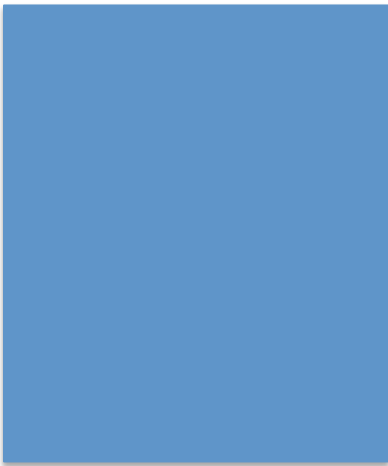
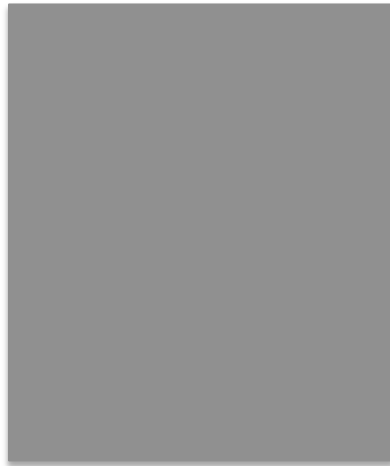




PSCR



2014 Public Safety Broadband Stakeholder Conference

June 3-5, 2014

10600 Westminster Blvd.
Westminster, CO 80020



2014 Public Safety Broadband Stakeholder Meeting

June 3—5, 2014
The Westin Hotel

10600 Westminster Blvd, Westminster, CO 80020

Day 1: Tuesday, June 3, 2014

8:00 a.m. – 5:30 p.m.

All Sessions Take Place in Westminster Ballrooms I, II, III

- 7:00 a.m.—8:00 a.m.: **Check In/Registration & Continental Breakfast (S. Courtyard)**
- 8:00 a.m.—10:00 a.m.: **FirstNet Board Meeting**
- 10:00 a.m.—11:00 a.m.: **60-minute Break—Sponsored by Nokia Solutions Networks**
- 11:00 a.m.—11:30 a.m.: **Welcome & Introduction**
- Dereck Orr, *Program Manager, PSCR*
 - Andrew Thiessen, *Operations Manager, PSCR*
- 11:30 a.m.—12:00 p.m.: **Keynote Address**
- Sue Swenson, *FirstNet Board Member*
- 12:00 p.m.—1:30 p.m.: **Lunch**
- 1:30 p.m.—2:30 p.m.: **Research & Development Roadmapping**
- Dereck Orr, *Program Manager, PSCR*
- 2:30 p.m.—3:00 p.m.: **30-minute Break**
- 3:00 p.m.—4:00 p.m.: **FirstNet Leadership Updates**
- TJ Kennedy, *FirstNet Deputy General Manager*
 - Ali Afrashteh, *FirstNet Chief Technical Officer*
 - Jeff Bratcher, *FirstNet Deputy Chief Technical Officer*
- 4:00 p.m.—5:30 p.m.: **Modeling & Simulation**
- Nada Golmie, *PSCR*
 - Richard Rouil, *PSCR*
- 5:30 p.m.—7:30 p.m.: **Reception Sponsored by General Dynamics C4 Systems**



2014 Public Safety Broadband Stakeholder Meeting
Westin Hotel | Westminster, CO

Day 2: Wednesday, June 4, 2014

8:30 a.m. – 5:30 p.m.

All Sessions Take Place in Westminster Ballrooms I, II, III

- 7:30 a.m.—8:30 a.m.:** **Continental Breakfast (South Courtyard)**
- 8:30 a.m.—9:00 a.m.:** **Day 2 Keynotes**
- Daniel Cotter, *Director, Department of Homeland Security's Office for Interoperability and Compatibility*
 - Admiral Ronald Hewitt, *Director, Department of Homeland Security's Office of Emergency Communications*
- 9:00 a.m.—10:30 a.m.:** **FirstNet Planning, Consultation, and Outreach Updates**
- Serena Maxey, *Technical Assistance Branch Chief, DHS OEC*
 - Keil Green, *Technical Assistance Support, DHS OEC*
 - Dave Buchanan, *FirstNet Director of State Consultation*
 - Rich Reed, *FirstNet Director of State Plans*
 - Amanda Hilliard, *FirstNet Director of Outreach*
 - Ed Parkinson, *FirstNet Director of Government Affairs*
- 10:30 a.m.—11:00 a.m.:** **30-Minute Break—Sponsored by General Dynamics C4 Systems**
- 11:00 a.m.—12:00 p.m.:** **Priority, Pre-Emption, and Quality of Service**
- Dr. Rob Stafford, *PSCR*
 - Tracy McElvaney, *PSCR*
 - Todd Bohling, *PSCR*
 - Jon Cook, *PSCR*
- 12:00 p.m.—1:30 p.m.:** **Lunch**
- 1:30 p.m.—2:30 p.m.:** **Indoor/In-Building Testing**
- Dr. Bob Johnk, *PSCR*
- 2:30 p.m.—3:30 p.m.:** **Extended Range Cell Testing**
- Chris Redding, *PSCR*
 - Camillo Gentile, *PSCR*
- 3:30 p.m.—4:00 p.m.:** **30-Minute Break**
- 4:00 p.m.—5:00 p.m.:** **Mobile Applications Security for Public Safety**
- Nelson Hastings, *PSCR*
 - Travis Green, *Lockheed Martin Corporation*
 - Alex Kreilein, *DHS OEC Detailee*
 - Theodora Titonis, *Veracode*
- 5:00 p.m.—5:30 p.m.:** **Video Quality Research**
- Dr. Joel Dumke, *PSCR*
- 5:30 p.m.—7:30 p.m.:** **Reception Sponsored by McAfee**



2014 Public Safety Broadband Stakeholder Meeting
Westin Hotel | Westminster, CO

Day 3: Thursday, June 5, 2014

8:30 a.m. – 5:00 p.m.

All Sessions Take Place in Westminster Ballroom I, II, III

- 7:30 a.m.—8:30 a.m.:** **Continental Breakfast (South Courtyard)**
- 8:30 a.m.—9:00 a.m.:** **Day 3 Keynote**
- Dr. Patrick Gallagher, *Acting Commerce Deputy Secretary*
- 9:00 a.m.—10:00 a.m.:** **Customs and Border Protection: Merging LMR & LTE Devices**
- Todd Bohling, *PSCR*
 - Bill Krimmel, *DHS Customs & Border Protection*
 - Gary Ruegg, *Interop Solutions, LLC*
 - Per Johansson, *MaXentric Technologies, LLC*
 - David Pederson, *Elbit Systems*
- 10:00 a.m.—10:30 a.m.:** **Audio Quality**
- Andrew Catellier, *NTIA ITS*
 - Steve Voran, *NTIA ITS*
- 10:30 a.m.—11:00 a.m.:** **30-Minute Break**
- 11:00 a.m.—12:00 p.m.:** **Small Cell Technology**
- Jonathan Cook, *PSCR*
 - Dharmesh Tyagi, *Nokia Solutions and Networks*
 - David Gross, *Global Wireless Technologies*
- 12:00 p.m.—1:30 p.m.:** **Lunch**
- 1:30 p.m.—2:30 p.m.:** **Next Generation Network Priority Services Testing & Evaluation**
- Tracy McElvaney, *PSCR*
 - Heather Kowalski, *DHS OEC*
 - Anna Paulson, *PSCR*
- 2:30 p.m.—3:30 p.m.:** **Requirements Gathering & Standards Development**
- Andrew Thiessen, *PSCR*
 - Barry Luke, *NPSTC*
- 3:30 p.m.—4:00 p.m.:** **30-Minute Break**
- 4:00 p.m.—5:00 p.m.:** **Local Control**
- Moderator: Steve Devine, *Missouri Department of Public Safety*
 - Andrew Thiessen, *PSCR*
 - Gino Scribano, *Motorola Solutions*
 - Wim Brouwer, *Alcatel Lucent*

2014 Public Safety Broadband Stakeholder Conference

Session Information & Abstracts



PSCR

- All sessions will take place in Westminster Ballrooms I, II, and III
- Presentations can be found at <http://www.pscr.gov/agenda.php>
- All sessions will include dedicated Q&A time.

Session 1: Research & Development Roadmapping

Presenter: Dereck Orr, PSCR

Description: In November 2013, PSCR held a Public Safety Broadband Research and Development (R&D) Roadmap Workshop. This workshop gathered stakeholders from public safety, state, local, and Federal government, and industry to discuss what R&D is necessary over the long-term, 5-10+ years, in order to enable LTE technology to fully meet the needs of the public safety community. Continuing the progress from that workshop, PSCR will:

- Demonstrate a public safety capabilities visualization tool built on data gathered from the November workshop;
- Discuss ongoing efforts and collect data inputs from conference participants to create an updated public safety scenario built on future technology capabilities, and;
- Provide an update on progress made towards a capability-specific technology roadmap

Session 2: FirstNet Leadership Updates

Speakers: TJ Kennedy, FirstNet; Ali Afrashteh, FirstNet; Jeff Bratcher, FirstNet

Description: In March 2014 the First Responder Network Authority (FirstNet) Board voted to proceed toward several important milestones along the authority's preliminary strategic roadmap – a course of action designed to ensure the building and management of a nationwide, interoperable, public safety communications network. FirstNet's Deputy General Manager and new Chief Technical Officer will provide an update and address questions regarding FirstNet's progress in implementing the strategic roadmap and discuss key activities for the next year.

Session 3: Modeling & Simulation

Speakers: Nada Golmie, PSCR; Richard Rouil, PSCR

Description: The Public Safety Communication Research (PSCR) program has been developing modeling and simulation tools to analyze and predict the performance of a future nationwide, interoperable public safety broadband network. These simulation models are intended to provide valuable information during the early phase of network planning, including data on network and feature performance and analysis of potential network architecture and site locations.

This talk covers the effects of large-scale incidents and network failures on the public safety broadband network. Until now our simulation and modeling results have mainly considered day-to-day public safety operations to assessing the number of sites needed, the users covered and the throughput achieved. In this talk, we focus on what happens in the event of larger incidents and network failures. How does a network designed and built to support public safety day-to-day traffic be affected by larger incidents? How sensitive is it to varying traffic loads? How resilient is the network in the case of equipment failures or infrastructure loss?

Session 4: FirstNet Planning, Consultation, and Outreach Updates

Speakers: Serena Maxey, DHS OEC; Keil Green, DHS OEC; Dave Buchanan, FirstNet; Rich Reed, FirstNet; Amanda Hilliard, FirstNet; Ed Parkinson, FirstNet

Description: The Middle Class Tax Relief and Job Creation Act of 2012 requires that FirstNet consult with regional, state, and local jurisdictions in developing requests for proposals and otherwise carrying out its responsibilities. The DHS Office of Emergency Communications has engaged with states through broadband coverage workshops to help prepare them for consultation with FirstNet. OEC will present findings from the workshops conducted to date. FirstNet will provide an overview of the state consultation process and discuss how they are preparing states for the process. FirstNet will also discuss its current outreach efforts and plans to expand.

Session 5: Priority, Pre-Emption, and Quality of Service

Speakers: Dr. Rob Stafford, PSCR; Todd Bohling, PSCR; Tracy McElvaney, PSCR

Description: Priority, Pre-emption and Quality of Service (QoS) are terms often used when talking about the National Public Safety Broadband Network. Spread across several 3GPP releases and different standards within those releases, these terms can create confusion for the Public Safety user. The Public Safety Communications Research team will attempt to de-mystify Priority, Pre-emption and QoS by presenting an overview from the end-user perspective. In addition, PSCR will introduce the evaluation approach being employed in the FirstNet QoS project.

Session 6: Indoor/In-Building Testing

Presenter: Dr. Bob Johnk, PSCR

Description: This session will focus on in-building Band 14 research conducted by PSCR engineers. The topics will include the difficulties encountered in establishing reliable communications and satisfactory network performance inside buildings. This session will also discuss and compare methods for improving in-building coverage. Results from three recent measurement campaigns will be featured and discussed in some detail to highlight these important issues.

Session 7: Extended Range Cell Testing

Speakers: Chris Redding, PSCR; Camillo Gentile, PSCR

Description: Extended cell range or boomer cells have been used for years in various cellular technologies to provide wide area coverage. The use of boomer cells for coverage in rural areas will be a critical capability for public safety to provide communications in remote areas. PSCR has augmented its existing demonstration network to test and evaluate a boomer cell, which will extend an LTE cell radius beyond the typical range of 2-3 miles to a range of 48 miles. PSCR has performed RF modeling and deployed this scenario. We will be presenting the results of the modeling and field measurements.

Session 8: Mobile Applications Security for Public Safety

Moderator: Nelson Hastings, PSCR

Panelists: Alex Kreilein, DHS OEC; Traviss Green, Lockheed Martin Corporation; Theodora Titonis, Veracode

Description: Mobile applications connect first responders to data that enables them with actionable information from situational awareness to real-time video communications. However, the risks associated with mobile applications may threaten operations if gone unchecked. Critical security and performance flaws enable the intentional exploitation of vulnerabilities by malicious actors or the unintentional consequences brought forth by poor code development and review practices. This session explores the current state of mobile applications risks, discusses opportunities for improvement on the status quo, and provides analysis for practitioners on available mitigations that address the risks articulated.

Session 9: Video Quality Research

Presenter: Dr. Joel Dumke, PSCR

Description: This session will present the research of the Public Safety Video Quality (PSVQ) project under PSCR. This project was established to determine how video is used in public safety applications and to make recommendations to practitioners. Topics will include a new definition of video quality, a new quality assessment method, results from subjective testing, and a network optimization method that incorporates those results.

Session 10: Customs and Border Protection: Merging LMR & LTE Devices

Moderator: Todd Bohling, PSCR

Panelists: Bill Krimmel, DHS; Gary Ruegg, Interop Solutions, LCC; Per Johansson, MaXentric Technologies, LLC; David Pederson, Elbit Systems

Description: PSCR has been selected by the Department of Homeland Security to perform technical assessment and testing for the CBP Technology Demonstrator Project. The project is evaluating integrating legacy LMR devices with LTE, providing an approach to allow remote security key and software upgrades. Come here about the next generation of devices that will provide interoperability between LTE and LMR.

Session 11: Audio Quality

Speakers: Andrew Catellier, NTIA ITS; Steve Voran, NTIA ITS

Description: This session will focus on Audio Quality in public safety communications. First, we will recap the Modified Rhyme Test (MRT) work conducted by the PSRC in recent years. Speech intelligibility issues associated with high-noise public-safety environments drove these tests. The work produced three substantial reports as well as thousands of speech files and associated MRT scores, all available at PSCR.gov. Next, we will present a software tool that efficiently estimates MRT results without conducting actual MRT tests. This software tool, dubbed ABC-MRT, uses temporal correlations of loudness patterns in articulation index bands to select one of six MRT words. As in the MRT, the ABC-MRT word-selection success rate forms a measure of speech intelligibility. We characterize the agreement between ABC-MRT estimates and the corresponding true MRT scores for 139 different communication scenarios. We also provide a live demonstration of a laptop-based ABC-MRT implementation that estimates the intelligibility of speech in the presence of recorded public-safety noise environments. Finally, we will describe planned future PSCR efforts to apply both ABC-MRT and MRT to characterize speech coders with respect to potential mission critical voice applications over LTE networks. In light of earlier results, we consider intelligibility in high noise environments to be a key consideration and we consider analog FM to be a key reference point for this work.

Session 12: Small Cell Technology

Panelists: Jonathan Cook, PSCR; Dan Picker, Purewave; David Gross, Global Wireless Technologies

Description: In the commercial world small cells are being used to add capacity to systems. For public safety applications, PSCR is investigating them for coverage scenarios that include on vehicle mounting, poles and ceilings. Come learn about what defines a small cell (power, size, etc.), how they can be utilized and what some of the issues are implementing them i.e. GPS timing & backhaul. We'll also be presenting our initial results from our small cell testing.

Session 13: Next Generation Network Priority Services Testing & Evaluation

Moderator: Tracy McElvaney, PSCR

Panelists: Anna Paulson, PSCR; Admiral Ron Hewitt, DHS OEC; Chris Essid, DHS OEC

Description: In support of National Security and Emergency Preparedness (NS/EP), it is necessary to extend existing Wireless Priority Services (WPS) by enabling Next Generation Network Priority Services (NGN-PS) over the LTE commercial network. The Department of Homeland Security Office of Emergency Communications (OEC) is sponsoring Public Safety Communications Research (PSCR) in a joint effort to build a Testing and Evaluation program focused on enabling of the NS/EP NGN Priority services. During this discussion the OEC and PSCR teams will present the state of NGN-PS as well as the strategy and methodology of building the NGN-PS Testing and Evaluation program.

Session 14: Requirements Gathering & Standards Development

Speakers: Andrew Thiessen, PSCR; Barry Luke, NPSTC, Pam Montanari, NPSTC

Description: Requirements and standards are many times the beginning of the product development life cycle that results in equipment that can be used by the public safety community. This session will detail how the Public Safety Communications Research team works to ensure that the public safety community remains firmly in the driver's seat for articulating their requirements, and how those requirements in turn translate into action for the development of standards to base equipment production on.

Session 15: Local Control

Moderator: Steve Devine, Missouri Department of Public Safety

Panelists: Gino Scribano, Motorola Solutions; Wim Brouwer, Alcatel Lucent; Andrew Thiessen, PSCR

Description: As FirstNet develops the Nationwide Public Safety Broadband Network, local control as it relates to the LTE network will be a critical component for each public safety organization to fulfill their mission. Experience shows that the needs of various public safety agencies are unique and can vary over both long and short time horizons. Therefore, flexibility must be built into the network to meet the local needs of each jurisdiction and to ensure that public safety has the control they need, when they need it, in partnership with FirstNet.

2014 Public Safety Broadband Stakeholder Conference

Speaker Biographies



Dereck Orr – PSCR

Dereck Orr is the Program Manager for Public Safety Communication Standards at NIST's Office of Law Enforcement Standards, and has held that position since December 2002. In that role, he leads the Public Safety Communications Research (PSCR) program that serves as an objective technical advisor and laboratory to the Department of Homeland Security and public safety to accelerate the adoption and implementation of the most critical public safety communication standards and technologies. From October 2003 until October 2004, Mr. Orr was detailed to the Department of Homeland Security to serve as the Chief of Staff of the SAFECOM Office within the Science and Technology Directorate, to help establish the new program. Prior to working at NIST, Mr. Orr served as a professional staff member of the Senate Appropriations Subcommittee for the Departments of Commerce, Justice, and State, and Related Agencies under Senator Fritz Hollings. In that position, Mr. Orr was responsible for the appropriations accounts relating to state and local law enforcement issues. Prior to that, Mr. Orr served four years at the Office of Community Oriented Policing Services (COPS) at the Department of Justice. Mr. Orr received a Masters in Public Policy from the College of William and Mary and a Bachelor of Arts in American History from the University of Texas at Austin.

Andrew Thiessen – PSCR

Andrew Thiessen is the Lead for Public Safety Communication Requirements and Standards for the Institute for Telecommunication Sciences (ITS), in the National Telecommunications and Information Administration, Department of Commerce. Mr. Thiessen's work at ITS is part of a joint effort between ITS and the NIST Office of Law Enforcement Standards (NIST/OLES) named the Public Safety Communications Research (PSCR) program. Mr. Thiessen leads the standards development efforts for the PSCR, which includes working in such standards development organizations as 3GPP, ATIS, GMSA, representing public safety's communications requirements. Mr. Thiessen is the Project 25 Compliance Assessment Program (P25 CAP) Laboratory Program Manager. Mr. Thiessen is also the Vice-Chair of the National Public Safety Telecommunications Council (NPSTC) Technology Committee and chair of the NPSTC Broadband Working Group (700MHz). Mr. Thiessen has worked as a principal in several small start-ups, as a Senior Systems Engineer for Sun Microsystems, an engineer for MITRE, and an engineer for the National Security Agency. Mr. Thiessen holds a Bachelor's degree in electrical engineering for Worcester Polytechnic Institute (WPI), a Bachelor's degree in English, also from WPI, a Master's degree in electrical engineering from Stanford University, and an MBA from Duke University.

Sue Swenson – FirstNet

Susan Swenson brings extensive experience as a telecommunications and technology executive to the FirstNet Board. She served as President and CEO of business software

provider Sage North America from 2008-2011. Ms. Swenson also served as COO of digital content company, New Motion/Atrinsic, mobile virtual network operator, Amp'd Mobile, and T-Mobile USA. She was also President and COO of Leap Wireless, International (Cricket Communications) from 1999-2004 and President and CEO of Cellular One from 1994-1999. Ms. Swenson serves on the board of Directors of Wells Fargo, Spirent Communications, Harmonic and Novatel Wireless. She also serves on the Dean's Advisory Board of the Paul Merage School of Business at the University of California, Irvine.



TJ Kennedy – FirstNet

TJ Kennedy is a seasoned executive with a unique blend of leadership, coalition building and technology expertise as well as hands-on experience in police, fire and emergency medical services. He began his career as a firefighter and emergency medical technician (EMT), and then became a state trooper. He then joined the commercial business sector, where he advanced to senior-level positions that honed his management and executive leadership skills. Known domestically and internationally for his expertise in critical infrastructure and large-scale public safety projects, he has focused on facilitating collaboration among local, state and federal authorities to deliver projects of national importance such as Public Safety for the Salt Lake Olympics as a dedicated team member of the Utah Olympic Public Safety Command. At FirstNet, Mr. Kennedy is responsible for leading the organization and collaborating with the FirstNet Board toward the deployment of a nationwide broadband network for the public safety community. He also oversees the critical user advocacy mission including stakeholder outreach, consultation, state plans, government affairs and communications. Prior to joining FirstNet, Mr. Kennedy was the Director, Public Safety and Security for Raytheon Company, where he was President of JPS Communications, a subsidiary focused on radio interoperability solutions. While working with the Utah Department of Public Safety, Mr. Kennedy served as a state trooper for the Utah Highway Patrol and was on the SWAT/Special Operations team. He was also a flight paramedic with Intermountain Life Flight in Salt Lake City and is a past president of the International Association of Flight and Critical Care Paramedics. Mr. Kennedy was a firefighter and a paramedic for Park City Fire District, and graduated from the University of Utah.

Ali Afrashteh – FirstNet

Ali has joined FirstNet as CTO recently. Since 2011 he has been consulting with many wireless operators and vendors globally. He was Vice President of Technology Development at Clearwire (2009-2011). His main focus was making WiMAX technology ready for deployment over 50 cities in US. He built a technology team of 5 departments: Core Network Design, RF Design/ BTS development, In-building/ Campus Solutions, Device/ Handset Development, Interoperability Lab and Field Testing. Prior to his current role, Ali was with Sprint/Nextel as VP of technology development for 10 years, leading iDEN, CDMA and OFDM technology development and deployment. Ali worked for sixteen years within the Bell lab/Bell Atlantic and PrimeCo (1984-1999) In PrimeCo he led the deployment of the first commercial CDMA wireless network in Houston. He did wireless research and development in Bell Labs. Ali also worked at RCA leading the surface radar design group and prior to that, he was assistant professor of Electrical Engineering at Wilkes University.

Ali received his **Ph.D.** in Electrical Engineering from the University of Texas at Austin. He has published many technical papers, and holds several patents.



Jeff Bratcher – FirstNet

Jeff Bratcher is the Deputy Chief Technical Officer for the First Responder Network Authority (FirstNet) and is based at the FirstNet Technical headquarters in Boulder, Colorado. Mr. Bratcher served as the Acting Deputy CTO from November 2013 through May 2014 and was recently selected as the permanent Deputy CTO reporting to Ali Afrashteh, the FirstNet Chief Technical Officer. Mr. Bratcher's duties include the management and oversight of the teams developing specifications to support the FirstNet mission in deploying a nationwide public safety broadband network for first responders.

Prior to joining FirstNet, Mr. Bratcher served as Division Chief for the Telecommunications and IT Planning Division at the U.S. Department of Commerce National Telecommunications and Information Administration (NTIA) Institute for Telecommunication Sciences (ITS) located in Boulder, Colorado and also served as the Technical and Operations Manager for the Public Safety Communications Research (PSCR) program. The PSCR program serves as an objective technical advisor and laboratory for public safety practitioners to accelerate the adoption and implementation of the most critical public safety communication standards and technologies.

Mr. Bratcher began his Federal service with NTIA/ITS in 2003 and received the Department of Commerce Gold Medal award in 2006 and Silver and Bronze Medal awards in 2011 for his efforts related to Public Safety communications research and development within the PSCR program.

Prior to joining Federal service, Mr. Bratcher worked for 10 years in the private sector at Motorola Cellular and Siemens Mobile in their respective field deployment engineering teams. Mr. Bratcher supported and led engineering teams that launched the first CDMA and GSM based digital cellular and broadband systems in domestic and international markets. Mr. Bratcher grew up in Artesia, New Mexico, is married to Michele Bratcher and has a young son and daughter, Dylan 10 and Jadyn 7.

Mr. Bratcher received his Master's of Science in Telecommunications from Southern Methodist University and a Bachelor's of Science in Electrical Engineering from Texas Tech University.

Nada Golmie, PSCR

Nada Golmie received her Ph.D. in Computer Science from the University of Maryland at College Park. Since 1993, she has been a research engineer in the advanced networking technologies division at the National Institute of Standards and Technology (NIST). She is currently the manager of the emerging and mobile network technologies group. Her research in media access control and protocols for wireless networks led to over 100 technical papers presented at professional conferences, journals, and contributed to international standard organizations and industry led consortia. She is the author of



"Coexistence in Wireless Networks: Challenges and System-level Solutions in the Unlicensed Bands," published by Cambridge University Press (2006). She is a member of the NIST Public Safety Communication Research program and leading the efforts on the simulation modeling and evaluation of LTE in support of public safety communications. She is the editor of IEEE Journal on Selected Areas in Communications Smart Grid series.

Richard Rouil, PSCR

Richard Rouil is a researcher working at the National Institute of Standards and Technology (NIST). He holds a Ph.D. in Computer Science from Telecom Bretagne, France (2009) that focused on mobility in heterogeneous networks. His main interests include modeling and simulation of wireless networks such as LTE and WiMAX. His current research focuses on the performance evaluation of LTE to support the deployment of networks used by Public Safety.

Daniel Cotter, DHS OIC

Dan has been with the DHS S&T First Responders Group, since October 2012. Prior to accepting this position, he was the DHS Chief Technology Officer. He also served as the DHS Geospatial Management Officer from 2005 to 2007.

Dan's private sector experience includes acting as the geospatial information technologies manager for a leading engineering firm, as the President of an airborne Light Detection and Ranging (LIDAR) company, and as vice president of a flood zone determination firm. His prior public sector experience includes twelve years with the Federal Emergency Management Agency. Dan is a Fellow of the American Association for the Advancement of Science and a recipient of the FEMA Director's Distinguished Service Award.

Dan holds a M.B.A. from Texas A&M University, and a M.S. in Geographic and Cartographic Sciences from George Mason University.

Admiral Ronald Hewitt, DHS OEC

Ronald T. Hewitt assumed the duties as Director of the Department of Homeland Security's Office of Emergency Communications on November 13, 2012. In this role, Mr. Hewitt plays a critical role for ensuring continuous, interoperable communications that support the Federal Government's mission essential functions and all the Nation's emergency responders to keep America safe, secure and resilient.

Prior to becoming the OEC Director, Mr. Hewitt served for six months as the Director and Deputy Manager of the National Communications System (NCS), a consortium of 24 Federal Departments and Agencies responsible for National Security/Emergency Preparedness (NS/EP) communications.

Before his arrival to the NCS, Rear Admiral Hewitt served as the U.S. Coast Guard's Assistant Commandant for Human Resources. Rear Admiral Hewitt's other career assignments include Project Manager for "Rescue 21," and the Marine Information for Safety and Law Enforcement (MISLE); Commanding Officer, Electronics Support Unit Boston; Executive Officer, Communications Area Master Station Pacific, Project Engineer at the Omega

Navigation Systems Center, Electronics Engineering Center in Wildwood, New Jersey and Operations Officer on the USCGC BITTERSWEET.



Mr. Hewitt, a native of Oregon, is a 1978 graduate of the U.S. Coast Guard Academy with a Bachelor of Science Degree; as well as a 1982 graduate of Purdue University with a Master of Science Degree; both degrees in Electrical Engineering. In 2000, he received a Master's Certificate in Information Technology Project Management from The George Washington University and is a certified Project Management Professional.

Keil Green, DHS OEC Support

Keil Green is a Consultant with Lafayette Group who currently supports the Department of Homeland Security's Office of Emergency Communications (OEC) and has spent the last decade working on behalf of DHS on the interoperability issue. Mr. Green supported the establishment of the Interoperable Communications Technical Assistance Program (ICTAP) in 2003, and has since helped coordinate ICTAP's work with public safety agencies in all 56 States/Territories. Mr. Green was fundamental in the design and implementation of a number of major DHS initiatives including the Tactical Interoperability Initiative, the National Emergency Communications Plan (NECP) Goals validation, and the Public Safety Interoperable Communications Grant Program (in cooperation with the Department of Commerce). Over the last two years, Mr. Green has focused on public safety broadband and has led DHS workshops with over twenty States on the broadband/FirstNet issue. Prior to his support for the Federal government, Mr. Green served as the program lead for a number of State and local law enforcement technology implementations focusing on biometric technology and mobile data deployments. Mr. Green previously supported the Domestic Policy Council at the White House as a post graduate scholar focusing on crime and drug policy. He is a graduate of the University of the South.

Dave Buchanan, FirstNet

David Buchanan is the Director of State Consultation for the First Responder Network Authority. Dave is leading the team that is developing the FirstNet State Consultation program, which includes a variety of activities and deliverables for FirstNet and the 56 states and territories. State consultation is a statutory requirement under the Middle Class Tax Relief and Job Creation Act of 2012, the law that established FirstNet, to ensure that the needs of public safety across the diversity of agencies and areas of the country are met. Dave has worked with first responders since 1999, with previous jobs at NTIA Office of Public Safety Communications and the Department of Justice COPS Office.

Rich Reed, FirstNet

As Director of State Plans, Mr. Reed is responsible for leading the planning team that will provide support to the nation's 56 states and territorial governments. Based on the output of state consultations, Mr. Reed's team will develop and deliver individual state plans to each governor for consideration, prior to implementing the National Public Safety Broadband Network (NPSBN). Prior to joining FirstNet, Mr. Reed served the U.S. Department of Homeland Security (DHS) Office of Emergency Communications (OEC) as the branch chief for Technical



Assistance. There, he managed the Interoperable Communications Technical Assistance Program (ICTAP) along with the Modeling, Analysis and Continuity (MAC) Section, overseeing more than 100 project leads, engineers, software developers, and subject matter experts providing "no cost" consultations and services to public safety agencies across the nation. Mr. Reed is an experienced communicator. He brings more than 25 years of senior-level experience in advanced communications, and has an extensive background in Land Mobile Radio (LMR) and Satellite Communications (SATCOM) installation, maintenance and repair. During his time on Navy active duty, Mr. Reed experienced a uniquely diverse career, serving both sea and shore rotations as a search and rescue swimmer, and traveling with the presidential and vice presidential advance teams of the White House Communications Agency (WHCA).

Amanda Hilliard, FirstNet

Amanda joined the First Responder Network Authority (FirstNet) in January 2014 as its first Director of Outreach. In this capacity, Amanda oversees FirstNet's education and outreach efforts with the public safety community across all levels of government. Prior to joining FirstNet, Amanda worked at the Department of Homeland Security Office of Emergency Communications (OEC) for 6 years, initially as a Senior Consultant with Touchstone Consulting Group and then a federal employee, leading public safety stakeholder engagement and outreach and statewide planning efforts. She most recently served as the OEC Partnerships Branch Chief, overseeing the Office's engagement with key stakeholder groups at all levels of government such as SAFECOM, the National Council of Statewide Interoperability Coordinators, the Emergency Communications Preparedness Center, and the One DHS Emergency Communications Committee. The branch predominantly executed its mission through stakeholder meetings, the delivery of annual statewide planning workshops, and the development of emergency communications products. While working for Touchstone, Amanda also provided support to the Metro-Boston Homeland Security Region in implementing their Five-Year Strategic Plan for Communications Interoperability and to the Office of Management and Budget's Office for E-Government and Information Technology in implementing its Government to Government portfolio initiatives. Amanda holds a Bachelor of Science in Finance from the Pennsylvania State University. She is a certified Project Management Professional and Six Sigma green belt.

Ed Parkinson, FirstNet

As the FirstNet Director of Government Affairs, Edward Parkinson is responsible for intergovernmental relations with local, state and federal organizations. Previously, Mr. Parkinson served for five years as a Professional Staff Member for the House Homeland Security Committee, then chaired by Rep. Peter T. King of New York. During this period, Mr. Parkinson's primary responsibility was in the field of first responder telecommunications. He also worked on issues including border security, emergency preparedness, cybersecurity and investigations into waste, fraud and abuse of government resources. Previously Mr. Parkinson served as an associate at Kearsage Global Advisors, an advocacy firm, and a research analyst at McKenna, Long and Aldridge, an international law firm specializing in public policy.

Mr. Parkinson earned a BA and an Honors postgraduate degree in International Affairs from the University of the Witwatersrand in Johannesburg, South Africa. In 2012 he completed a Masters degree in Liberal Studies from Georgetown University with a focus on International Affairs.



Dr. Rob Stafford, PSCR

Dr. Stafford is one of the charter members of the LTE research program at PSCR. He is the principal architect of many of the RF infrastructure tests used in the program and has a background that ranges from instrumentation theory and precision RF metrology through propagation analysis and signal processing for software defined radios. Rob has done work in the fields of high speed time domain waveform metrology, voice over IP, cellular network discovery and RF signal processing techniques, as well as participating in standards bodies like the Internet Engineering Task Force and the IEEE 802 networking group.

Todd Bohling, PSCR

Todd Bohling is currently the Lab Operations and Technical lead with the U.S. Department of Commerce NIST Office of Law Enforcement Standards working on broadband initiatives and supporting the Public Safety Communications Research (PSCR) program. Mr. Bohling is responsible for the PSCR Lab Operations, which includes planning, design, configuration, and implementation of everything that is being tested or evaluated in the lab. Mr. Bohling also is the technical lead on a set of DHS projects that are related to LMR working with LTE. Mr. Bohling has over 30 years working in the field of wire line and wireless Telecommunications. He has worked at some of the largest telecommunication companies in the world, such as AT&T Bell Labs, Motorola, and Nokia Solutions Networks. Mr. Bohling has his Masters of Science in Computer Science from Illinois Institute of Technology and a Bachelor's of Science in Electrical Engineering Technology from DeVry University.

Tracy McElvaney, PSCR

Tracy started his career with Motorola in 1995 as an intern. Through 16 years at Motorola, Tracy worked in the areas of First Office Application and Deployment, System Integration, Inter-Vendor Verification, Outage Recovery and System Engineering. Tracy was recognized as a Distinguished Member of the Technical Staff in 2007 and received Outstanding Achievement Awards in 2000, 2006, 2007 and 2010. Tracy has considerable experience in the deployment of new technologies and has led deployment projects in North and South America as well as China, Japan, India, Thailand, Malaysia and Indonesia.

In 2011, Tracy transitioned to Nokia-Siemens Networks when they acquired the Motorola Networks Division. In his 3 years at NSN, Tracy worked in LTE System Engineering as the technical lead for a Japan LTE commercial trial, then transitioned into the North America team where he served as a technical lead in a VoLTE commercial trial.

Tracy joined PSCR in January of 2014. He is excited to be a part of the Public Safety Communications Research team and contributing to the significant research taking place at NIST.



Dr. Bob Johnk, PSCR

Bob Johnk received his Ph.D. degree in Electrical Engineering at the University of Colorado in 1990, where he specialized in electromagnetics, propagation, and antennas. Bob is currently an electronics engineer at the Institute for Telecommunication Sciences (NTIA/ITS) where he is engaged in public safety radio communications and mobile radio propagation research. Prior to joining NTIA/ITS in 2007, he was with the National Institute of Standards and Technology (NIST) in Boulder, Colorado for 17 years where he was the leader of the time-domain electromagnetic fields project. Bob has received best paper awards from the IEEE EMC Society, NIST, and NTIA. In 2011, Bob received a technical achievement award from the IEEE EMC Society in 2011 for his work "in the development of free-space time-domain measurement techniques". Bob holds both an extra class amateur radio license and a commercial general radiotelephone operator's license with ship radar endorsement. Bob enjoys spending time with his wife Loan (married for 35 years!) and sons, Kevin and Ben. Bob's favorite activity is taking walks with his wife in the beautiful Colorado sunshine.

Chris Redding, PSCR

Christopher Redding is an Electronics Engineer with the Institute for Telecommunication Sciences (ITS) where he has worked since 1990. He is currently working on the PSCR program where he has been involved in LTE testing to include test plan development, RF test and measurement, drive testing and data analysis. His past experience includes work in the areas of adaptive radio technology, IP applications over radio networks, cellular network discovery and LMR. Prior to joining ITS he worked at the National Security Agency where he was involved with the development of tactical secure voice systems. Chris holds a BS in Electronics Engineering Technology from Kansas State University.

Camillo Gentile, PSCR

Camillo Gentile received his Ph.D. degree from the Pennsylvania State University, University Park, Pennsylvania in Electrical Engineering. His doctoral work concentrated on computer vision and neural networks. He has been a researcher in the Advanced Network Technologies Division at the National Institute of Standards and Technology (NIST), Gaithersburg, Maryland since 2001. In the past he has worked on mobile ad-hoc network (MANET) routing and geolocation systems. His current interests include radio-frequency channel modeling, the Smart Grid, LTE, and millimeter-wave telecommunications.

Nelson Hastings, PSCR

Nelson Hastings is a member of the Public Safety Communications Research (PSCR) program team organizing and leading their security research and testing efforts. Located in Gaithersburg, he has been part of the Computer Security Division in the Information Technology Laboratory at NIST for the past 15 years. Before joining the PSCR efforts, he was the Technical Lead of the NIST Voting Program while leading the program's computer security efforts. He also co-chaired the Cyber Security Working Group's Testing and Certification sub-group of the Smart Grid Interoperability Panel. In addition, he has worked in the areas of public key infrastructure and the cryptographic module validation (FIPS 140-2) program.

Dr. Hastings received his Ph.D. in Computer Engineering from Iowa State University, M.S. in Electrical Engineering from Western Michigan University, and B.S. degrees in Electrical Engineering and Computer Engineering from the University of Missouri-Columbia.



Alex Kreilein, DHS OEC

Alex Kreilein joined the Department of Homeland Security's Office of Emergency Communications as a Technology Policy Strategist in July of 2011. He is currently detailed to the National Institute of Standards and Technology at the Public Safety Communications Research Program at the US Department of Commerce Boulder Labs. Mr. Kreilein provides expert management, guidance, and support on issues pertaining to public safety and national security communications networks, cybersecurity policy, network risk analysis, and mobile applications strategy. He was previously a Legislative Assistant to Congresswoman Jane Harman. Mr. Kreilein graduated from Fordham University, attended the University of International Business and Economics in Beijing, China, and holds a M.A. from the U.S. Naval War College in National Security & Strategic Studies. He is currently a candidate for a M.S. at the CU Boulder Interdisciplinary Telecommunications Program.

Traviss Green, Lockheed Martin Corporation

Traviss currently manages the design, deployment and sustainment of emerging technology solutions for focus and priority programs and most recently was the special projects lead for a customer that manages the largest public engineering, design, and construction support agency in the world. He has led award-winning technology implementations, industry-recognized production service offerings, and supported a list of corporate focus and priority programs across the intelligence community, department of defense and civilian environments.

Throughout his professional career, he was selected for multiple special recognition awards (SRA) acknowledging his demonstration of technical excellence, earned the designation as a Modern Day Technology Leader (MDTL) - Black Engineer of the Year Award (BEYA) by the Career Communications Group, and was a two-time recipient of both the Celebration of Excellence (COE) and the prestigious NOVA Award for Leadership Excellence – the company's highest honors awarding technical achievement.

Currently, he is the appointed advisor for Science, Technology, Engineering, & Mathematics (STEM) Innovation for Prince George's County Executive, Rushurn L. Baker III and actively volunteers at his alma mater, Bowie State University, as a Board Member with the College of Arts and Sciences and Board Chair for the College of Education.

Theodora Titonis, Veracode

Theodora Titonis' passion for technology began when she started programming computers at the age of seven. While pursuing computer science at The Ohio State University she focused on the challenging field of security. By 2009, Theodora built a multi-million dollar security company providing expertise to federal government defense and intelligence agencies, leading financial institutions and Fortune 500 Companies.

In 2010, Theodora founded Marvin Mobile Security, launching revolutionary machine

learning technology to protect enterprises from the threat of risky and malicious mobile apps. Marvin Mobile was launched at TechCrunch Disrupt in September 2011 and was acquired by Veracode, the leader in application security, in September 2012. Ms. Titonis now serves as Veracode's Vice President of Mobile.



Dr. Joel Dumke, PSCR

Dr. Dumke earned his Ph.D. in Electrical and Computer Engineering from Purdue University in 2010. He specialized in digital imaging and his research focused on automatic image segmentation. He then took a position at the Institute for Telecommunication Sciences, an agency of the US Department of Commerce. Since the spring of 2011, he has been the leader of the Public Safety Video Quality project.

Dr. Patrick Gallagher, Department of Commerce

Dr. Patrick Gallagher was confirmed as the 14th Director of the U.S. Department of Commerce's National Institute of Standards and Technology (NIST) on Nov. 5, 2009. He also serves as Under Secretary of Commerce for Standards and Technology, a new position created in the America COMPETES Reauthorization Act of 2010. Prior to his appointment as NIST Director, Gallagher had served as Deputy Director since 2008.

Gallagher provides high-level oversight and direction for NIST. The agency promotes U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology. NIST's FY 2014 resources total \$850.0 million in direct appropriations, an estimated \$47.3 million in service fees, and \$107.0 million from other agencies. The agency employs about 3,000 scientists, engineers, technicians, support staff, and administrative personnel at two main locations in Gaithersburg, Md., and Boulder, Colo. NIST also hosts about 2,700 associates from academia, industry, and other government agencies, who collaborate with NIST staff and access user facilities. In addition, NIST partners with more than 1,300 manufacturing specialists and staff at more than 400 MEP service locations around the country.

Under Gallagher, NIST has greatly expanded its participation, often in a leadership role, in collaborative efforts between government and the private sector to address major technical challenges facing the nation. NIST's participation in these efforts stems from the agency's long history of technical accomplishments and leadership in private-sector led standards-development organizations and in research fields such as manufacturing engineering, cyber security and computer science, forensic science, and building and fire science. Currently, he co-chairs the Standards Subcommittee under the White House National Science and Technology Council.

Gallagher joined NIST in 1993 as a research physicist and instrument scientist at the NIST Center for Neutron Research (NCNR), a national user facility for neutron scattering on the NIST Gaithersburg campus. In 2000, he became group leader for facility operations, and in 2004 he was appointed NCNR Director. In 2006 the U.S. Department of Commerce awarded Gallagher a Gold Medal, its highest honor, for his leadership in interagency coordination efforts.

Gallagher received his Ph.D. in physics at the University of Pittsburgh and a bachelor's degree in physics and philosophy from Benedictine College.



Bill Krimmel, DHS

William (Bill) Krimmel serves as the Branch Director/Program Manager for the Department of Homeland Security (DHS) Joint Wireless Program Management Office (JWPMO) in Chantilly, VA. He supervises the department to ensure that all mission critical priorities are accounted for and delivered on time. Also fills the role of the Acquisition Program Manager (PM) to the DHS Tactical Communication Network (TacNet) Program (Level 1).

Gary Ruegg, Interop Solutions, LLC

Gary Ruegg is the CEO and Managing Partner Interop-Solutions, LLC. He has also held the following positions: Executive Director, Metro Area Transit, Omaha, NE; Director, Transportation Systems, SAIC; Design and implementation of DOT Commercial Vehicle Weigh Station By-Pass; President, AMCI. Mr. Ruegg's background includes design and implementation of 900MHz data-radio system across North America for United States Rail Industry, and design and implementation of Positive Train Control on-board locomotive data control system for rail operations. Mr. Ruegg also was the Director of Advanced Train Control Systems, UPRR and was responsible for design and implementation of on-board data terminals and digital locomotive control interface. Mr. Ruegg received his BS in Economics at the University of Maryland and is a Licensed Locomotive Engineer.

Per Johansson, MaXentric Technologies, LLC

Per Johansson is VP of Engineering at MaXentric Technologies, LLC responsible for traffic management of data and telecommunication networks. Formerly, he was Principal Development Engineer at Calit2 (California Institute for Telecommunications and Information Technology, UC San Diego), heading the Wireless Networking Research group. From 1991-2006 he held several research staff positions at Ericsson Corporate Research both in Sweden and in the US, and brings with him more than 20 years of telecommunications research experience. His expertise stretches from traffic management and performance analysis of data and telecommunication networks, to wireless multi-access and multi-hop radio networking technologies. Mr. Johansson also served on several Standards and Industry organizations (ATM Forum and Bluetooth SIG). Mr. Johansson has a M.Sc. EE, -91, and a Tekn. Lic. EE -98, both from Lund Institute of Technology, Lund, Sweden. He has four issued US Patents. Mr. Johansson is the recipient of the Fred W. Ellersick Prize (formerly the Communications Society Magazine Prize Paper Award) for "Bluetooth: an Enabler for Personal Area Networking", IEEE Network Magazine, Sept/Oct 2001 and has published over 25 papers in referred journals and conference papers.

David Pedersen, Elbit Systems

David Pedersen is the Director of Business Development for Elbit Systems of America's C4I Product Line for the Sensor's and Fire Control Division, specializing in communications products. He is assisting with the Homeland Security (HLS) Product Line which is complimentary to his experience in military communications. The recent Integrated Fixed Towers (IFT) award to ESA has required shared resources from C4I to support Land Mobile Radio (LMR) P25 and Long-term Evolution (LTE) fusion initiatives to provide the next

generation public safety and first responder communications technology demonstrator.



Mr. Pedersen represents all communications products such as radios, modems, advance data links, High Power Amplifiers (HPA), and computers for Elbit Systems of America (ESA). Prior to working for ESA, Mr. Pedersen served as RF Group Lead, Systems Engineering Manager, Director of Engineering, General Manager, and Director of Business Development for Allied Signal, Northrop Grumman, Andrew Corporation and Herley Industries respectively.

He received his BS degree in Electrical Engineering from Syracuse University in 1981 and his MS degree in Electrical Engineering from The Johns Hopkins University in 1985.

Andrew Catellier, NTIA ITS

Andrew Catellier works as an electronics engineer for the Theory division of the Institute for Telecommunication Sciences (ITS) in Boulder, Colorado. Mr. Catellier has worked for ITS since 2006 and conducts research concerning the delivered quality of audio, video, and multimedia streams, whether assessed by humans or objectively by machines, as well as research concerning speech coding. He also conducts speech intelligibility research for the Public Safety Communications Research (PSCR) program. The PSCR program is a joint effort with the National Institute of Standards and Technology (NIST) Office of Law Enforcement Standards (OLES) and serves as an objective technical advisor and laboratory for public safety practitioners to accelerate the adoption and implementation of the most critical public safety communication standards and technologies. Andrew earned a Bachelor's of Science and a Master's of Science in Electrical Engineering from the University of Wyoming.

Steve Voran, NTIA ITS

Stephen Voran received the MSEE degree from the University of Colorado in 1989. He has been with the Institute for Telecommunication Sciences in Boulder, Colorado since 1990. His research there has been in the areas of signal processing applications to quality assessment, coding, transmission, and enhancement of speech and audio signals. He has published numerous technical reports and papers on those topics.

Jonathan Cook, PSCR

Jonathan Cook is an Electronics Engineer in the Communications Technology Laboratory at the National Institute of Standards and Technology (NIST). Mr. Cook has been with PSCR for three years where he has been developing and performing tests on Radio Access Network (RAN) equipment including both small cells and macro cells. He has been working with 2G, 3G and 4G telecommunications equipment for the past 16 years and he has over 30 years of experience in radio frequency testing and development.

Dharmesh Tyagi, Nokia Networks

Dharmesh Tyagi has been working in the wireless industry for last 18 years, where he has taken various management and engineering roles with major wireless companies. Over the course of his career, Dharmesh has been involved in the building of countrywide broadband

networks for commercial carriers and DoD/Federal and Public Safety networks around the globe. Dharmesh in his current role at Nokia Networks is responsible for FirstNet PSBN initiative development and support.



David Gross, Global Wireless Technologies

David Gross has been with Global Wireless Technologies (GWT) for the past 8 years, most recently in the role of Director of Product Marketing. He has obtained an MBA and MA in Government Studies from Johns Hopkins University, and a Bachelors degree from SUNY Binghamton. He grew up in Northern New Jersey but please don't hold that against him if you are so inclined.

Anna Paulson, PSCR

Ms. Paulson started her career in Telecommunications as a Multichannel Transmission Systems Operator (31R) for the 10th Signal Battalion of the U.S. Army's 10th Mountain Division. After leaving the Army, she worked as a Network Technician for Broadwing Communications (a high capacity network provider) while earning her Bachelor of Science in Electrical Engineering at the University of Colorado-Denver. After graduation, Ms. Paulson worked at Avaya Communications before being hired as an Electronics Engineer at the Institute for Telecommunication Sciences (ITS) at the Department of Commerce Labs in Boulder, Colorado. At ITS, she works exclusively for the Public Safety Communications Research program (PSCR). Outside of work, Ms. Paulson is pursuing a Master of Science degree via the Interdisciplinary Telecommunications Program at the University of Colorado-Boulder.

Heather Kowalski, DHS OEC

Ms. Heather Kowalski became the Director, Communications Portfolio Management Branch, with the merger of the National Communications System (NCS) and (OEC). In this role, she leads the OEC acquisition of critical national communications tools designed to assist State, Local and Federal governments communicate during the nation's disasters, natural or man-made. Managing a portfolio in excess of \$80 million, she coordinates between Department of Homeland Security (DHS) and other Federal, State, Local and private sector partners on the advancement of technologies, the resiliency of the nation's communications infrastructure and represents the national security and emergency preparedness (NS/EP) communications interests before international standards setting bodies.

Prior to joining the NCS, Ms. Kowalski served as a Senior Systems Architect, a Strategic Consultant and an Information Assurance/IT Security Expert with several Defense and Homeland Security contractors. Additionally, she led several efforts and developed capabilities to improve the nation's ability to respond to and recover from all disasters including serving as the Chief Information Security Officer and Information System Security Manager within the United States Citizenship & Immigration Services. In this role, she was instrumental in managing over 200 domestic sites, 20 international sites and 100 systems that were critical in ensuring the nation had the proper information technology capabilities to manage immigration and citizenship matters.

Ms. Kowalski has contributed to several publications, including the American Bar Association's *Implementation and Science & Technology* and the *Roadmap to an Enterprise*

Security Program (ISBN 1-59031-501-4). She also was a contributing member to the President's National Security Telecommunications Advisory Committee's Financial Services Task Force.



PSCR

She holds a Masters in Science in Information System Manager from Carnegie Mellon University, Pittsburgh, PA and a Masters in Business Administration (MBA) from the University of Hartford-Paris, France/Hartford, CT and a Bachelors of Arts in Western European Studies from Wells College, Aurora, NY. She's a member of Project Management Institute and the International Information Systems Security Certification Consortium. She has earned and maintains her Certified Information Systems Security Professional-Information Systems Security Management Professional (CISSP-ISSM P) and Program Management Professional certifications.

Barry Luke, NPSTC

Barry Luke works with the National Public Safety Telecommunications Council (NPSTC) which is a federation of 15 organizations that advocate for public safety communications spectrum, interoperability and technology issues. He currently supports NPSTC's public safety broadband requirements work groups. He is recently retired from the Orange County (Florida) Fire Rescue Department where he served as a Deputy Fire Chief coordinating public safety communications and technology systems for 49 fire stations in the central Florida area. Chief Luke is a Life Member of APCO International and started his career as a dispatcher with the Gainesville Police Department in 1974 at age 15. He has also worked as a police officer, firefighter/paramedic, and flight medic.

Steve Devine, Missouri Department of Public Safety

Stephen Devine is the Assistant Director of the Missouri Statewide Interoperability Network. His duties consist of working on radio technology issues, Project 25 compliance and spectrum management as associated with the network and public safety interoperability in Missouri. Stephen has been involved in all aspects of public safety communications for over 25 years and is a member of the APCO Broadband Committee, Vice Chairperson of the National Regional Planning Council and a member of the Project 25 Board and Directors. Stephen has most recently served as lead or participated in several NPSTC working groups addressing public safety communications and most recently identifying criteria associated with public safety mission critical voice, PTT over LTE and the definition of Public Safety Grade of Service in a broadband environment. Stephen resides in Jefferson City, Missouri.

Gino Scribano, Motorola Solutions

Gino Scribano is a Motorola Solutions Fellow. His current work is focused on developing public safety broadband solutions and industry outreach.

His career with Motorola has spanned 24 years; the last 5 years have been in the public safety broadband business, and prior years with the former Motorola cellular infrastructure business. In the cellular infrastructure business, Gino contributed to the development of base-station and speech transcoding products for LTE, CDMA, PDC, and GSM technologies. He also contributed to the development of a voice processing platform for the Iridium® satellite communication network.

Gino is a member of Motorola's Science Advisory Board, holds 10 U.S. Patents, and has been awarded the Motorola title of *Dan Noble Fellow* in recognition of leadership in technological innovation. Gino holds a Bachelor of Science degree in Electrical Engineering from the Illinois Institute of Technology.



Wim Brouwer, Alcatel Lucent

Wim has more than 30 years experience in telecommunications, and is responsible for the public safety LTE end-to-end architecture. In this role he works with the individual products to assure the needs of public safety are incorporated. He works with FirstNet as well as public safety customers to drive the nationwide public safety network forward. He also works closely with the National Institute of Science and Technology (NIST). Wim was a member of the Interconnectivity Infrastructure Group established to define interoperability between the various waiver networks, and was a subject matter expert on the FCC Technical Advisory Board for First Responder Interoperability. Wim is also a member of APCO and has served on several APCO Broadband subcommittees.