

**VISITING COMMITTEE ON ADVANCED TECHNOLOGY (VCAT)
MINUTES OF THE OCTOBER 7-8, 2014 MEETING
BOULDER, CO**

ATTENDANCE:

**Visiting Committee
Members Attending**

Brooks, Rodney
Chand, Sujeet*
Chowdhry, Uma*
Colwell, Rita*
Haymet, Tony
Holt, William
Padovani, Roberto
Romig, Alton D.
Solomon, Darlene

VCAT Exec. Dir.

Lellock, Karen

NIST Leadership Board

Boehm, Jason
Celotta, Bob
Dimeo, Robert
Fangmeyer, Robert
Harary, Howard
Kayser, Rich
Kimball, Kevin
Locascio, Laurie
May, Willie
Olthoff, Jim
Porch, Susanne
Rochford, Kent
Romine, Chuck
Royster, Cecelia
Salber, Stephen
Saunders, Mary
Schiller, Susannah
Singerman, Phillip*
Wixon, Henry

NIST Staff

Arrisueno, Gladys
Averill, Jason
Barbosa, Nick
Briggman, Kim
Copello, Brian
Diddams, Scott
Evans, Heather
Fekete, Jim
Frechette, Simon*
Gebbie, Katharine*
Goldstein, Barbara
Grove, Tom
Jonathan Hardis*
Holbrook, Dave*
Holtzman-Bell, Virgin
Janezic, Mike
Jillavenkatesa, Ajit
Kelley, Mike
Levine, Judah
Lezec, Henri*
Lofquist, Mark
McElvaney, Tracy
Miner, Laurel
Orr, Dereck
Ost, Laura
Porter, Gail
Possolo, Antonio*
Remley, Kate
Ringen, Sonja
Scholl Matthew
Shaw, Stephanie
Skillicorn, Alan
Wang, Chin-Ming (Jack)
Yoon, Howard

Others

Nelson, Eric, NTIA
Prafullchandra, Hemma,
HyTrust Inc.
Swenson, Sue, FirstNet
Taylor, Thomas, DoD

*Participated Remotely

Tuesday, October 7, 2014

Call to Order – Dr. Tony Haymet, VCAT Chair

Dr. Haymet called the meeting to order at 12:00 p.m. and pointed out the emergency exits. Dr. Haymet introduced the new VCAT Executive Director, Karen Lellock and invited guest Hemma Prafullchandra, CTO of HyTrust, Inc. Hemma is nominated to serve on the VCAT and is moving through the vetting and review process. Dr. Haymet congratulated Dr. Willie May on his nomination to serve as the Undersecretary of Commerce for Standards and Technology. He concluded his remarks by outlining the schedule for the remainder of the meeting.

OVERVIEW AND SAFETY

NIST Update and Agenda Review – Dr. Willie E. May, Acting Under Secretary of Commerce for Standards and Technology and Acting NIST Director

Presentation Summary: Dr. May provided information on a number of organizational updates, research activities and staff accomplishments. He summarized the current budget requests for NIST. The President's request for NIST is \$900 million, that's up about \$50 million or so over the past year. The Senate mark is at \$900 million and the House mark is around \$856 million, which would be \$6 million roughly over this year. NIST is currently operating under a continuing resolution that runs through December 11th.

Dr. May updated the VCAT on several of his priorities including filling key vacancies in the Physics and Engineering Laboratories, the Associate Director for Laboratory Programs, the Director of the Manufacturing Extension Partnership program, and the Director of the Standards Coordination Office. Dr. May selected Howard Harary to serve as Director of the Engineering Laboratory and Jim Olthoff will fill the position of Director of the Physics Laboratory. Formal vacancy announcements for the other positions will be posted in the coming months.

Dr. May highlighted several awards given to NIST scientific and technical staff. He also shared information about the performance of NIST's Net-Zero Energy House that was able to achieve net-zero over the course of the first year and will now be used to test various energy efficient technologies. He also highlighted the Megacities project, a collaboration with NOAA, NASA, and a number of other organizations where NIST providing the measurement technology to allow urban environments to determine the total of burden for a given locality but also to investigate sources and sinks.

Dr. May provided a brief update on the MEP program which is focusing on a pilot effort to re-compete the MEP system by starting with 10 states to rebalance investments in the individual centers. Also highlighted were the National Network of Manufacturing Institutes (NNMI) and the continued support for the Institutes from DOE and DOD. NIST has the statutory responsibility to coordinate the network and the Secretary of Commerce is interested in a commerce-supported Institute. NIST is continuing to work with the Secretary on options for supporting one in light of not having funds directly appropriated for an Institute.

NIST is continuing to support dedicated Centers of Excellence focused on partnering with external stakeholders, usually led by a university, to quickly develop competencies needed to carry out the NIST mission in certain areas. The first one was awarded about a year ago, the CHiMaD, Center for Hierarchical Materials by Design in Chicago is led by the University of Chicago, Northwestern University,

and Argonne National Laboratories. This year NIST received additional funding in FY14 to stand up two additional centers of excellence. The focus of these two centers will be disaster resilience and forensic science.

Dr. May also describe NIST activities, partnerships, and collaborations focused on supporting a National Commission of Forensic Sciences, a National Cybersecurity Center of Excellence (NCCOE), Cyber-Physical Systems Global City Teams Challenge, NFL Head Health Challenge, and the NIST Science & Technology Entrepreneurship Program

Dr. May concluded his presentation by focusing on a few operational initiatives focused on improving the efficiency of internal operations including, acquisitions, agreements, human resources, legal services , and human subjects research review process.

Discussion: The group discussed the following topics:

- The scope of the National Commission of Forensics;
- The focus of the National Cybersecurity Center of Excellence;
- How will the Cybersecurity Framework address compliance

For more information, see Dr. May's [presentation](#).

Safety Update – Richard Kayser, Chief Safety Officer

Presentation Summary: With regard to safety metrics, Dr. Kayser reviewed NIST's actual number of Occupational Safety and Health Administration (OSHA) recordable and Days Away, Restricted, or Transferred (DART) cases from FY 2011 – FY 2014, emphasizing that both metrics have decreased over this time period. Most of NIST's OSHA recordable and DART cases continued to be due to slips, trips, and falls.

Dr. Kayser updated the VCAT on the initial findings of the NIST safety climate survey that was conducted based on the VCAT's recommendation. The survey was conducted over the summer and received an overall response rate of 60%. More in-depth analysis of the data are planned but a few highlights were presented including, improvements in employee's understanding of their safety and health responsibilities and the sentiment that managers at all levels of the organization recognize the importance of safety. The survey also identified a number of opportunities for improvements including, safety training effectiveness and communication of safety related resources. A full analysis of the survey findings will be conducted and recommended actions will be presented to NIST senior leaders in the coming months. Plans for communicating the results to staff are also underway.

Discussion: The group discussed the following topics:

- Growing evidence of the safety culture getting into the "DNA" of the organization;
- Need for continued analysis of the slips, trips, and falls incidents to determine opportunities for improvement;
- Importance of ergonomics in the consideration of employee safety and health.

For more information, see Dr. Kayser's [presentation](#).

CRYPTOGRAPHIC REVIEW

NIST's response to VCAT Recommendations, Anticipated Actions – Chuck Romne, Director Information Technology Laboratory

Presentation Summary: Dr. Romine updated the VCAT on the actions and planned next steps related to the recommendations the VCAT outlined in their July 2014 report, [NIST Cryptographic Standards and Guidelines Development Process](#). He summarized the VCAT recommendations and highlighted NIST actions to date.

Actions to date in the area of Openness and Transparency:

- Draft of NIST IR 7977, *NIST Cryptographic Standards and Guidelines Development Process*
- Public posting of all released materials
- Public posting of Committee Of Visitors Review briefing materials
- Open discussions on the issue, the VCAT Report, and NIST actions, to multiple stakeholders for awareness and input

Actions to date in the area of Independent Strength/Capability:

- New hires, guest researchers, and faculty appointments in the Cryptographic Technology Group
- Creation of Washington DC-Area Cryptographic Group
- Strengthen the pipeline of staff and engagements

Actions in the area of Clarification of Relationship with NSA:

- All NSA contributions to NIST guidance will be acknowledged
- NIST / NSA Memorandum of Understanding (MOU) publicly posted
- Initial introduction and discussion with new Director of NSA and NIST Director held
- Re-evaluation of the parameters of the current NIST / NSA MOU (in progress)

Actions in the area of Technical Work, Development and Processes:

- Removal of Dual_EC_DRBG from Draft SP 800-90A
- Initiated internal review of NIST cryptographic reference materials
- Re-engineering the configuration management and cryptographic development processes, with input from the NIST Standards Coordination Office

Dr. Romine also highlighted additional actions to continue to strengthen capabilities with new hires and guest researchers, improve communication and outline process improvements in tools and training.

Discussion: The group discussed the following topics:

- Suggestions for expanding the membership of the Cryptography group to include participants beyond universities;
- How to measure progress in this area to assess the impact of the changes made;
- Suggestion that the actions and updated presented be captured in a written document to be shared with the Committee of Visitors.

For more information, see Dr. Romine's [presentation](#).

DISASTER RESILIENCE PLAN

Overview of Disaster Resilience Plan Changes, Framework, and Community Resilience Center of Excellence – Jason Averill, Acting Division Chief, Materials and Structural Systems Divisions, Engineering Laboratory

Presentation Summary: Dr. Averill updated the VCAT on the discussions that began in the February and June 2014 meetings related to NIST's responsibilities and activities in support of disaster resilience. He provide an overview of activities in several areas including: Organizational Changes to Strengthen the Disaster & Failure Studies Program (D&FSP), the Disaster Resilience Framework, the Resilience Fellows Program, and the Community Resilience Center of Excellence (COE). Organizational changes, including the creation of a new Community Resilience Group will bring together the work to implement the framework with the research program to ensure that there is a strong scientific basis to our community resilience efforts and continues support for D&FSP. The Disaster Resilience Framework will provide a conceptual structure and educational tool that indemnifies mature standards and recommends best practices. The initial development of the framework has involved substantial stakeholder engagement. The Community Resilience Fellows program is new and involves having a set of experts in certain areas work with NIST. The first set of Fellows includes 9 individuals which will be directly engaged with the development of the framework to ensure that we have something that is a world-class product. Through the Community Resilience COE, NIST will develop collaborations focused on developing competencies in Computational Modeling Environments, Data Management Tools and Field Studies supporting community resilience. NIST anticipates award decisions for the Community Resilience COE by the end of December 2014.

Discussion: The group discussed the following topics:

- The need for cost considerations around the framework recommendations to allow decision-makers to make informed decisions about implementing specific recommendations;
- The role of other federal agencies in the broader Disaster Resilience Framework;
- How to measure or test the models being developed against real world type applications.

For more information, see Dr. Averill's [presentation](#).

HEALTHY NIST: RECRUITING, TRAINING, AND RETAINING SCIENTIFIC AND TECHNICAL TALENT

Dr. May opened this session by introducing the most recently announced NIST fellows. Three of the fellows, Scott Diddams, Antonio Possolo, and Henri Lezec provided insights into why they originally came to NIST, why they stay, and what NIST can do to continue to attract and retain high quality researchers.

Current Landscape: NIST Scientific Personnel Trends and Demographics; Existing Personnel Authorities and Policies; Existing Authorities of Other Scientific Agencies –Susanne Porch, Director, Office of Human Resources Management

Presentation Summary: After the Fellow's shared their experience, Ms. Porch presented information and data on the make-up of NIST's technical workforce in terms of occupation, positions, paybands, gender, education, and length of service. Ms. Porch posed three questions for consideration:

1. Is NIST still competitive for talent in terms of compensation?
2. How does NIST ensure we can recruit/develop the necessary talent to fill key management and leadership positions at NIST?

3. How does NIST ensure the right balance in skills to meet its core metrology mission and emerging national priorities?

Additional data and insights were provided to foster discussion around the questions.

Discussion: The group discussed the following topics:

- Suggestions for tracking data around acceptance rates for job offers and conducting a compensation study for comparable data points and developing a business case for change;
- Examples from the private sector on how retirement, retention and recruitment is handled;
- Consideration for NIST to outline what the workforce in 2018/2020 will be and identify what authorities or initiatives need to be in place to accommodate future workforce demands.

For more information, see Ms. Porch's [presentation](#).

October 8, 2014

ADVANCED COMMUNICATIONS

NIST's Programmatic Approach to Advanced Communications – Kent Rochford, Director, Communications Technology Laboratory

Presentation Summary:

Dr. Rochford provided an overview of NIST's newly created Communications Technology Laboratory (CTL) and highlighted three main priorities focused on the development of appropriate measurements and standards to:

- Enable robust, mission-critical, interoperable public safety communications
- Enable effective and efficient spectrum use and sharing
- Enable advanced communications technologies

Dr. Rochford highlighted the research programs and partnerships focused on supporting these priorities. In the area of public safety, Dr. Rochford identified the importance of interoperability to support first responders. NIST is committed to supporting the FirstNet mission and have been working to identify the technical requirements needed. The CTL has also developed a demonstration network to start validating standards. Dr. Rochford discussed the role of the Center for Advanced Communication (CAC), a joint initiative between NIST and the National Telecommunications and Information Administration (NTIA). With this effort, NIST will be bringing measurement science, statistical studies, and uncertainty analysis, to the modeling work of NITA to help support challenges around spectrum sharing. Through the National Advanced Spectrum and Communications Test Network (NASCTN), Federal, academic, and commercial test facilities will provide testing, modeling and analysis necessary to develop and deploy spectrum-sharing technologies and inform future spectrum policy and regulations. Dr. Rochford also discussed goals of other countries in developing 5G technologies and the work that CTL is doing in advanced communications and how it can support some of the key 5G technologies. Lastly, Dr. Rochford highlighted work with multiple-input/multiple-output antennas or MIMO that have the potential to create the most capacity but is fraught with measurement problems. Dr. Rochford closed his presentation with a discussion around the resources needed to fund the projects and his prioritization.

Discussion: The group discussed the following topics:

- Agreement about the need for an independent, impartial body that does modeling and measurements for coexistence issues while also looking forward to the new advanced technologies;
- How do you cooperate and collaborate with industry around various innovation and applications to support the core infrastructure;
- How do you conduct tests and develop standards to ensure systems work in real-world disasters and situations not just in predictability tests environments.

For more information, see Dr. Rochford's [presentation](#).

National Telecommunications & Information Administration (NTIA) Programmatic Approach to Advanced Communications – Eric Nelson, National Telecommunications & Information Administration (NTIA)

Mr. Nelson of NTIA's Institute for Telecommunication Sciences (ITS) provided a brief review of the history and long-term collaborations between NTIA and NIST. He highlighted the major research programs of NTIA that include: Radio propagation, modeling, Spectrum measurements, ITU-T and ITU-R studies, Audio, video and multimedia quality, Public Safety Communications, and Spectrum sharing. Mr. Nelson described the measurement, models and simulations NTIA is developing to support a new spectrum framework, including various partnerships and cross agency collaborations.

Discussion: The group discussed the following topics:

- Accolades for the long standing relationship between the two agencies;
- The need for a national initiative focused on government spectrum dependent systems, especially radar.

For more information, see Mr. Nelson's [presentation](#).

Stakeholder Perspective – Tom Taylor, DOD & Sue Swenson, FirstNet

Dr. Rochford introduced Sue Swenson, Chair of FirstNet and Tom Taylor of the CIO office within DOD. Ms. Swenson described the FirstNet organization that consists of a 15 person Board with representatives from federal, state and local entities and industry representatives along with about 100 staff that are a combination of federal employees, detailees and contractors. Together they are focused on creating a dedicated public safety network for first responders. Ms. Swenson highlighted the role of the Public Safety Communications Research Program (PSCR) and specifically the importance of the partnership with NIST in supporting the standards work.

Mr. Taylor described DOD's perspective on spectrum sharing that includes robust implementations that are validated through trusted tests. He emphasized the need for trusted measures and metrics that everyone can adopt because reallocating spectrum is not an option for the future it will be about optimizing an effective spectrum sharing system that supports all users. He highlighted the need to reduce redundancy in testing and an unbiased trusted environment for sharing information, increasing coordination, and validating accurate measurements. Mr. Taylor highlighted three use cases, 3.5 GHZ, Spectrum Sharing Determination, and "Model City," and outlined the issues/risks and solution requirements for each.

Discussion: The group discussed the following topics:

- The connection and relationship between DOD and FirstNet;
- Next steps to address the spectrum sharing issues;
- The timeline for roll out of FirstNet.

For more information, see Mr. Taylor's [presentation](#).

CLOSE AND ADMINISTRATIVE BUSINESS

There were no public comments offered.

The VCAT discussed the February 2015 meeting and potential topics to be included in the 2014 VCAT Annual Report.

Adjournment

The meeting was adjourned at 12:00 p.m. on October 8, 2014

I hereby certify that to the best of my knowledge, the forgoing minutes are accurate and complete.

Karen Lelock, Executive Director, NIST Visiting Committee on Advanced Technology

Dr. Tony Haymet, Chair, NIST Visiting Committee on Advanced Technology