



National Public Safety Telecommunications Council

Radio Interoperability Best Practices

Best Practice #4

Best Practice #4 - Interoperability Relationships

This Best Practice is part of a larger, ongoing effort by NPSTC to identify best practice recommendations for a variety of topics dealing with interoperability. Readers are encouraged to read the [Radio Interoperability Best Practices Report](#)¹ companion document for a more detailed explanation of the history, development process, and intent of this document.

Best Practice Statement

Formal relationships among all involved stakeholders should be created to manage and govern interoperability resources.

Statement of Importance

First responders need to know the interoperable channels and resources² that are available to them for day to day coordination, automatic aid, and mutual aid responses. That knowledge includes channel names, where they are located in their respective radio equipment, how they operate, and the *policies regarding channel use and authorization*.

Supporting Elements

Interoperability is defined in Section 90.7 of the Federal Communications Commission's (FCC) rules as, "An essential communications link within public safety and public service wireless communications systems which permits units from two or more different entities to interact with one another and to exchange information according to a prescribed method in order to achieve predictable results."³ The success of radio interoperability must start with planning.

¹http://npstc.org/download.jsp?tableId=37&column=217&id=3853&file=NPSTC_Radio_IO_Best_Practice_Overall_Report_Final.pdf

² Interoperability resources include console patches, IP Gateways, designated talk groups on trunking systems, as well as conventional channels.

³ http://www.ecfr.gov/cgi-bin/text-idx?SID=ba5840d92638b2a5365a528ddb8004ad&mc=true&node=pt47.5.90&rgn=div5#se47.5.90_17

Systems that include shared interoperability channels are a simple solution. The rules of when to use these resources, who controls and maintains them, the knowledge of where they work (coverage), and who has access should be codified by all stakeholders leveraging these formal relationships. Participants in these formal agreements must include technical, operational (field and communications center), and management personnel.

The importance of developing and maintaining a local and/or regional Tactical Interoperable Communications Plan (TICP), with input and consensus approval by all stakeholders, cannot be overstated.

One way of developing successful interoperability relationships is by identifying common shared channels, agreeing to their intended use, defining their name and CTCSS/DPL or NAC code (if not already defined by a national standard), agreeing to common placement within the radio, and identifying if they should be installed on dispatch center consoles and supported by communications center personnel. The goal should be to have the groups/zones/banks programmed in the same position; using the standardized channel name⁴ in the radios. This arrangement will help operational personnel find the assigned channel during an emergency. These channels should also appear with the same name on the dispatch consoles. Channel groupings could be defined by common geographical boundaries or common operational areas, or by functionally defined operations. These groupings should be adopted by formal agreement and assigned when incidents occur in the designated areas. See Use Case #3.

Challenges to successful interoperability occur when agencies build interoperable communications infrastructure and announce it as "available for use" without accompanying policy and procedure guidelines. In other cases, changes were made which affected the use of interoperability resources and information was not distributed in advance of the change. Impediments to successful interoperability can be minimized and awareness and use heightened through the adoption of written policies and procedures; establishment of a formal change management process⁵, and adoption of a recurring training program.

Incident Use Case Examples

Use Case # 1: Adams County operates on an 800 MHz radio system while Baker County operates on a UHF system. A vehicle pursuit initiates in Baker County near the border of Adams County. As the pursuit heads towards Adams County, dispatchers from Adams County and Baker County agree on a patch that will provide seamless radio communication. Only one agency needs to create the patch and this action is coordinated between the dispatch centers.

⁴ [ANSI Standard 2017 - http://npstc.org/download.jsp?tableId=37&column=217&id=17&file=11042-2017_CommonChannelNamingDocument.pdf](http://npstc.org/download.jsp?tableId=37&column=217&id=17&file=11042-2017_CommonChannelNamingDocument.pdf)

⁵ BP #2 – Interoperability Systems Change Management Practices - <http://npstc.org/radioInteropBP.jsp>

Dispatchers from both counties then announce to their field units that the patch has been enabled and provide instructions on how to access the frequency. In this case, the Adams County PSAP patches their 800 MHz talkgroup to the UTAC repeater located in the eastern portion of Adams County (which is also available in Adams County's console). As the pursuit moves away from the Baker County UHF coverage area, Baker County's deputies switch to the selected UTAC channel allowing units to remain in communication with Adams County deputies who continue the pursuit. This is made possible due to preplanning efforts and ongoing coordination between the public safety agencies in the region. Technicians, first responders, and communications center personnel all participate in these planning efforts. The use of the UTAC channel and the patching solutions used in this pursuit had been developed and vetted through the regional communications coordinators (COMC), formalized in a written document, and then adopted by the regional agencies.

Use Case #2: A statewide VHF repeater system has been implemented and serves as a travel channel when large wildland fires occur and mutual aid resources respond up and down the state. The channel is monitored by designated dispatch centers in order to assist strike teams with logistical needs or to redirect units if conditions change. The repeater output frequency is available for simplex intra-strike team communications. The policy for this channel's use was developed through the Statewide Interoperability Executive Committee (SIEC) and executed through the State's Emergency Management Agency via written mutual aid agreements. Fire agencies throughout the state sign the agreements and distribute the travel communications plan. Fire agencies are responsible to confirm that all VHF equipment in their possession is programmed properly and that responders are trained to use the channel.

Use Case #3: The City of Quincy runs an International airport whose departures fly over Quincy Bay. Adams County Lifeguards patrol the inner waters of Quincy Bay and the Coast Guard patrols the outer waters. The city, county, and United States Coast Guard (USCG) established a Communications Working Group (CWG) and created a Marine Disaster Communications Plan to address any incident that that may occur on the bay or beach area. The Communications Plan includes 16 channels to support interoperability and emergency response. Each agency has agreed to program these channels into a Bank or Zone as specified in the Plan. The Bank or Zone will be referred to as the "Marine Zone". The 16 channels in the Marine Zone are USCG channels, County Fire and Lifeguard channels, City Fire channels, interoperable channels, and shared air-to-ground channels. This agreement was formalized and compliance with the communications elements of the plan are mandatory for all agencies responding to incidents in the covered area.. The annual Marine disaster drill utilizes this set of channels to validate and familiarize responders to the purpose and usage of these channels.

Relationship to SAFECOM Continuum Lanes

This best practice touches the Governance, Standard Operating Procedures, and Training and Usage lanes of the SAFECOM Interoperability Continuum.

Migration Path

Agreements between two or more agencies involving the sharing of channels should always be formalized in advance. The nationwide interoperability/mutual aid channels are a standardized set of channels that could serve as a basis for initial on-the-scene coordination and resolution of local interoperability issues. These nationwide interoperability/mutual aid channels will also be of benefit for deployments outside of the normal response area. While these channels should be preprogrammed in radios, perhaps the most difficult part is the management or governance piece of the solution. The rules that govern mutual operation must be considered prior to any actual use.

There are several steps to consider when establishing a formal interoperable communications agreement, be it statewide, regional, or an agreement between two agencies.

- Do not limit the list of shared channels to only include the nationwide interoperability channels.
- Be aware that the FCC and NTIA have each published regulations governing the use of the Nationwide Interoperability channels by both federal and non-federal entities. These rules provide specific guidelines for the coordination and use of the frequencies and need to be considered in any plan.⁶
- Establish formal communications working groups that include operational, technical, and management personnel from each agency involved in the planning. The inclusion of communications center personnel is an integral part of this planning process.
- Associate working groups are helpful to the planning process, including those with established authorities such as Fire Chiefs, Police Chiefs, Joint Power Authorities, SIECs, etc.
- The communications plan should define the channel lineup, the geographical boundaries for usage, and responsibility of 24 hour monitoring, enabling and disabling of repeaters and patches.
- Written policies and procedures should be created.
- Final versions of these documents shall be adopted by the respective authorities and shared among all stakeholders.

⁶ See <http://www.ntia.doc.gov/osmhome/redbook/redbook.html> section 4.3.16 for Federal frequency use under the rules of the NTIA. See http://wireless.fcc.gov/index.htm?job=rules_and_regulations Part 90 for Non-Federal frequency use under the rules of the FCC.

- Recurring training and the use of exercises and drills, both intra and interagency, will encourage the utilization of these established resources resulting in familiarity and accomplishing the interoperable goals.
- Daily use these channels (as appropriate) should be encouraged to maintain awareness and to sustain technical and operational proficiency.
- A review process addressing the policy, procedures, and communications plan, including provisions for change management, should be developed,

Related Documents

The following links point to reference materials used in developing this Best Practice or otherwise referenced in the document. Additional supporting documents can be found on the Best Practice Working Group page on the NPSTC website at www.NPSTC.org or by joining NPSTC Committees Community on the National Interoperability Information eXchange at www.NIIX.org.⁷

[Writing Guide for a Memorandum of Understanding \(MOU\) – SAFECOM/DHS -
http://www.safecomprogram.gov/NR/rdonlyres/2D396F0E-CE19-4DCB-A30A-35982721F5AA/0/SOP.pdf](http://www.safecomprogram.gov/NR/rdonlyres/2D396F0E-CE19-4DCB-A30A-35982721F5AA/0/SOP.pdf)

[Emergency Communications Governance Guide for State, Local, Tribal, and Territorial Officials, September 2015 – SAFECOM/NCSWIC -
https://www.dhs.gov/sites/default/files/publications/2015%20Governance%20Guide_Master_508c%20Final.pdf](https://www.dhs.gov/sites/default/files/publications/2015%20Governance%20Guide_Master_508c%20Final.pdf)

[Communications-Specific Tabletop Exercise Methodology
http://www.safecomprogram.gov/NR/rdonlyres/C67306E9-3C28-4654-91A5-0CDFD6D3DE55/0/CommunicationsSpecificTabletopExerciseMethodology.pdf](http://www.safecomprogram.gov/NR/rdonlyres/C67306E9-3C28-4654-91A5-0CDFD6D3DE55/0/CommunicationsSpecificTabletopExerciseMethodology.pdf)

[DHA/SAFECOM Webpage on Governance Resources - https://www.dhs.gov/safecom/governance](https://www.dhs.gov/safecom/governance)
[Best Practice #1 – Nationwide I/O Channel Naming and Usage](#)
[Best Practice #3 – Training and Proficiency in the Management and Usage of Interoperability Equipment and Systems](#)

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Contributors List

Numerous members of the Radio Interoperability Best Practices Working Group representing the public safety, government, academia, and industry communities contributed to the creation and review of this document.

⁷ Select Interoperability Committee -> Best Practices -> Shared Documents

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