgraded to Phase 2. However, the BWI system can operate with the existing two sites as FDMA and the new CMARC sites as TDMA. The new CMARC sites can either be stand alone repeaters sites or in various simulcast cells. The Master site will be smart enough to route calls intelligently and make it invisible to the users in the field.
- In the total scheme of things, we should consider replacing the STR's. It will be a small price to pay to get the regional system going towards TDMA trunking.
- A feature called dynamic frequency blocking allows the demonstration system to be constructed using the same frequencies at all sites. The controllers will not key up a repeater on the same channel simultaneously thus avoiding interference. This feature may help get the demo system up and deployed quickly across a wide area without having to garner a lot of frequencies right away.

5.3.5 Maryland Eastern Shore Interoperability Network (MESIN)

The Maryland Eastern Shore Interoperability Network (MESIN) is proposing to expand four additional 800 MHz NPSPAC (Worcester, Somerset Dorchester, and Queen Anne's) sites throughout the shore and to install VHF/UHF at eight sites (Worcester, Somerset, Ocean City, Wicomico, and four in Kent), and provide console enhancement at the10 dispatch centers.

The benefit of 800 MHz site expansions is to provide additional interoperability to the existing MESIN Network. The addition of the VHF/UHF sites increase regional mutual aid communications capabilities with the Commonwealth of Virginia, the State of Delaware and Maryland State Agencies currently operating on VHF/UHF systems.

5.3.6 Deployment of a Southern Maryland 5-Channel 800 MHz NPSPAC Conventional Overlay Network

St. Mary's, Calvert, and Charles Counties are also seeking to complete a 5-channel 19-site 800 MHz NPSPAC conventional overlay network to foster greater mutual aid interoperability between the disparate public safety radio systems in use in Southern Maryland. Specifically, the three Counties would like to create the capability for all 19 RF remote sites in use in Southern Maryland to have transmit/receive 800 MHz NPSPAC conventional mutual aid functionality on all five nationwide mutual aid

channels (i.e., 8CALL, 8TAC1, 8TAC2, 8TAC3, 8TAC4). Relying on eventual OC-3 microwave connectivity architected to interconnect Southern Maryland, each of the County PSAP's would be capable of accessing any of the 19 NPSPAC transceiver sites in Southern Maryland.

Console Integration of Interoperability Control Stations

Eventual Southern Maryland plans are to augment current voice radio interoperability capabilities by integrating several radio control stations with existing console electronics equipment to facilitate monitoring and patching of neighboring radio systems with the local public safety 800 MHz radio system. Specifically, plans include the integration of interoperability control stations operational on the following neighboring public safety radio systems:

- St. Mary's County, MD
- Charles County, MD
- Calvert County, MD
- Prince George's County, MD
- Fairfax County, VA
- Prince William County, VA
- Stafford County, VA
- King George County, VA
- Alexandria, VA
- Arlington County, VA
- Washington, DC.

Further technical studies are required to develop a more complete technical and cost management roadmap and PSIC funds will help achieve these goals.

5.3.7 NCR integration of Mutual Aid Channels

Long-term plans for Maryland's area of the NCR include an expansion of the interoperability overlay started by the Central Maryland Area Radio Communications (CMARC) system that would include Montgomery, Prince George's and Frederick Counties. CMARC is a regional overlay that provides public safety access to the five 800 MHz interoperability mutual aid channels designated by the Federal Communications Commission (FCC), a capability that does not uniformly exist throughout the NCR region.

The proposed project uses advanced technology in conjunction with existing infrastructure to improve the region's efficiency and enhance interoperable communications. This project is cost-effective in that it takes maximum advantage of the existing infrastructure. The counties benefiting from expansion of the CMARC system are a high risk for natural disasters, particularly severe storms. Additionally, these counties are at high risk from terrorism threats due to their proximity to the

Nation's Capital. Montgomery and Prince George's counties both border Washington, DC.

The goal of this project is to deploy infrastructure to Montgomery, Prince George's and Frederick counties for region-wide use of the National calling and Tactical Channels. These channels will provide another "layer" of communications interoperability for this region of emergency services providers.

Further technical studies are required to develop a more complete technical and cost management roadmap and PSIC funds will help achieve these goals.

5.4 National Incident Management System (NIMS) Compliance

The Maryland SCIP promotes and supports the use of National Incident Management System (NIMS) through anticipated synchronization with Maryland's "Statewide Homeland Security Strategic Plan" and the action plans contained therein.

This approach promotes NIMS compliance through multi-disciplinary working groups and committees that ensure all aspects of NIMS remain at the forefront during strategic planning.

MEMA is responsible for monitoring NIMS compliance for local, state, and government agencies. Policies and procedures are in effect to track and report NIMS compliance activities for all governmental response, emergency preparedness and incident management organizations. NIMS implementation progress is measured at all levels of government by MEMA.

The State of Maryland is presently in full NIMS compliance. Maryland began compliance with the Federal Homeland Security Presidential Directive #5 (HSPD-5) by adopting the National Incident Management System (NIMS). On March 4th, 2005, Executive Order 01.01.2005.09 established NIMS as the state standard for emergency management, directed all state agencies to adopt NIMS in cooperation with local jurisdictions and selected the Maryland Emergency Management Agency (MEMA) to coordinate and facilitate ICS/NIMS training throughout the state. MEMA along with county EMA's as well as statewide training partners have been instrumental in transitioning the state to plain language communications and achieving common terminologies for an all-hazards emergency response approach.

NIMS compliance stipulations are also incorporated into sub grantee contract language and are part of sub grantee monitoring. Eligibility to receive federal preparedness funding in FFY 2008 is contingent upon state and local jurisdictions meeting NIMS implementation requirements.

The Maryland SCIP anticipates compliance with the National Incident Management System (NIMS) and the National Response Plan through eventual revisions and

synching with goals and objectives contained in the Maryland Statewide Homeland Security Strategic Plan.

It is anticipated that later drafts of Maryland's SCIP will include NIMS and National Response Plan goals that compliment the SIEC's interoperability goals. These goals will strengthen response capabilities that prepare first responders and citizens for All-Hazards Events.

The role that Public Safety Interoperable Communications (PSIC) funded equipment will play in enabling or improving NIMS compliance will be to further the interoperability of all agencies and jurisdictions that are awarded PSIC funding. This role is critical to the replacement of old technology that is in use throughout the state at all levels of government. Modern equipment will facilitate the interagency communications that NIMS procedures seek to standardize by enabling better use of the Incident Command System.

Local jurisdictions, as well as state government agencies, are responsible for following requirements:

- Adopt NIMS for all government departments and agencies.
- Manage all emergency incidents in accordance with the Incident Command System.
- Coordinate and support incidents through the use of Multi-Agency Coordination Systems.
- Communicate information to the public through a Joint Information System and Joint Information Center.
- Establish the communities' NIMS compliance baseline.
- Coordinate Federal preparedness funding to implement the NIMS.
- Revise and update standard operating procedures to incorporate the NIMS.
- Participate in and promote mutual aid.
- Complete the IS-700 course.
- Complete the IS-800 course.
- Complete the ICS 100 course.
- Complete the ICS 200 course.
- Incorporate NIMS into training and exercises.
- Participate in all-hazards, multi-jurisdictional/discipline exercise based on the NIMS.
- Incorporate corrective action into response plans and procedures.
- Inventory response assets to conform to resource typing standards.
- Ensure relevant national standards are incorporated into equipment acquisition programs.
- Apply standard terminology across the public safety sector.

The state of Maryland and MEMA are responsible to local entities for the following support and leadership:

- Monitoring formal adoption of NIMS.
- Communicating implementation requirements.
- Measuring progress.
- Facilitating reporting.
- Ensuring federal preparedness funding is linked to satisfactory progress.
- Including implementation compliance reviews in audits.
- Monitoring and assessing outreach efforts across the state.

The state of Maryland is committed to ensuring NIMS compliance and training are at the forefront of our strategic planning efforts.

5.5 Review and Update Process

This draft of the SCIP was based upon the prior work of the IPT, but was reformatted, updated and coordinated with the SIEC, PSC, Federal, Regional, State and Local partners.

Following the submission of the SCIP for the December 3rd PSIC application deadline, the SCIP has continued to evolve in Maryland. Part of the intended outreach program designed to engender support for statewide interoperability efforts, is the plan to reach out to local jurisdictions. Within six months of the final PSIC application submission, statewide coordinators have met with representatives from every county to acquire feedback and information regarding interoperability needs, planning and future outlook. It is anticipated that the SCIP undergo yearly updates, which shall be driven by the SIEC.

Version 3.0 will be a 6 Month review to incorporate county feedback. This will be completed by July 28th, 2008.

Version 4.0 will be a comprehensive review and update of plans, including goals accomplished through the use of PSIC funds and status updates of the statewide 700 MHz radio system. This will be completed by July 28th, 2009.

Version 5.0 will be a comprehensive review and update of plans, including goals accomplished through the use of PSIC funds and the overall result of the PSIC program in Maryland and the region. This will include updates on the 700 MHz radio system as well as significant updates on data interoperability. This will be completed by July 28th, 2010.

Further full-version updates of the SCIP will be developed yearly by July 28th, or as needed.

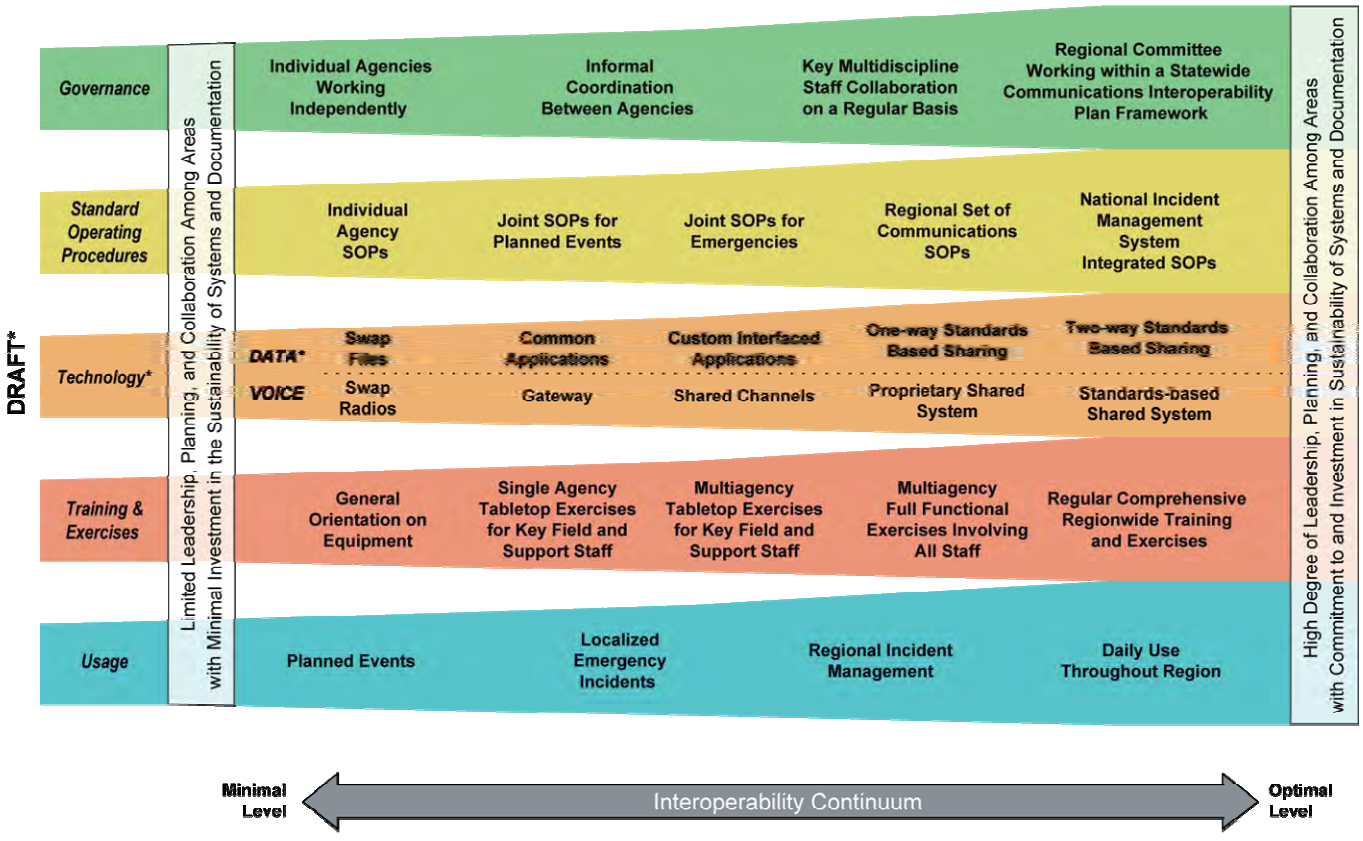
5.6 Performance Measures

The Interoperability Continuum is designed to help the emergency response community and local, tribal, state, and Federal policy makers address critical elements for success as they plan and implement interoperability solutions.

The Interoperability Continuum was developed in accordance with the SAFECOM program's locally driven philosophy and its direct input from practitioners in the Emergency Response Council (ERC). The Safecom ERC is composed of a large group of first responder practitioners from around the country. The ERC is charged with providing guidance and input to the SAFECOM Executive Committee (EC), and - through the EC - to the DHS Office of Emergency Communications (OEC) and the Office of Interoperability & Compatibility (OIC).
The Continuum was established to depict the core facets of interoperability according to the stated needs and challenges of the emergency response community and will aid emergency responders and policy makers in their short- and long-term interoperability efforts.

Making progress in all aspects of interoperability is essential, since the elements are interdependent. Therefore, to gain a true picture of a region's interoperability, progress along all five elements of the Continuum must be considered together.

The end goal for interoperability in Maryland is to reach the optimal level of interoperability for all critical elements for success on the continuum.



* Draft status applies only to the Data Lane within the Technology section.

Figure 5-8: Project Safecom Interoperability Continuum

What follows is a self-assessment of where Maryland falls along the continuum of various success factors for interoperability. The progress that is made along this scale will enable policy makers to track progress of the statewide interoperability initiative.

Governance:

- Maryland's current interoperability governance structure is *very high on the continuum*. Our current SIEC and PSC involve regional committees working within a Statewide Communications Interoperability Plan framework.
- Following the optimal level of interoperability governance, several regional committees already exist that report to the Statewide Interoperability Executive Committee (SIEC). Within the next few months, all interoperability regions within the state will be incorporated under regional interoperability committees. This has been expressed through a signed executive order, and eventually will be formalized through legislation as well.
- Each county and Baltimore City will provide a representative to serve on the proposed regional interoperability committees. Once established, regional performance measures will be identified and added to the statewide communications interoperability plan.
- The PSC, along with the State Interoperability Coordinator will review all public safety communication project requests. This is not intended to serve as a bottleneck for project management, but a method for ensuring adequate awareness across disciplines as well as multiple levels of state and local government.
- The Program Management Office (PMO) will work in conjunction with the PSC to ensure that interoperability projects within the state receive effective project management and technical support.

Standard Operating Procedures:

- Maryland's current set of Standard Operating Guidelines (SOPs) are *reasonably high on the continuum*. There are several regional sets of SOPs for communications, most notably including the CMARC and MESIN systems.
- Continuance of statewide NIMS compliance through increased training and the use of the NIMSCAST tool, along with future operational governance from the SIEC operations subcommittee will assist in developing NIMS compliant SOPs for statewide use.
- Safecom grant guidance for 2008 has put an emphasis on the processes that are involved in interoperability. The next generation of federal interoperability grants will assist in developing NIMS compliant SOPs for statewide use.
- In 2008, the PSC will develop an SOP template(s) for use in all regions of the state.

- The PSC will support planning activities that result in the development of five regional and one statewide SOP for interoperability (to include a distribution and exercise plan).

Technology (Voice):

- Voice communications in the state are *reasonably high on the continuum*. Whereas every part of the state can communicate through gateways, only certain portions of the state have shared channels and/or proprietary shared systems.
- Long term voice interoperability involves the implementation of a statewide 700 MHz radio system. This system will be a standards-based shared system that will provide seamless operations statewide with the ability to connect with other local and regional systems. While relying on past and current infrastructure investments, this system will also be advanced through PSIC grant funds as well as currently set-aside state funds.
- The SIEC will support the advancement of regional and statewide implementation of the national mutual aid channels (i.e. VTAC, UTAC, 8TAC, and TAC-Stack). While currently limited to the Central Maryland and Eastern Shore regions, PSIC funds will help determine a roadmap for implementation of these channels into Southern Maryland and the NCR. Once the Western Maryland's WAGIN system is in place, then its functionality regarding mutual aid channels will be further examined.
- Presently, mutual aid channels directly cover 54% of the state's population and 57% of the state's geography. With the addition of console cross-patching, mutual aid channel coverage reaches 86% of the population and 67% of the state's geography. It is anticipated that by 2013, Maryland will achieve 99% population coverage and 95% geographical coverage for radio support of the mutual aid channels.

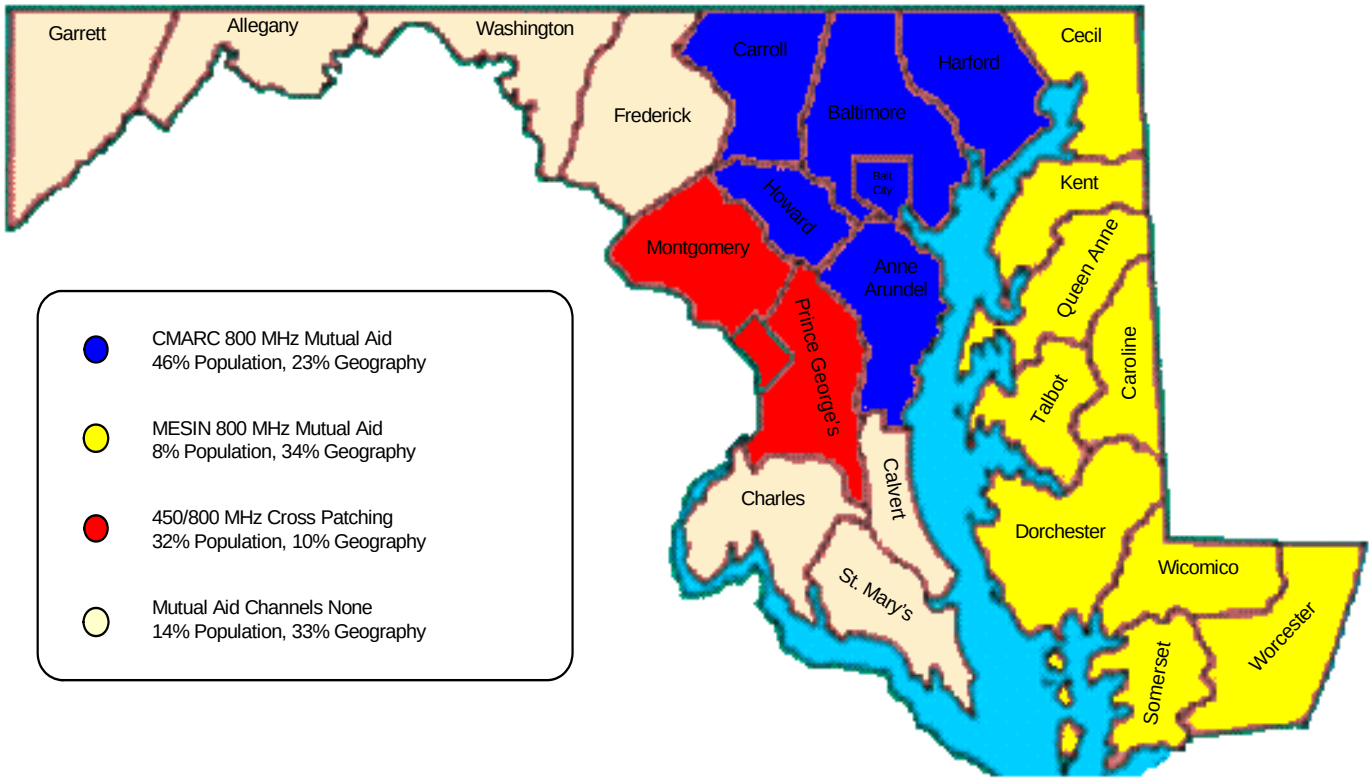


Figure 5-9: Mutual Aid Channel Coverage in Maryland

- The future deployment of a statewide 700 MHz system will promote P25 compliance statewide. By 2013, Maryland should achieve 95% geographical coverage and 99% population coverage for P25 compliant radio systems. The statewide 700 MHz radio system will be a state of the art, P25, Phase 2 compliant system.

Technology (Data):

- Data communications standards are *reasonably high on the continuum* in Maryland through the use of proprietary shared systems such as WebEOC, CapWIN and EMMA.
- The statewide 700 MHz radio system will be capable of pushing low speed data for standards-based statewide text messaging alerts. Currently, the portions of the 700 MHz spectrum that are set aside for broadband data have yet to be assigned in the FCC spectrum auction. Once these determinations have been made, statewide data interoperability planning can address these issues for this portion of the spectrum. Eventually, standards-based shared systems will be able to push high-speed data for a wide range of applications statewide including pictures, video, and a statewide CAD/RMS system.

- In 2008, enhancements are expected to be added to the EMMA GIS project to support CapWIN and other platforms. These enhancements will begin as one-way standards based sharing and proceed to two-way standards based sharing for statewide data platform support.
- In 2008, Maryland anticipates an expansion of the state's health and medical data sharing platform. This will eventually be a two-way standards based sharing of data in conjunction with the state's EMMA GIS and WebEOC platforms.
- To provide real-time data exchange with law enforcement databases and the dissemination of officer safety alerts, at least 75% of the patrol vehicles in each region of Maryland will have mobile data terminals (MDTs) installed by the end of 2008. Progress will be noted by achieving these goals for state law enforcement agencies and local law enforcement agencies in the Northern, Southern, Eastern Shore, Western and Central Maryland regions.
- All Maryland law enforcement officers will be afforded access to vital criminal justice information and intelligence databases through the continuing use and expansion of CapWIN.
- Within the next 3 years, Maryland anticipates the deployment of an interoperable statewide Computer Aided Dispatch/Records Management System (CAD/RMS). Whereas many local PSAPs in the state dispatch and monitor both local and state public safety officers from one-way standards based systems, this project anticipates statewide integration into a two-way, standards based data system.
- Within the next 3 years, Maryland anticipates the integration/coordination of state and local closed circuit television (CCTV) resources, in order to provide comprehensive review and analysis of critical surveillance data.
- The Maryland Coordination and Analysis Center (MCAC) will be appropriately funded to sustain operations in the development and dissemination of actionable intelligence products related to the State's homeland and hometown security.
- The expansion/addition of regional Information Centers will be appropriately staffed and funded to identify and track regional crime problems. These regional centers will enhance the speed at which information is analyzed and disseminated through one-way standards based systems.
- Every Maryland jurisdiction is working towards having a real time, 24/7 biosurveillance system that has access to a wide span of data, including: symptoms presenting in emergency rooms and to paramedics, over-the-counter sales of pharmaceuticals, animal carcass pick up and other important public health data.
- There is a goal to increase the number of hospitals in the State reporting data into ESSENCE. The percent of hospitals reporting data currently is 32%, the goal in next 12 months 70%, the goal in next 24 months 100%. While this is presently a one-way standards based data system, within 2 years, Maryland anticipates that it become a two-way standards based system. Additional goals for this system include:
    - Expanding the integration of over the counter (OTC) medication data reporting into ESSENCE.
    - Expanding the number of jurisdictions in Maryland reporting OTC medication data from two existing pharmacy chains that currently report

into ESSENCE. Current – 8%, next 12 months – 33%, next 24 months 100%.

- Expanding the number of major chain pharmacies that have over 20 outlets reporting OTC medication data into ESSENCE. (Add two chains every year)
- Incorporating school absenteeism data into ESSENCE. Goal 70% in the next 24 months
- Incorporating poison control center data into ESSENCE and combining the data from both poison control centers. Goal 100% in the next 12 months.
- Incorporating animal surveillance data from the Department of Agriculture into ESSENCE. (Avian Influenza Migratory Waterfowl monitoring program). Goal 100% in the next 12 months.
- Monitoring bed availability – hospitals have the capability to report bed availability twice in 24 hours. Currently 100%.

Training and Exercises:

- Presently, interoperability exercises are often multi-agency tabletop exercises for key field and support staff; thus *moderately high on the interoperability continuum*.
- Safecom grant guidance for 2008 has put an emphasis on the processes that are involved in interoperability. The next generation of federal interoperability grants will assist in developing training and exercises for statewide usage and will ensure that MEMA and statewide interoperability planners will be able to improve on the working relationships and processes that are key to interoperability.
- Maryland anticipates at least one tabletop exercise per year per region that supports regional and statewide communications interoperability.
- Maryland anticipates adding specialized exercises for strategic deployable communications resources that support Mobile Command Units (MCUs), radio caches, Site On Wheels (SOWs) and other such technologies designed to restore or temporarily support damaged infrastructure.
- Within the next 2 years, Maryland plans to procure a ***Learning Management System*** to synchronize training offerings and promote and track credentialing statewide.
- Training sessions include FEMA developed and state conducted courses such as “Basic Public Information Officer” and “Mass Care Management” as well as ICS required coursework, specialized training such as WebEOC training, COML and COMT training for integration into TICPs in both the Baltimore and NCR UASI regions.

Usage:

- Currently interoperability usage is *moderately high on the continuum* with regional incident management interoperability available for certain regions of the state, while others only involve interoperability for localized emergency incidents.

- Several projects for PSIC grant funding involve the study and eventual expansion of the 800 MHz mutual aid channels statewide. These channels will help achieve regional incident management.
- PSIC funds have also been designated to assist with the next generation of CMARC. CMARC will eventually achieve region-wide roaming for daily use throughout the central Maryland region.
- Additionally, the statewide 700 MHz system, upon being operational will achieve optimal levels of usage for daily use in operations throughout the state.

5.7 Critical Success Factors

As stated before, the end goal for interoperability in Maryland is to reach the optimal level of interoperability for all critical success factors on the Safecom continuum. Each step taken in furtherance of interoperability is important, but certain elements of these programs are critical to the future success of Maryland's Interoperability program.

The table below identifies where Maryland is rated on the interoperability continuum along with actions or measures to be accomplished, in consideration of the objectives outlined in section 5.3. It must be stated that the factors that have been selected are a beginning and as the program moves ahead, additional necessary actions will be realized and incorporated into this plan.

Table 5-1 Critical Success Factors

Section	Continuum Score	Critical Success Factors/Action	Target: Month/Year
Governance	5 of 5		
		Identify and coordinate funding sources	Ongoing
		Issuance of the Governor's Interoperability Executive Order	Completed
		Finalize and release RFP for 700 MHz statewide radio system	Completed
		Finish establishing regional interoperability committees in all regions	10/2008
		Refresh membership in the state	10/2008

		interoperability governance structure	
		Institute PSC grant review and recommendation for multiple funding sources	7/2008
		Establish Interoperability Project Management Office to manage statewide projects	12/2008
		Develop standard templates for MOUs to be used with and among local jurisdictions	1/2009
		Propose state legislation to support the statewide interoperability governance structure and funding	1/2009
		Hire consultants for PMO project management support.	1/2009
		Ratify formal charter for SIEC and PSC	2/2009
Standard Operating Procedures	3 of 5		
		Enhance existing regional Standard Operating Procedures	Ongoing
		Ensure SOPs include all appropriate NIMS requirements	Ongoing
		Develop a standard statewide SOP template	1/2009
		Establish regional interoperability SOPs for regions without them	1/2009
		Establish a statewide SOP document supporting local and regional SOPs.	5/2009
Technology (Data)	3 of 5		
		Continue to support and enhance existing data platforms such as EMMA, CapWIN, WebEOC, and the Health/Medical Data Platform including Essence.	Ongoing
		Procurement and construction of a CAD/RMS system for state agencies with interoperable linkage to local agencies.	Funding Dependent (initiate by 7/2009)
		Complete data connectivity (PSINET) to all 9-1-1 centers, hospitals, local health departments.	4/2010
		Support the effort to place MDTs in first responder units	1/2011

		Expansion of the statewide health and medical data platform for alerting, system status monitoring (EMS, hospitals), and patient tracking.	2/2011
Technology (Voice)	3 of 5		
		Support the continued build out of the statewide microwave and fiber infrastructure.	Ongoing
		Support the establishment of local and regional mutual aid channel deployment.	Ongoing
		Review the engineering plans for regional radio systems to determine solutions for interconnection through MIMICS	10/2008
		Incorporate existing inventory of assets (infrastructure, systems, user equipment, dispatch, communications centers) into the CASM tool	4/2009
		Construction of a statewide 700 MHZ interoperable communications system	Start 4/2009
		Completion of the Western Maryland Interoperability Project (WAGIN).	4/2010
		Expansion of the 800 MHz mutual aid channels into all regions.	2/2013
		Continue planning, regional phased approaches, construction and strategic placement of TAC Stack units with VTAC, UTAC, and 8TAC	In Progress/ Funding Dependent
Training/ Exercises	4 of 5		
		Maintaining a minimum of one table top exercise per region per year is expected	Ongoing
		Maintaining a minimum of one specialized functional exercise involving command units, radio caches, and Sites on Wheels.	Ongoing
		Specialized training remains available for WebEOC, EMMA, and other data platforms.	Ongoing
		The joint procurement of a learning management system to provide support for communications interoperability training for first responders.	3/2010 - Funding Dependant

Usage	3 of 4		
		Continue to support interoperability usage for planned events.	Ongoing
		Continue to support the usage of interoperability for emergency events.	Ongoing
		Support the use of interoperability technology for regional events as well as on a daily basis.	Ongoing
		Establishment of clear SOPs regarding the use of interoperability technology and when and how to utilize the assets.	7/2009

6 Implementation

The State of Maryland plans to deploy a wireless communications system that will provide State, local, and regional public safety first responders with interoperable voice and data services that support daily and emergency operations. The purpose of this Plan is to define and establish the strategy and technical architecture for a statewide, interoperable wireless radio system to support public safety voice and data communication requirements. This particular report provides recommended options for deploying a statewide interoperable radio system and defining a pragmatic implementation strategy.

System Overview

Maryland has developed specifications required to build a statewide radio network supporting routine operations and interoperable communications for State agencies, county government agencies, municipal government agencies, and local public safety organizations within the jurisdictional operating areas of these entities including areas of joint operations.

The Statewide Radio System must provide gateways for, interface to, and operate with all of the following existing land mobile, microwave, and wide area network systems:

- Maryland State Police: Low Band VHF Statewide Land Mobile Network
- Maryland Department of Natural Resources: Statewide Land Mobile Network operating at Low and High Band VHF and UHF
- Maryland Institute for Emergency Medical Service Systems:
    - Statewide Land Mobile Network operating at UHF
    - Statewide Microwave Backbone and Transport System
- Maryland Department of Transportation: Low Band VHF Statewide Land Mobile Network
- Maryland Department of Corrections: Statewide System of Independent Land Mobile Networks
- Maryland Department of Juvenile Services

System Description

The State of Maryland Interoperability System will consist of a multi-site, multicast digital architecture, controlled by two or more central or primary controllers, and linked by a combination of microwave, fiber optic, and wire line links. The system will include new towers developed specifically for its design. It will also make extensive use of existing tower sites and existing data communications links operated by a number of public safety entities, including local, county, and regional assets in addition to assets controlled or operated by the State or State entities.

Respondents to the RFP issued on July 9th, 2008 will provide specific proposals regarding the proposed systems, features and requirements that will include details regarding the following categories:

6.1 Implementation Plan and Project Milestones (by region)

6.2 Implementation Phases for Each Region

Tasks include installation, turn-up, and testing of the systems and sites in accordance with the acceptance test plan. The required functionality, performance, and equipment specifications of all user and field devices shall be verified.

6.2.1 Control Centers/Dispatch Centers

6.2.2 Wireless Infrastructure/Base Stations

6.2.3 Network Infrastructure

6.2.4 Subscriber Equipment

- Programming of user and field devices including, but not limited to Mobile radios, Portable radios, and Vehicular repeaters.

6.3 Project Schedule

The project schedule shall include, but is not limited to the following milestones:

1. Final design review date
2. System manufacture and integration time frames
3. Pre-shipment system integration and staging dates
4. Factory/staging acceptance test dates
5. Shipping dates
6. System installation and optimization dates
7. Field acceptance test dates
8. Installation configuration audit date
9. Operational Test
10. Cutover plan and schedule
11. Coverage testing dates
12. Training dates

6.4 Project Organization

A project organizational chart must identify by name and contact information for all key personnel, plus the name and contact information of the executive officer (of the company) responsible for assuring compliance with project specifications, project schedules, and problem resolution.

6.5 Project Management

Project management services shall include, but not be limited to:

1. Weekly task item status reports
2. Monthly project status meeting
3. System design and final design review
4. Implementation planning, scheduling, and coordination
5. Management of all system integration activities
6. Installation and optimization
7. Acceptance testing
8. Migration and cutover planning
9. Maintenance support
10. Subcontractor management
11. Monthly update of the CPM schedule
12. Maryland Standard Section 109 CPM schedule
13. Coordinate access to all sites with the State Project Manager.

6.6 Project Engineering

Project engineering services shall include, but not be limited to:

1. Final system design and review
2. Frequency analysis and planning
3. Coverage prediction and acceptance testing
4. Fleet map planning
5. Template development/approval
6. System configuration
7. Implementation support
8. Final system documentation

9. Resolution of technical problems

6.7 Inspections / Testing

6.8 Materials and Equipment List

6.9 Schedule

The schedule will include dates for the following minimum activities as they pertain for each region:

1. Submittals
2. Submission of equipment orders
3. Template / Fleet Map Development
4. Delivery of equipment
5. Benchmark testing
6. Factory acceptance testing
7. Start of installation
8. Completion of installation
9. Acceptance testing

Template/Fleet Map Development

Acceptance Test Plan

Phasing Plan

6.10 Interference Analysis

6.11 Design Document and Shop Drawings

1. This Design Document shall include:
    a. Detailed system description
    b. RF link budget for each transmitter/receiver location.
    c. A diagram of all major system components and locations with RF signal levels at the input and output of all active components
    d. Rack layouts of equipment
    e. Detailed steps taken to mitigate any interference identified.

6.12 Record Documents and Drawings

6.12.1 Test Results

6.12.2 Operation, Maintenance, and Service Manuals

The manuals shall include the following:

1. Complete maintenance instructions, wiring diagrams, troubleshooting instructions;
2. System service instructions for Work which the manufacturers recommend be performed by the users;
3. Complete parts lists for each major item of equipment and/or system supplied;
4. Complete collection of manufacturers' product and catalog literature for equipment and systems installed;
5. Manufacturers' warranties;
6. Operating characteristics, performance data, ratings, and manufacturers' specifications for each item of equipment or system;
7. Name, address, and telephone number for service for each item of equipment or system;

6.12.3 Training Plan

The Contractor shall provide a Training Plan that describes the methodology by which designated personnel will be provided system management, operational and maintenance training for the 700 MHz system and associated equipment.

6.12.4 Software User Documentation

6.12.5 Installation, Transition, and Continuity of Operations

The plan shall also cover the following, including but not limited to:

1. Physical installation of hardware
2. Installation of software
3. Installation of mobile and portable radios
4. Training
5. Installation schedule and procedures, to ensure that equipment is installed in a logical sequence as well as a timely manner without sacrificing quality.

6.13 Dispatch Center Installation and Cutover

6.14 Vehicle Installation

6.14.1 Decommission of Existing Radio

6.15 Scope of Work for Warranty and Maintenance Services

6.15.1 Maintenance Plan and Procedures Manual

This manual shall include, descriptions of the maintenance management system, internal controls, safety practices and detailed procedures for all anticipated preventive and corrective work.

6.15.2 Records

The Offeror shall provide monthly activity reports on the status of maintenance and repair problems to detect significant patterns and trends.

6.15.3 Warranties and Guarantees

The Offeror shall provide to the State of Maryland, all equipment and services guarantees and warranties.

6.15.4 Preventive Maintenance

Within the Maintenance Plan and Procedures Manual, the Offeror shall describe procedures and activities to be performed as part of the preventive Maintenance program, including:

a) Inspection and periodic replacement of all filters.
b) Cleaning and dust treatment of fixed radio equipment and accessory systems.
c) Cleaning and dust treatment of all mobile and portable radios and accessories.

1. Check that all hardware and software is working properly.
2. Inspection of control center equipment including, but not limited to:
   a) Servers,
   b) Software
   c) Computer equipment, such as keyboards, monitors, mice, storage drives, etc.
3. Inspection of WAN and LAN equipment, such as routers, bridges, and switches, and perform manufacturers diagnostic tests.
4. Inspection and performing manufacturer's diagnostic tests of the two-way radio system.

5. Inspection and cleaning of all fixed equipment at all the State of Maryland and shared tower sites.

6.15.5 Spare Parts and Equipment Assemblies

The Offeror shall provide all necessary spare parts, equipment assemblies and tools required to fully maintain and operate the two-way radio system.

6.15.6 Corrective Work

The Offeror shall provide full operations support for all components furnished under this contract twenty-four (24) hours per day and seven (7) days per week.

6.15.7 Hardware Maintenance and Support

The Offeror shall be responsible for all aspects of system hardware Maintenance and support during the warranty and maintenance periods.

6.15.8 Software Maintenance and System Administration

The Offeror shall be responsible for all aspects of system software Maintenance and system/database administration during the warranty and Maintenance periods.

6.15.9 Software Change Notification Service

The State of Maryland shall be informed of alterations, modifications and updates for all software provided within this Project.

6.15.10 Software Licenses

The Offeror shall grant to or obtain in the name of the State a perpetual, non-revocable, non-transferable, and non-exclusive license to use the Software and documentation related thereto for the 700 MHz Radio System provided.

6.16 Training

The training shall address the following topics:

1. Overview training of the system technology and setting user expectations for non-technical personnel.
2. Management training for administrative and management personnel who will be responsible for defining and maintaining the system's configurable parameters.

3. User equipment operator training for designated trainers on the operation of portable radios, mobile radios, and control stations. The training may be conducted using a “train-the-trainer” format.
4. Console Workstation equipment operator training for dispatchers and their supervisors.
5. Maintenance training for technicians on maintaining and troubleshooting all equipment to the unit, board, or component level as appropriate.

6.17 Software Updates

7 Funding

Several Maryland State agencies have identified funding for a phase one of the proposed 700 MHz statewide communications system. They include the Maryland Transportation Authority, the State Highway Administration, the Maryland Transit Administration, the Maryland State Police and the Maryland Aviation Administration. These agencies will represent several thousand users on the system. The funding identified by the state agencies listed above coupled with PSIC funds total more than 90 million dollars.

The SIEC and the PSC are aware that there is presently no long-term funding plan in place for statewide interoperability efforts. However, Governor O'Malley has selected Interoperability as one of his top priorities and the SIEC can anticipate significant support from the Governor's office in terms of funding requests and budget priorities.

On July 27, 2007, Governor O'Malley released a twelve-point set of core goals[23] for an all-hazards preparedness approach in Maryland. The first two points in the governor's address speak directly to interoperability (both voice and data) and his commitment to support those goals for Maryland:

- ***Interoperable Communications***—*First responders in Maryland should have access to a fully digital, trunked radio system which all response partners can access in order to transmit and receive voice and data. First responders in every region should have robust CAD/RMS systems capable of coordinating dispatch data for all response partners and capable of transmitting data to systems such as WebEOC for consolidation and roll up of regional CAD data.*
- ***Intelligence/Information sharing***—*Law enforcement officers in every region in Maryland should have the ability to transmit and receive law enforcement database information from the field and share that information on a real-time basis. Maryland's fusion center should share useful and actionable information from the field and from regional and federal counterparts with every jurisdiction on a real time basis.*

The regional interoperability projects have secured significant funding in order to implement those systems. A summary of those systems' funding is provided below:

- CMARC Funding[24]
  - Phase I funding of CMARC has been provided by a $915,000 Urban Area Security Initiative Grant from the U.S. Department of Homeland Security, Office of Emergency Preparedness, through MEMA
  - Phase II funding of CMARC has been funded by a $5 million COPS grant from the U.S. Department of Justice

[23] See Appendix for Governor's Preparedness Goals, 7/27/07
[24] Upcoming drafts intend more detailed views of CMARC funding.

- MESIN Funding[25]
  - In September 2003 Worcester County was awarded a $5.6 million dollar federal grant to develop an interoperable communications project.
  - In 2006, Accomack and Northampton counties in Virginia have received $52,000 in grant funding for granting them access to MESIN as an important mutual-aid tool.

- NCR Radio Cache[26]
  - Late in 2003, the MWCOG Fire Chiefs' Committee asked the Fire Communications Sub-Committee to develop UASI grant proposal, in coordination with our law enforcement partners, to procure a radio cache of 1000 portable radios for the National Capital Region
  - Using more than $5.2M of UASI funding, three caches of radios are available

- Tower Budget Plans
  - For the past 8 years, there have been consistent infrastructure investments in the range of $5-10 million per year, for a total investment in excess of $50 million.
  - For the current and upcoming fiscal years, FY2008 allocated $7.5M and FY2009 is requested at $9.0M for the State Public Safety Communications Infrastructure Project. Additionally, SHA and MIEMSS have allocated a combined $4M since FY2005 through FY2008 for tower infrastructure.

The Plan for Developing a Comprehensive Funding Strategy

One of the responsibilities of the SIEC is to seek support, including possible federal or other funding, for state sponsored wireless communications systems. The SIEC and the PSC also must identify sustainable funding sources for system implementation and recurring costs, such as equipment replacement and operation costs. State agencies and locals jurisdictions alike will be encouraged through PSC outreach efforts to fund interoperability projects from their own resources in order to ensure their sustainability.

Through continued collaboration between state and other agencies, mutual funding resources will be sought to address joint state/regional interoperability projects.

[25] Upcoming drafts intend more detailed views of MESIN funding.
[26] Upcoming drafts intend more detailed views of NCR funding

8 Conclusion

The state of Maryland, in close coordination with its local partners, has been working to address public safety communications interoperability for many years. Its partnerships on backbone infrastructure (towers, microwave network, net.work.Maryland fiber) as well as systems (MIMICS, CMARC, MESIN) have done much to improve interoperability. Similarly, mutual efforts to share data utilizing such tools as WebEOC, EMMA, MEGIN and CapWIN have provided wireless field access to real time systems information; which has much improved situational awareness during emergency events. By pursuing the short term/interim/long term objectives outlined in section 5.2, working to implement the planned 700 MHz system and developing funding sustainable strategies, the state of Maryland will meet Governor O'Malley's homeland security goals for interoperability.

Appendix A See Attached Baltimore and NCR TICP Documents.

Appendix B State of Maryland State-Licensed Radio Frequencies

State Agency	Sub Agency	Frequency	Description
Department of General Services	None	153.845	Salisbury Multi Service Center
Department of General Services	None	154.8	Department of General Services Police (Annapolis)
Department of General Services	None	155.025	Annapolis Public Buildings & Grounds
Department of General Services	None	155.775	Police Primary (Statewide)
Department of General Services	None	155.775	Police (Baltimore)
Department of General Services	None	155.835	Baltimore Public Buldings & Grounds
Department of Health and Mental Hygiene	None	154.04	Western Maryland Center (Hospital in Hagerstown)
Department of Health and Mental Hygiene	None	155.265	Spring Grove Hospital Center (Baltimore, "WNPA Control 2")
Department of Health and Mental Hygiene	None	155.325	Holly Center (Salisbury)
Department of Health and Mental Hygiene	None	155.325	Holly Center (Salisbury)
Department of Health and Mental Hygiene	None	461.3	Regional Institute for Children and Adolescents (Rockville)
Department of Natural Resources	None	31.5	Broadneck Office (Southern Area 3)
Department of Natural Resources	None	31.9	Hillsboro Office (Eastern Area 2)
Department of Natural Resources	None	37.08	Hillsboro Office (Eastern Area 2)
Department of Natural Resources	None	37.12	Broadneck Office (Southern Area 3)
Department of Natural Resources	None	37.36	Johnson Office (Eastern Area 1)
Department of Natural Resources	None	37.38	Area 2
Department of Natural Resources	None	37.42	Central Area 5
Department of Natural Resources	None	151.205	Natural Resources Police and Forestry Operations
Department of Natural Resources	None	151.31	Southern Region Park Operations
Department of Natural Resources	None	151.325	Eastern & Western Region Park Operations
Department of Natural Resources	None	151.355	Northern Region Forestry Operations
Department of Natural Resources	None	151.355	Central Region - Forestry
Department of Natural Resources	None	151.415	Northern Region Park Operations
Department of Natural Resources	None	151.415	Central Region - Parks
Department of Natural Resources	None	151.46	Eastern & Western Region Forestry Operations
Department of Natural Resources	None	154.28	Fire Mutual Aid Radio System - Metro Area
Department of Natural Resources	None	155.085	For Charles County Fire - Charles County Fireground
Department of Natural Resources	None	155.475	National Law Enforcement Emergency Frequency
Department of Natural Resources	None	155.61	For Charles County Sheriff - Charles County Sheriff's Office (Channel 2?)
Department of Natural Resources	None	155.85	Mobile Repeaters
Department of Natural Resources	None	156.45	Marine Channel 09 (State Operated)
Department of Natural Resources	None	156.8	Marine Channel 16 (Distress Calling)
Department of Natural Resources	None	159.24	Talk-Around
Department of Natural Resources	None	159.285	Mid Atlantic Region Forest Firefighting Compact Channel
Department of Public Safety and Correctional Services	Department of Juvenile Services	154.8	Charles H. Hickey Reform School
Department of Public Safety and Correctional Services	Division of Correction	153.86	Metropolitan Transition Center (Baltimore)
Department of Public Safety and Correctional Services	Division of Correction	153.905	Maryland Correctional Institution - Jessup
Department of Public Safety and Correctional Services	Division of Correction	153.965	Metropolitan Transition Center (Baltimore)
Department of Public Safety and Correctional Services	Division of Correction	155.12	Western Correctional Institution
Department of Public Safety and Correctional Services	Division of Correction	155.31	North Branch Correctional Institution
Department of Public Safety and Correctional Services	Division of Correction	155.535	Maryland Correctional Institution - Hagerstown
Department of Public Safety and Correctional Services	Division of Correction	155.535	Western Correctional Institution - Primary
Department of Public Safety and Correctional Services	Division of Correction	155.595	Eastern Correctional Institution (Westover)
Department of Public Safety and Correctional Services	Division of Correction	155.61	Western Correctional Institution - Maintenance
Department of Public Safety and Correctional Services	Division of Correction	155.655	North Branch Correctional Institution
Department of Public Safety and Correctional Services	Division of Correction	155.685	North Branch Correctional Institution

State Agency	Sub Agency	Frequency	Description
Department of Public Safety and Correctional Services	Division of Correction	158.925	Baltimore City Jail
Department of Public Safety and Correctional Services	Division of Correction	158.97	Maryland Correctional Institution - Jessup
Department of Public Safety and Correctional Services	Division of Correction	159.03	Western Correctional Institution
Department of Public Safety and Correctional Services	Division of Correction	453.15	Eastern Correctional Institution (Westover)
Department of Public Safety and Correctional Services	Division of Correction	453.45	Maryland Correctional Adjustment Center
Department of Public Safety and Correctional Services	Division of Correction	453.475	Maryland Correctional Training Center (Hagerstown)
Department of Public Safety and Correctional Services	Division of Correction	460.2	Eastern Correctional Institution (Westover)
Department of Public Safety and Correctional Services	Home Detention Unit	37.06	Home Detention Unit (Baltimore/Washington)
Department of Public Safety and Correctional Services	Jessup Area Emergency Warning System	39.1	Jessup Area Emergency Warning System ("Patuxent Control")
Department of the Environment	None	31.34	Bureau of Mines & Environmental Resources Administration/Interoffice
Department of the Environment	None	31.46	Bureau of Mines & Environmental Resources, Command/Water Resources
Department of the Environment	None	37.24	Environmental Services
Department of the Environment	None	155.265	Emergency Response Division, Hazmat Operations (Spill Control)
Department of the Environment	None	172.275	Woodland Pest Control
Department of Transportation	Maryland Transit Administration	160.395	Subway Road
Department of Transportation	Maryland Transit Administration	160.905	Light Rail Road
Department of Transportation	Maryland Transit Administration	161.01	Light Rail Operations
Department of Transportation	Maryland Transit Administration	161.085	Maintenance/Cleaning
Department of Transportation	Maryland Transit Administration	161.475	Subway Yard
Department of Transportation	Maryland Transit Administration	161.565	Subway Maintenance
Department of Transportation	Maryland Transit Administration	494.7625	Police Dispatch/Operations (Baltimore Area Transit)
Department of Transportation	Maryland Transportation Authority	453.475	Police - Ft. McHenry Tunnel/Harbor Tunnel
Department of Transportation	Maryland Transportation Authority	453.575	Police - Bay Bridge Detachment
Department of Transportation	Maryland Transportation Authority	453.575	Police - Francis Scott Key Bridge/Port of Baltimore
Department of Transportation	Maryland Transportation Authority	453.575	Police - Hatem Bridge Detachment
Department of Transportation	Maryland Transportation Authority	453.975	Police - Nice Bridge Detachment
Department of Transportation	State Highway Administration	44.74	Syscom
Department of Transportation	State Highway Administration	47.02	District 5 (Anne Arundel, Calvert, Charles, St. Mary's)
Department of Transportation	State Highway Administration	47.1	District 6 (Allegany, Garrett, Washington)
Department of Transportation	State Highway Administration	47.12	District 7 (Carroll, Frederick, Howard)
Department of Transportation	State Highway Administration	47.14	District 2 (Caroline, Cecil, Kent, Queen Anne's, Talbot)
Department of Transportation	State Highway Administration	47.2	District 3 (Montgomery, Prince George's)
Department of Transportation	State Highway Administration	47.26	Traffic Safety Office
Department of Transportation	State Highway Administration	47.32	Statewide/Emergency
Department of Transportation	State Highway Administration	47.4	District 1 (Dorchester, Somerset, Wicomico, Worcester) and District 4 (Baltimore, Harford)

State Agency	Sub Agency	Frequency	Description
Department of Transportation	State Highway Administration	151.04	Repeats MSP Barrack M (39.24 MHz)
Department of Transportation	State Highway Administration	458.9625	Vehicle Repeater
Emergency Medical Resources Center	None	462.95	Med 9 (Call 1 - Region III)
Emergency Medical Resources Center	None	462.975	Med 10 (Call 2 - Region V)
Emergency Medical Resources Center	None	463	Med 1 (Region V)
Emergency Medical Resources Center	None	463.025	Med 2 (Region V)
Emergency Medical Resources Center	None	463.05	Med 3
Emergency Medical Resources Center	None	463.075	Med 4 (Region III)
Emergency Medical Resources Center	None	463.1	Med 5 (Region V)
Emergency Medical Resources Center	None	463.125	Med 6
Emergency Medical Resources Center	None	463.15	Med 7
Emergency Medical Resources Center	None	463.175	Med 8 (Region III)
Fire/EMS	None	154.28	Mutual Aid - Baltimore Area Primary / Fireground
Fire/EMS	None	154.295	Mutual Aid - Washington Area Primary
Law Enforcement - Baltimore Area	None	460.05	Metro-Net Intersystem
Law Enforcement - Washington Area	None	39.62	Police Mutual Aid Radio System (P-MARS)
Law Enforcement - Washington Area	None	866.3625	Police Mutual Aid Radio System (P-MARS)
Maryland Emergency Management Agency	None	141.06	Emergency Operations Center Link Statewide
Maryland Emergency Management Agency	None	143.04	Emergency Operations Center Link Statewide
Maryland State Police	None	39.04	Barrack P Glen Burnie (Anne Arundel County)
Maryland State Police	None	39.06	Barrack H Laplata (Charles County)
Maryland State Police	None	39.1	Motor Vehicle Administration (MVA) Communications
Maryland State Police	None	39.1	Statewide Mutual Aid between Barracks (MSP-1)
Maryland State Police	None	39.14	Barrack J Annapolis (Anne Arundel County)
Maryland State Police	None	39.24	Tactical/STATE Team (MSP-5)
Maryland State Police	None	39.24	Barrack C Cumberland (LaVale) (Allegany County)
Maryland State Police	None	39.24	Barrack M Perryville (I-95 corridor mile-marker 62 to Delaware line)
Maryland State Police	None	39.26	MARNIS (MSP-2)
Maryland State Police	None	39.28	Barrack U Prince Frederick (Calvert County)
Maryland State Police	None	39.3	Barrack L Forrestville (Prince George's County)
Maryland State Police	None	39.32	Barrack N Rockville (Montgomery County)
Maryland State Police	None	39.34	Barrack O Hagerstown (Washington)
Maryland State Police	None	39.34	Barrack D Bel Air (Harford County) (MSP-3)
Maryland State Police	None	39.36	Barrack Q College Park (Prince George's County)
Maryland State Police	None	39.38	Barrack T Leonardtown (St. Mary's County)
Maryland State Police	None	39.4	Special Tactical Assault Team Element (STATE) Operations
Maryland State Police	None	39.4	Barrack B Frederick (Frederick County)
Maryland State Police	None	39.42	Barrack A Waterloo (Jessup) (Howard County)
Maryland State Police	None	39.44	Barrack R Golden Ring (Baltimore County)
Maryland State Police	None	39.52	Barrack G Westminister (Carroll County)
Maryland State Police	None	39.6	Barrack V Berlin (Worcester County)
Maryland State Police	None	39.62	Washington DC Area Police Mutual Aid Radio System (P-MARS) Simulcast of 866.3625 MHz
Maryland State Police	None	39.64	Barrack E Salisbury (Wicomico County)
Maryland State Police	None	39.66	Criminal Investigation Division (CID)

State Agency	Sub Agency	Frequency	Description
Maryland State Police	None	39.78	Barrack X Princess Anne Detachment (Somerset County)
Maryland State Police	None	39.8	Barrack S Centreville (Kent and Queen Anne's Counties)
Maryland State Police	None	39.8	Barrack W McHenry (Garrett County)
Maryland State Police	None	39.84	Barrack F Northeast (Cecil County)
Maryland State Police	None	39.92	Tactical
Maryland State Police	None	39.96	Barrack I Easton/Denton and Cambridge Det. (Caroline, Dorchester, and Talbot Counties)
Maryland State Police	None	44.74	SYSCOM Medevac Operations
Maryland State Police	None	44.9	Emergency Operations / Nuclear Emergency
Maryland State Police	None	47.5	Civil Defense
Maryland State Police	None	47.66	SYSCOM Medevac to Hospital (Rural Areas)
Maryland State Police	None	151.475	Vehicle Repeaters: Barrack M
Maryland State Police	None	155.19	Portable Radios Barrack-to-Barrack
Maryland State Police	None	155.475	Portable Radios Nationwide Mutual Aid for Law Enforcement
Maryland State Police	None	155.73	Vehicle Repeaters: Annapolis Barrack, Glen Burnie Barrack, Golden Ring Barrack
Maryland State Police	None	159.405	Portable Radios: Special Tactical Assault Team Element (STATE)
Maryland State Police	None	453.35	Executive Protection Unit: Annapolis/Ocean City
Maryland State Police	None	453.725	Executive Protection Unit: College Park/DC Area
Maryland State Police	None	453.75	Executive Protection Unit: Baltimore Area
Public Safety Interoperability	None	151.1375	VHF Tactical 1
Public Safety Interoperability	None	154.4525	VHF Tactical 2
Public Safety Interoperability	None	155.7525	VHF Calling
Public Safety Interoperability	None	158.7375	VHF Tactical 3
Public Safety Interoperability	None	159.4725	VHF Tactical 4
Public Safety Interoperability	None	453.2125	UHF Calling
Public Safety Interoperability	None	453.4625	UHF Tactical 1
Public Safety Interoperability	None	453.7125	UHF Tactical 2
Public Safety Interoperability	None	453.8625	UHF Tactical 3
Public Safety Interoperability	None	866.0125	I-CALL
Public Safety Interoperability	None	866.5125	I-TAC 1
Public Safety Interoperability	None	867.0125	I-TAC 2
Public Safety Interoperability	None	867.5125	I-TAC 3
Public Safety Interoperability	None	868.0125	I-TAC 4
Regional Interservice (RINS)	None	866.8375	RINS 2
Regional Interservice (RINS)	None	866.8625	RINS 5
Regional Interservice (RINS)	None	867.2375	RINS 3
Regional Interservice (RINS)	None	867.4875	RINS 4
Regional Interservice (RINS)	None	867.7625	RINS 6
Regional Interservice (RINS)	None	868.5125	RINS 1

Appendix C Tac-Stack White Paper (see attached)

Appendix D Glossary

ACRONYM LIST

8TAC	800 Megahertz (MHz) Tactical Aid Channel
ABS	Administrative & Budgetary Support
AES	Advanced Encryption Standard
AGILE	Advanced Generation of Interoperability for Law Enforcement
APCO	Association of Public-Safety Communications Officials
ATM	Asynchronous Transfer Mode
AVL	Automatic Vehicle Location
BDA	Bi-Directional Amplifier
CAD	Computer Assisted Dispatch
CapWIN	Capital Wireless Integrated Network
ComCARE Emergencies	Communications for Coordinated Assistance and Response to
CIP	Critical Infrastructure Protection
CMARC	Central Maryland Area Radio Communication
CommTech	Communications Technology Program
CONOPS	Concept of Operations
COPS	Community Oriented Policing Services
COTS	Commercial-Off-The-Shelf
DBM	Department of Budget and Management
DHMH	Department of Health and Mental Hygiene

DHS	Department of Homeland Security
DMIS	Disaster Management Interoperability Service
DNR	Department of Natural Resources
DoD	Department of Defense
DOIM	Department of Information Management
DOJ	Department of Justice
DPSCS	Department of Public Safety and Correctional Services
E911	Enhanced 911
EMMA	Emergency Management Mapping Application
EMS	Emergency Medical Service
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FICC	Federal Interagency Coordination Council
GAO	Government Accounting Office
GHz	Gigahertz
GIS	Geographical Information System
GWG	Governance Working Group
HAZMAT	Hazardous Materials
HS	Homeland Security HS
HSIN	Homeland Security Information Network
HSOC	DHS Homeland Security Operations Center
HVAC	Heating, Ventilation and Air Conditioning

IEEE	Institute of Electrical and Electronics Engineers
IETP	International Educators Training Program
IIU	Internal Integration Unit
IM	Incident management
IMS	Incident Management System
IP	Internet Protocol
IPT	Interoperability Project Team
IR	Intellirepeater
IT	Information Technology
IWN	Integrated Wireless Network
JRIES	Joint Regional Information Exchange System
LMR	Land Mobile Radio
LTAC	Low Band Tactical Aid Channel
MACo	Maryland Association of Counties
MD	Maryland
MEGIN	Maryland Emergency Geographic Information Network
MEMA	Maryland Emergency Management Agency's
MESIN	Maryland Eastern Shore Interoperability Network
MHz	Megahertz
MIEMSS	Maryland Institute for Emergency Medical Services Systems
MIMICS	Maryland Incident Management Interoperable Communications System
MML	Maryland Municipal League
MMRG	Maryland Mapping Resource Guide
MOU	Memorandum of Understanding

MPT	Maryland Public Television
MSP	Maryland State Police
NCC	National Calling Channel
NCR	National Capital Region
NGA	National Governors Association
NIJ	National Institute of Justice
NIMS	National Incident Management System
NIST	National Institute of Standards and Technology
NPSPAC	National Public Safety Planning Advisory Committee
NTACs	National Tactical Channels
NTFI	National Task Force on Interoperability
NRP	National Response Plan
OCTO	District of Columbia (DC) Office of the Chief Technology Officer
ODP	Office for Domestic Preparedness
OIC	Office for Interoperability and Compatibility
OLES	Office of Law Enforcement Standards
OMB	Office of Management and Budget
OTAR	Over-The-Air Rekeying
P25	Project 25 (P25)
PSAPs	Public Safety Access Points
POTS	Plain Old Telephone System
PSWN	Public Safety Wireless Network
PVCs	Permanent Virtual Circuits
RDT&E	Research, Development, Testing, and Evaluation

RF	Radio Frequency
RFP	Request for Proposal
RISS	Regional Information Sharing System
RoIP	Radio over Internet protocol
S&T	Directorate of Science and Technology
SAFECOM	Wireless Public SAFEty Interoperable COMmunications Program
SHA	State Highway Administration
SIEC	Statewide Interoperability Executive Steering Committee
SOP	Standard Operating Procedures
SOR	Statement of Requirements
STARS	Virginia Statewide Agencies Radio System
TAC	Tactical Aid Channel
TCO	Total Cost of Ownership
TIA	Telecommunications Industry Association
UASI	Urban Area Security Initiative
UHF	Ultra High Frequency
USGS	United States Geological Survey
UTAC	Ultra High Frequency (UHF) Tactical Aid Channel
VHF	Very High Frequency
VOAD	Volunteer Organizations Active in Disasters
VTAC	Very High Frequency (VHF) Tactical Aid Channel
WAIS	Wide Area Interoperability Systems
XML	Extensible Markup Language

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