



National Public Safety Telecommunications Council

Radio Interoperability Best Practices

Best Practice #6:

Channel Assignment Based on Infrastructure Coverage

This Best Practice is part of a larger, ongoing effort on the part of 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

Interoperability channels supporting first responders² should be assigned based on the documented and known infrastructure coverage between the radio system/systems and the radio communication devices that are being utilized.

Scope of this Best Practice

This best practice is intended for channel assignment of any channel recognized as a mutual aid or interoperability channel, whether it is local, regional, state, federal, or tribal. For the purpose of this best practice, the term “interoperability channels” is not limited to the channels listed in the NIFOG.

Statement of Importance

Interoperability channels and resources used to support an incident should be selected based on documentation that verifies the system’s capabilities, including geographic coverage and availability in first responder radios.. Interoperability channels and resources should be tested

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

² Includes incidents, planned events, and training exercises.

to ensure their capabilities are verified and the results should be documented and distributed to all potential users.³

Infrastructure coverage is defined as the radio system's current coverage and reliability in a geographically bounded area with subscriber radios (mobile, portable, etc.) that will be used during an incident. As the subscriber radio types deployed may vary from agency to agency, interoperability channels should be tested prior to assignment to confirm that the radio communications coverage for a given area will be successful. This includes the ability to communicate both in-building and over a wide geographical area using mobile and portable radios

Maintaining radio contact between first responders and the supporting communications center is important, but should not necessarily be the primary reason for channel and resource selection. There may be specific tasks within an incident where limited communications are needed which may be provided using simplex radio channels that are not available to the communications center.

Channel selection should always be based on the operational requirements of the incident and those requirements should be documented or communicated in advance. This allows for selection of the most appropriate resource and prevents over or under utilization of I/O systems. The use of an I/O channel should always be in conformance with the documented capabilities and limitations of the channel resource that has been selected. First responders and telecommunicators should always be aware of system limitations that may impact operations if the selected I/O resource is less than optimal.

Insufficient planning prior to assignment of an I/O resource to support an incident or event often results in poor, unreliable, or even non-existent communications between assigned operational teams and/or the communications center.

The initial assignment of an I/O channel or resource starts with an established or suggested assignment practice. It may also be based on a request to the on-duty dispatchers responsible for the area in which the incident is occurring. As the incident expands, immediate interoperable decisions are critical, and knowledge of the local, regional, and statewide assets that can be brought into the incident is paramount.

Interoperability channel assignments and the ability of the systems to support them is an ever changing dynamic. Documented or known infrastructure coverage, the use of this knowledge

³ This includes PSAP supervisors, operators; radio system technicians and to field level first responders.

prior to channel assignment to an incident, along with pre-established governance⁴ and change management⁵ comprise the decisionmaking process when a selection is made.⁶

Supporting Elements

Ideally, the decision of which channels or talkgroups to assign to an incident would be transparent to the telecommunicator and should be based on established policy. The policy may be based on the incident's location and the most appropriate and available channel to support the operations. Some agencies use wall charts and maps to display this information while others use automated dispatch software that provides recommendations for channels or talk groups that have been determined to have the highest reliability for the incident area and type. Maps are commonly used and are typically developed internally to provide visual guidance on what channels or talkgroups are the most appropriate for an incident. Other common methods to determine resource assignment are based on historical experience and system status knowledge. All of these are highly reliable methods and all support this best practice by avoiding the assignment of resources without sufficient information on their capabilities.

Telecommunicators should receive initial and recurring training on how resource assignments are made. This training should include familiarization with, or use of, local, regional, and statewide interoperable assets and their associated coverage capabilities. These assets can typically provide wider area coverage and should be preprogrammed into agencies subscriber units. It should be noted that regional and statewide systems may operate in a different manner than the local radio systems used on a daily basis.

SAFECOM Continuum

Channel Assignment Based on Infrastructure Coverage touches every lane of the Continuum which effectively demonstrates its importance.

Incident Use Case Examples

Use Case #1. Multiple agencies are responding to an incident that requires the assignment of an interoperability channel in a remote section of the home agency's jurisdiction. Previous testing has shown that the incident location has little to no communication infrastructure support on

⁴ See Best Practice #4 – Interoperability Relationships -

http://npstc.org/download.jsp?tableId=37&column=217&id=3902&file=BP_4_IO_Relationships_Final_170403.pdf

⁵See Best Practice #2 - Change Management Practices -

http://npstc.org/download.jsp?tableId=37&column=217&id=3856&file=BP_2_IO_Sys_Change_Mgt_Practices_Final.pdf

⁶ The NPSTC Best Practice report and other Best Practice Statements can be found on the NPSTC website at <http://npstc.org/radioInteropBP.jsp>.

all channels available to the communications center, but all channels and their coverage abilities have been well documented in advance (direct only, repeated local, or linked to the communications center). The computer aided dispatch (CAD) system has been preprogrammed to recommend primary and alternate interoperability channels that best meet the coverage needs for the incident location and type. The responsible telecommunicator instructs responding units to select the appropriate channel. Initial units arrive on the scene and advise the communications center that the channel assigned does not provide the support needed. An alternate channel is selected based on the CAD recommendation and both on scene and responding units are advised of the change. The communications center announces the channel that has not provided the expected level of support as unavailable for assignment and follows the predefined policy to initiate the repair.⁷

Use Case #2. A Search and Rescue Mission for a missing hiker in a rugged mountainous region requires interoperable communications between Search and Rescue (SAR) personnel, the local EMS provider, and the County Sheriff's Office. Due to the box canyon nature of the search area there is no infrastructure solution that provides uniform coverage and the terrain is not conducive to long-range simplex operations, thus requiring a deployable solution. Deployment of a portable repeater with battery and solar cell charging systems to a nearby elevated area is determined to be the best solution, based on prior planning which identified all available I/O resource in the region and their technical capabilities. The deployable asset provides reliable radio communications to all team members at the incident and also allows access, including satellite Internet capability, to the Sheriff's Office dispatch center.

Migration Path

One of the first steps involves identification of all I/O resources available to an agency or region. Planning, training, and testing are all based on the available infrastructure. Relationships and the use of a Memorandum of Understanding (MOU) or similar instrument are important to document ownership, maintenance and repair responsibilities.⁸

Interoperable radio channels assigned to an incident should be chosen based on the availability of the communications infrastructure, frequency band operations, and console access in and around the affected area. The following steps articulate the sequential actions to improve interoperability based on the discussion in this Best Practice:

⁷ See Best Practice #5 – Infrastructure Management - http://npstc.org/download.jsp?tableId=37&column=217&id=3936&file=BP_5_Infrastructure_Management_Final_170517.pdf

⁸ See Best Practice #4 – Interoperability Relationships - http://npstc.org/download.jsp?tableId=37&column=217&id=3902&file=BP_4_IO_Relationships_Final_170403.pdf

- Step 1. Determine which local and regional infrastructure is available for use during an event or incident.
- Step 2. Ensure MOUs/MOAs are in place with most logical responders who will use the interoperable channels.
- Step 3. Ensure interoperable channels/talkgroups are programmed into all appropriate subscriber units.
- Step 4. Develop coverage maps for existing infrastructure for both portable and mobile subscriber units. In the short-term, this step can be used to train dispatchers about the system, provide a Communications Unit Leader (COML) with information should it be required, and, in the longer-term, be used to develop automation in channel/talkgroup assignment for event/incident support.
- Step 5. As system upgrades and changes are made ensure that proper training is conducted for dispatch center staff and associated personnel as it relates to system coverage and performance.
- Step 6. Practice or simulate multiple scenarios in different areas to provide real-world experience with system performance across its mapped coverage area.

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 Radio Interoperability Best Practice Working Group page on the NPSTC website at www.NPSTC.org or by joining the NPSTC Committees Community on the National Interoperability Information eXchange at www.NIIX.org.⁹

Allied Radio Matrix for Emergency Response (ARMER) Standards, Protocols, Procedures
Phoenix Regional Interoperability Guide
[Arizona Interoperability Radio System \(AIRS\)](#)¹⁰

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Contributors List

⁹ Select Interoperability Committee -> Best Practices -> Shared Documents

¹⁰ AIRS SOP -

http://www.npstc.org/download.jsp?tableId=37&column=217&id=3928&file=Arizona_AIRS_SOP_10192010.pdf

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.

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