Commonwealth of Virginia

Strategic Plan for Statewide Communications Interoperability

Fiscal Years 2005-2007

SAFECOM

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Executive Summary

Reliable, real time, and adequate wireless interoperable communications is a critical issue for the Commonwealth of Virginia (the Commonwealth). Presently, the majority of local public safety responders cannot communicate with their counterparts in other jurisdictions or at the regional, state, and federal levels. To address this crucial problem, the Commonwealth partnered with SAFECOM[1], a federal program managed by the Department of Homeland Security, to design a **locally-driven** strategic planning approach in enhancing communications interoperability across Virginia that has resulted in this Strategic Plan.[2]

This Plan presents:

- A mission for the Commonwealth Interoperability Coordinator (CIC) and the vision for the Commonwealth's public safety communications interoperability efforts
- Key goals that support the mission and vision
- Specific initiatives that the Commonwealth can perform to achieve the identified goals
- A governance model and the functional requirements necessary for the CIC to implement and accomplish the initiatives
- Recommended next steps that will immediately put the Commonwealth on the path to successful implementation of this Plan and enhancing communications interoperability in Virginia

The locally-driven strategic planning process designed and employed by the Commonwealth and SAFECOM included six regional focus group sessions and a strategic planning session. The purpose of the regional focus group sessions was to capture perspectives from local public safety responders throughout the Commonwealth as the basis for the mission, vision, and initiatives presented at the strategic planning session. The outcome of the strategic planning session was consensus of the mission, vision, and recommended key initiatives based primarily on the data gathered from the regional focus group sessions.

[1] The SAFECOM program's mission is to help local, tribal, state, and federal agencies improve public safety response through more effective and efficient interoperable wireless communications.

[2] This project was supported through a Memorandum of Understanding between the Commonwealth of Virginia and the U.S. Department of Homeland Security's SAFECOM program and an U.S. Department of Justice grant (2003-IJ-CX-K027) from the National Institute of Justice.

The Commonwealth Interoperability Coordinator's mission is to improve public safety in the Commonwealth through enhanced data and voice communications interoperability between local, regional, state, and federal agencies.

As defined by the Commonwealth's public safety community, the vision for communications interoperability is to provide agencies and their employees at the local, regional, state, and federal levels with the ability to communicate at optimal efficiency, in real time, and across disciplines and jurisdictions. Achieving this vision will allow public safety responders to share information more effectively during day-to-day operations and major emergency situations.

The following key goals support the mission and vision and resulted primarily from the local perceptions on communications interoperability:

KEY STRATEGIC GOALS

- **Establish communications interoperability as a high priority**
- **Expand the statewide use of a common language and coordinated communication protocols**
- **Increase interoperability capabilities and coordination by maximizing the use of existing communications systems and equipment and by planning for future technology purchases**
- **Enhance the knowledge and proper use of existing and future communications equipment by providing frequent and routine training for public safety personnel**

This Plan provides a framework that if implemented in conjunction with existing interoperability efforts, such as STARS, will dramatically improve communications interoperability throughout the Commonwealth. Currently, there is not a single system or technical solution that will solve interoperability for 100 percent of localities or state agencies.

Maintaining forward momentum on improving communications interoperability requires timely action on the goals and initiatives outlined in this Plan; failure to do so may jeopardize the local level support established during the strategic planning process. Therefore, the CIC will focus on the following critical activities in the next 90 days of implementing this Plan:

CRITICAL NEXT STEPS

- Submit a proposal to fund initiatives outlined in this Plan to the Commonwealth Preparedness Working Group for consideration by August 15, 2004

- Conduct the first Executive Committee meeting by September 30, 2004 to support and facilitate the implementation of the communications interoperability initiatives

- Launch a web-based survey to assess and document the public safety community's current perspective of and satisfaction with communications interoperability in the Commonwealth to determine the baseline for measuring success moving forward by October 1, 2004

- Coordinate and host the Statewide Communication Interoperability Conference on October 19-20, 2004 to facilitate information sharing between and among local, regional, state, and federal public safety practitioners and industry

Introduction

The lack of interoperable wireless communications systems has been an issue plaguing public safety organizations for decades. In many cases, these organizations do not have adequate radio spectrum (channels or frequencies) or equipment to perform their critical duties. They are unable to communicate or share critical voice and data information with other jurisdictions or disciplines in day-to-day operations or during major emergency response scenarios, including natural disasters and terrorist acts.

In the Commonwealth, the majority of local public safety responders are not able to communicate effectively or directly with their state-level counterparts. Additionally, communication between local, regional[3], and state public safety organizations and federal responding agencies is often limited to the telephone. Given the local and regional vulnerabilities and challenges – including terrain, presence of military bases and international airports, natural events (such as hurricanes, tornadoes, etc.), and proximity to Washington D.C. – the inability to relay incident scene information directly, efficiently, or effectively jeopardizes the lives of the Commonwealth's public safety responders and citizens.

Several stories were shared in the regional focus group sessions to further demonstrate the need to enhance communications interoperability in the Commonwealth. The following are a few of the examples offered:

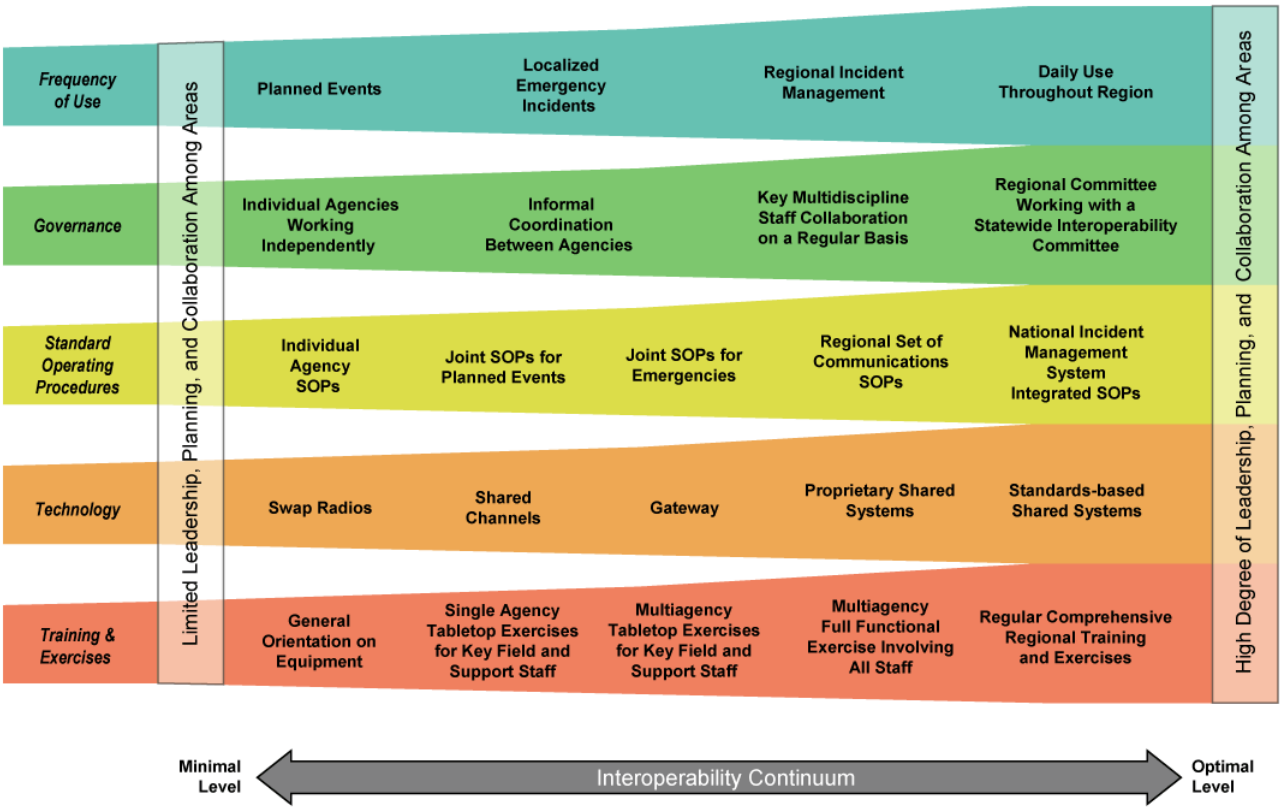
> *There is a nine mile stretch in the Southwest region of Virginia where radio communications is not available because of the mountainous terrain.*
>
> *A suspect drove directly past a state trooper who was unaware that the driver of the passing vehicle had just shot a deputy. Had the deputy been able to communicate directly with the trooper, the criminal would have been captured within minutes of the deputy being shot. The inability to communicate the information in real time and directly endangered the lives of citizens and public safety responders.*
>
> *An officer in pursuit of a car was not able to communicate directly with a deputy stationed ahead of the car chase to inform the deputy that the car being pursued was driving on the shoulder of the road. The deputy was stationed on the shoulder of the road ahead of the approaching car. In the time it took the pursuing officer to call into dispatch and have the dispatcher contact the deputy positioned on the shoulder, the car being pursued crashed into the back of the deputy's vehicle.*

The Commonwealth recognizes the critical need to improve communications interoperability between and among jurisdictions and disciplines to enhance the safety and security of public safety responders and citizens throughout the Commonwealth. This Plan and the preceding planning process reflect the

[3] In this Plan, the terms "regional" and "regions" refer to the seven regions of the Commonwealth, as identified by the Governor and currently used by VDEM, VSP, and VDFP.

commitment of the Commonwealth and the local, regional, state, and federal responding agencies to improve public safety through enhanced communications interoperability[4].

To clearly illustrate the elements and level of effort involved in moving from a minimal level of interoperability to an optimal level, SAFECOM developed the Interoperability Continuum[5] shown below.



[4] The National Taskforce on Interoperability (NTFI) defines communications interoperability as "the ability of public safety agencies to talk to one another via radio communication systems—to exchange voice and/or data with one another on demand, in real time, when needed." ("Why Can't We Talk? Working Together To Bridge the Communication Gap To Save Lives," February 2003. Accessed at http://www.agileprogram.org/ntfi/ntfi_guide.pdf)

[5] SAFECOM endorses the Interoperability Continuum graphic and is working to define the elements on the continuum.

Progression along the Interoperability Continuum is contingent on the following key drivers:

- Leadership commitment
- Fostering collaboration across disciplines (EMS, Fire, Law Enforcement, and all public safety agencies) through leadership support
- Using interoperability solutions on a regular basis
- Coordinating across all elements (Frequency of Use, Governance, Standard Operating Procedures, Technology, and Training/Exercises)
- Progressing along all the elements of the continuum in parallel
  For example, if new equipment is procured but training exercises have not been conducted on the proper use of the new equipment, then progression toward the optimal level of interoperability has not truly occurred

Mission and Vision Statements

A mission statement answers the question: Why do we exist as an organization? The mission should define the objective and approach of the organization. A vision statement answers the question: Where do we want to be in the future?

In defining the mission for the Commonwealth Interoperability Coordination Office (CICO) and the vision for communications interoperability in the Commonwealth, the CIC sought input from the local, regional, and state public safety community.

During the strategic planning session held in May 2004 participants were presented with statements reflecting the purpose of the CICO and describing what communications interoperability looks like in the future. From this session, the following mission and vision statements were developed:

Mission

Improve public safety in the Commonwealth of Virginia through enhanced data and voice communications interoperability between local, regional, state, and federal agencies.

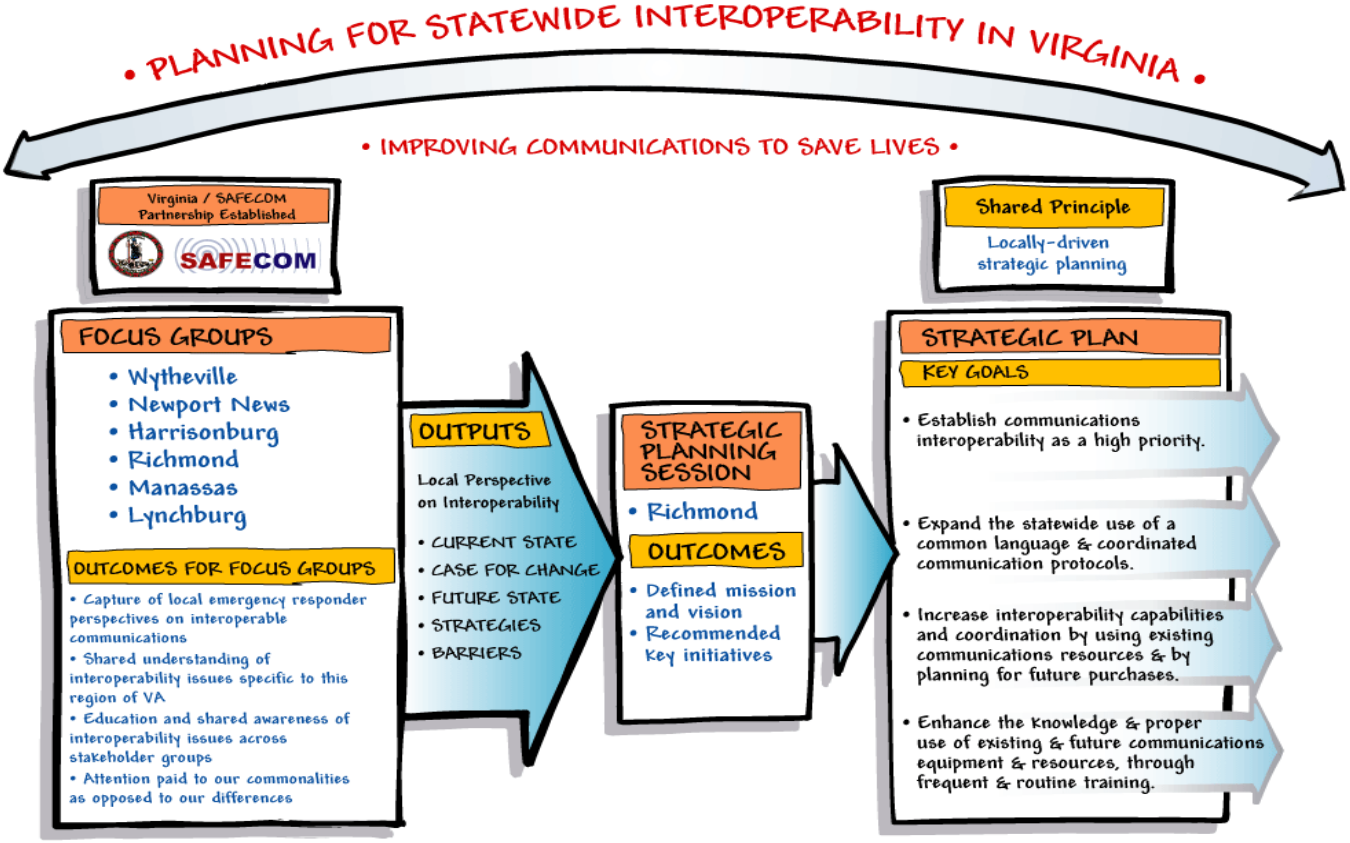
Vision

Agencies and their employees at the local, regional, state, and federal levels will be able to communicate at optimal efficiency, in real time, across disciplines and jurisdictions, to respond more effectively during public safety-related day-to-day operations and major emergency situations.

Strategic Planning Process

The Commonwealth, together with the SAFECOM program, designed a strategic planning process that: drew on the best practices from other states' ongoing efforts, gathered local perspectives through regional focus group sessions, and leveraged existing local, regional, state, and federal interoperability initiatives and resources.

The graphic below depicts the process roadmap for developing the locally-driven Strategic Plan for Communications Interoperability in the Commonwealth. The roadmap highlights how the focus groups and strategic planning session were the driving force in identifying key initiatives in this Plan.



The Virginia/SAFECOM Partnership

The Commonwealth and SAFECOM entered into a partnership based upon applying SAFECOM principles to plan and implement enhanced statewide communications interoperability. SAFECOM has a mission to help local, tribal, state, and federal agencies improve public safety response through more

effective and efficient interoperable wireless communications. In developing a Strategic Plan for interoperable communications, Virginia has benefited from SAFECOM's abundant information and resources pertaining to governance, coordination, planning, measures of success, challenges, and lessons learned from the insights and practices of other states that have started down their own path toward interoperability.

Both the Commonwealth and SAFECOM recognized the need for a locally-driven approach to enhancing communications interoperability. Therefore, each stage of the strategic planning process was designed to ensure that the resulting goals and initiatives would be a collaborative approach. This collaborative approach consisted of input and recommendations from local, regional, and state public safety responders and support from SAFECOM to help ensure that the strategic plan receive the support from all levels of government necessary for successful implementation. The strategic planning process included the following milestones:

- Research Report: Review of Statewide Interoperability Planning Efforts Across the Country
- Regional Focus Group Sessions
- Strategic Planning Session

The remainder of this section provides a description of each milestone and a summary of the participating stakeholders. The research report on Interoperability Planning Efforts Across the Country, as well as report summaries from each of the six regional focus group sessions and the strategic planning session, may be accessed on the Virginia interoperability website (www.interoperability.publicsafety.virginia.gov).

Research Report: Review of Statewide Interoperability Planning Efforts Across the Country

The report on Interoperability Planning Efforts was created to provide examples of other states' efforts, complemented by a brief analysis of how some of these efforts have been successful and fit within SAFECOM principles. The report recognizes the broad, strategic perspective called for when initiating communications interoperability planning efforts at the local and state levels.

Regional Focus Group Sessions

During April and May 2004, representatives from the Commonwealth and SAFECOM conducted six regional focus group sessions. The local and regional representatives participating in each session provided valuable input and perspectives on interoperability in the Commonwealth. The data gathered during the six sessions provided a basis for the key initiatives presented and discussed at the strategic planning session.

Each focus group session was designed as a series of conversations centered on the following:

- Current State: the current state of local, regional, and statewide communications interoperability
- Case for Change: the case for why it is critical that public safety communications be improved
- Future State: where, in an ideal situation, the Commonwealth's public safety communications systems, processes, and procedures will be in the future
- Recommended Strategies: the identification of specific and critical initiatives or projects that could be performed to incrementally move the Commonwealth from the current state to the future state
- Barriers: the existing obstacles and challenges to achieving the future state and carrying out the recommended strategy

The conversations focused on day-to-day operations and major emergency response scenarios, as well as explored interoperability-related issues including, but not limited to: local, regional, state, and federal coordination, training, operational structure, technology, spectrum, and funding. Each focus group session aimed to:

- Capture local public safety responders' views on interoperable communications
- Reach an understanding of interoperability issues specific to each region of the Commonwealth
- Share knowledge on interoperability issues across stakeholder groups
- Identify and highlight commonly held views and ideas

Strategic Planning Session

The strategic planning session, held in Richmond on May 18, 2004, convened key stakeholders and leaders from local, regional, state, and federal public safety agencies to review and endorse key initiatives, identified through the regional focus group sessions, for public safety communications interoperability in the Commonwealth. The outcome of the strategic planning session was consensus on the cornerstones of the statewide interoperability strategy.

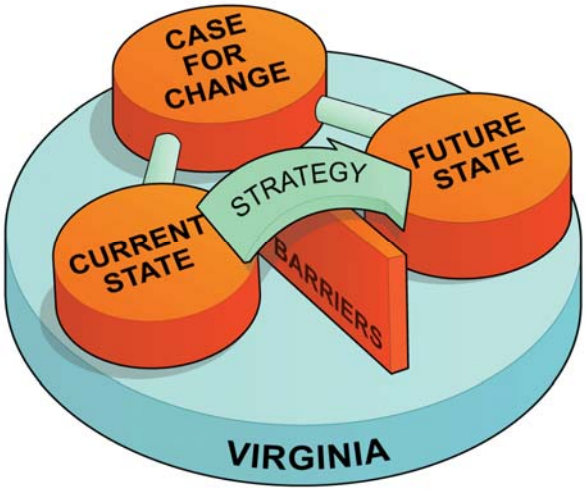
Participating Stakeholders

The regional focus groups and strategic planning session incorporated input from representatives with a wide range of public safety responsibilities. Invitees were selected by the Virginia Sheriffs' Association, the Virginia Association of Chiefs of Police, the Virginia Fire Chiefs Association, the Virginia State Police, the Virginia Department of Fire Programs, the Virginia Department of Emergency Management, and the Virginia Department of Health. Participants of the focus group sessions and the strategic planning session represented the following organizations:

- Fire and Rescue
- Local Law Enforcement
- Emergency Medical Services
- Sheriffs
- Hospitals
- Emergency Communications
- Local Government
- Virginia State Police
- Virginia National Guard
- Virginia Port Authority
- U.S. Department of Homeland Security
- U.S. Department of Justice
- Virginia Departments of: Emergency Management, Health, Transportation, Forestry, Game and Inland Fisheries, Agriculture, Information Technology Agency, Fire Programs, Commonwealth Preparedness, and Public Safety

Bridging the Gap

The goals and initiatives outlined in this Plan represent the foundation of the locally-driven strategy to begin bridging the gap between the current state of communications interoperability in the Commonwealth and the future state, or vision, while recognizing existing challenges, or barriers. The current and future states outlined below represent the local public safety community perspective as revealed during the six focus group sessions. This graphic depicts the methodology for discussing communications interoperability in Virginia.



Where We Are Today – The Current State

The current state describes "what exists and how"; the facts related to the status of communications interoperability and responders' capabilities in day-to-day activities and major emergency response scenarios.

- There is a **lack of priority** on the issue:
  - Inconsistent funding streams for planning, technology purchases, and maintenance
  - Insufficient personnel resources allocated to driving collaboration and between and among jurisdictions and disciplines

- There is a **lack of coordination** due to:
  - Incompatible verbal communications protocols (no common language)
  - Inadequate coordination of standard operational procedures

- There is a **lack of lifecycle planning**:
  - Training and maintenance is not considered or budgeted for when purchasing new technology

- There are **technical barriers** that impede interoperability:
  - Incompatible systems and equipment
  - Lack of equipment standards (no open architecture)

- There is a **lack of information sharing** on interoperability systems, equipment, and resources:
  - Planned systems and upgrades may impact surrounding jurisdictions
  - Best practices and lessons learned are not readily shared
  - Available technology solution options are not commonly known

- There is an **inadequate level of training**:
  - Equipment capabilities and functionality are not always maximized
  - Standard Operating Procedures do not exist for all major emergency response scenarios involving various jurisdictions, disciplines, and levels of government

- There are **numerous statewide mutual aid channels** that operate in various frequencies:

Public Safety Entity	Frequency
SIRS	39.54 MHz
Fire Mutual Aid	154.265 & 154.295 MHz
EMS Mutual Aid	155.205 MHz
Hospital Emergency Radio (HEAR)	155.400 & 155.340 MHz
NPSPAC Call	821/866.0125 MHz
NPSPAC Tactical	821/866.5125 MHz
NPSPAC Tactical	822/867.0125 MHz
NPSPAC Tactical	822/867.5125 MHz
NPSPAC Tactical	823/868.0125 MHz

Where We Want to Be – The Future State

The future state describes "the ideal"; the vision of communications interoperability across the Commonwealth.

- **Interoperability is a high priority** for public officials and public safety responders throughout the Commonwealth

- **Common standards exist**:
  - Communication/Verbal (e.g. clear text, common language, etc.)
  - Technical (e.g. P25)

- Operational procedures (e.g. NIMS)

- **Coordinated approach for lifecycle planning** exists (planning, purchasing, distribution, training, and maintenance)

- **Extensive training and information sharing** is supported and made available

How We Are Going To Get There – The Goals to Bridge the Gap

The strategy to bridge the gap between the current state and vision for the future state in the Commonwealth includes four initial goals and supporting initiatives. The key goals and initiatives will be fulfilled over time and revised as necessary to remain in alignment with the vision for communications interoperability in the Commonwealth.

- **Establish communications interoperability as a high priority**:
  - communications and outreach
  - executive and advisory committees
  - statewide conference

- Expand the statewide use of a **common language and coordinated communication protocols**

- Increase interoperability capabilities and coordination by **maximizing the use of existing communications systems** and equipment and by **planning for future technology purchases**

- Enhance the knowledge and proper use of existing and future communications equipment, systems, and resources by providing **frequent and routine training for public safety personnel**

Key Goals and Initiatives

To move the Commonwealth from the identified current state to the desired future state, the following initial goals and corresponding initiatives have been identified as overall strategy to begin implementing during FY 2005 – FY 2007. Performance measures have been offered as a means to determine success and progress in working toward achieving the goals.

GOAL 1: *Establish communications interoperability as a high priority*

Rationale

Implementing the strategy to enhance communications interoperability requires the support and involvement of public officials and public safety responders at the local, regional, and state levels. Strong, unwavering commitment by these stakeholders is a prerequisite to the success of all interoperability initiatives.

Initiatives:

- Conduct a statewide communications interoperability awareness campaign to elevate public interest and increase the level of commitment by public officials and citizens
- Conduct a statewide web-based survey to measure public safety responders' perceptions of communications interoperability
- Host a Statewide Interoperability Conference to encourage collaboration and the sharing of information between local and state public safety officials as well as industry representatives
- Establish the First Responder Interoperability Executive Committee and Advisory Committee as the advising (governance) structure for interoperable communications in the Commonwealth
- Designate regional managers in each of the seven regions to coordinate with the CIC to drive the implementation of the locally-driven goals and initiatives to ensure local and regional support for statewide communications interoperability
- Identify and assist in obtaining grant dollars for localities, regions, and state agencies' interoperability efforts
- Develop and recommend funding disbursement strategies for implementation of interoperability initiatives

- Coordinate with the Statewide Agencies Radio System (STARS) representatives to ensure interoperability remains in the forefront of business decisions

Performance Measures:

The fulfillment of initiatives supporting Goal 1 may be measured based upon the following metrics:

- At least 10 local and regional public safety response meetings conducted annually
- Minimum of 50 percent of attendees at the Statewide Interoperability Conference are local or regional representatives
- Minimum of ten interoperability awareness presentations to public officials and citizens by June 30, 2005
- Overall satisfaction rating of interoperability perception survey results by June 30, 2005
- Local and regional levels of government comprise at least 50 percent of the First Responder Interoperability Executive Committee and Advisory Committee by June 30, 2005
- Percentage of increase in interoperable grant dollars awarded to localities, regions, and state agencies when compared to the FY 2003 - FY 2004 baseline
- Increase the number of grant applications submitted by local, regional, and state public safety agencies for communications interoperability funding
- Increase number of grants awarded to localities, regions, and state agencies compared to FY 2003 – FY 2004 baseline

GOAL 2: *Expand statewide use of a common language and coordinated communication protocols*

Rationale

The need to migrate from separate and distinct communication codes to a clear text/common language would greatly assist interoperability efforts by eliminating the need for public safety responders to decipher codes. Additionally, adopting and adhering to standard incident command response procedures will foster greater interoperability and coordination. As a result, public safety responders will be able to go anywhere in the Commonwealth and immediately be familiar with the emergency response protocols.

Initiatives:

- Adopt common language (universal) protocols for all public safety responders in the Commonwealth

- Disseminate information supporting the National Incident Management System (NIMS) standard incident command response procedures for local, regional, and state incidents

Performance Measures:

The fulfillment of initiatives supporting Goal 2 may be measured based upon the following metrics:

- 100 percent of public safety training academies have migrated from separate and distinct codes to common language for radio communications by June 30, 2006

- Number of exercises performed that support NIMS and coordination of operational procedures

GOAL 3: *Increase interoperability capabilities and coordination by maximizing the use of existing communications systems and equipment and by planning for future technology purchases*

Rationale

Compatibility of equipment and coordination of systems between and among local, regional, state, and federal public safety agencies is a key requirement to enhance communications interoperability. While quick short-term fixes to technology incompatibility do exist, public safety responders in the Commonwealth need to take steps to enhance the compatibility of current equipment and systems as well as move toward long-term compatibility by planning for future system requirements and purchases. By sharing perspectives, leveraging past experiences, and making current practices interoperability-oriented, public safety responders can promote and enhance long-term compatibility of equipment and practices.

Initiatives:

- Provide information to localities on successful regional coordination (lessons learned, saving, etc) when procuring new communications systems

- Provide information to localities on voice over internet protocols (Voice over IP) and other opportunities for both long-term and tactical solutions that enable localities on various bands to communicate directly during major emergency response scenarios

- Promote the use of the NPSPAC channels in the 30 existing 800 MHz systems around the Commonwealth to foster communications interoperability in major emergency response scenarios

- Incorporate communications lifecycle guidelines and requirements (e.g. planning, purchasing, implementation, training, and maintenance) into future Requests for Proposal

- Review current state equipment purchasing and service contracts to determine whether they support particular local or regional communications interoperability requirements

- Promote localities' use of current and future state contracts for purchasing communication equipment and services

Performance Measures:

The fulfillment of initiatives supporting Goal 3 may be measured based upon the following metrics:

- Annually increase the percentage of localities that purchase communications equipment through existing and future state contracts

- Number of localities in each region linked by a shared communications system (such as an 800 MHz system) by June 30, 2005

- Number of interoperable communications-related state contracts reviewed by the Commonwealth Interoperability Coordination Office (CICO) or Virginia Information Technologies Agency (VITA) by June 30, 2005

GOAL 4: *Enhance the knowledge and proper use of existing and future communications equipment, systems, and resources by providing frequent and routine training for public safety personnel*

Rationale

Communications interoperability cannot occur without local, regional, and state public safety responders being knowledgeable about emergency response planning processes, requirements, and initiatives, the use of equipment and systems, documented best practices, and lessons learned from past incidents. Extensive training and education will maximize responders' preparedness for emergency situations and ensure they are able to maximize the functionality of communication equipment.

Initiatives:

- Promote the education and training of first responders on the existence and proper use of current equipment, systems, and resources, such as NPSPAC channels, available at the regional and state level

- Conduct outreach to localities and regions on existing Commonwealth interoperability efforts, including STARS and SIRS, to increase awareness and encourage collaboration within the public safety community

- Extract, disseminate, and publish lessons learned from all training exercises

Performance Measures:

The fulfillment of initiatives supporting Goal 4 may be measured based upon the following metrics:

- Number of regional tabletop exercises annually conducted where interoperable communications is a focal point

Barriers

Primarily through the regional focus group sessions, the strategic planning process unveiled various challenges that hinder enhancing data and voice communications interoperability. When fully achieved, the identified goals and initiatives will allow the Commonwealth to begin to overcome many of the identified barriers.

Inadequate resources to implement the initiatives

The implementation of the initiatives will require significant resources. The Secure Commonwealth Panel established the position of Commonwealth Interoperability Coordinator to focus on improving interoperability communications in the Commonwealth; however, a single position cannot implement all of the identified initiatives. The successful implementation of this Plan will be contingent largely upon establishing sufficient resources to support the CIC in developing initiative action plans and coordinating with regional representatives to execute the initiatives.

Inadequate and inconsistent funding to jurisdictions

Funding available at the local, regional, state, and federal levels is neither consistent nor sufficient to support the complete public safety communications system lifecycle required for enhanced interoperability. The system lifecycle consists of planning, procuring, training, maintaining, upgrading, and replacing equipment. Funding typically occurs as a one-time isolated opportunity and is often earmarked specifically for the purchase of equipment, as opposed to other crucial components of the lifecycle. In addition, funding is neither apportioned equitably nor readily available at the local level, resulting in significant equipment disparities between jurisdictions even after adjusting for differences in population.

Separate and disparate local initiatives

Localities receive state and federal public safety grants that are either earmarked for specific purposes or used at the localities' discretion. These local initiatives may not be coordinated with other local, regional, or statewide communications interoperability initiatives, which may result in equipment purchases or upgrades that are not be compatible with existing systems and equipment. Disparities in funding and system capabilities have resulted in a wide range of local communications initiatives that are often difficult to coordinate with other local or statewide systems. For example, if a locality or region migrates to an 800 MHz communications system, it loses connectivity with the Statewide Interdepartmental Radio System (SIRS)[6] unless it decides to dedicate resources to maintain two systems.

[6] SIRS is a designated low-band voice communications system, which provides interoperable capabilities between local law enforcement and the VSP.

Inability to direct standard communications interoperability solutions
As a Commonwealth, Virginia's localities and regions have significant latitude to undertake their own initiatives. If localities identify solutions they feel enhance public safety, they have the flexibility to implement those solutions, regardless of whether they are interoperable with public safety solutions elsewhere. Commonwealth officials are often unable to gain support for establishment, or continuation of, existing open standards to address this problem, and thus regional coordination is stifled.

Lack of awareness and priority around communications interoperability
While the lack of interoperable communications systems has historically been a significant issue within the public safety community, the urgency and extent of the issue has only recently achieved widespread recognition. As partners with the public safety community, public officials and decision makers in the Commonwealth do not routinely receive sufficient information on the challenges surrounding communications interoperability. Receiving timely and adequate information could support them in their decisions and elevate the interoperability issue to a high priority level. In addition, the public is not fully informed on the lack of communications interoperability capabilities in the Commonwealth; therefore, citizens are not demanding action from their elected officials.

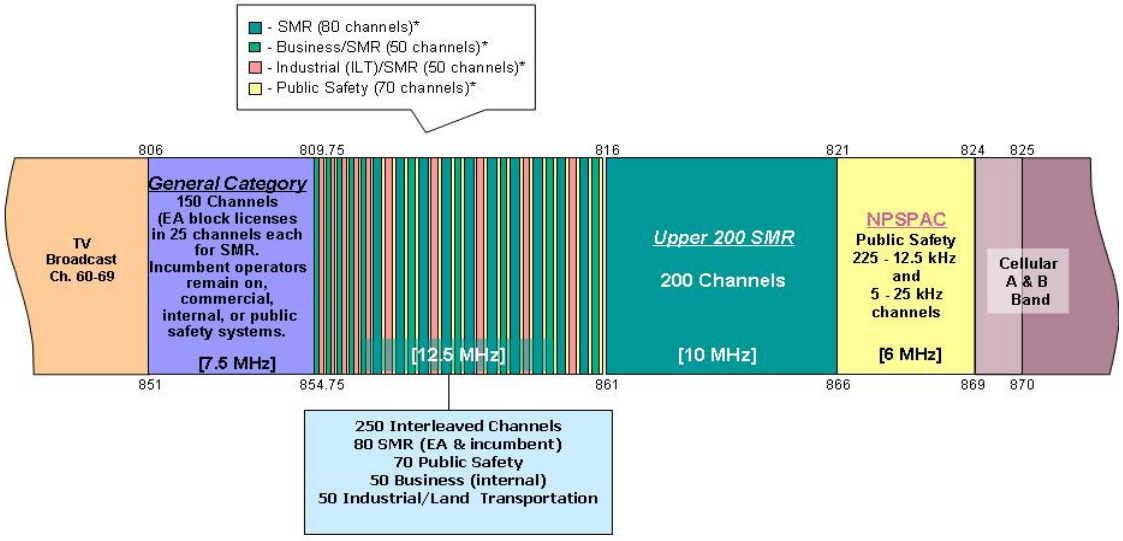
Incompatible equipment and systems
The vendor-driven public safety communication technology market has contributed to localities' use of incompatible equipment and the rapid obsolescence of equipment and systems as a result of new technologies. Until vendors work together at the public safety community's behest to create an open architecture and manufacture compatible equipment, localities will continue to purchase equipment that may not be interoperable. Jurisdictions will also continue to have to replace obsolete equipment, rather than upgrading existing technology. When vendors do reach agreement regarding an open architecture, jurisdictions' legacy systems will remain incompatible or become obsolete unless the agreed-upon standards are backward-compatible with older equipment.

Crowded and fragmented spectrum
The spectrum used by public safety responders in the Commonwealth and elsewhere is fragmented and inadequate; public safety responders share the spectrum with other users, including members of the media and general public. The Commonwealth lacks the authority to allocate and coordination spectrum resources; therefore, the Commonwealth must work together with the Federal Communications Commission (FCC) to achieve a solution.

The FCC is working to find a solution to the crowded and fragmented spectrum currently plaguing the public safety community. In July 2004, in recognition of the critical need for the Nation's first responders to have robust and highly reliable communications systems, the Federal Communications Commission adopted a

plan to resolve the ongoing and increasing problem of interference to public safety radio systems operating in the 800 MHz band.

FCC Spectrum Allocation of 800 MHz Band



* Allocation different in Mexican and Canadian border regions

Overcoming the Barriers

This matrix identifies how the key goals and initiatives outlined in this Plan will begin to address each of the barriers.

Barriers	Goal #1	Goal #2	Goal #3	Goal #4
Inadequate Resources	√			
Inadequate and Inconsistent Funding	√		√	
Disparate Local Initiatives	√	√	√	√
Broad Flexibility	√	√	√	√
Lack of Awareness and Priority	√			
Incompatible Equipment			√	√
Insufficient Spectrum*				

*This barrier is outside the scope and control of the Commonwealth. However, the Commonwealth will coordinate with the Federal Communications Commission (FCC) and SAFECOM to stay apprised of federal changes related to spectrum and will communicate developments to the local, regional, and state public safety community.

Existing Interoperable Communications Systems and Efforts

Throughout the Commonwealth, there are various systems and efforts underway or in existence that may support the implementation of this Plan. Many of the initiatives and efforts highlighted below may be capitalized upon by the public safety community through adequate and sufficient communications, outreach, coordination, and training. The goals and initiatives in this Plan will aim to maximize these existing opportunities.

Local and regional interoperability initiatives

During the strategic planning process, several local and regional interoperability initiatives were identified that may be scalable or serve as models. Some of these existing efforts include:

- Regional 800 MHz trunked systems are currently deployed by 30 cities, counties, and other jurisdictions.

- The Alexandria Police Department is participating in testing, integrating, and evaluating communication equipment (ACU-1000, UHF, VHF, and 800 MHz frequencies mobile radios) in actual operational environments. The gateway has the ability to achieve voice interoperability with up to 19 public safety agencies.

- The City of Charlottesville, the University of Virginia, and Albemarle County will be using $6 million in secured grant money to upgrade voice and data capabilities.

- The Hampton Roads Planning District Committee, which includes ten cities and six counties, is working to address regional interoperability and using $6 million in secured grant money for planning and equipment.

- The City of Harrisonburg-County of Rockingham radio system will be an 800 MHz island among several UHF system users. The project is striving to work with manufacturers to develop an integrated, manufacturer-based approach to interoperability, rather than third party add-on approaches.

- The City of Lynchburg, the City of Bedford, the County of Bedford, and the County of Amherst collaborated to develop the Central Virginia Regional Radio System. The radio system is an 800 MHz trunking system that enables communications between all local fire, police, public works, and other governmental agencies. In addition to voice communication, some localities also use the radio system for data communication.

- The City of Richmond, Chesterfield County, and Henrico County, through the Capital Region Communications Steering Committee, are working to improve inter-jurisdictional communications, provide system redundancy, and expand the radio coverage area. The committee is currently developing recommendations for $6.5 million in secured grant money, of which approximately $3.8 million will be directed toward interoperability improvements.

- The National Capital Region (NCR), in conjunction with the SAFECOM/RapidCom project, is working to assist responders in achieving emergency-level interoperable communications for incident commanders.

Existing tactical interoperable equipment

Several state agencies, including the Virginia State Police (VSP), Virginia Department of Emergency Management (VDEM), Virginia Information Technologies Agency (VITA), and Virginia Department of Forestry (VDOF), have tactical interoperable solutions that public safety responders can deploy within a few hours of an event. A few examples include:

- VSP has three command posts that can be deployed to an incident within two hours to create tactical interoperability.

- VSP has eight ICRI units allowing for up to five public safety agencies to achieve radio interoperability.

- VDEM has two mobile command posts capable of operating on numerous radio frequencies and three mobile towers that can be deployed to an incident scene.

- VITA has a portable UHF 20-watt repeater and UHF portables that can provide communications coverage within a 2-5 mile radius.

- VDOT has two motorized mobile command posts and three tow-behind trailers positioned at regional locations.

- VDOT has a portable ACU-1000 capable of interconnecting up to 11 radios operating on various frequencies.

Some of these solutions may be scalable or serve as models for statewide communications interoperability.

Existing state interoperability systems and initiatives

There are several statewide communications interoperability efforts currently underway. The appendix of this Plan provides a more comprehensive description of the existing statewide interoperability systems and initiatives.

- **Capital Area Wireless Integrated Network (CapWIN).** CapWIN is a partnership between Maryland, Virginia, and the District of Columbia. With a laptop, commercial connections, and a CapWIN license, public safety responders can communicate and exchange data in real time.

- **In-Building Radio Coverage.** HJ588 outlines improving "In-Building Radio Coverage" by installing devices into large buildings that will boost the radio signal of the first responders on the inside of a building to allow them to transmit and receive clearly with the dispatch or incident commander outside the building.

- **NPSPAC mutual aid channels**. NPSPAC channels are available statewide to increase interoperability, by enabling first responders from 800MHz systems to deploy to an incident scene and switch their radio to the NPSPAC mutual aid channel. NPSPAC consist of one call in channel and four tactical channels between 820-824 MHz.

- **Statewide Agencies Radio System (STARS).** When complete, STARS will provide mobile radio voice and data communications for 20 participating statewide agencies. Additional information on STARS is included in the appendix of this Plan.

- **Statewide Interdepartmental Radio System (SIRS).** SIRS is a designated low-band voice communications system, which provides interoperable capabilities between Virginia local law enforcement and the VSP. Additional information on SIRS is included in the appendix of this Plan.

Potential industry-wide standards

Efforts to develop industry-wide standards have been underway since the late 1980's. Project 25 (P25) is an industry-wide effort to develop a voluntary standard for uniform digital two-way radio for public safety organizations.[7] If the P25 effort is successful, it may ease the way for improved communications interoperability.

[7] Project 25 – An APCO International project to develop interoperable communications standards for public safety digital mobile radio systems; AFC (Automated Frequency Coordination) – APCO International. Accessed at http://www.apcointl.org/frequency/project25.

Performance Management Approach

The implementation of a performance management process will help ensure the successful achievement of the goals and initiatives outlined and contribute to the stakeholders' understanding of how this Plan and effort will serve them. Through partnership and communication, the execution of this Plan will contribute to the public safety community's duty to make the Commonwealth a safe place to visit, work and live.

The output and related processes that are a part of the performance management approach begins with setting goals and performance measures to track progress. Goals are then achieved through the planning of project activities and alignment of resources. Next, the CIC reviews the implementation of the project activities and compares the results to the performance measures. Finally, the CIC proposes recommendations and makes performance-based decisions about project improvements.

Set Goals

This Plan is the roadmap for activities that will be accomplished during FY 2005 – FY 2007 and determines what success looks like for these accomplishments. Beginning with the FY 2005 budget cycle, this roadmap will help shape the resource needs of the CIC to meet the stated goals and initiatives.

Unanticipated events and other factors will affect the CIC's ability to implement the goals and initiatives in this Plan. Therefore, the CIC envisions this Plan to be a living document, reviewed annually, that is a current description of its mission, goals, initiatives, and performance measures.

Plan and Budget

The CIC will tie its budget requests with the goals and initiatives. Over time, the strength of this link will increase as the CICO expands and gains experience with the performance management infrastructure. This infrastructure includes methods to determine targets for each measure, identify the source systems for the data, determine how and by whom data is reviewed, and how the CIC will act upon it. It is important to build and stabilize this performance measurement process and gain experience managing this data.

Review Work

Once baselines and targets have been established, the data will be consolidated to provide a "snapshot" of the actual performance. The data will provide a mechanism to monitor implementation of this Plan.

Continuous Improvement

As part of the performance management approach, the CIC will continuously review and assess its progress toward meeting the goals and initiatives. The outcomes of establishing a continuous improvement process are: bringing about organizational improvement, reducing inefficiencies, and maximizing resources.

Interoperability Management in Virginia

Interoperability efforts in the Commonwealth are primarily managed by two state offices: the Office of Commonwealth Preparedness and the Office of the Secretary of Public Safety - along with the Secure Commonwealth Panel and the Commonwealth Preparedness Working Group. Below is a description of these organizations:

The **Office of Commonwealth Preparedness (OCP)** is the Commonwealth's homeland security organization. This cabinet-level office is responsible for coordinating the resources, across all secretariats, that are used to protect the Commonwealth's citizens, coordinating policy development and resource availability with the federal government, serving as the governor's liaison to the U.S. Department of Homeland Security and to regional Virginia emergency preparedness groups, and participating in the development of all statewide disaster, emergency management and terrorism management plans.

The **Office of the Secretary of Public Safety (SPS)** is responsible for numerous functions, including planning and coordinating emergency response and disaster recovery and providing technical assistance, research and training for law enforcement agencies, community fire departments, and prosecutors. The SPS provides guidance to the 11 state agencies under its direction. These agencies are:

- Department of Alcoholic Beverage Control
- Department of Correctional Education
- Department of Corrections
- Department of Criminal Justice Services
- Department of Emergency Management
- Department of Fire Programs
- Department of Juvenile Justice
- Department of Military Affairs
- Virginia Parole Board
- Department of State Police
- Commonwealth Attorney's Services Council

In January 2002, by Executive Order 7, the Governor established the **Secure Commonwealth Panel (SCP)**, a 22-member panel led by the Assistant to the Governor for Commonwealth Preparedness. The panel, which reports quarterly to the Governor, is responsible for monitoring and assessing the implementation of statewide prevention, response and recovery initiatives and when necessary, reviewing, evaluating and proposing recommendations relating to emergency preparedness in the Commonwealth. The panel consists of nine subcommittees devoted to Agribusiness, Citizens and Communities, First Responders, Government Operations and Funding, Health and Medical, Industry and Commerce, Technology, Transportation, and Utilities. Members of the panel

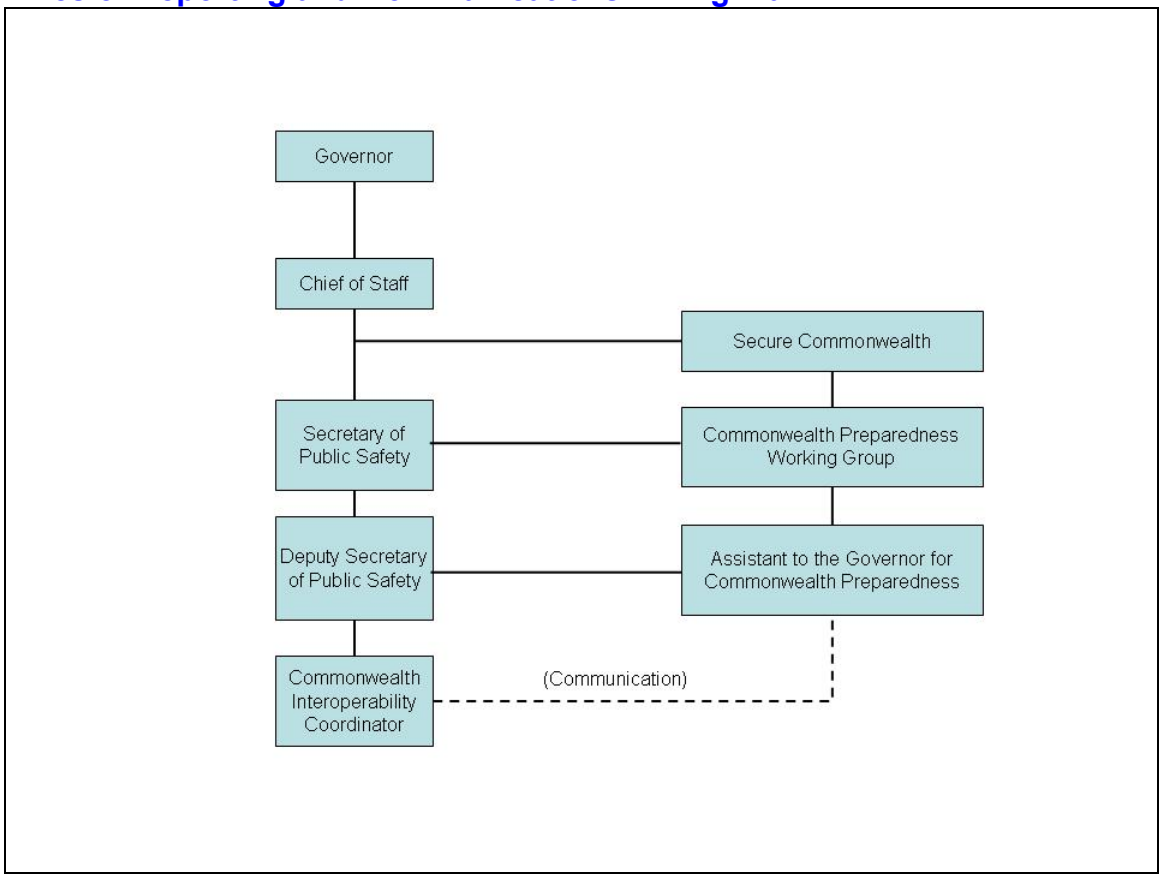
include representatives of local and state government, state legislators, and the private sector.

The **Commonwealth Preparedness Working Group (CPWG)** is a sub-panel of the Secure Commonwealth Panel. This working group is responsible for coordinating state operations related to preparedness and readiness. Members of the group have operations leadership roles in a broad range of state agencies.

In December 2003, the SCP, in concert with the CPWG, created the **Commonwealth Interoperability Coordinator (CIC)** position to focus on improving interoperability within the Commonwealth. The CIC position resides within the Office of the Secretary of Public Safety.

The chart below depicts the reporting structure in Virginia and lines of communications between the CIC, the Office of the Secretary of Public Safety, the Office of Commonwealth Preparedness, the Commonwealth Preparedness Working Group, the Secure Commonwealth Panel, and the Governor.

Lines of Reporting and Communications in Virginia:



The Commonwealth Interoperability Coordination Office (CICO)

The Commonwealth Interoperability Coordination Office, led by the Commonwealth Interoperability Coordinator, is essential to successfully accomplish the goals and initiatives outlined in this Plan. The CICO functions primarily as an organization to coordinate initiatives, communicate information, and facilitate discussion on interoperability efforts between and among the Commonwealth's regions and jurisdictions as well as the federal government. In addition to the CIC, the following functional requirements have been identified to support in the development and implementation of the goals and initiative:

- Communications and Outreach
- Technology
- Training, Policies, and Procedures
- Grant Writing, Procurement, Finance, and General Administration
- Regional Coordination

As the scope and responsibilities of the CICO expand over time, or as initiatives are accomplished, these functional requirements may be readily modified to accommodate the growth in other areas of interoperability.

Commonwealth Interoperability Coordinator (CIC)

The CIC is responsible for ensuring the goals and initiatives included in this Plan are meeting the communications interoperability needs of the local and regional public safety practitioners in Virginia, as well as aligning with the state and federal direction. General responsibilities of the CIC may include:

- Liaison between the local and regional public safety community, state agencies and Commonwealth officials
- Driving the implementation of the locally-focused Strategic Plan
- Revising the Strategic Plan annually
- Chairing the First Responder Interoperability Advisory Committee (FRIAC)
- Chairing the First Responder Interoperability Executive Committee (FRIEC)
- Serving as a member of the Commonwealth Preparedness Working Group (CPWG)

Functional Requirement: Communications and Outreach
Communications and outreach is critical to enhancing interoperable communications and spans across each goal in this Plan. General communications and outreach functions may include:

- Distributing information, lessons learned, best practices, challenges and opportunities to:
    - Local public safety responders and organizations
    - Regional representatives
    - State representatives
    - Executive and Advisory Committee members
    - Commonwealth Preparedness Working Group
    - Secure Commonwealth Panel
    - Other key stakeholders and decision makers

- Designing questions to survey public practitioners on their current perspective of interoperable communications capabilities

Functional Requirement: Technology
Expertise on communications technology, systems, standards, and industry is s a key element in progressing toward optimal interoperability. General technology functions may include:

- Providing technical assistance and support to localities and state agencies

- Informing training, policies, and procedures related to equipment purchases and interoperability lifecycle planning

- Assessing existing and emerging technology and equipment capabilities and limitations

- Consulting the CIC on technology, spectrum, standards issues at the federal, state, and local levels

Functional Requirement: Training, Policies, and Procedures
Participants in each focus group session identified training and universal policies and procedures as essential to improving interoperability. Many of the initiatives strive to meet this need. General functional requirements under training, policies, and procedures may include:

- Developing policies and procedures related to communications interoperability issues as required

- Dissemination of information related to training opportunities at the local, regional, and state level across all disciplines

- Coordinating with training academies to have polices and procedures incorporated into courses

Functional Requirement: Grant Writing, Procurement, Finance, and General Administration

Several of the tasks associated with accomplishing the initiatives involve assisting localities in obtaining funding, lifecycle planning, and supporting the CIC in caring out and planning for activities. General functional requirements of grant writing, procurement, finance, and general administration may include:

- Assisting localities, when requested, in reviewing grant applications

- Researching grant funding opportunities and limitations to:
    - secure funding for the strategic goals and initiatives
    - disseminate information on upcoming grant opportunities and grant conditions to local and state representatives

- Managing meeting, conference, and speaking opportunities for the CIC to:
    - facilitate coordination between localities and state organizations
    - share information with local and state public safety officials

- Monitoring budget and track expenses and performance of initiatives

- Reviewing state contracts and system lifecycle requirements

Functional Requirement: Regional Coordination

Coordination between each of Virginia's seven regions' efforts and activities related to interoperability is essential to the successful implementation. General functions of regional coordination may include:

- Coordinating the implementation of project plans in each region

- Coordinating monthly with regional stakeholders to:
    - facilitate statewide coordination
    - solicit input regarding implementation of the initiatives
    - promote information sharing, including training opportunities

- Sharing regional and local best practices and interoperability efforts

- Informing key stakeholders of relevant local and regional interoperability needs

Proposed Governance Structure

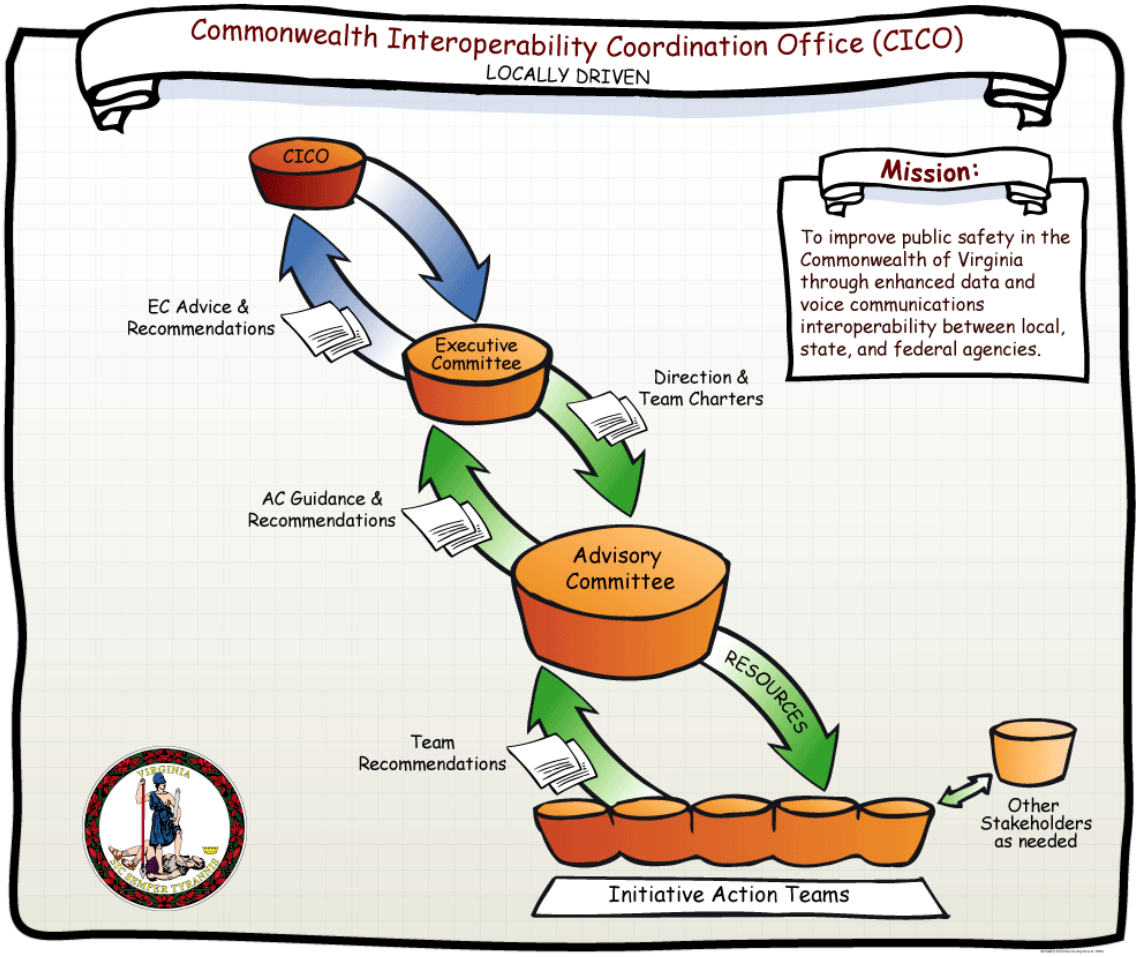
The support of local, regional, and state public safety leadership across the Commonwealth is critical to the successful implementation of this Plan for statewide communications interoperability. To obtain the support of this leadership, the public safety community must have the opportunity to provide input to the CICO as well as a meaningful role in advising decisions that affect public safety organizations.

The proposed governance approach encourages transparency, accountability, and collaboration through:

- Leadership representation of a broad spectrum of local level public safety responders
- Participatory decision making
- Support of legislation that enforces timely and cost efficient implementation of the Strategic Plan initiatives that support statewide communications interoperability
- Relationship building at the local, regional, state, and federal levels
- Outcome based strategic planning

This structure will enable public safety responders to participate and be represented in three groups: as members of the Executive Committee, as members of the Advisory Committee, and as participants in the Initiative Action Teams.

The graphic below depicts the high-level flow of information and communication between the components of the governance structure.



As a key initiative – *establish the advisory committee and executive committee as the advising (governance) structure for interoperable communications in the Commonwealth of Virginia* – and essential element in obtaining the required support to drive the successful executive of this Plan, the membership, roles and responsibilities, and operating guidelines for each group will be defined during the initial weeks of implementation.

Next Steps

The first 90 days of roll out and the initial phases of implementing this Plan is critical to gaining the support to successfully accomplish the outlined goals and initiatives that will enhance communications interoperability in the Commonwealth.

There are several key actions and activities that the CIC will need to focus on during the next three months to help ensure the successful implementation of the identified initiatives as well as future initiatives that may arise as the Commonwealth commits to improving public safety through enhanced communications interoperability. These activities include:

- Submit a proposal to fund initiatives outlined in this Plan to the Commonwealth Preparedness Working Group for consideration by August 15, 2004

- Conduct the first Executive Committee meeting by September 30, 2004 to support and facilitate the implementation of the communications interoperability initiatives

- Launch a web-based survey to assess and document the public safety community's current perspective of and satisfaction with communications interoperability in the Commonwealth to determine the baseline for measuring success moving forward by October 1, 2004

- Coordinate and host the Statewide Radio Communication Interoperability Conference on October 19-20, 2004 to facilitate information sharing between and among local, regional, state, and federal public safety practitioners and industry

Appendix A: Participating Stakeholders

Representatives of the following stakeholder groups participated in the communications interoperability strategic planning process:

State Agencies

- Capital Police
- Office of the Secretary of Public Safety (SPS)
- Virginia Department of Emergency Management (VDEM)
- Virginia Department of Fire Programs (VDFP)
- Virginia Department of Forestry (VDOF)
- Virginia Department of Health (VDH)
- Virginia Department of Transportation (VDOT)
- Virginia Information Technology Agency (VITA)
- Virginia National Guard
- Virginia State Police (VSP)

Working Groups

- Commonwealth Preparedness Working Group (CPWG)
- First Responder Interoperability Advisory Committee (FRIAC)
- Secure Commonwealth Panel (SCP)

State and Local Associations

- Association of Public Safety Communication Officials (APCO)
- Capital Region Communications Steering Committee
- Hampton Roads Planning District Commission
- University of Virginia Medical Center
- Virginia Association of Chiefs of Police (VACP)
- Virginia Association of Governmental EMS Administrators (VAGEMSA)
- Virginia Coalition of Police and Deputy Sheriffs (VCOP)
- Virginia Fire Chiefs Association (VFCA)
- Virginia Professional Fire Fighters (VPFF)
- Virginia Sheriffs' Association (VSA)

Projects

- Capital Area Wireless Integrated Network (CapWIN)
- Statewide Agencies Radio System (STARS)

Localities

Amherst County
Arlington County
Augusta County
Chesterfield County
City of Alexandria
City of Bristol
City of Charlottesville
City of Chesapeake
City of Covington
City of Fairfax
City of Fredericksburg
City of Harrisonburg
City of Lynchburg
City of Richmond
City of Roanoke
City of Salem
City of Virginia Beach
City of Weber
Culpeper County
Fairfax County
Frederick County
Hampton Roads
Hanover County
Henrico County
James City County
Loudoun County
Powhatan County
Prince William County
Roanoke County
Rockingham County
Stafford County
Stonewall Jackson
Town of Appalachia
Town of Ashland
Town of Cana
Town of Haysi
Town of Mineral
Town of Wytheville
York County

Federal Agencies

- Department of Justice
  - National Institute of Justice (NIJ)
- Department of Homeland Security
  - SAFECOM

Appendix B: Suggested Resources

Virginia Interoperability Web Page

- www.interoperability.publicsafety.virginia.gov

Federal Interoperability General Information

Organizations that provide interoperability solutions support and education:

- AGILE Program (www.agileprogram.org)
- Joint Tactical Radio System (jtrs.army.mil)
- GAO Report on interoperable communications (www.gao.gov/new.itmes/d04740.pdf)
- National Incident Management System (NIMS) training (training.fema.gov/EMIWEB/IS/is700.asp)
- National Law Enforcement and Corrections Technology Center (www.nlectc.org)
- SAFECOM (www.safecomprogram.gov)

SAFECOM Federal Partners

Federal departments working towards interoperable communications:

- Department of Agriculture (www.usda.gov)
- Department of Defense (www.defenselink.mil)
- Department of Energy (www.doe.gov)
- Department of Health and Human Services (www.hhs.gov)
- Department of Homeland Security (www.dhs.gov)
- Department of the Interior (www.doi.gov)
- Department of Justice (www.usdoj.gov)
- Department of the Treasury (www.ustreas.gov)

State Partners

- Virginia Department of Emergency Management (www.vdem.state.va.us)
- Virginia Department of Fire Programs (www.vdfp.state.va.us)
- Virginia Department of Health (www.vdh.state.va.us)
- Virginia Office of Commonwealth Preparedness (www.commonwealthpreparedness.virgnia.gov)
- Virginia Office of the Secretary of Public Safety (www.publicsafety.virginia.gov)
- Virginia STARS (www.publicsafety.virginia.gov/Initiatives/STARS.cfm)
- Virginia State Police (www.vsp.state.va.us)

Local Public Safety Organizations

- Virginia Association of Chiefs of Police (www.vachiefs.org)
- Virginia Association of Governmental EMS Administrators (www.vagemsa.org)
- Virginia Fire Chiefs Association (www.sfcav.org)
- Virginia Professional Fire Fighters (www.vpff.org)
- Virginia Sheriffs' Association (www.virgniasheriffs.org)

Grants Information

- Department of Homeland Security (www.dhs.gov/dhspublic/display?theme=18)
- National Institute of Justice (www.ojp.usdoj.gov/nij/funding.htm)
- Office of Community Oriented Policing Services (www.cops.usdoj.gov)
- Office of Domestic Preparedness (www.ojp.usdoj.gov/odp/grants_programs.htm)

Communications Spectrum

Federal agencies that manage the commercial and public communications spectrum:

- Federal Communications Commission (wireless.fcc.gov/publicsafety)
- National Telecommunications and Information Administration (www.ntia.doc.gov)

Technology and Standards Information

Standards bodies working to promote interoperable communications technology:

- Association of Public-Safety Communications Officials, International (www.apcointl.org)
- Capital Wireless Integrated Network (CapWIN) (www.capwin.org)
- Institute of Electrical and Electronics Engineers (www.ieee.org)
- International Telecommunication Union (www.itu.int)
- National Institute of Justice's Technology Programs (www.ojp.usdoj.gov/nij/sciencetech)
- National Institute of Standards and Technology (www.nist.gov)
- Project 25 (www.project25.org)
- Project Mobility for Emergency and Safety Applications (MESA) (www.projectmesa.org)
- Telecommunications Industry Association (www.tiaonline.org)

Appendix C: Glossary of Terms and Acronyms

Glossary of Terms[8]

Analog: A signal that may vary continuously over a specific range of values.

Band*: the spectrum between two defined limited frequencies. For example, the Ultra High Frequency (UHF) is located from 300 MHz to 3,000 MHz in the radio frequency spectrum.

Bandwidth: The range within a band of frequencies; a measure of the amount of information that can flow through a given point at any given time.

Block grant: Federal grant funding that is allocated to state and localities based on a pre-determined statutory formula.

Channel*: A single unidirectional or bidirectional path for transmitting or receiving, or both, of electrical or electromagnetic signals.

Communications interoperability: The ability of public safety agencies to talk across disciplines and jurisdictions via radio communications systems, exchanging voice and/or data with one another on demand, in real time, when needed, and as authorized.

Communications system*: A collection of individual communication networks, transmission systems, relay stations, tributary stations, and data terminal equipment usually capable of interconnection and interoperation to form an integrated whole. The components of a communications system serve a common purpose, are technically compatible, use common procedures, respond to controls, and operate in unison.

Coverage*: The geographic area included within the range of a wireless radio system.

Cycle: One complete performance of a vibration, electrical oscillation, current alternation, or other periodic process.

Digital: Voice communication normally occurs as an analog signal; that is, a signal with a voltage level that continuously varies. Digital signals occur as the presence or absence of electronic pulses, often representing only one of two values: a zero (0) or a one (1). Voice transmissions may be sent over digital radio

[8] Terms marked with an asterisk (*) are as defined in the National Task Force on Interoperability (NTFI) "Why Can't We Talk? Working Together To Bridge the Communications Gap To Save Lives," February 2003.

systems by sampling voice characteristics and then converting the sampled information to ones and zeros.

Discretionary grant: Federal grant funding distributed at the discretion of the agency administering the program funding, usually through a competitive process.

First responders: Individuals who in the early stages of an incident are responsible for the protection and preservation of life, property, evidence, and the environment, including emergency response providers, as well as emergency management, public health, clinical care, public works, and other skilled support (such as equipment operators) that provide immediate support services during prevention, response, and recovery operations.[9]

Formula grant: Federal grant that is allocated based on a predetermined statutory formula.

Frequency*: The number of cycles or events of a periodic process in a unit of time.

Frequency bands*: Where land mobile radio systems operate in the United States, including:

High HF	25-29.99 MHz
Low VHF	30-50 MHz
High VHF	150-174 MHz
Low UHF	450-470 MHz
UHF TV Sharing	470- 512 MHz
700 MHz	764-776/794-806 MHz
800 MHz	806-869 MHz

Grant: Funding made available to local agencies from State and Federal government agencies, as well as from private sources, such as foundations. Grants usually require the submission of a formal application to justify one's funding request.

Hertz: Abbreviation for cycles per second.

Infrastructure*: The hardware and software needed to complete and maintain the radio communications system.

Interference*: Extraneous energy, from natural or man-made sources, that impeded the reception of desired signals.

[9] First Responder as defined the December 17, 2003 Homeland Security Presidential Directive/Hspd-8, Subject: National Preparedness

Jurisdiction: The territory within which power or authority can be exercised.

Locality: A particular neighborhood, place, or district.

Local revenue fund: Funding obtained by local governments through local taxes (e.g. sales tax, property tax), user fees, and other user charges, as well as through the issuing of debt instruments, such as bonds.

Modem: An acronym for modulator/demodulator, which is a device that translates digital signals coming from a computer into analog signals that can be transmitted over standard telephone lines. The modem also translates the analog signal back into a digital signal that a computer can understand.

Mutual aid: The mutual aid mode describes major events with large numbers of agencies involved, including agencies from remote locations. Mutual aid communications are not usually well planned or rehearsed. The communications must allow the individual agencies to carry out their missions at the event, but follow the command and control structure appropriate to coordinate the many agencies involved with the event.

Mutual aid channel: A radio channel specifically allocated for use during emergency mutual aid scenarios.

Narrow-banding: Generally, narrowband describes telecommunication that carries voice information in a narrow band of frequencies. For state and local public safety, narrow-banding typically refers to the process of reducing the useable bandwidth of a public safety channel from 25 kHz to 12.5 kHz. The FCC issued the migration of Private Land Mobile Radio systems using frequencies in the 150-174 MHz and 421-512 MHz bands to narrowband technology. These rules set deadlines on applications for new wideband systems, modifications of existing wideband systems, manufacture and importation of 25 kHz equipment, the requirement for public safety to migrate to 12.5 kHz systems by January 2018.

Receiver: The portion of a radio device that converts the radio waves into audible signals.

Refarming: An administrative process being conducted by the FCC to reallocate channel bandwidths and, as a result, promote spectrum efficiency.

Repeater: In digital transmission, equipment that receives a pulse train, amplifies it, retimes it, and then reconstructs the signal for retransmission; in fiber optics, a device that decodes a low-power light signal, converts it to electrical energy, and then retransmits it via an LED or laser source. Also called a “regenerative repeater”.

Spectrum: The region of the electromagnetic spectrum in which radio transmission and detection techniques may be used.

Spectrum efficiency: The ability to optimize the amount of information sent through a given amount of bandwidth.

Steering committee: A group of usually high-level officials charged with setting policy for a project.

Supplemental responders: Responders who provide support to first responders during incidents requiring special assistance. Supplemental responders include:

- Emergency Management: Public protection, central command and control of public safety agencies during emergencies
- Environmental Health/Hazardous Materials specialists: environmental health personnel
- Homeland Security and Defense units
- Search and Rescue teams
- Transportation personnel

Transmitter: The portion of a radio device that sends out the radio signal.

Trunked radio system*: A system that integrates multiple channel pairs into a single system. When a user wants to transmit a message, the trunked system automatically selects a currently unused channel pair and assigns it to the user, decreasing the probability of having to wait for a free channel for a given channel loading.

Acronyms

AMPS: Advanced Mobile Phone System
APCO: Association of Public Safety Communication Officials
CapWIN: Capital Area Wireless Integrated Network
CIC: Commonwealth Interoperability Coordinator
CICO: Commonwealth Interoperability Coordination Office
CPWG: Commonwealth Preparedness Working Group
DOJ: Department of Justice
DHS: Department of Homeland Security
HF: High Frequency
ICR: Incident Command Response
ICRI: Incident Commander's Radio Interface
kHz: Kilohertz (1 thousand cycles per second)
MHz: Megahertz (1 million cycles per second)
NIJ: National Institute of Justice
NIMS: National Incident Management System
NPSPAC: National Public Safety National Advisory Committee
OCP: Office of Commonwealth Preparedness
PLMR: Private Land Mobile Radio
SCP: Secure Commonwealth Panel
SIRS: Statewide Interdepartmental Radio System
SPS: Office of the Secretary of Public Safety
STARS: Statewide Agencies Radio System
UHF: Ultra High Frequency
VHF: Very High Frequency
VACP: Virginia Association of Chiefs of Police
VAGEMSA: Virginia Association of Governmental EMS Administrators
VDEM: Virginia Department of Emergency Management
VDFP: Virginia Department of Fire Programs
VDH: Virginia Department of Health
VDOT: Virginia Department of Transportation
VFCA: Virginia Fire Chiefs Association
VITA: Virginia Information Technology Agency
VPFF: Virginia Professional Fire Fighters
VSA: Virginia Sheriffs' Association
VSP: Virginia Department of State Police

Appendix D: Consensus Plan Letter of Support

ASSOCIATION OF PUBLIC-SAFETY COMMUNICATIONS OFFICIALS-INTERNATIONAL
INTERNATIONAL ASSOCIATION OF CHIEFS OF POLICE
INTERNATIONAL ASSOCIATION OF FIRE CHIEFS
MAJOR CITIES CHIEFS ASSOCIATION
MAJOR COUNTY SHERIFFS' ASSOCIATION
NATIONAL SHERIFFS' ASSOCIATION

PUBLIC SAFETY ORGANIZATIONS COMMEND FCC FOR SUPPORTING PUBLIC SAFETY IN THE 800 MHZ PROCEEDING

Fire, Police, EMS and Communications Officials Move Closer to Resolution of the Pervasive and Dangerous Problem of 800 MHz Radio Interference

JULY 9, 2004

We applaud the Federal Communications Commission (FCC) for its leadership and unanimous decision yesterday in support of the public safety community across America. We are grateful to FCC Chairman Powell and the Commissioners for their careful consideration in this important proceeding. Today serves as a benchmark for the public safety community as a critical step in eliminating 800 MHz radio interference.

The FCC's groundbreaking decision will be positively received in police stations and firehouses all across America. We want to extend our thanks to the other Consensus Plan parties in this process – namely the land mobile radio interests, private wireless organizations, and Nextel Communications – all of whom worked tirelessly with public safety in the development of this comprehensive solution. A special thanks also goes out to the more than 1,000 public safety agencies and the nearly 10,000 private citizens who have spoken out in support of reliable, interference-free communications for our nation's first responders. Without their strong and consistent voices, this much-needed decision may have never happened. We understand the FCC has asked Nextel to go beyond their original pledge of spectrum exchange and supplemental financial compensation. We reiterate our pledge to work with Nextel, the FCC, and all those affected by today's ruling in order to realize a swift and safe implementation.

While the Commission's decision is a monumental step in finally resolving the dangerous and complex problem of 800 MHz interference, our work is not yet done. We now call on everyone who has been involved in this proceeding to unify in support of the Commission's order and to work with local agencies and the federal government to see that the implementation of this Plan is as smooth and efficient as possible. We hope all the interested parties will recognize that continued opposition would only further delay public safety's solution to interference, which is to the detriment of police, fire and EMS officials as well as the American public.

Once more, we commend the Commission for providing the framework to permanently eliminate public safety 800 MHz radio interference. This is a historic event. On behalf of the men and women who serve America's communities, we thank you.

Vincent R. Stile, President, APCO
Chief Ernest Mitchell, President, IAFC
Chief Joseph M. Polisar, President, IACP
Chief Harold L. Hurtt, President, MCC
Sheriff Wayne V. Gay, President, NSA
Sheriff Margo Frasier, President, MCSA

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Appendix E: Local, Regional, and Statewide Interoperability Initiatives

Local and Regional Interoperability Initiatives

Several localities and regions within Virginia have initiated interoperability efforts that may be scalable or serve as models for statewide interoperability. These efforts include:

Local 800 MHz trunked systems. The following localities operate or are implementing 800 MHz trunked systems:

- Chesterfield County
- City of Richmond
- Henrico County
- City of Chesapeake
- Fairfax County
- MWAA-Dulles & National Airports
- Capital Region Airport
- City of Virginia Beach
- City of Newport News
- City of Hopewell-DSCR
- City of Suffolk
- City of Manassas & Manassas Park
- City of Norfolk
- City and County of Roanoke
- Arlington County
- Loudoun County
- Prince William County
- College of William and Mary
- Dominion Virginia Power
- City of Alexandria
- City of Portsmouth
- City of Colonial Heights
- City of Charlottesville, Albemarle County & UVA
- Fauquier County
- Culpeper County
- York County/James City County
- City of Hampton
- Hanover County
- Spotsylvania County
- City of Lynchburg
- City of Bedford
- Bedford County
- Amherst County

Alexandria Police Department. The Alexandria Police Department is currently participating as a test site for the National Institute of Justice to test, integrate, and evaluate communication equipment in actual operational environments. Equipment being tested includes a gateway consisting of two ACU-1000 devices and 19 UHF, VHF, and 800 MHz frequencies mobile radios. The gateway has the ability to achieve voice interoperability with up to 19 public safety agencies. The system has already supported several large-scale events in the Washington, DC metropolitan area.

Capitol Region Communications Steering Committee. The steering committee, which includes the City of Richmond, Chesterfield County, and Henrico County, is working to improve inter-jurisdictional communication, deploy resources effectively, expand the radio coverage area, and provide system

redundancy. The steering committee is developing recommendations that will be funded by part of a secured grant.

Central Virginia Regional Radio System. The radio system, which is used by the City of Lynchburg, the City of Bedford, the County of Bedford, and the County of Amherst, uses an 800 MHz trunking system to enable communication between all local fire, police, public works, and other governmental agencies. Some localities are using the radio system for data communication in addition to voice communication.

Central Virginia Regional Radio System and the VSP Division III. A voice over internet protocol (VoIP) connection has been developed and is in operation between the Central Virginia Regional Radio System and the VSP Division III.

Charlottesville-Albemarle-UVA Project. The City of Charlottesville, Albemarle County, and the University of Virginia are using $6 million in secured grant funding to upgrade voice and data communication abilities. This initiative, which includes the implementation of an 800 Digital/Analog MHz Public Safety Radio System and two Raytheon JPS-1000 (mobile ACU-1000) Mobile Communication/Command Vehicles, will help ensure the safety of first responders and improve communications interoperability in the area. One of the Mobile Communication/Command Vehicles will be available to the Commonwealth if needed.

City of Harrisonburg-County of Rockingham Radio System Project. The City of Harrisonburg-County of Rockingham radio system will be an 800 MHz island among several UHF system users. The project is striving to work with manufacturers to develop an integrated, manufacturer-based approach to interoperability, rather than third party add-on approaches. The approach is pushing breadth and depth of seamless cross band, cross protocol, system-level interoperability with public safety and private entities through the use of a public-private partnership. The partnership will promote interoperability through creative, cooperative ideas and affordability through public funding mitigation with the private partners.

Hampton Roads Planning District Commission Regional Communications Committee. The committee, which includes ten cities and six counties, is working together to address regional communications interoperability. The committee has secured a grant for communications interoperability planning and equipment and is currently conducting analysis to determine the best way to utilize the secured grant funding.

National Capital Region RapidCom Project. The National Capital Region (NCR), in conjunction with the SAFECOM/RapidCom project, is working to assist responders in achieving emergency-level interoperable communications for incident commanders. Working with local stakeholders, a set of assistance

offerings has been identified that will improve the effectiveness of the NCR's existing interoperable capabilities. In addition, pocket guides, as well as more detailed procedures, will be distributed clearly outlining the steps required to establish interoperable connections and the capabilities available.

Statewide Tactical Interoperability Solutions

The Commonwealth has worked to develop tactical solutions that can be deployed to a situation with a few hours of an event to provide tactical communications interoperability. Examples of the Commonwealth's tactical interoperability solutions include:

- Virginia State Police (VSP) currently has three command posts in Northern, Central, and Western Virginia that can be en route to an incident within two hours to create tactical interoperability.

- VSP has ten radios at each of the seven division locations that can be deployed to a situation and handed out at the scene—primarily to the incident management team—to establish some tactical interoperability for radio communications.

- VSP has eight Incident Commander's Radio Interface (ICRI) units that can allow up to five public safety agencies to achieve radio interoperability. The ICRI units can also be linked together to increase this number to ten radios. These units can operate on battery power (24 hours on eight "AA" batteries) or on electricity if available. VSP also plans to deploy a radio technician with these units to assist with the deployment of these units.

- Virginia Department of Emergency Management (VDEM) currently has two mobile command posts that contain VHF High band, VHF low band, UHF, VSP radio, VHF Marine, VHF Aircraft, civil Air Patrol, cell phone, and SATCOM communication capabilities. These command posts can be deployed within two hours of an incident, plus drive time. VDEM plans to install JPS ACU-1000 units that will allow up to 24 connections to various radio and telephone.

- VDEM has two portable 60-foot towers and one portable 75-foot tower that can be deployed to an incident; each of these towers has trailers and generators, and they can strengthen a repeater's signal to increase the communication footprint at an incident.

- Virginia Information Technologies Agency has a portable UHF 20-watt repeater and 30-35 UHF portables that can provide communications coverage within a 2-5 mile radius. Additional programmable UHF radios can be used to increase the 30-35 UHF portables that are deployed with the system.

- The Virginia Department of Transportation (VDOT) has a portable ACU-1000 capable of interconnecting up to 11 radios operating on various frequencies.

- VDOT has two motorized mobile command posts and three tow-behind trailers positioned at regional locations.

- VDOT maintains a cache of ten handheld radios at each of their six regional locations and 24 radios at the Charlottesville Central Office for distribution to attain on-site interoperability.

- The Virginia Army National Guard has the Unified Command Suite (UCS) stationed with the 34th Civil Support Team in Blackstone, Virginia. The UCS provides tactical interoperable communications (voice, data, and video) between first responders, local, regional, state, and federal agencies using 800 MHz, VHF, HF, UHF, SATCOM, and commercial Ku Band Satellite. There are plans to install a JPS ACU-1000 unit that will allow the UCS to connect with up to 12 radios or telephones. The UCS can be deployed by the Governor and be en route within three hours to support civil authorities reacting to events involving Weapons of Mass Destruction.

Appendix F: Statewide Project Summaries

Capital Wireless Integrate Network (CapWIN)

The CapWIN project is a partnership between the States of Maryland and Virginia and the District of Columbia to develop an integrated transportation and criminal justice information wireless network. This unique project will integrate transportation and public safety data and voice communication systems in two states and the District of Columbia and will be the first multi-state transportation and public safety integrated wireless network in the United States. The project will have national implications in technology transfer including image/video transmission and the inclusion of transportation applications in an integrated system. National observers will be able to monitor the progress and development of the system during the evolution of the project. This project can potentially build a foundation for networks throughout the United States and other countries. The project will be completed in multiple phases including an initial strategic planning phase (completed), the implementation phase (currently underway) and a continuous development and expansion phase.

A pilot test was initiated during the strategic planning phase of the project. The pilot included twenty-two (22) in-vehicle mobile computer systems that allowed messaging between police vehicles in Maryland, Virginia and Washington, D.C.; transportation vehicles in Maryland and Virginia; and local fire vehicles. These mobile platforms and other developmental transportation and public safety systems were successfully interfaced during the pilot project. The primary goal of the project is to have multiple mobile data platforms communicating seamlessly across the network regardless of their jurisdiction or geographical location. These CapWIN end-users will include federal, state and local police, fire, and EMS vehicles as well as state DOT service patrols.

A strategic plan was developed with input from transportation and public safety agencies (federal, state, local) serving the Washington Metropolitan area to determine the following: functions needed, system requirements, security requirements, information priorities, evaluation methodology, a multi-year phased implementation strategy, and a long-term business plan that addressed ongoing operations and maintenance. The strategic plan is available on the website.

The CapWIN System Architecture

CapWIN is a state-of-the-art wireless integrated mobile data communications network being implemented to support federal, state and local law enforcement, transportation and public safety agencies in the Washington, D.C. Metropolitan area.

The purpose of CapWIN is to greatly enable and enhance communications for first responders during critical incident responses by integrating data and messaging systems, effectively creating the first multi-state, inter-jurisdictional transportation and public safety integrated wireless network in the United States.

CapWIN provides a “communication bridge” allowing mobile access to multiple criminal justice, transportation, and hazardous material data sources.

CapWIN:

- Is built on an open, scalable, and reliable Web-based architecture.
- Provides minimal impact to existing systems.
- Makes efficient use of limited bandwidth.
- Makes extensive use of technology standards.
- Makes extensive use of Commercial-Off-The-Shelf (COTS) products.
- Provides low total cost of ownership (TCO).
- Provides enhanced data security.
- Provides better uses of limited resources.

National Public Safety Planning Advisory Committee (NPSPAC) Channels

The Commonwealth of Virginia is represented by two NPSPAC Regional Planning Committees, Region 42 (most of Virginia) and Region 20 (Northern Virginia). These committees oversee the use of NPSPAC channels and ensure that the FCC rules and regulations are adhered to within Virginia.

NPSPAC mutual aid channels are available statewide to increase interoperability. These consist of one call in channel and four tactical channels between 820-824 MHz. The NPSPAC channels allow first responders from 800MHz systems to deploy to an area where there is an 800MHz system and switch their radio to the NPSPAC mutual aid channel. These channels exist nationwide and have national procedures governing use.

Current NPSPAC Channels

Channel/Name	Channel Number	Frequency (Mobile/Base Station in MHz)
CALL	601	821.0125/866.0125
TAC 1	639	821.5125/866.5125
TAC 2	677	822.0125/867.0125
TAC 3	715	822.5125/867.5125
TAC 4	753	823.0125/868.0125

There are 30 existing or planned 800 MHz systems within Virginia, primarily in more metropolitan areas. During mutual aid situations this will allow first responders to deploy to another metropolitan area and by using the NPSPAC channels these first responders can use their own radios to communicate. In accordance with the Region 42 NPSPAC Committee, any 800 MHz systems that have over five channels must monitor and have the NPSPAC CALL channel and at least 1-2 TAC Channels. VHF and UHF can also reach NPSPAC channels via system patches or use of regional 800 MHz systems already in place.

The FCC has recently adopted a proposed solution to the interference problems public safety radio systems have been encountering in the 800 MHz band. This plan would involve relocating the NPSPAC channels to new frequencies within the 800 MHz band. If the proposal is implemented the new NPSPAC channels would be relocated to 806-809 MHz for Mobile and 851-854 MHz for Base Stations. It is important to note that these changes are still pending and are subject to legal challenges.

State Interdepartmental Radio System (SIRS)

SIRS is a low band frequency 39.54 MHz that is currently used statewide by local law enforcement to communicate between localities and the Virginia State Police (VSP). SIRS was developed in 1978 and since most law enforcement radios used low band it made sense so that the existing radios could use multiple frequencies. SIRS has three primary goals:

- Direct car to car radio communications between local and state police;
- Provide radio communications during prisoner transports; and
- Provide interoperability between localities and VSP.

SIRS is not to be used for everyday routine radio traffic, this type of use bogs down the system. This system provides the ability for direct interoperability and does not rely upon a dispatch function for those with SIRS equipment.

SIRS is governed by the SIRS Advisory Board, which is appointed by the Secretary of Public Safety. The SIRS Board is responsible for policy formation, eligibility for membership, and research on matters relating to public safety communication problems affecting the Commonwealth's ability to deliver effective law enforcement services.

SIRS is widely used by rural localities to communicate with VSP on a daily basis since many of these localities still operate low band radio systems. Many localities have migrated to 800 MHz and high band radio systems, which require some type of patch or interconnectivity to continue the use of SIRS. However, in some cases these localities or regions have severed the use of SIRS due to the costs associated with maintaining two systems.

SIRS continues to provide direct interoperability between locality law enforcement and VSP throughout Virginia. The 39.54 MHz frequency can be used throughout Virginia to link up local law enforcement with VSP providing true interoperability, which increases public safety. While this system is over 30 years old it is still widely used and effective.

More information can be obtained about SIRS by contacting the SIRS Board Chair, Sheriff Farrar Howard, Jr. at (804) 966-9500.

Statewide Agencies Radio System (STARS)

The STARS Program will provide wireless communications for 20 participating state agencies by upgrading the existing Virginia State Police (VSP) land mobile and microwave radio networks. STARS will create an integrated, seamless, statewide, wireless voice and data communications system designed to meet the needs of these agencies. The system will be shared by agencies engaged in public safety, protection, and service; and will facilitate interoperability with and between localities at the county and city level. To accomplish this, the program will:

- Increase capacity, upgrade the technology, and enhance coverage of the land mobile radio network
- Implement statewide law enforcement mobile data
- Upgrade the technology of, and create disaster recovery alternate paths for, the microwave radio network

Also being upgraded as part of this program are the wireless data communications for the Virginia components of the National Weather Service Integrated Flood Observing and Warning System (IFLOWS) network.

Future procurement phases are planned to:

- Expand portable radio coverage where operationally required
- Install VSP wireless access points at Area Offices and Division Headquarters
- Create a secure and highly reliable statewide Intranet with wireless access
- Implement private 700 MHz radio wideband mobile data in selected areas

Completion for currently planned procurement phases is scheduled for 2011. The subscriber equipment including mobile radios, portable radios, vehicular repeater systems, and mobile computers will be replaced periodically as necessary and the infrastructure technology can be updated if operationally required. The STARS Program will provide participating agencies with a cost-effective systems approach that enables interoperability between federal, local, and Commonwealth government agencies.

STARS Technology Brief

The STARS Program was originally conceived in the mid nineteen-nineties to be an upgrade to the antiquated Virginia State Police land mobile radio system, which was implemented in 1977. As planning progressed, both technology advances and direction from state government led the program to the present concept of a shared system composed of the twenty state agencies that use two-way radio communication as a regular part of their operations.

To support the large increase of user agencies and radios, the microwave backbone of the system is undergoing a complete renovation. The 87 existing

tower sites will grow to 121 sites and the network is now designed to have alternate paths, or rings, to provide continuously high reliability in the event of path outage.

Forty-five of these tower sites will be used for two-way communications with user radios. These sites will provide Commonwealth personnel quality, statewide, mobile radio coverage. STARS will be one of the first geographically statewide systems to employ digital trunked technology in the VHF 150 MHz band.

The Commonwealth will be one of the first states to employ an Integrated Voice and Data (IV&D) land mobile radio architecture that uses the same mobile radio for both voice and mobile computer communications. Virginia will therefore have statewide mobile data coverage for law enforcement. Integrating the voice and data networks saves the Commonwealth the expense of a separate data infrastructure with an additional radio/modem in each vehicle. The IV&D infrastructure will also provide Over-the-Air Re-Keying (OTAR) of the radio encryption, a recent technological innovation. This allows the encryption codes resident in the vehicle's equipment to be managed remotely.

The digital trunking technology allows diverse functional groups of people to communicate privately within their own organizational elements as "talk-groups", even while other groups are communicating among themselves. Members of a talk-group can be located anywhere in the state and included in a call by the system's control computer. As the members of a talk group move throughout Virginia, the system will automatically track them so they will not be out of communications with other members of their group. Whenever an activity or emergency requires interoperability, different talk-groups can be combined to provide joint communications.

The digital trunking technology will also be carried a step further for the agencies that use portables while away from their vehicles. STARS will include a Digital Vehicular Repeater System (DVRS), which will translate the VHF signal used between the tower and vehicle into an 800 MHz signal for vehicle-to-portable communications. The DVRS will allow communications to be encrypted and secure over the entire radio circuit, from the originator to the recipient.

The initial procurement build-out of STARS is anticipated to occur over a six-year period. STARS is first scheduled to be operational, in the twenty-one counties and four cities comprising the Richmond area, in December 2005. Some participating agencies will have their STARS equipment installed in conjunction with the State Police field division in which they have operations. Legacy VHF radio frequencies of the agencies may be programmed into the STARS subscriber equipment to provide continuity with areas of the state that have yet to be upgraded. STARS scheduled operational status dates for the State Police field divisions are:

Richmond (Division One)	December 2005
Tidewater (Division Five)	May 2008
Culpeper (Division Two)	July 2008
Northern Virginia (Division Seven)	October 2008
Salem (Division Six)	April 2009
Appomattox (Division Three)	May 2009
Wytheville (Division Four)	September 2009

Note: This implementation could be adjusted should VSP Division Seven Headquarters move into a new facility as is being proposed.

The implementation of each of these exciting and cutting-edge technologies into STARS will provide the Commonwealth with critical public safety communications.

Interoperability Specifics

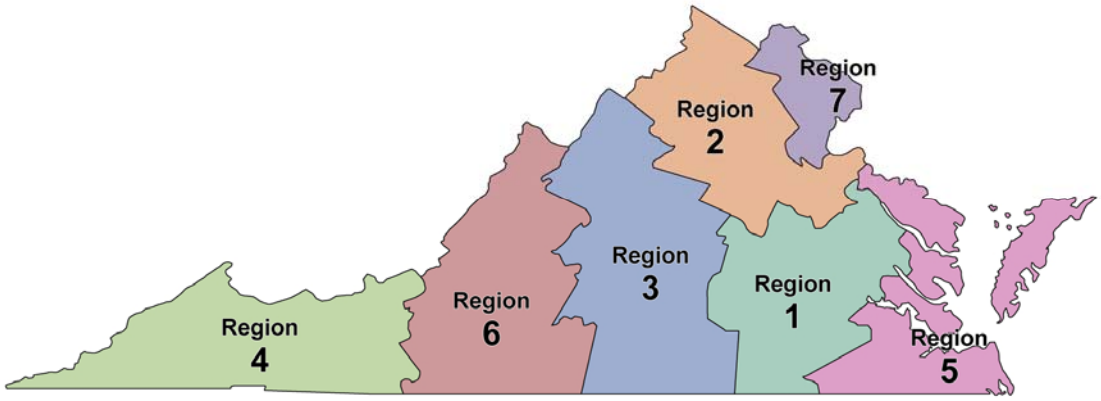
A single interface link (an RF talk-path) will be provided to each of the counties and independent cities to bring interoperability at no cost to the jurisdiction. A fixed radio placed at one of the 121 STARS transmitter sites, will be programmed to include a specific talk group or channel as determined by the locality. This fixed radio will act as a mobile radio on the locality network. When interoperability is needed, the dispatchers (locality and State Police) will contact with each other via telephone to establish a patch. The number of links can be increased as additional funding and radio frequencies are obtained for STARS.

In a wide scale emergency, if the situation warrants it, localities may be connected to each other in this manner to provide regional intercommunications. These interface links can also be used to interconnect locality radio talk-groups or channels to each other without being on a STARS talk-group. In-band (VHF and 800MHz) direct, radio-to-radio communications on locality radio networks, is also possible if the situation warrants it. Note that when direct communications is employed on both non-STARS VHF and 800 MHz frequencies, the STARS user will loose contact with their agency dispatcher and their emergency alert feature on the radio will not be functional because they are on the locality radio system. Additionally, when direct VHF is used, mobile data transmissions will be suspended and Automatic Vehicle Location (AVL) will not be functional.

The STARS Project Management Team is considering a VoIP based interoperability solution, in lieu of or in addition to the RF interface architecture described above. Implementing this approach is highly dependent on the yet to be finalized determination of the quantity and quality of the radio frequencies available at each of the STARS transmitter sites. The potential increase in locality loading, on the limited STARS spectrum resources, must be assessed for prior to redesigning the network.

Localities and federal organizations may be added as full-time STARS users/partners when feasible. The addition of any users/partners will necessitate additional VHF radio channels to cover the additional requirements. Note that STARS is designed for mobile radio coverage, accordingly additional transmitter sites may be necessary if portable radio coverage is required. Questions concerning STARS should be addressed to the STARS Program Director Captain Michael E. Bolton at (804) 646-2022.

Appendix G: Seven Regions



Region 1: RICHMOND

- Amelia County
- Brunswick County
- Charles City County
- Chesterfield County
- City of Colonial Heights
- Dinwiddie County
- City of Emporia
- Essex County
- Goochland County
- Greensville County
- Hanover County
- Henrico County
- City of Hopewell
- King & Queen County
- King William County
- New Kent County
- Nottoway County
- City of Petersburg
- Powhatan County
- Prince George County
- City of Richmond
- Sussex County

Region 2: CULPEPER

- Caroline County
- Clarke County
- Culpeper County
- Fauquier County
- Frederick County
- City of Fredericksburg
- Greene County
- Kings George County
- Louisa County
- Town of Luray
- Madison County
- Orange County
- Page County
- Rappahannock County
- Shenandoah County
- Spotsylvania County
- Warren County
- City of Winchester

Region 3: CENTRAL VIRGINIA

- Albemarle County
- Amherst County
- Appomattox County
- Augusta County
- Buckingham County
- Campbell County
- Charlotte County
- Cumberland County
- Town of Farmville
- Fluvanna County
- Halifax County

- City of Harrisonburg
- Lunenburg County
- City of Lynchburg
- Nelson County
- Prince Edward County
- Rockingham County
- Town of South Boston
- City of Staunton
- City of Waynesboro

Region 4: SOUTHWEST

- Bland County
- City of Bristol
- Buchanan County
- Carroll County
- Dickenson County
- City of Galax
- Giles County
- Grayson County
- Lee County
- City of Norton
- Pulaski County
- City of Radford
- Russell County
- Scott County
- Smyth County
- Tazewell County
- Washington County
- Wise County
- Wythe County

Region 5: TIDEWATER

- Accomack County
- City of Chesapeake
- Town of Chincoteague
- City of Franklin
- Gloucester County
- City of Hampton
- Isle of Wight County
- James City County
- Lancaster County
- Mathews County
- Middlesex County
- City of Newport News
- City of Norfolk
- Northampton County
- Northumberland County
- City of Poquoson
- City of Portsmouth
- Richmond County
- Southampton County
- City of Suffolk
- Surry County
- City of Virginia Beach
- Westmoreland County
- City of Williamsburg
- York County

Region 6: ROANOKE

- Alleghany County
- City of Bedford
- Bedford County
- Botetourt County
- City of Buena Vista
- Town of Christiansburg
- Town of Clifton Forge
- City of Covington
- Craig County
- City of Danville
- Floyd Dounty
- Franklin County
- Henry County
- Highland County
- City of Lexington
- City of Martinsville
- Montgomery County
- Patrick County
- Pittsylvania County
- City of Roanoke
- Rockbridge County
- City of Salem
- Town of Vinton

Region 7: NORTHERN VIRGINIA

- City of Alexandria
- Arlington County
- City of Fairfax
- Fairfax County
- City of Falls Church
- Loudoun County
- City of Manassas
- City of Manassas Park
- Prince William County
- Stafford County

If you have any questions regarding the VA Strategic Plan please contact:

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