NPSTC
National Public Safety Telecommunications Council

National Public Safety Telecommunications Council (NPSTC)
Full NPSTC Meeting
September 28-29, 2016
Office of the Chief Technology Officer, District of Columbia

Welcome and Opening, Ralph Haller, NPSTC Chair. Mr. Haller called the meeting to order at 8:30 am EDT. Participants on the phone were asked to send a record of their attendance to attend@npstc.org. A quorum was present. Mr. Haller introduced Derek Poarch, new representative for the Association of Public-Safety Communications Officials (APCO)–International; Martha Carter will serve as the alternate. Mr. Haller thanked Mike Corey, Amateur Radio Relay League (ARRL), for shipping the AV equipment to the meeting.

Federal Partners Update

Department of Homeland Security (DHS), Office of Emergency Communications (OEC), Chris Essid, Deputy Director. Mr. Essid reported on the OEC partnership with the National Governors' Association Policy Academy focused on enhancing communications interoperability. Each workshop was focused on the chosen state's particular needs in events in Alaska, Hawaii, Illinois, Utah, and West Virginia. The 2006 NGA Policy Academy led to the creation of OEC, the National Emergency Communications Plan (NECP), Statewide Interoperability Committee (SWICs), and the Statewide Interoperability Governing Body (SIGBs). The recommendations garnered from the work will be published in late winter 2017.

OEC has been conducting pilot observations at planned urban events via the Interoperable Communications Capabilities Analysis Program (ICCAP). OEC has also rolled out a new Statewide Governance and Planning Integrated Product Team (IPT) to enhance support through strategic planning and TA. There will be a new look for the Government Emergency Telecommunications Service (GETS) to be sent to the 460,000 users on November 1.

OEC will begin a new baseline assessment of national communication. OEC will conduct an extensive analysis on the data beginning in March 2017 to help target resources and identify capability gaps and resources. Mr. Essid asked NPSTC's organizations to act as "champions" to assist in this task.

Department of Homeland Security (DHS), Office for Interoperability and Compatibility (OIC), Sridhar Kowdley, Program Manager. Mr. Kowdley discussed the First Responder Electronic Jamming Exercise held at White Sands Missile Range in 2016. The purpose of the exercise was to conduct live testing and demonstrations of first responder communications in an electronic jamming threat environment. The goal was to understand the impact of electronic threats on first responder communications and mission operations; identify training gaps and mitigation strategies; and share lessons learned and best practices with first responders nationwide. There is a proliferation of electronic jammers that can delay emergency response time.

The event coordinated 225 persons, 61 agencies, and 70 first responder scenarios, using 53 commercial and Department of Defense (DoD) jammers, operating over 500 square miles. The testing occurred over 5 days. On the first day testing involved attacks against critical infrastructure and GPS receivers. On the second day there was testing against UAS. Stanford University is developing a program to track down GPS jammers which was successfully tested at this event. Days 3 through 5 targeted first responders which assessed not only how the equipment was impacted by GPS and broadband jamming across multiple bands, but also how well responders were able to work around the jamming to still accomplish their mission.

First responders were surprised at how well the commercial jammers worked and acknowledged a gap in training. A report is in development now. On behalf of OIC, Mr. Kowdley thanked participants of this multi-agency effort including the FCC, FAA, OEC, and New Mexico DHS. There will be a follow-on exercise in 2017 that will include anti-jamming solutions and evaluate first responder jamming mitigation techniques and tactics procedures. Policy issues will also be examined. The jammers are band specific but they transmitted widely out of band. Jammers are illegal in the U.S. but not in other countries.

Technology and Broadband Committee, **Tom Sorley, Committee Chair; Andy Thiessen and Michael Britt, Vice Chairs**

Broadband Emerging Technologies, **Kim Coleman Madsen, Chair.** Ms. Coleman Madsen reported on the activities of the Working Group which has included an overview of the National Institute of Standards and Technology (NIST) sensors and analytics, the Smart Cities project, state alternative planning approaches, and NG911 and broadband data. Recently the Working Group heard presentations on the Smart Cities project, from the National Telecommunications and Information Administration (NTIA) on the Internet of Things (IoT), a panel discussion on state alternative planning to FirstNet, and a NG911 primer discussion. In October, there will be a presentation on the public safety broadband rollout in the United Kingdom.

The Working Group is finalizing a report that discusses public safety requirements for the Nationwide Public Safety Broadband Network (NPSBN) Agency Status Page. High-level features include rapid access for first responders to the FirstNet network status, agency-designated information and resources, and incident information on emergency events. NPSTC originally recommended this Status Page in the 2009 *700 MHz Broadband Task Force Report* and 2012 *NPSTC Statement of Requirements (SoR*) provided to FirstNet. The FirstNet RFP also contains multiple references to the agency information homepage. Examples of public safety uses for the status page include the following scenarios: A police officer can view a list of high-priority emergencies among all agencies and across levels of government, or a fire engine responding mutual aid to an incident can access incident information to assist their response such as location, radio channels assigned, and staging area. A public safety user might be alerted to major incident occurring nearby based on their GPS proximity to the event.

The Working Group is finalizing a list of functional details for the status page. Access will be based on user authentication, real-time data via agency interface, landing pages for home vs. itinerant users, a common status page template for consistency, and capability for alerts based on the severity of the incident. The page needs to be designed to support all device types, devices without keyboards, the transition of agency incident codes, navigation between regional and local status pages, and navigation

between agency specific local pages. A report will be complete in November and presented to the Governing Board and ultimately to the FirstNet Public Safety Advisory Committee (PSAC). Kevin McGinnis, National Association of State Emergency Medical Services Officials (NASEMSO), asked if the report identifies scenarios involving EMS. Mr. Luke said it did.

LMR to LTE Migration Working Group, Chris Kindelspire, Chair. Mr. Kindelspire briefed on the activities of this Working Group created to research the intersection as first responders move communication into the LTE environment while still supporting LMR. Much of the focus in the Working Group is how agencies will interoperate with each other when one agency is using LTE while another agency has elected to remain on LMR. These public safety agencies will continue to respond with each other and will need to have full interoperability to do their work safely. The Working Group is reviewing LMR Unit ID and LTE Talk ID features and what the LTE ID should include such as agency name, officer name, CAD Unit number; how to differentiate users accessing multiple devices such as vehicle, tablet, and handheld radios; and the need for a default ID when the user is not active.

What will a dispatcher's display show when a unit keys up their device? What will other first responders see on their devices when another unit is talking? Each first responder has multiple identity attributes including their name, their agency personnel ID number or badge number, the vehicle ID of the car they are driving today, and their CAD Unit ID which identifies their mission.

Regarding the Unit ID and Alias, the Working Group is researching whether there is a need for a nationwide standardized Unit ID structure. First responders can be out of area but need meaningful translation such as a trooper radioing for assistance or out of area mutual aid assistance.

How should the LTE Unit ID appear on the LMR device? The Working Group is also looking at how the scan function will work in LTE. Multiple simultaneous audio steams may work in a multi-speaker environment in the dispatch center but may be very problematic for a police supervisor using a traditional handheld device. LMR radios have sequential audio scan while LTE has multi-audio monitor; scanning three talk groups could result in three simultaneous audio streams coming to the device user.

The Working Group is examining differences in LTE and direct mode communications for off network communications. The 3GPP standard states that a user should automatically move to ProSe (Direct Mode) communications. The goal is to provide the first responder with continuous communications. What is the threshold setting that detects loss of coverage? A responder moving through a building may be in and out of communication. When operating in direct mode, should the radio automatically switch back when network coverage is detected? Can a device be locked into a specific mode?

The 3GPP standard allows a user in direct mode to discover other nearby users. Nearby users will be displayed in a list similar to a list of WiFi hot spots. Who should appear on this list needs to be determined. Should it be everyone in range, specific disciplines, and users from same agency? What should appear on the list? Agency, name, CAD Unit ID, and how the list should be organized. The 3GPP standard addresses the ability of a first responder to communicate with public safety units on the FirstNet macro network and with off network users in direct mode. This would allow a fire department battalion chief to communicate with other units and the dispatcher on the network as well as communicate with firefighters who are operating in direct mode in the basement of the building. How will this work? The user experience with LMR needs to transition to LTE. Chief McGinnis noted that

much EMS work occurs across states creating tremendous complexity on the issues Mr. Kindelspire discussed.

The Working Group has been focused on interoperability with a focus on voice operations. The current name may imply pushing this migration. Mr. Kindlespire suggested that the name be changed to LMR LTE Integration and Interoperability.

Motion and Vote: Based on the above discussion, Lloyd Mitchell, Forestry Conservation Communications Association (FCCA), moved to change the name of the Working Group to LMR LTE Integration and Interoperability. Paul Szoc, International Municipal Signal Association (IMSA), seconded the motion. Approved.

Broadband Deployable Systems, Barry Luke, NPSTC Deputy Executive Director. Mr. Luke reported on the work of the joint U.S./Canadian group created at the request of DHS/S&T and Canada's Centre for Security Sciences. A deployable can include anything from a back pack to a vehicle towed system. The Working Group has created a series of use cases to describe how these devices might be used. There are different ways a deployable may be used, when using backhaul and connected to the macro network, when disconnected from the main network, or when more than one deployable is being used. The group created an incident commander/Communications Unit Leader (COML) matrix to determine what type of deployable would be needed in different situations. For example, a vehicle based deployable unit would likely not have the same coverage area as a trailer/towed solution. Over the last 2 years, they have identified 50 requirements across a number of different categories.

The Working Group is also examining cross border use of deployables on the northern border, particularly for wildland fires. They are examining technical and operational challenges regarding 3GPP standards and regarding security credentials that would need to be stored on the deployable system. The report should be available for Governing Board review in November.

FCC Field Office, Charles Cooper. Mr. Cooper reported on the status of the modernization of the FCC Field Offices, which will be complete on January 7. Another element of the Field Office modernization was to standardize how interference reports come to the FCC. The office is currently seeking funding to accomplish that. Mr. Haller complimented the FCC's Enforcement Bureau for cooperating with NPSTC and public safety stakeholders as the Commission modernized the Field Office program.

Radio Programming Compatibility Requirements, Tom Sorley. Mr. Sorley provided an update on this Working Group. They held a face-to-face meeting on September 20-21, in Houston, TX, with a cross section of the group present as well as one vendor. The Working Group is performing a quality assurance check on a new version of the PAM tool with new 700 MHz channels added and asking industry partners to verify that their subscriber information listed in the PAM tool is correct.

At their meeting, they discussed gaps in the current PAM tool capabilities and created a vision for the future PAM tool technology. The recommendations were to add channel names and full NIFOG channels list to each vendor tab to make use of tool easier and to ultimately deliver the tool to DHS for posting on a website such as DHS Public Safety Tools. DHS would maintain the tool and provide for the quality assurance of future changes. The group plans to develop a request for a Technical Bulletin to be submitted to the Telecommunications Industry Association (TIA). They will develop collateral to explain

and support the request to TIA including a visual aid on the programming process before the "pre-PAM tool," current PAM tool, and future state. Support letters will be submitted with the request to TIA and representatives will plan to attend the January TIA meeting to promote submission. Chris Lougee, TIA, said one of the original objectives was to have the tool grow into a middleware program that would automate the process. Mr. Sorley said the Working Group would like to accomplish that but need to approach the task in stages. Once TIA accepts the Technical Bulletin it would serve as a foundational first step.

Unmanned Aircraft Systems (UAS)/Robotics, Dr. Michael Britt, Chair. Dr. Britt reported on the initial series of presentations hosted by the Working Group including the Larimer County UAS program to map accident reconstruction which reduced time on the road by 30 minutes and increased the accuracy of measurement by 6 inches. They have also heard presentations on the use of UAS for Search and Rescue (SAR) at Texas A&M University; regulatory guidance on UAS from the FAA; on the Michigan State Police Aviation UAS program used primarily for post-fire investigations; and on the State of Arizona regarding persistent close air support.

Dr. Britt enumerated the many uses for UAS including search and rescue, accident reconstruction, situational awareness, fire investigations, and infrastructure inspection such as on radio towers or bridges. The group is developing three outreach documents: Considerations for public safety agencies when implementing a UAS program; overview of current operational uses of UAS/robotics by public safety; and public safety communication aerial platforms via UAS.

Video Technology Advisory Group (VTAG), Paul Patrick. Mr. Patrick, reporting for Chair John Contestabile, updated the group on the work of the VTAG which recently met in Seattle, WA, in conjunction with the Video Quality in Public Safety (VQiPS) Annual Workshop. The meeting included policy round tables; agency use cases; body worn camera issues; role of video in an active shooter incident; video on UAS platforms; impact of storage, redaction, and release; emerging video and analytic technologies; and research on human behavioral analysis.

Video Analytics in Public Safety (VAPS) is examining how video data and information from other sources like sensors and the IoT can be integrated to paint a full common operating picture. Analytics also reduces the need for a human to sit in front of a bank of video monitors "watching" for something to happen. VAPS participated in a meeting in conjunction with the PSCR meeting in June. The VQiPS released *Policy Considerations for the Use of Video in Public Safety* in June that discussed policy uses that need to be locally decided.

3rd Generation Partnership Project (3GPP), Andy Thiessen, Chair. Mr. Thiessen said 3GPP met last week in New Orleans, LA, to work on approval of work occurring in the previous quarter. The latest meeting included discussions on what a 5G radio will look like. Two big goals are to continue to enhance mobile broadband based on LTE, for mobility and connectivity and Internet access, and to continue to drive capacity.

In phase one of the 5G standards, there won't be direct mobility and little benefit compared with existing LTE networks. The standards are progressing to allow an overlay of 5G or later radio technology, but it won't be a replacement for LTE. Phase two will be a push for vehicle-to-vehicle communications created in LTE and will include direct mobility. On the core networking side, there's a big focus on

"slicing" the network. This creates a thin layer of networking capability to allow for different applications to be deployed on the network and managed independently even with numerous users.

The key is to improve reliability. The FirstNet perspective is about driving more capability for dynamic control. Mission critical push to talk (MC PTT) was added at the end of Release 13 standards work, which was completed in March, but it is receiving more attention in Release 14. Mission critical video and data have not been getting as much attention as MC PTT.

Internet of Things (IoT), Tom Sorley. Mr. Sorley provided an update of the IoT Task Force which was created to investigate IoT isues impacting public safety. The Broadband Emerging Technologies Working Group has been studying various IoT initiatives. The Task Force will examine the IoT ecosystem and will develop a set of recommended issues for further study. They will begin work in January as the Broadband Deployables Working Group concludes its work. Mr. Thiessen said his lab is building out an IoT testbed to understand the technical issues that may arise to inform policy decisions.

FirstNet NPSBN Development

Kevin McGinnis, Board Member. Chief McGinnis introduced Mr. Kennedy.

FirstNet, TJ Kennedy, President. Mr. Kennedy reported on the status of FirstNet development and progress along the strategic roadmap, elaborating on Phases I, II, and III. The FCC issued the Notice of Proposed Rulemaking (NRPM) and Spectrum Relocation Order. FirstNet has offered grant awards to those who are moving out of the 700 MHz spectrum. The NTIA Final Fee Review process is required by the Act that created FirstNet. FirstNet technical teams have been working closely with standards groups to ensure the network is operable and interoperable. In Phase IV, FirstNet actually delivers the draft state plans. As they finalize state plans, they plan a synchronous delivery of the 56 state and territory plans.

In many markets where infrastructure is already in place, FirstNet will be able to deploy quickly. FirstNet often receives questions on the Band 14 Core [a FirstNet responsibility]; RAN deployment [Governor decides whether to opt in or opt out]; and wireless services, products, and applications [public safety decides]. If a state chooses to opt out, it has 180 days to issue a state RFP and alternative plan development. This would occur in an unknown time frame that includes a mandated FCC review period, NTIA RAN construction funding grant, NTIA spectrum lease application, and First Net spectrum lease negotiation.

Topical Presentation

Compliance Testing, LLC, Michael Schafer, President. Mr. Schafer briefed on issues surrounding Project 25 (P25) compliant radios for first responders. Compliance Testing urged the FCC to add compliance testing to the 700 MHz rules. The original P25 CAP objectives were interoperability, pricing competition in procurements, and graceful migration both backward and forward. LMR manufacturers' priorities are to keep costs down and to have access to testing for all phases at one location. Quick accessible testing provides a level playing field for smaller companies. He said public safety agencies would benefit from more LMR equipment tested sooner, with more competitive pricing, and ISSI testing, which has never been done, and CSSI testing. There are new products trying to come onto the market but they can't get P25 testing done in a timely manner.

P25 CAP has received a boost with the reinvigoration of the advisory panel by DHS, new managers, and a new APCO P25 manager. There are only two labs that have been approved to do independent, unbiased testing. Unfortunately, he said, independent labs have a non-viable sustainable business model due to start-up costs, ISO compliance, and the need for expensive SMEs.

With the infusion of funds, Compliance Testing's independent lab could perform all LMR testing and be available 50 weeks per year. The start-up costs would be $5 to 10 to million with annual costs of $1 to 2 million. His lab is seeking federal funding to provide this independent testing.

Protecting Public Safety Use of GPS, Greg Buchwald, Chief Technology Officer, Motorola Solutions, Inc., Engineer. Mr. Buchwald discussed the protection of public safety use of GPS, providing a history of the L-Band spectrum where GPS resides. In 2003 the FCC approved the use of an Ancillary Terrestrial Component (ATC) which supplements the satellite component of a mobile satellite system. In 2009 to 10, the GPS community realized that allowing ATC next to the weak signal of the L Band would cause interference. There are two types of interference mechanisms: Out of band emissions (OOBE) into the GPS receiver which can only be fixed at the LightSquared transmitter. LightSquared proposed to add filtering to mitigate the interference. GPS receiver blocking, which can only be fixed at receiver, is a function of GPS receiver design and the distance between the LightSquared transmitter and "victim" receiver. Round 1 testing began in 2010-12. NPSTC formed two sub groups to monitor precision timing and general navigation and location, chaired by Mr. Buchwald.

Motorola set up a test bench to determine the amount of interference. The testing was rigorous. This was a continuous time-consuming test procedure which did determine there was denial of service. Mitigation methods were employed and Motorola redesigned devices to utilize improved GPS chipsets and redesigned the antenna to incorporate a narrowband filtering.

In June 2014, LightSquared revised its plan to change the downlink and uplink. The "Upper" band (~1545 – 1555MHz) will not initially be deployed and the "Lower" band (~1525 – 1535MHz) will be rolled out as a 10MHz LTE downlink channel. In the mid-band, the 1551 MHz allocation is still part of a long-term plan that Mr. Buchwald doubts will ever happen, given the interference potential.

In 2015, LightSquared became Ligado and initiated testing to demonstrate a new plan that would not interfere with GPS. It retained Roberson and Associates to perform all tests. Roberson reached out to NPSTC for input on test procedures and regulatory perspective. Ligado reached agreements with John Deere and other GPS manufacturers. NPSTC met multiple times face-to-face with Roberson and strongly influenced test procedures. NPSTC remains the industry-wide advocate of GPS protection for the public safety community. Mr. Buchwald said terrestrial use of the L-Band will most likely occur because the spectrum is far too valuable to go unused. MSS services have proved to be useful in rural areas while urban areas can best utilize the spectrum for terrestrial use cases. The FCC is under tremendous pressure to open additional spectrum for broadband. LightSquared was selectively cooperative in the 2011/2012 time frame. The re-organized LightSquared, now Ligado, is attempting to cooperate industry-wide this time around. The involvement of third-party consultants that have interest in opening spectrum but also the protecting incumbents and adjacent service users such as Roberson and Associates demonstrate their desire to find a fully workable solution.

Interoperability Committee Discussion, John Lenihan, Interoperability Committee Chair; Jason Matthews, Vice Chair

Encryption Task Force, Jason Matthews, Chair. There has been an ongoing discussion over whether encryption should be allowed on nationwide interoperability channels. NPSTC created a Task Force to research the associated issues. In April the FCC settled the matter when they issued new rules that require analog voice communications on these channels. This rule change effectively prohibits digital encryption on nationwide interoperability channels but also creates a standardized way of communicating by requiring analog voice on these channels in the VHF, UHF, and 800 MHz Band.

Encryption is allowed on certain nationwide channels that are not specifically identified by the FCC as interoperability channels. Since the 700 MHz band is only operated in digital, encryption is allowed in that band on channels other than the two 700 MHz Calling Channels. The FCC did not change the way that local, regional, and state channels not designated for interoperability (and even federal channels) are used and encryption can be used based on local policy. The Task Force is working on a draft outreach document that will explain the rule and will include a table showing the designated nationwide interoperability channels. That document will go to the full Interoperability Committee for comments before it comes to the Governing Board for consideration in November.

Emergency Medical Services, Paul Patrick, Chair. The Working Group has published an outreach paper, titled, *"10 Reasons You Need to Be Engaged with FirstNet"* to encourage more EMS personnel to interact with FirstNet and to ensure EMS needs will be met. The document will be distributed to the SWICs and the SPOCs to encourage more EMS participation. The Working Group is also focusing research into GPS-enabled medical alarms to learn more about these systems, which have a sensor that can detect a fall and will automatically transmit an alert to the company's call center. These devices are gaining popularity and the Working Group has identified a number of manufacturers who are now marketing them. This issue was brought to the Working Group's attention by a California fire agency dispatch center that was receiving calls to respond to these emergencies.

Cross Border Working Group, Steve Mallory, Chair. Chief Lenihan, reporting for Mr. Mallory, reported on the NPSTC outreach publication discussing regulatory updates on the border. On June 30, the FCC and Canada jointly released guidance on cross border base station placement. This will let public safety agencies place a base station radio in Canada to support their own operations in the U.S. or to provide enhanced interoperability between U.S. and Canadian first responders. The Working Group has created some outreach documents which have been distributed broadly. CITIG is also working to announce these changes to first responders on the Canadian side of the border. The Working Group is setting up a webinar, scheduled for October 17, in which the FCC will review these updates and answer questions from public safety agencies.

The Working Group is also examining cross border 911 data sharing. The issue was raised by a real-life occurrence leading to questions on how a U.S. PSAP can access a customer's cellular data from a Canadian company and how a U.S. PSAP can obtain GPS coordinates from a Canadian cell phone carrier during a border emergency. The Working Group is creating a report on how PSAPs can coordinate. The outreach document is almost complete and will be shared with the wireless carriers for comment before being sent to the Governing Board for approval.

The State of Texas has identified issues with calls from Mexico being routed to their PSAPs. Mexico is currently switching their nationwide emergency number from "006" to "911." Texas PSAPs are receiving a significant number of 911 calls from persons inside Mexico, including U.S. citizens who have traveled into Mexico but are still connected to their US. wireless carrier as well as from Mexican citizens, who are in Mexico, but their phone has roamed onto a U.S .wireless carrier, who delivers the emergency call to the Texas PSAP. Texas is working with the carriers to better align some of the cell tower routing tables and is also trying to establish relationships with the Mexican cellular carriers to discuss issues there.

The Working Group is also developing best practices for emergency vehicle border crossings, monitoring the CAUSE V experiment, and examining the impact of the railroad police decision in the U.S. on Canada.

Radio IO Best Practices Working Group, John Lenihan. Reporting for Mark Schroeder, Chief Lenihan, reviewed the most recent focus of this group. They have completed four Best Practice statements: Radio Channel Naming, Training on Use of IO Systems and Equipment, Change Management Process Involving IO Systems, and Infrastructure Management for IO Systems. The Radio IO Best Practices report, which is an introduction to the individual best practice documents, is also being finalized. The main report and the first four Best Practices should be coming to the Governing Board for consideration by the end of the year.

Award Presentation and Break. Mr. Patrick and Mr. Haller presented the following NPSTC awards to the deserving recipients.

Participants Award, *Sponsored by NASEMSO.* The NPSTC Participants Award was created to recognize individuals and/or organizations that have supported NPSTC and the public safety community on critical objectives such as achieving interoperability. The recipients were Bette Rinehart and David Eierman.

Leadership Award, *Sponsored by NASEMSO.* The NPSTC Leadership Award was created to recognize individuals and/or organizations that have demonstrated exceptional personal and professional conduct. The recipients were Brian Marenco, Kim Coleman Madsen, Chris Kindelspire, and Tom Sorley.

Hertz Award, *Sponsored by APCO International.* The Hertz award, named in honor of Heinrich Hertz whose name denotes the scientific unit of frequency--cycles per second--is not an annual award but one that is only awarded when exceptional performance warrants it. The recipient was Joel Berger.

DJ Atkinson Technical Award, *Sponsored by Jeff Bratcher.* The DJ Atkinson Technical Award, created in 2012 to honor DJ Atkinson's work, recognizes individuals and/or organizations that have demonstrated exceptional technical support to NPSTC and the public safety communications community. The recipient was Greg Buchwald.

Lifetime Achievement Award, *Sponsored by NENA.* The NPSTC Lifetime Achievement Award reflects the many years the recipient has worked for the interests of public safety communications, nationwide. The recipient shall have positively influenced nationwide policy in many ways over his/her lifetime, which as a result, has demonstrably improved public safety communications. This award is not given annually, but rather as determined by the NPSTC Governing Board. The recipient was Roger Hixson.

Chairman's Award, *Sponsored by Ralph Haller.* The recipients were Jackie Bayless, Sandy Dawkins, and Dawn Ober.

Richard DeMello Award, *Sponsored by IMSA.* The Richard DeMello Award is presented to one individual in public safety communications who has demonstrated the highest levels of personal and professional conduct and performance in the local, state, and national public safety communications arena. The recipient was Paul Patrick. Mr. Patrick said he was surprised and honored to receive this award.

Organizations Update

Telecommunications Industry Association (TIA), Jim Holthaus, Representative. Mr. Holthaus reported on TIA's technology and standards activity. TIA is a trade association for the global information and communications technology (ICT) industry. Its work comprises standards development, policy initiatives, business opportunities, market intelligence, and networking events. TIA is accredited by the American National Standards Institute (ANSI) to develop voluntary, consensus-based industry standards. TIA has 12 engineering committees. Work completed in 2016 includes:

General: TIA-102 Documentation Suite Revision C reflects TR8 progress since the last publication (2012), including new TIA publications, improved graphics, and addresses miscellaneous errata identified.

Air Interfaces: A revision to the FDMA, TDMA, and Analog Air Interface Performance Measurement Method Standards *ensure that harmonics present in Class D amplifiers do not interfere with various audio measurements.* Revisions of the FDMA Conventional Conformance test update the list of reference documents, make general terminology clarifications and provided clarifications on test result expectations without modifying or adding any tests.

Broadband: A revision of TSB-88.2-E (Wireless Communications Systems – Performance in Noise and Interference Limited Situations – Part 2: Propagation and Noise) adds information associated with Broadband Air Interface Propagation and Noise modeling.

Work in Progress includes:
Security: Link Layer Encryption will provide improved Security for all air interfaces of P25, protects control channel control messages, and hides group and individual IDs. An addendum to the Key Fill Interface standard will enable Key Fill Device (KVL) interface to a KMF, an Authentication Facility and another Key Fill Device.

Wireline Interfaces: An addendum to the ISSI Messages and Procedures Standard corrects several errata that have been noted since the last publication. A revision to the Fixed Station Interface Standard adds additional capabilities, the most significant of which is Packet Data. Group and Individual Regrouping for the Trunking ISSI/CSSI Standard will enable dispatch equipment connected to Trunking Infrastructures via the ISSI/CSSI to control both group and individual regrouping services.

Air Interfaces: A revision to the FDMA Common Air Interface addresses errata that have been collected since the last publication. A revision to the Trunking Interoperability Test merges the FDMA and TDMA material and address an error in a call pre-emption test procedure. A new standard for a TDMA Control Channel provides the messages and procedures for operating a 12.5 kHz channel with 2 TDMA slots where either or both may service Control Channel traffic. An addendum for additional Emergency Alarm expands the existing emergency alarm request message to indicate that the

emergency alarm request has been generated by conditions other than depression of the emergency alarm button.

Broadband: Additions to TSB-88 are in progress. These additions will create recommendations for Broadband Data System coverage modeling and verification.

TIA is drafting a response to FCC's Order on Reconsideration seeking comments on adoption of the 15 recommended feature sets and capabilities proposed by the P25 CAP AP. The response reinforces TIA's support of P25 CAP and seeks to resolve ambiguities in proposed testing and focus requirements to features necessary for interoperability. TIA plans to share this response with NPSTC prior to submittal to the Commission.

NPSTC Strategic Plan, Lloyd Mitchell, Executive Committee Task Force Chair. Mr. Mitchell introduced Scott Bryant, saying NPSTC will celebrate 20 years as an organization and it is time to refresh the strategic roadmap.

Strategic Plan Discussion, Scott Bryant, Scott Bryant and Associates. Mr. Bryant said NPSTC's last strategic plan update occurred 10 years ago with a format update in 2011. A roadmap is a vehicle for decision making which will be based on input from NPSTC. He plans to send a participant survey to the Governing Board which is designed to solicit feedback and input on the quality of NPSTC services and products; the overall satisfaction with NPSTC; willingness to recommend NPSTC to others; and strengths, challenges, and change to improve effectiveness. The survey will be web based with email invitations and responses will be confidential. He will interview each of the Governing Board members to learn what has been accomplished, what works well now, what is not working well, future focuses, primary challenges or barriers to future visions, and most effective strategies. The results will be compiled into a report. At the January meeting, results will be reviewed and discussed in an effort to update the NPSTC Strategic Plan.

September 29, 2016

Federal Partners Update

Federal Communications Commission (FCC), David Furth, Deputy Bureau Chief, Policy and Licensing Division, Public Safety Homeland Security Bureau (PSHSB). Mr. Furth and Mr. Marenco presented on current activities at the FCC beginning with the long awaited FirstNet notice on the state opt-out process. It addresses the process the Commission will use to evaluate opt-out requests. The process will begin late in 2017. The Commission also adopted a Report and Order regarding 700 MHz narrowband incumbents, many of whom who have moved from that FirstNet spectrum. FirstNet is providing grant funds for those agencies. By August 21, 2017, licensees will need to have moved. The Bureau is working with FirstNet to coordinate these processes.

The Commission adopted a reconsideration order in the 700 MHz narrowband proceeding, regarding the 2014 rules and the TIA filing on the certification of equipment to comply with P25 CAP requirements. TIA asked to change the sequence so equipment certification could occur before meeting the P25 CAP standard. The Commission granted the request with the caveat that the equipment is certified before it is marketed or sold, and it clarified a number of other rules on their own motion. The Commission is

seeking comment on the amendment to the trunking rule and a petition Motorola filed on clarification of the 700 MHz rules. Comments are due October 26 and replies on November 10.

The Order to extend eligibility on the interoperability channels to the railroad police goes into effect on October 28. The Commission continues to work on 4.9 GHz and has generated a large record. The goal is to maximize public safety use of the band, but to also allow the opportunity for growth and greater flexibility in use of the band. The Bureau expects to circulate a draft Further NPRM to the Commissioners by the end of the year for their review and approval.

Mr. Marenco reported on the work occurring on both borders. On June 30, 2016, the FCC and Innovation, Science and Economic Development Canada(ISED) jointly released documents that enhance cross border communications. The FCC Public Notice provides guidance to U.S. public safety licensees seeking to: (1) roam into Canada; (2) communicate from the U.S. through base station repeaters in Canada; or (3) host Canadian licensees seeking to communicate through base station repeaters in the United States. Canada's notice provides guidance to Canadian public safety agencies seeking to place base stations in the U.S.

Another issue in Canada revolves around 700 MHz narrowband regarding issues of voice and airborne channels. Canada proposes that it establish its own airborne channels, which means the U.S. would have use of its own airborne channels along the border with no conflicts form Canada. The down side is the U.S. will have to clear some channels currently in use for base/mobile operations so Canada will also have clear airborne use.

Regarding the 800 MHz rebanding on the Mexican border, Mr. Marenco said there are 100 licensees waiting to retune but they are blocked by licensees in Mexico. A task force is meeting regularly and achieving significant progress. Mexico will implement the Asia Pacific Telecommunity (APT) band plan for 700 MHz which is inconsistent with the U.S. band plan. The Mexican regulatory agency will issue those orders next month paving the way for U.S. licensees to retune. A task force is in discussions on this issue as well.

The federal interoperability channels in the 162-174 MHz and 406.1-420 MHz bands can be used by state, local, and territorial public safety agencies to enable joint federal/non-federal interoperability. NTIA governs new rules that allow a simplified process to coordinate that use through the SWICs. An MOU between a federal department and each state/territory SWIC allows all state, local, and territorial public safety agency to use those channels for operating with a federal agency. NTIA will designate a federal representative in each state to interact with the SWIC to negotiate an MOU. The FCC will then issue a Public Notice to announce the process.

Mr. Root questioned how to make the process easy for localities and states, instead of acquiring individual agency licenses. Mr. Marenco said a state representative could apply with a letter signed by the SWIC. Chris Lewis, Department of Interior, said a single individual or office would sign with a single federal office at an appropriate level. Then the state would seek statewide licensing and do the deconfliction with state agencies and federal counterparts. John McIntosh, Association of Fish and Wildlife Agencies (AFWA), asked which federal agency the FCC anticipates will be the partner. Jimmy Downes, FPIC, said the appropriate agency is based on which agency is licensed the spectrum. Mr. Lewis said he has signatory authorization and has already signed one MOU and hopes this will become the

template for this sharing. Mr. Furth said the Bureau shares that goal and is working on the SWIC side and having the states manage their own process.

On behalf of NPSTC, Mr. Patrick presented Mr. Marenco with a Leadership Award in recognition of his many years of work on behalf of public safety to improve cross border communications.

Federal Partners for Interoperability Communication (FPIC), Jim Downs LMR Standards and Security Coordinator, Office of Emergency Communications (OEC). The FPIC serves as a coordination and advisory body to address technical and operational wireless issues relative to interoperability within the public safety emergency communications community, interfacing with voluntary representatives from federal, state, local, tribal, and territorial. The FPIC has an established working relationship with the Emergency Communications Preparedness Center (ECPC), the NCSWIC EC, and the SAFECOM-NCSWIC Technology Policy Committee as a technical advisory resource.

The FPIC focuses on improving interoperability among the public safety community at all levels of government and addressing common public safety related communications issues. The FPIC addresses topics and questions concerning Interoperable Communications, Security Services, Spectrum (related to interoperability), and Standards.

Importance of LMR Sustainment: The sustainment of resources and operational capability supporting LMR is vital to public safety mission critical communications. It is important that government leaders and public safety managers recognize sustained funding is critical to keep LMR systems functional. The FPIC, in coordination with OEC, is working closely with the NCSWIC to address LMR issues at all levels of public safety that include technology, funding, governance, and others.

Cooperative Partnerships: Reduced federal and state/local budgets force agencies to seek opportunities to achieve cost-effective solutions and operational efficiencies by securing partnerships with statewide and regional public safety systems. Cooperative partnerships provide enhanced coverage and better interoperability with state and local agencies. The partnership in Wyoming is a prime example of how the FPIC has supported cooperative opportunities resulting in enhanced communications for all concerned. Other partnerships include Alaska, Connecticut, Missouri, South Carolina, and Washington. The FPIC has promoted these initiatives for many years and is embarking on a new initiative with the NCSWIC to identify assets for potential future partnerships.

FPIC Spectrum Activity: The federal interoperability channels in 162-174 MHz and 406.1-420 MHz bands can be used by state, local, and territory public safety agencies to enable joint federal/non-federal interoperability. NTIA Manual 4.3.16 governs new rules that allow a simplified process to coordinate that use through the SWICs. An MOU between a federal department and each state/territory SWIC allows all state, local, and territorial public safety agency to use those channels for operating with a federal agency (no need to coordinate with every single public safety agency in the state.)

In coordination with NTIA, OEC/FPIC is drafting an MOU template reflecting NTIA Manual changes allowing local, state, and territorial agencies to use LE/IR channels. A draft MOU has been provided to NTIA's Office of Spectrum Management for comment and has gone through legal review. The draft MOU will be coordinated with federal spectrum managers and NCSWIC through the FPIC Spectrum

Subcommittee. Further coordination with federal agencies and SWICs is required to identify signatories for each MOU.

FPIC is currently working with the FCC and NTIA to identify interoperability channels that can be used nationwide for immediate and unencumbered use. This is different from the use of the LE/IR channels. A preliminary search of existing LE/IR and AGA4 assignments identified some candidate channels. The FCC has agreed to consider pairing these channels with FCC part 90 interoperability channels. Further coordination will be conducted through the FPIC Spectrum Subcommittee. The FPIC is developing strategies for identifying cross border interoperability channels with Canada. Based on recent suggestions to NTIA from Region 9, the FPIC Spectrum Subcommittee also agreed to address cross-border interoperability channels with Mexico.

Encryption Publications: The FPIC Security Working Group has teamed with SAFECOM and NCSWIC to develop a series of documents addressing encrypted communications in a P25 environment.

- *Guidelines for Encryption in Land Mobile Radio Systems – Feb 2016, www.dhs.gov/technology*
- *Best Practices for Encryption in P25 Public Safety Land Mobile Radio – Sept 2016, www.dhs.gov/technology*
- *Considerations for Encryption in Public Safety Radio Systems – Sept 2016, www.dhs.gov/tecnology*
- *Best Practices for Encryption in P25 Public Safety Land Mobile Radio Systems* and *Considerations Encryption in Public Safety Radio Systems.* Final Draft documents have been approved by the SAFECOM – NCSWIC Technology Policy Committee and the FPIC and have been published. www.safecom.gov/technology.
- *Operational Best Practices for P25 Public Safety Land Mobile Radio*. First draft (outline) will be developed by FPIC Security Working Group.

Encryption Guidance: The FPIC Security Working Group, in coordination with the National Law Enforcement Communications Center (NLECC) and other public safety agencies, developed a standardized Storage Location Number (SLN) assignment list for National Encrypted Interoperability (June 2015). This guidance is not mandatory but is iimportant to maintaining encrypted discipline and avoiding conflicts. The FPIC encourages public safety agencies who are going to implement encryption to coordinate with the NLECC for SLN, Key, and Key ID assignments. A national database can be developed to avoid conflicts and improve encrypted interoperability. It is iimportant to coordinate with your adjacent jurisdiction. After the LMR sustainment survey is complete, the FPIC will attempt to populate a SLN database to avoid conflicts with neighboring jurisdictions. This information will be protected and distributed on a need-to-know basis.

Theoretically, different entities could have different SLNs refer to the same Traffic Encryption Keys. The In an OTAR system, each SLN contains two TEK keysets (one active/one inactive). This is a decimal value between 0 and 4095. Example:

- Agency A: SLN 0001 KID: 12AF TEK:1234567890ABCDEF
- Agency B: SLN 1234 KID: 12AF TEK:1234567890ABCDEF
- Agency C: SLN 4095 KID: 12AF TEK:1234567890ABCDEF

These all refer to the same traffic key. Even though the SLNs do not match, the radio will decode the audio since the KIDs and TEKs are the same.

Different agencies with uncoordinated SLN/KID/TEK assignments can create an interoperability nightmare. Example:

- Agency A: SLN 0001 KID: 0001 TEK:ABCDEF1234567890
- Agency B: SLN 0001 KID: 0001 TEK:1234567890ABCDEF

The same SLN and KIDs all refer to different traffic keys. The radio will attempt to decode audio with unsuccessful results and will not interoperate.

- Agency C: SLN 0001 KID: 0002 TEK:ABCDEF1234567890

In the case of the same TEK but the Key ID does not match, it will not interoperate. Multi-band environments will increase the operational complexity and require additional coordination.

Organizations Update

University of Melbourne Centre for Disaster Management and Public Safety (CDMPS), Geoff Spring, Representative. Mr. Spring reported on the activities of the CDMPS which is working to align its activities with NPSTC initiatives. CDMPS held an international symposium on disaster management in 2015, where attendees developed four principles guiding Australian mission critical public safety communications: Policy and regulation frameworks, stakeholder identification, technology, and leadership. CDMPS comprises a number of partnerships beyond NPSTC and includes P25, PSCR, British APCO, APCO Canada, Australian Radio Communications Association, CommsConnect, and Centre for Spatial Data Infrastructure and Land Administration.

Current research projects include integrated 3D indoor and outdoor situational awareness for emergency management; 3D indoor visualization for guiding victims and staff during an evacuation on a mobile device; supporting natural disaster management utilizing real-time information; crowd-sourced geographic information for emergency response; next generation disaster management; optimizing diversion costs in road network recovery, and fire incident report visualization. There is a particular focus on next generation disaster management related to capturing information from sensors. Mr. Springs asked NPSTC to share a questionnaire to support research related to that focus.

Australian government department discussion papers:

- Productivity Commission Inquiry into Public Safety Mobile Broadband [awaiting response to recommendations]
- Next Generation Triple Zero [tender deferred 2 years]
- SMART ICT Inquiry
- Spectrum Review
- Radio Communications Bill

Submissions being worked on:

- Compatible-Intelligent Transportation Systems
- Express of Interest for Location Based Service for Triple Zero

Mr. Haller said CDMPS is proposing to create an organization similar to NPSTC. He would like to report to them that NPSTC supports this development and will assist as needed.

Motion and Vote: Rick Comerford, International Association of Emergency Managers (IAEM), moved that the Governing Board issue a resolution of support for the new CDMPS organization. Mr. Mitchell seconded. Approved.

Spectrum Management Committee and other Current Topics, Don Root, Chair; Charlie Sasser, Vice Chair

700 MHz Deployable Trunked Systems Task Force, Don Root. NPSTC's *700 MHz Deployable Trunked System* report identified six deployable channels and designated two of the six for control. As Mr. Marenco reported, the FCC has negotiations underway on the southern border. This may place the control channels in the "Mexico Primary" block requiring the channels for control to be revised. When discussions are complete, the Task Force will request Governing Board approval to develop and issue the revision with National Regional Planning Council (NRPC).

Notice of Proposed Ruling Makings (NPRMs) Impacting Spectrum, Don Root. Mr. Root discussed two filings that NPSTC should consider commenting on.

Reconsideration Order, No. 13-87. The FNPRM seeks comment on the DHS P25 CAP Advisory Council list of 15 feature sets for conventional operation and also asks what 700 MHz rules need to be changed to help enable vehicular repeaters. The Committee held a special call on September 23 to discuss and develop a draft for the Committee call in October. Comments are due on October 26 and reply comments are due November 10. As noted above, P25 CAP compliance must now be completed before equipment is marketed or sold. States may delegate the administration of 700 MHz air-ground channels to the 700 MHz Regional Planning Committees (RPCs).

NPRM, WP Docket No. 16-261. This NPRM is in response to the Land Mobile Communications Council (LMCC) recommendations that propose to extend conditional licensing to 700, 800, and 900 MHz bands. It also proposes that existing licensees be allowed to apply prior to new applicants for 800 MHz band expansion and guard band channels. Comments are due November 22 and reply comments are due December 22. The Committee recommends NPSTC support both proposals. The Governing Board concurred and will review and vote on the draft NPSTC comments once developed. The 700 and 800 MHz band applications would receive RPC approval before submission to the FCC.

Spectrum Access System (SAS), Don Root. SAS has been positioned by others as a means under which different services can share the same spectrum with prioritization assigned for each service. SAS is a new approach and it is being tried in the 3.5 GHz band. Silicon Flatirons Center in Boulder held a recent conference on SAS with speakers from FCC, NTIA, Hill staff, and industry.

Discussion: The Committee seeks Governing Board input on questions important to public safety as NPSTC studies and evaluates SAS. Mr. Haller said this will likely be included in the FN for 4.9 GHz. All four frequency coordinators support the current method of frequency coordination. For SAS to work, an entity needs to provide a central computerized database to track all users to the spectrum. He expects this will become a very active item for NPSTC. Mr. Root indicated the Spectrum Management Committee

will take steps to gain additional education on SAS in the context of how it would potentially benefit or negatively impact public safety.

Filing Summary Recap, Charlie Sasser. Mr. Sasser reported on NPSTC filings to date.

Date Filed	Topic	Type of Filing
9/12/16	Outage Reporting	Reply Comments
8/11/16	Noise Floor	Comments
7/22/16	5.9 GHz DSRC	Reply Comments
7/13/16	Interference Portal	Letter
7/8/16	4.9 GHz	Ex Parte (#2)
7/7/16	5.9 GHz DSRC	Comments
6/21/16	Ligado 1675-1680 MHz	Comments
6/3/16	T-Band Update Report	Ex Parte
5/23/16	Ligado 1545-1555 MHz	Comments
4/21/16	4.9 GHz	Ex Parte (#1)
1/13/16	Wireless Emergency Alerts	Comments

Mr. Overby said NPSTC will be filing a number of comments in the near future. The Governing Board will receive bullet points in advance and the comments a week before they are due.

Project 25 Technology Interest Group (PTIG), Steve Nichols, Director. Mr. Nichols said PTIG updated their FAQ this September to include 14 new questions and to address changes in the P25 CAP testing

process. The FAQ includes an overview, compliance testing, benefits, the relationship of P25 to other radio technologies, interoperability, multi-vendor P25 solutions, and P25 security services.

PTIG has also updated the list of P25 trunking and conventional systems in June 2016. These systems are in the U.S., Australia, Canada, New Zealand, and the United Kingdom. The list is organized by state and includes the user name and the frequency band. These documents and many other resources are available at www.project25.org.

Next Generation 9-1-1, Roger Hixson, ENP, National Emergency Number Association (NENA). Mr. Hixson discussed NG 9-1-1. NG9-1-1 fully replaces E9-1-1, while retaining the capabilities and functions in place today; adds capabilities to support changes for current and new types of originating service providers; adds flexibility for PSAPs and 9-1-1 authorities to manage calls, share costs and applications; and adds capabilities to integrate and interoperate with emergency entities beyond the PSAP.

NG 9-1-1- allows for additional data to be acquired from multiple sources. Data can be used to identify initial responders for dispatch, make immediate notification to other agencies, provide information to help increase responder safety, and improve call processing.

Some new data will naturally come into play as new service types appear. Each type of service may also involve additional optional data beyond what is naturally associated with that call type. Each 9-1-1 Authority will have to decide optional additional data is to be used in the operations for their PSAPs and what training will be required to support it.

NG9-1-1 capabilities include caller-provided medical data, floor plans, telematics, fire control panels, building/fire code inspections, hazardous materials, and historical data. Call takers will be able to work together from different locations, a "virtual PSAP," with more options for contingency planning and disaster recovery, and the ability to collaborate in the region and standardize training.

Administrative Discussion

The next NPSTC meetings will be held by teleconference on Tuesday, January 24, 2017, and at IWCE, on Friday, March 31, 2017.

Adjournment. Paul Szoc, International Municipal Signal Association (IMSA), moved to adjourn; Mr. Comerford seconded. The general meeting adjourned at 11:19 am EDT and the Board moved into Executive Level IV Session.