Guide to
Standards and
Technology

Homeland
Security

SAFECOM

SAFECOM's Standards Development Model

Where We Are Going...

Radio, voice, and data interoperability is a problem in many jurisdictions due to the lack of communication standards. Communication standards allow practitioners to reliably communicate with departments and jurisdictions that use equipment from different vendors. Because standards are critical to interoperability, SAFECOM has built a process to identify where standards are necessary and to accelerate their development.

The purpose of this guide is to communicate how SAFECOM works with the public safety community to define communication requirements and to accelerate standards to help meet those requirements.
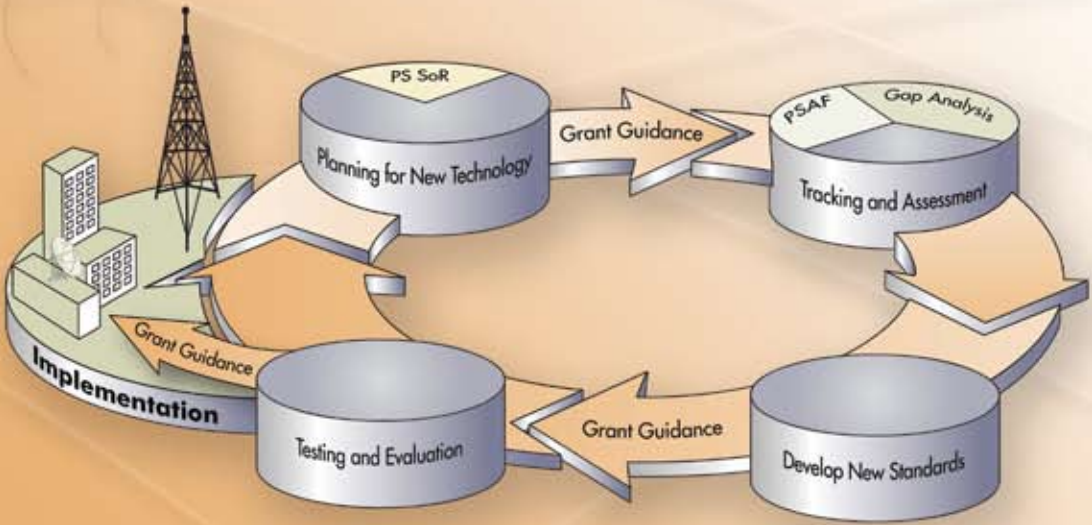
This guide will give users a better understanding of how SAFECOM helps drive these standards for greater interoperability.

Standards and the Future State of Interoperable Communications

Public safety's long-term vision for interoperable communications is a national system-of-systems that responds effectively to a local incident, a major terrorist attack, or a natural disaster. A system-of-systems approach makes it possible for distinct land mobile radio systems owned and operated by different public safety agencies to communicate with each other without having to purchase the same equipment. A system-of-systems approach, when executed, gives public safety practitioners the flexibility to select equipment that best fits their technical requirements and budget constraints while still achieving interoperability

The key to this solution is standardization.

The Internet is an example of an existing system-of-systems. It allows systems that are designed by multiple manufacturers and run on different operating systems to interface with each other and exchange information without requiring the end user to have any special knowledge. Such interface standards are the key to making technology interoperable.

The diagram shows a cyclical model with the following components: Planning for New Technology (PS SoR), Tracking and Assessment (PSAF, Gap Analysis), Develop New Standards, Testing and Evaluation, and Implementation, connected by "Grant Guidance" arrows.

How To Use This Guide

1 **To learn more about the model and its components...**

Turn to the next page for a detailed explanation.

2 **To find out how your community is specifically impacted by various components of the model...**

Choose your role in the public safety community from the tabs on the right. For example, if you are law enforcement officer, turn to the emergency responder tab to learn how your community may be financially, politically and operationally impacted by the standards development process.

SAFECOM's Standards Development Model

How the Model Works

The model above describes SAFECOM's practitioner-driven approach to standards development. The model considers four key areas of activity:

1. Planning for New Technology
2. Tracking and Assessment
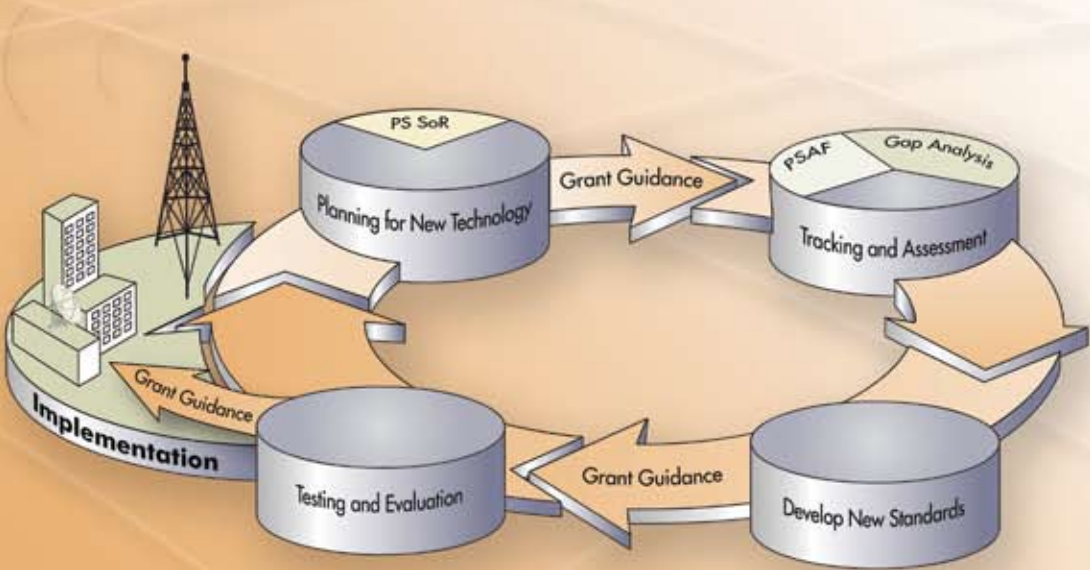3. Developing New Standards
4. Testing and Evaluation

Although the implementation of standards that increase interoperability is the goal, the development of standards comes first, and requires some time. Therefore, SAFECOM has elected to use common grant guidance to move interoperability forward even before essential standards can be produced. (This is depicted in the model.)

Note: The model shows processes that are in constant motion. Simultaneous activity is taking place in all areas.

Planning for New Technology

Although SAFECOM and its partners do a great deal of work planning and accounting for new technology, this guide focuses on one particular effort, the Statement of Requirements (SoR). The SoR will drive the development of future equipment.

The SoR: The first step in SAFECOM's approach to accelerating standards development is to define the communication requirements of public safety practitioners. This is done through the SoR, a living document developed in partnership with the public safety community. It establishes a set of requirements describing the communication services that public safety practitioners need when responding to emergency events. The SoR will be updated and revised as requirements for it demand.

The SAFECOM communications lifecycle diagram showing: PS SoR / Planning for New Technology → Grant Guidance → PSAF / Gap Analysis / Tracking and Assessment → Grant Guidance → Develop New Standards → Grant Guidance → Testing and Evaluation / Implementation → Grant Guidance (cycle continues).

Tracking and Assessment

Tracking and assessing technology and standards is a broad area of activity. SAFECOM is focused on two efforts to accelerate the development of standards.

1. **Public Safety Architecture Framework (PSAF):** SAFECOM began development of the PSAF based on the requirements outlined in the SoR. The term "architecture framework" or AF, refers to a structured process used globally by industry and government. It is used to compare and integrate legacy communication and information systems to save resources. PSAF goes a step further. It is a blueprint for systematically defining an organization's current technical capability, or baseline, and its desired, future technical capability.

The purpose of the PSAF is two-fold:

A. The PSAF helps the SAFECOM program identify needed standards. It is used to identify where key interface standards exist and where standards need to be developed. Identifying these standards is essential to achieve public safety's system-of-systems vision.

B. The PSAF serves as a guide for localities planning for interoperability. It helps engineers and planners document their public safety communication capabilities and analyze their system in relation to other systems. The PSAF provides practitioners with a set of tools and common language for mapping the details of their local communications systems. It enables the comparison of capabilities and equipment for interoperability between jurisdictions.

2. **Gap Analysis:** The PSAF is used to support a gap analysis in two different ways:

A. Nationally, SAFECOM uses the PSAF to expose gaps in technical standards.

B. Local public safety communities can use the PSAF to conduct their own gap analysis to identify where technology or standards can be used to support local operational needs and interoperability with surrounding public safety communities.

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Developing New Standards

Based on the results of the gap analysis, SAFECOM will work with the public safety community to determine whether to fill these gaps with existing standards, modified standards, or new standards. SAFECOM and the public safety community anticipate that many of these gaps can be filled by existing standards.
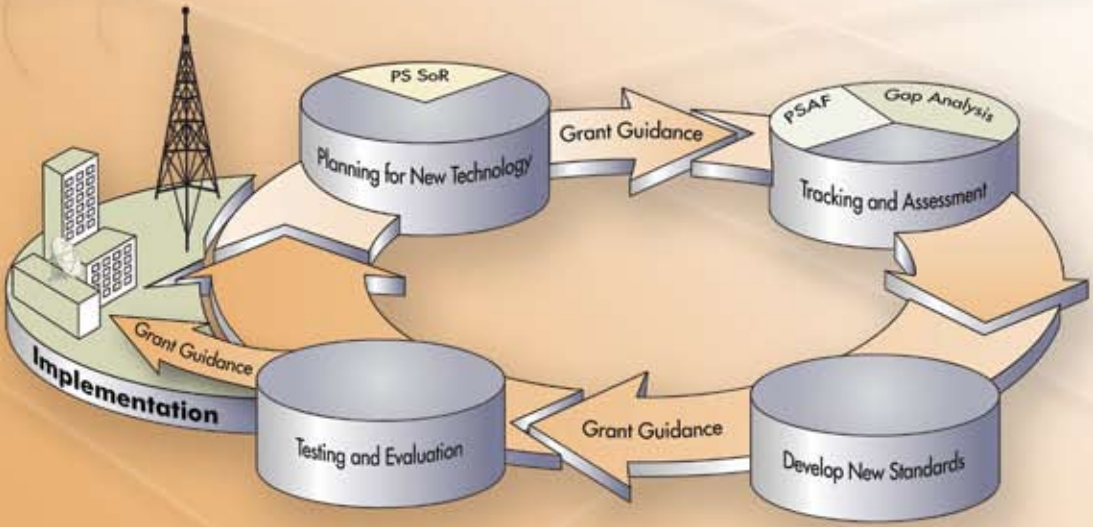
Testing and Evaluation

After standards are agreed upon, they will be tested against the SoR and the PSAF. Equipment will also undergo testing for compliance against these standards. The testing and evaluation stage, discussed below, ensures standards implementation.

Standards Implementation: Once tested, standards provide the ability to:

1. Interoperate between communication systems by using standard interfaces
2. Develop products that interoperate with products from other manufacturers

As standards are identified and provided in commercially available products, public safety practitioners will be able to migrate toward fully interoperable architectures.

Grant Guidance: SAFECOM-coordinated grant guidance provides criteria for the use of federal grant dollars. The grant guidance seeks to avoid the creation of public safety communication system stovepipes at the local and state levels. As standards mature and viable equipment is available, grant guidance will be modified so that funding is made available for standard-based solutions that support interoperability. This guidance is included in grants issued by multiple federal grant programs, including Community Oriented Policing Services (COPS) and the Office for Grants and Training (OG&T).

The diagram shows a cycle with the following stages:
- PS SoR — Planning for New Technology
- Grant Guidance
- PSAF / Gap Analysis — Tracking and Assessment
- Grant Guidance
- Develop New Standards
- Grant Guidance
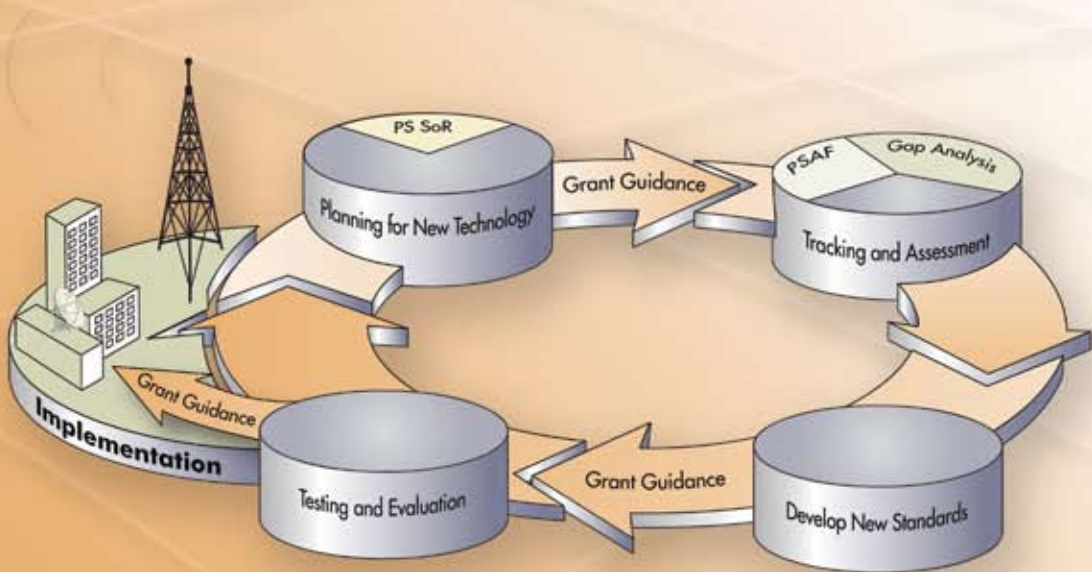- Testing and Evaluation
- Grant Guidance
- Implementation

Emergency Responders

SAFECOM's Standards Development Model

"I believe that true interoperability can best be achieved with a standards-based, shared system that is implemented at the statewide or regional level."

— Assistant Fire Chief
County of Los Angeles Fire Department

How Does This Affect Me?

SAFECOM has established a governance committee consisting of public safety practitioners to ensure the SAFECOM strategy remains practitioner-driven. SAFECOM governance supports standards development and includes a steering panel, a user needs committee, and an architecture standards committee. The information below demonstrates how public safety input is used to work toward interoperability and how the effort may affect emergency responders.

Funding: SAFECOM, with the input of the public safety community, developed a coordinated grant guidance document to inform the community of its eligibility for grants, the purposes for which grants could be used, and guidelines for putting into effect a wireless communication system. To avert the creation of public safety communications systems stovepipes at the local and state levels, the grant guidance encourages the use of grants to purchase equipment that complies with public safety-prescribed standards.

SAFECOM's grant guidance is included as part of the COPS and the OG&T grant processes.

Planning for New Technology

The SoR: The SoR was developed by public safety practitioners, for practitioners. The SoR defines the current and future operational and functional requirements for public safety. Because the SoR is entirely practitioner-driven, it provides industry and standard-making organizations vital information to help develop technologies and standards that meet practitioner needs. Specifically, the SoR provides the following information:

1. Requirements that industry can use to better align its research and development of evolving technologies, thus encouraging competition and greater product availability
2. A description of operational and functional communication needs
3. A foundation for future planning

The SoR is intended to be a living document, continually updated and revised as technology and requirements change and evolve. Eventually, the SoR will

State & Local Coordinators

Political Leadership

System Engineers

Industry

SAFECOM's Standards Development Model

advise the public safety community on requirements and standards for purchasing equipment.

Tracking and Assessment

The PSAF: The PSAF guides local system planners as they analyze and document their communication systems individually and in relation to other systems. The PSAF provides practitioners with a roadmap and common language to guide their local communications systems. The PSAF helps practitioners determine where standards are needed that comply with interoperability standards driven by the SoR. The PSAF is useful when applying for future equipment funding because the grant guidance encourages interoperability between jurisdictions.

Testing and Evaluation

Equipment: Testing and evaluating both existing and new technology against the SoR, the PSAF, and current standards creates an opportunity to coordinate the requirements of practitioners with the research, development, and production of new technology and equipment by industry. This coordination will serve to produce equipment that supports the needs of practitioners in the field.

With the SoR, PSAF, and grant guidance, SAFECOM can provide resources to advise states, regions, and localities how to locate resources and buy equipment that is interoperable with surrounding localities as well as with future national standards.
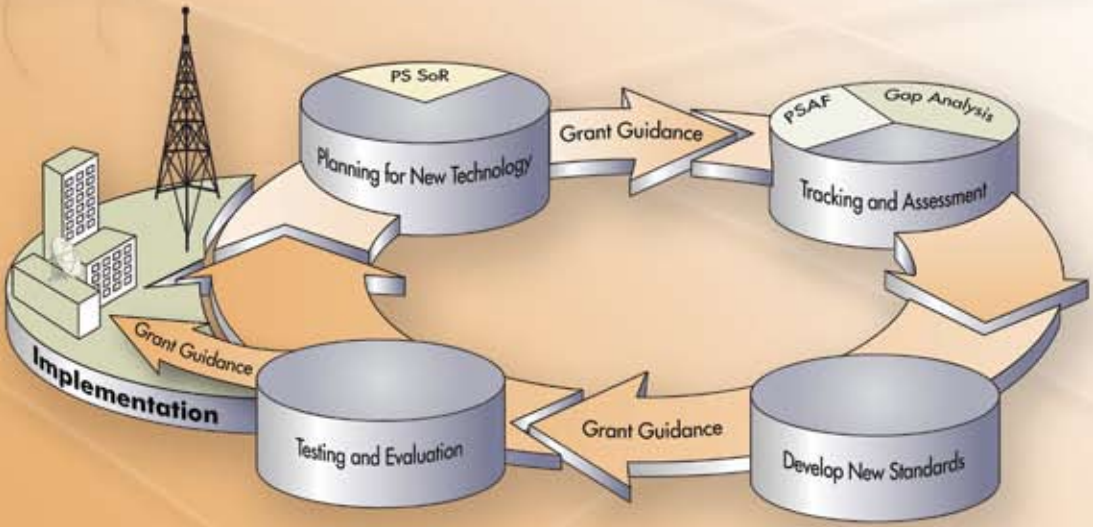

Resources to Help:

For information on the various governance panels, please visit: http://www.safecomprogram.gov/SAFECOM/about/governance/default.htm

For a copy of the SoR, see: http://www.safecomprogram.gov/SAFECOM/library/technology/1258_statementof.htm

For grant guidance: http://www.safecomprogram.gov/SAFECOM/grant/default.htm

For SAFECOM tools and best practices: http://www.safecomprogram.gov/SAFECOM/tools/

The cyclical diagram contains the following labeled elements:

- PS SoR
- Planning for New Technology
- Grant Guidance
- PSAF
- Gap Analysis
- Tracking and Assessment
- Grant Guidance
- Develop New Standards
- Grant Guidance
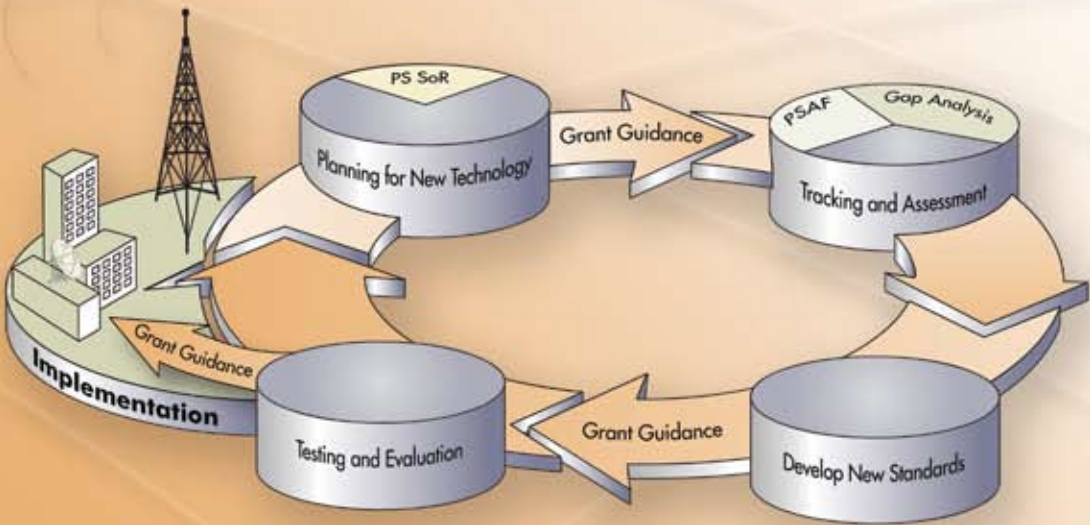- Testing and Evaluation
- Grant Guidance
- Implementation

State & Local Coordinators

SAFECOM's Standards Development Model

"Who better to identify what works and what does not work than the very same public safety responders that use radios on a daily basis to save lives?"

— Chris Essid, Office of Commonwealth Preparedness
for the Commonwealth of Virginia

How Does This Affect Me?

Coordinating a state or local interoperability initiative is a major effort. SAFECOM's approach to standards development can help state and local leaders plan their initiatives accordingly.

Resources for State and Local Coordinators: SAFECOM developed the coordinated grant guidance with the input of the public safety community. Grant guidance outlines eligibility for grants, the purposes for which grants could be used, and guidelines for putting into effect a wireless communication system.

State and local jurisdictions can maximize eligibility for federal grant money by aligning their interoperability efforts with standards and requirements prescribed by SAFECOM initiatives. The SoR, the PSAF, and the Statewide Coordination Implementation Plan (SCIP) can assist in this effort.

Planning for New Technology

The SoR: The SoR is a living document developed in partnership with the public safety community. It establishes a set of requirements describing the communication services that public safety practitioners need when responding to emergency events. State coordinators can use the SoR to:

1. Identify operational and functional communication needs
2. Offer a foundation for capital planning and spending
3. Seek vendors that align their research and development of evolving technologies with the SoR

Tracking and Assessment

The PSAF: The PSAF is used by the SAFECOM program to identify where key interface standards exist and where standards need to be developed. Identifying these standards is essential to achieve the system-of-systems vision.

State and local coordinators can use the PSAF as a guide to help system planners as they analyze and document their public safety communication systems in relation to other systems. The PSAF provides practitioners and

SAFECOM's Standards Development Model

coordinators with a roadmap and common language for internally outlining the details of their state and local communications systems to others in their region avoiding, stovepipe solutions and increasing eligibility for federal grants.

Testing and Evaluation

Equipment: The testing and evaluation of existing and new technology against the SoR, the PSAF, and current standards creates an opportunity to coordinate the requirements of practitioners with the research, development, and production of new technology and equipment by industry. This coordination will produce equipment that supports the needs of practitioners in the field and therefore educate practitioners and coordinators on future purchasing decisions.

Additional Planning Resources: The practitioner-driven approach relies heavily upon the input of various advisory and working groups and steering and governance panels. The SCIP methodology can help state and local coordinators with its step-by-step process for developing an interoperability strategic plan, which includes formation of a governance structure. SAFECOM wrote the SCIP methodology by drawing on the planning approach of the Commonwealth of Virginia to develop an interoperability strategic plan. Creating an interoperability strategic plan is strongly recommended in SAFECOM's grant guidance; it may increase a state's or locality's eligibility for federal grants.

Resources to Help:

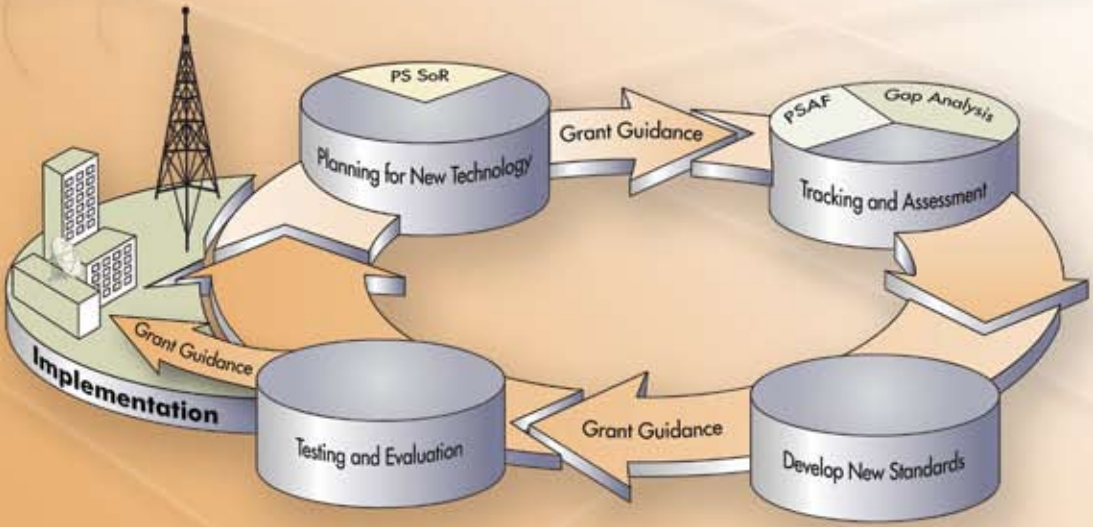**For information on the various governance panels, please visit:** http://www.safecomprogram.gov/SAFECOM/about/governance/default.htm

For the SCIP: http://www.safecomprogram.gov/SAFECOM/library/interoperabilitycasestudies/1223_statewidecommunications.htm

For grant guidance: http://www.safecomprogram.gov/SAFECOM/grant/default.htm

For a copy of the SoR: http://www.safecomprogram.gov/SAFECOM/library/technology/1258_statementof.htm

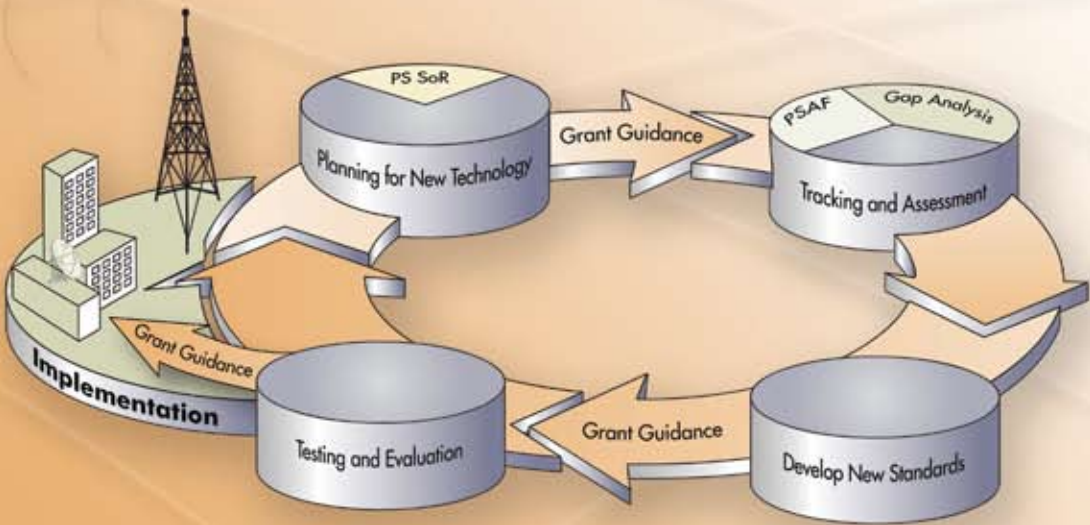**For SAFECOM tools and best practices:** http://www.safecomprogram.gov/SAFECOM/tools/

Political Leadership

SAFECOM's Standards Development Model

"Advancing interoperability is, by necessity, an iterative process,"

— Dr. David Boyd
Director of the Office for Interoperability and Compatibility

How Does This Affect Me?

Communications interoperability is an important issue for state and local first responders and has received attention from various federal agencies. For an elected or appointed state official with administrative and financial responsibilities, important issues to consider about SAFECOM's standards approach for increased interoperability are outlined below.

State Funding

State and local jurisdictions can maximize eligibility for federal grant money by aligning their interoperability efforts with standards and requirements prescribed by SAFECOM initiatives. To help in this effort, SAFECOM developed, with the input of the public safety community, coordinated grant guidance to avert communication system stovepipes at the state and local levels. SAFECOM's grant guidance is included as part of large grants for public safety communications to encourage the use of these funds to purchase standards-based equipment. It thus educates public safety practitioners and interoperability coordinators on future purchasing decisions and capital planning.

Equipment

Testing and evaluation of existing and new technology creates an opportunity to coordinate the requirements of practitioners with the research, development, and production of new technology and equipment by industry. This coordination will produce equipment that supports and complies with the needs of practitioners in the field and ultimately will be included as part of the grant guidance.

Additional Resources

SAFECOM uses a practitioner-driven approach that relies heavily upon the input of advisory and working groups and steering and governance panels. States and localities can benefit by using this approach to develop a statewide interoperability strategic plan. The Statewide Coordination Implementation Plan (SCIP) methodology describes a step-by-step process to develop an interoperability strategic plan, which includes the formation of a governance structure. In addition, a well-thought-out strategic plan may increase a state's eligibility for federal grants.
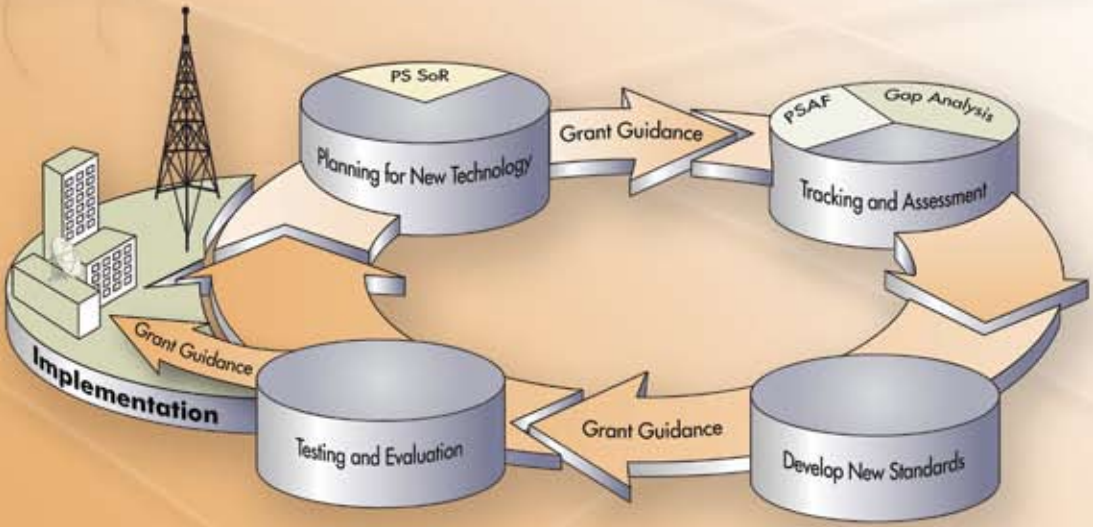
System Engineers

Industry

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Resources to Help:

For grant guidance: http://www.safecomprogram.gov/SAFECOM/grant/default.htm

For the SCIP: http://www.safecomprogram.gov/SAFECOM/library/interoperabilitycasestudies/1223_statewidecommunications.htm
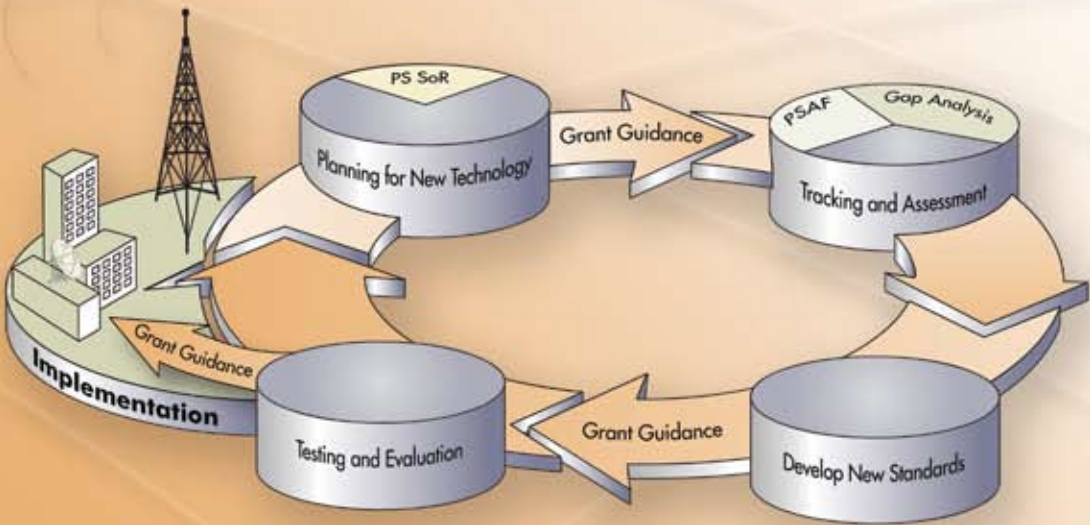
For SAFECOM tools and best practices: http://www.safecomprogram.gov/SAFECOM/tools/

System Engineers

SAFECOM's Standards Development Model

"Your system may work well in your area, the problem is that your firemen don't just stay in your area..."

— James Wadsworth
Manager, Radio Services Center
Fairfax County Department of Information Technology Industry

How Does This Affect Me?

SAFECOM knows that system engineers are essential to any communication system. System engineers have a unique understanding of user needs and the technology for serving those needs. From advising public safety officials on procurement options to choosing encryption methods, system engineers are often the most familiar with the technical, financial, and even political complexities of the communication systems they service and manage. The information below assists engineers regarding SAFECOM's approach.

Planning for New Technology

The SoR: The SoR is a requirements document that provides a consolidated set of requirements for public safety communications. Because practitioners drive the SoR, it provides industry with a clear picture of public safety requirements. In turn, the SoR drives:

1. SAFECOM standards activity
2. SAFECOM research and development

The SoR helps system engineers to:

1. Identify operational and functional communication needs
2. Seek vendors that align their research and development of evolving technologies with the SoR

Tracking and Assessment

The PSAF: The PSAF provides planners and engineers with a roadmap and common language to guide their local communications systems. It can determine where standards are needed in order to comply with interoperability standards set by the SoR. To achieve this complex task, the PSAF provides three views of public safety communications:

1. The Operational View – Identifies how public safety performs its mission.
2. The Systems View – Relates systems and requirements to operational needs.
3. Technical Standards View – Delineates the technical rules and guidelines that allow these systems to interoperate.

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By using the PSAF to conduct a gap analysis, local public safety communities can identify where to use technology or standards to support local operational needs and interoperability with surrounding public safety communities.

Testing & Evaluation

A National Voluntary Lab Accreditation Program (NVLAP) is being established to accredit independent labs to test and verify whether commercially available products comply with specific standards. The National Institute of Standards and Technology (NIST) will accredit the labs that offer this voluntary testing service. Industry will be able to submit equipment for testing and receive certification that products passed standards compliance testing. This will produce equipment that supports and complies with the needs of practitioners in the field and will ultimately be included as part of the grant guidance.
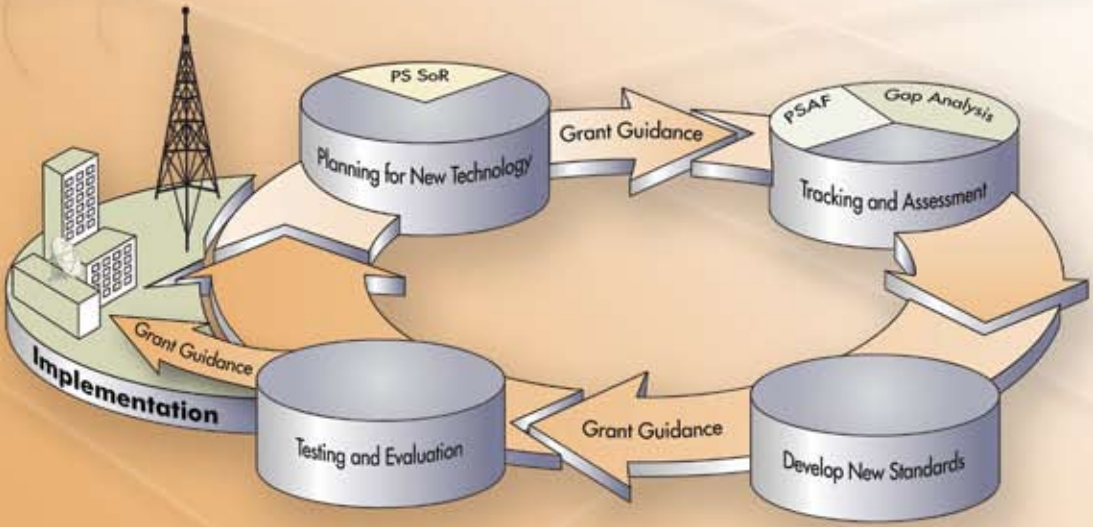
Grant Guidance: Because system engineers and planners often advise practitioners on procurement decisions, SAFECOM created grant guidance to avoid the creation of public safety communications systems stovepipes at the local and state levels. The grant guidance encourages the use of grants to purchase equipment that complies with the standards prescribed by the public safety community.

Resources to Help:

For a copy of the SoR: http://www.safecomprogram.gov/SAFECOM/library/technology/1258_statementof.htm

For Grant Guidance: http://www.safecomprogram.gov/SAFECOM/grant/default.htm

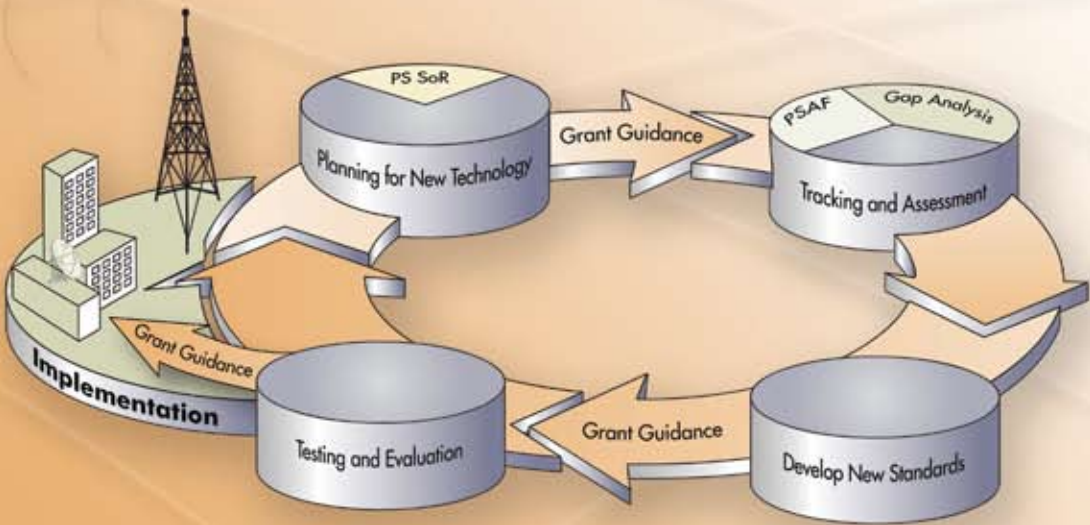**For SAFECOM tools and best practices:** http://www.safecomprogram.gov/SAFECOM/tools/

Industry

SAFECOM's Standards Development Model

"...interoperable communications can only be achieved if there are technical standards that facilitate that interoperability."

— Industry Member

How Does This Affect Me?

SAFECOM and the public safety community recognize the important role the communications industry plays in achieving interoperability. This section identifies key elements in the model where industry is involved or has an interest.

Planning for New Technology

The SoR: The SoR is a requirements document that provides a consolidated set of requirements for public safety communications. Because practitioners developed the SoR, it provides industry with a clear picture of public safety requirements. The SoR drives:

1. SAFECOM standards activity
2. SAFECOM research and development

In addition, because the SoR forecasts public safety technology needs, industry can use it to inform its product development decisions.

Tracking and Assessment

The PSAF and Gap Analysis: SAFECOM and local jurisdictions use the PSAF tool to identify where technology is required to support operational needs and to ensure interoperability with other public safety communities.
Since industry provides these solutions, opportunities may exist through the following means:

1. Offering existing products to close technology gaps that the PSAF and gap analysis identify
2. Offering products that support interface standards
3. Using the PSAF to plan products accordingly

Testing & Evaluation

A National Voluntary Lab Accreditation Program (NVLAP) is being established to accredit independent labs to test and verify whether commercially available products comply with specific standards. The National Institute of Standards and Technology (NIST) will accredit the labs that offer this voluntary testing service.
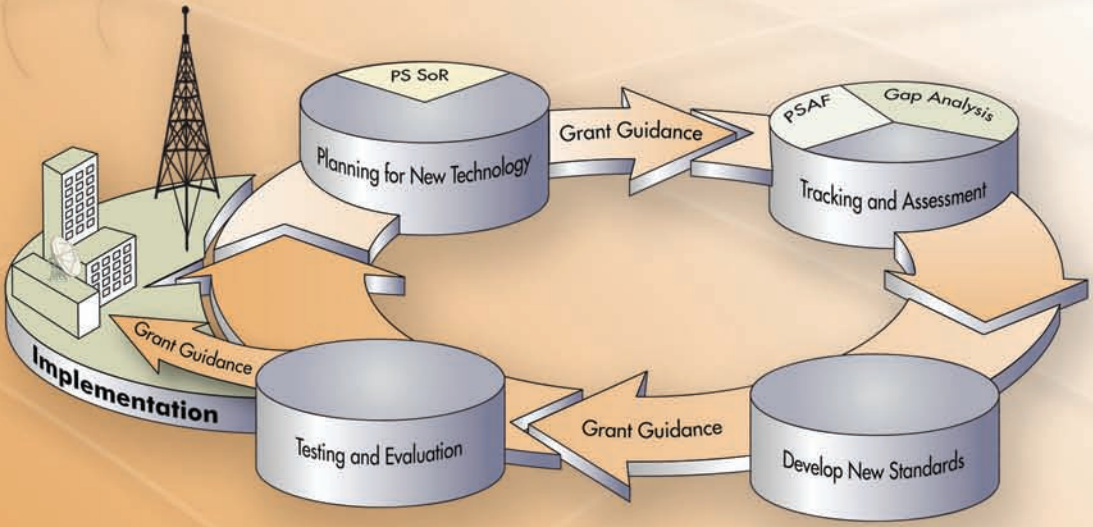
SAFECOM's Standards Development Model

Industry will be able to submit equipment for testing and receive certification that products passed standards compliance testing.

Grant Guidance: SAFECOM's grant guidance is included as part of large grants for public safety communications. Grant guidance encourages the recipients of these grants to purchase standards-based equipment. Opportunities may exist for vendors who produce equipment that complies with this guidance.

Resources Help:

For a copy of the SoR: http://www.safecomprogram.gov/SAFECOM/library/technology/1258_statementof.htm

For grant guidance: http://www.safecomprogram.gov/SAFECOM/grant/default.htm

PS SoR

Grant Guidance

PSAF   Gap Analysis

Planning for New Technology

Tracking and Assessment

Grant Guidance

Implementation

Grant Guidance

Testing and Evaluation

Grant Guidance

Develop New Standards

The Department of Homeland Security (DHS) established the Office for Interoperability and Compatibility (OIC) in 2004 to strengthen and integrate interoperability and compatibility efforts in order to improve local, tribal, state, and Federal emergency response and preparedness. Managed by the Science and Technology Directorate, OIC is assisting in the coordination of interoperability efforts across DHS. OIC programs and initiatives address critical interoperability and compatibility issues. Priority areas include communications, equipment, and training. A communications program of OIC, SAFECOM, with its Federal partners, provides research, development, testing and evaluation, guidance, tools, and templates on communications-related issues to local, tribal, state, and Federal emergency response agencies.

Homeland Security

SAFECOM

Visit www.safecomprogram.gov or call 1-866-969-SAFE