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National Public Safety Telecommunications Council

Radio Programming Compatibility Project Report

April 9, 2014

Project Overview:

P25 standards were developed to allow multiple manufacturers radios to operate on a single radio system for interoperability. The Radio Programming Compatibility Requirements (PCR) Working Group focused on the incompatibility between manufacturers; programming software and sought to provide a tool for public safety to streamline the programming process between manufacturers' radios. Radio programming is very complex with many data fields that assign frequencies, IDs, features, and options. A slight error during the programming process will prohibit the radio from accessing a trunking system or conventional channel when the radio is used. This issue impacts public safety agencies using radio equipment from multiple vendors. It also creates a huge safety issue at the scene of a major incident when large quantities of radios need to be programmed for mutual aid use.

The Working Group, which includes radio system vendors, stakeholders, and first responders, has been meeting since 2012 to develop a tool that would benefit public safety and help eliminate human errors during multijurisdictional events. An Excel spreadsheet tool was created to provide a basic level of data exchange between various P25vendor radios. This spreadsheet will assist in the interoperability programmingof P25 radios and will help reduce errors during programming.

It is not the intention of the Working Group to replace existing vendor supported programming software. A functional knowledge of the vendor software is essential when using this tool.

Background:

On Monday, February 21, 2011, Officer David Crawford with the St. Petersburg, FL Police Department was shot and killed while investigating a report of a suspicious person. Law enforcement agencies from throughout the Tampa Bay region responded to assist in the search for the suspect. Many of the first responder's radios had recently been programmed with additional talkgroups to allow them to communicate on the countywide P25 network for interoperability. When the mutual aid law enforcement units tried to communicate on the P25talkgroups their radios did not work. A less desirable (and less reliable) console patch had to be created to allow the officers to coordinate their search.

It was later determined that a programming error allowed the radio to be fully operable on most frequencies but unable to communicate during a critical interoperability response.

In 2011, there were more than eight vendors manufacturing P25 equipment. Each of them had their own proprietary programming software and none of the software packages were compatible. The technician would have to know the specifics of each software system and understand that the same data element (i.e., frequency) might have a different label in each vendor's program. The complexity in navigating pages of software programming could easily cause the introduction of errors and incorrect settings.

Process and Progress:

In May of 2011, this issue was brought before the NPSTC Governing Board during a meeting in Washington, D.C. NPSTC immediately embraced this issue and authorized the formation of a special Working Group.

By September of that same year, the Radio PCR Working Group was fully organized and began holding monthly conference calls with public safety practitioners and manufacturers.

In the beginning of the project, it was noted that many of the manufacturers do not support the ability to import or export information from their radio programming software. The Working Group gave a presentation to the P25 Steering Committee to seek their input. The group supported the effort but did not think that the vendor community would modify their software platforms due to the cost involved. Several vendor representatives misunderstood the intent of the project and felt that the group was trying to develop a replacement software programming tool. In spite of these issues, the Radio PCR teamcontinued making progress to develop a programming support tool.

In May of 2012, Working Group members arranged a meeting with several radio system vendors at a NPSTC meeting. The discussion centered on how to use an Excel spreadsheet to assist with radio programming. The group then worked to identify all of the individual data fields that would be required to program radios from any manufacturer. This effort involved an extensive review of each manufacturer's programming software to make sure that all data fields were included in the spreadsheet.

During monthly conference calls the spreadsheet continued to be refined including normalization of the various unique data fields used by each vendor. Vendor representatives assisted the Working Group to help ensure that the fields were correctly labeled and could be translated.

In August of 2013, the Working Group gathered at the Association of Public Safety Communications Officials –International (APCO) Conference in Anaheim, CA. Using the data spreadsheet as a guide, team members programmed multiple portable radios and performed a live demonstration using equipment from five different vendors who had been supporting the effort.

The spreadsheet was further refined based on input from the Working Group. Fourteen public safety agencies then offered to independently test the programming spreadsheet and to provide feedback to the Working Group.

This test period ended in February of 2014. Feedback from the testing agencies was good and everyone felt that the spreadsheet tool was an excellent source of information for their programming teams. Additional revisions and updates were made to the spreadsheet, including the use of drop-down boxes and some auto-population of data fields.

The Working Group met at the International Wireless Communications Expo (IWCE) Conference in March and retested the spreadsheet with multiple radios. A live demonstration was provided to the NPSTC Governing Board on Friday, March 28, 2014. Even though the spreadsheet is still in a "beta" version, the results were so compelling that the NPSTC Board voted to approve its release and posting on the NSPTC website.

Field Testers:

NPSTC would like to thank the following personnel and agencies for testing the Radio PCR spreadsheet and providing valuable feedback.

Radio PCR Beta Testing Agencies	
NAME	**AGENCY**
Carl Guse	Wisconsin State Patrol
Curtis Walser	City of Cedar Rapids, Iowa
Bob Symons	Wyoming Office of HS/SWIC
Dale Osborne	Montana Highway Patrol
Scott Mcinnis	Onondaga County Department Of Emergency Communications, New York
Keith LaPlant	DHS Type-1 Communications Unit Leader (COML) US Coast Guard
Steve Devine	State of Missouri
Ken Link	New Jersey State Police
Paul Roberts	City of Boise, Idaho
Dan Robinson	Michigan
Kevin King	Shawano Ambulance, WI
Joe Delgiudice David Chapman	City of Providence, RI

The Spreadsheet – What it Does

This tool uses an Excel spreadsheet to capture specific P25 radio programming data fields. In its current version, a user must manually enter the specific programming information into the spreadsheet. Some radio manufacturers allow the agency to export a listing of the radio code plug data, while other manufacturers require agency personnel to go through the programming software and manually record the information. When the data has been entered for a participating vendor, the spreadsheet will then display the required information in the proper format for the other P25 participating vendors. So, if information is entered about a radio from Vendor A, the technician will instantly see the necessary information to program a radio from Vendor B. This includes the correct data field names for each vendor and includes notations where some data elements are not an exact match. Using the information in the spreadsheet, a technician can more easily program a different vendor's radio.

Current Version of the Spreadsheet is a "Beta Version A1":

- This version is available to anyone for download from the NPSTC website (www.npstc.org).
- Users must already have Vendor Programming software and know how to program radios.
- The current spreadsheet provides basic data field interoperability for eight different vendors.
- Data can be pre-populated into the spreadsheet prior to a planned event. This spreadsheet should not be used during a live event unless previously tested and validated using agency radios.
- The spreadsheet provides an inter-vendor glossary of terms for the represented manufacturers.
- It does not provide authorization for programming a radio. It only provides information that is needed.
- Fixed data sets will allow vendors to develop import/export functions, if they so choose, allowing the spreadsheet user interface to grow.
- The spreadsheet will be Version release controlled.
- The spreadsheet currently requires the manual entry of data, where programming errors may still occur.
- The spreadsheet is specifically designed to help program interoperability channels and talkgroups on both conventional and trunked radios. It does not address proprietary features.
- Programmers must test the radios prior to actual use to ensure that the radios function properly.
- While the spreadsheet may provide assistance with the programming of radios for planned events, it is not yet recommended for use in a major emergency, where radios need immediate programming to support mutual aid personnel.

Issues Remaining:

The Working Group is continuing to develop the Radio PCR Tool Kit. The following issues have been identified for further action:

- Complete the User Interface Tab to allow easy viewing of single channel/system/talkgroup.
- Continued vendor involvement is critical in the development and implementation of an export/import feature from their respective vendor software.
- An entity needs to be identified to maintain the spreadsheet tool and be responsible for upgrades and enhancements.
- Research and develop a standard import/export format to allow vendor software radio data to automatically populate the spreadsheet and be exported into another vendor's software.
- Maintaining realistic expectations for the program and communicating those to the user community.
- Investigation into development of a data standard for programming software that supports the Programming and Management tool.

Next Steps

The Working Group has identified the following near term issues.

- Finalize a White Paper on the project.
- Plan for continued testing, to include use and testing during a planned event and conference demonstrations.
- Creation of an instructional tool on how to use the spreadsheet.
- Publish the entire tool kit on the DHS public safety tools website.
- Determine ability for DHS to support development of automation and import/export enhancement.
    - Automation of Single Channel/System/Talkgroup tab
    - Automation of NIFOG integration
    - Automation of IC205/IC217 integration
    - Integration in to All Hazards COML/COMT curriculum and training
    - Integration in to CASM
    - Integration into Public Safety Tools Website
- Hosted Webinar to provide User Training

The Big Picture:

NPSTC is currently working on a related project to develop best practices for radio programming and utilization of communications assets at the scene of a large incident. Many after action reports cite problems with the programming, assignment, and use of radio equipment at major events. The Radio PCR spreadsheet represents a significant advancement with one of these issues.

The Radio PCR Team:

NPSTC would like to thank the following members of the Radio PCR Working Group for their contributions to this project.

Tom Benedett
James Bitting
David Boyd
Scott Bradford
Michael Britt
Randy Dalrymple
DonaldDenning
David Eierman
Jeremy Elder
Fred Frantz
Victoria Garcia
Scott Glazer
Art Goldberg
Jesse Griggs
Karl Hartmetz
Mark Hill
Jim Holthaus
Robert Hugi
Julie Jacobs
Bill Janky
Todd Johnson
Phil Kirmuss
Kenneth Link
Chris Lougee
Claudio Lucente
Don Lynch
Kevin Lyons
Paul Middleton
Pam Montanari
Steve Nichols
Rex Nisbet
Larry Nyberg
John Oblak
Bill Pagones
Nick Pennance
Mike Petersen
Rolf Preuss
Paul Roberts
Daniel Robinson
Charlie Sasser
Tom Sorley
Bob Speidel
Masaaki Takahashi
Marc Vaughn
Keith Victor
David Warner
Bill Waugaman
Don Wingo
Michelle Zilis