

**VISITING COMMITTEE ON ADVANCED TECHNOLOGY (VCAT)
MINUTES OF THE JUNE 11-12, 2013, MEETING
GAITHERSBURG, MD**

ATTENDANCE:

**Visiting Committee
Members Attending**

Chowdhry, Uma
Haymet, Tony
Holt, William
Kerr, Karen
Khosla, Pradeep
Padovani, Roberto
Solomon, Darlene
Taub, Alan
Tracy, John

VCAT Exec. Dir.

Ehrlich, Gail

NIST Leadership Board/Designee

Boehm, Jason
Brockett, Del
Celotta, Bob
Dehmer, Joseph
Dimeo, Robert
Fangmeyer, Robert
Gallagher, Patrick
Harary, Howard
Jenkins, George
Kayser, Rich
Kelley, Michael
Kimball, Kevin
Locascio, Laurie
May, Willie
Porch, Susanne
Romine, Chuck
Salber, Stephen
Saunders, Mary
Singerman, Phillip
Sunder, Shyam
Wixon, Henry

NIST Staff

Acierto, Linda
Allocca, Clare
Arnold, George
Arrisueno, Gladys
Averill, Jason

NIST Staff Cont:

Ballou, Susan
Banghart, John
Banovic, Steve
Baum, Michael
Benner, Eric
Boettinger, William
Bonevich, John
Bubar, Eric
Cavanagh, Richard
Currens, Chris
Evans, Heather
Fasolka, Michael
Foecke, Timothy
Folk, Alex
Forry, Samuel
Gayle, Frank
Gebbie, Katharine
Gillerman, Gordon
Goldstein, Barbara
Guyer, Jonathan
Hacker, Christina
Hardis, Johnathan
Harris, Patricia
Herman, Martin
Herman, Michael
Hight-Walker, Angela
Huergo, Jennifer
Hughes, Colleen
Ibberson, Richard
Jillavenkatesa, Ajit
Jones, Al
Jones II, John Paul
Joy, Linda
Kauffman, Leah
Kilmer, Roger
Kushmerick, James
Lin, Eric
Liu, Rosa
Madrzykowski, Daniel
Migler, Kalman
Miner, Laurel
Olthoff, James
Parris, Reenie

NIST Staff Cont:

Pavelle, Kenneth
Phillips, Margaret
Richter, Curt
Schen, Michael
Schilling, Linda Beth
Schlatter, Katie
Schufreider, Jim
Shaw, Stephanie
Silver, Rick
Small, John
Sriram, Ram
St. Pierre, Jim
Stieren, David
Stolorow, Mark
Swanson, Marianne
Thorne, Roger
Vorburger, Theodore
Wagner, Catherine
Warren, Jim

Others

English, Bristol –
House Subcommittee on
Technology
Gallo, Marcy –
House Subcommittee on
Technology
Fox, Paul –
Microsoft Services
Lee, Vernon –
Microsoft Services
Mayfield, Harry –
Lewis-Burke Associates LLC,
Government Relations
Montgomery, Kim --
House Subcommittee on
Technology
Richmann, James –
Institute for Defense Analyses
Webber, Naomi –
Lewis-Burke Associates LLC,
Government Relations

Call to Order – Dr. Alan Taub, VCAT Chair

Dr. Taub called the meeting to order at 8:00 a.m. and pointed out the emergency exits. He requested that the VCAT members review the NIST Three-Year Programmatic Plan, FY 2014 – FY 2016, for a subsequent discussion.

Welcome and Agenda Review – Dr. Willie May, NIST Associate Director for Laboratory Programs and Principal Deputy

Presentation Summary – Dr. May reviewed NIST safety trend data through May 31, 2013, which is improving and noted that this data now reflects the number of recordable cases as requested by the VCAT. Turning to the budget, the NIST laboratories have received substantially increased funding since Fiscal Year (FY) 2006, with the exception of 2011, in recognition of NIST’s role in the nation’s innovation agenda; and the budget for the labs is approaching its ten-year doubling path. Dr. May also provided the proposed allocation of the FY 2013 program increases for the NIST labs totaling \$54 million, including \$20 million to restore core programs which have eroded over the last several years. He also summarized the FY 2014 program increases for the NIST labs totaling \$114 million, increases for the manufacturing external programs totaling \$41 million, and \$1 billion in one-time funding for the National Network for Manufacturing Initiative (NNMI). Internal planning processes have begun for the FY 2015 budget request. Lastly, Dr. May introduced Dr. Joe Dehmer, the new Director of the Physical Measurement Laboratory (PML), with past experience at Argonne National Laboratory, NIST, and the National Science Foundation.

For more details, see Dr. May’s [presentation](#).

Discussion – The group discussed the following topics:

- The effects and NIST strategies related to the FY 2013 budget recession and sequestration; and
- The VCAT’s request for the base funding levels associated with the FY 2013 and FY 2014 program initiatives as well as the FY 2012- FY 2014 funding levels of major buckets of baseline programs.

NIST Safety Update – Dr. Richard Kayser, NIST Chief Safety Officer

Presentation Summary – With regards to safety metrics, Dr. Kayser reviewed NIST’s actual number of the Occupational Safety and Health Administration (OSHA) recordable and Days Away, Restricted, or Transferred (DART) cases in FY 2012 and FY 2013 at the laboratory level and by support organization and emphasized that NIST has improved over last year. In response to the VCAT’s recommendations, NIST’s total injury cases and OSHA recordable cases for FY 2013 now includes all of NIST Operating Units (OU) and associates. This data indicates that associates have not been involved in many injury cases and none were associated with OSHA recordable cases.

Dr. Kayser described NIST’s recent actions in response to the VCAT’s recommendations to identify the top priority Incident Reporting and Investigation System (IRIS) issues, take actions to reduce their occurrence, and provide regular updates on progress. The top priority incidents resulting in 75% of all OSHA recordables are slips, trips, and falls; struck by / struck against; and overexertion. NIST is developing several strategies and tactics to reduce these incidents, including the integration of operational controls in the safety management system, for discussion with the NIST Executive Safety Committee in July. Each OU has identified a specific area for improvement as well.

In response to the VCAT’s recommendation for trained NIST senior executives to engage in “ground rounds,” NIST is implementing a “Shared Standard” of safety performance, whereby NIST has identified the most common safety issues and their solutions. These include housekeeping, general room

conditions, chemicals and waste, electrical safety, and work practices. NIST senior leaders will be trained on how to monitor these conditions.

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

Discussion – The group discussed the following topics:

- Associates are a crucial aspect of safety.
- Safety training for the new PML Director has been primarily by immersion, including safety data presentations and discussions at NIST senior leadership meetings and PML division chief meetings.
- NIST will continue to compare its safety data to other organizations but its goal will remain at zero accidents.
- NIST staff is committed to being safe; for example, the recent colloquium on laser safety was well attended.
- The VCAT commended NIST for its progress, and requested that NIST include IRIS injury data on the safety chart and provide a histogram on the time to close an IRIS case.

VCAT Discussion of NIST Three-Year Programmatic Plan, FY 2014 – FY 2016 – Dr. Alan Taub, VCAT Chair

The Committee provided comments in several areas of the NIST Three-Year Programmatic Plan, FY 2014 – FY 2015. The VCAT members asked about the status and expected impact of the Technology Transfer and Commercialization priority. Dr. Philip Singerman, Associate Director of Innovation and Industry Services, noted that NIST efforts in this area are significant and on-going and provided examples. He also described the role of the NIST Technology Transfer Policy Committee which will meet again at the end of June to review NIST's progress. The major goal of this effort has been to broaden the definition of technology transfer by identifying a broad range of specific mechanisms that the laboratories use to transfer technology and to improve NIST's internal processes. The VCAT would like to hear more about the impact of these changes at future meetings.

Another comment addressed the absence of the word "climate" under national priorities and the suggestion to include this topic as a priority under a broader category of environmental sustainability. The Committee also suggested that energy as well as infrastructure be included as a major element of NIST priorities. The VCAT endorsed the Plan, as written.

NIST Update – Dr. Patrick Gallagher, Under Secretary of Commerce for Standards and Technology and NIST Director

Presentation Summary – Recent changes to DOC leadership include the departure of Acting Secretary of Commerce and Deputy Secretary Rebecca Blank, the nomination of Penny Pritzker as the Secretary of Commerce, the reassignment of Cam Kerry as the Acting Secretary of Commerce, and the announcement of Pat Gallagher as the Acting Deputy Secretary for Commerce in addition to his duties as the Undersecretary for Standards and Technology. With a very strong business career and public service functions, Penny Pritzker should be a remarkable Secretary of Commerce.

Changes to the NIST organization include Joe Dehmer as the new Director of the Physical Measurement Laboratory, Mike Molnar as the Director of the new Advanced Manufacturing Program Office, Roger Kilmer as the new Chief Manufacturing Officer, Steve Salber from Boulder as the new Chief Facilities Management Officer, Phil Singerman as the Acting Director of the Hollings MEP, and Robert Fangmeyer as the Acting Director of the Baldrige Performance Excellence Program. NIST is also proposing to establish a Center for Advanced Communications in Boulder as its seventh Operating Unit and to break

out the acquisitions and agreements function from Facilities and Property Management as a separate chief office.

Turning to the budget, Dr. Gallagher described how long-range planning has been challenging in an environment of uncertainty. NIST's enacted FY 2013 level was an increase over FY 2012. NIST's FY 2013 spend plan is pending Congressional approval and no problems are anticipated. The FY 2014 President's budget request is on the Hill and it is unclear how the process will unfold. Dr. Gallagher also noted that NIST facility maintenance and operations funding is not sustainable. He also pointed out that the mandatory account for a one-time investment of \$1 billion for the NNMI will require separate legislation. A VCAT member summarized how the momentum for the NNMI is continuing to build.

For more details, see Dr. Gallagher's [presentation](#).

Discussion Summary –Dr. Gallagher led a discussion on the VCAT's charge to focus on cybersecurity and advanced manufacturing and explained the context for their input. NIST has a key role in the nation's response to growing cybersecurity concerns across a number of critical sectors. The VCAT's input is needed to help NIST ensure that it has the internal capacity and collaboration tools to leverage its critical role in cybersecurity. Other discussion topics raised by the VCAT members included the need for system risk measurements, the need for industry to have a place to go to for help in solving its network problems, and the definition of success of the Cybersecurity Framework.

Dr. Gallagher noted the importance of advanced manufacturing and the key role that NIST plays in the intersection between the public and private sector funding areas of research and development. He would like the VCAT to provide input on the technical capacity and collaboration tools within the NIST laboratory programs in meeting the needs of industry in advanced manufacturing. Other discussion topics covered the differences between the Manufacturing Technology Acceleration Centers (M-TAC) and the Manufacturing Extension Partnership (MEP), and NIST's important role in supporting standards setting as a non-regulatory agency.

In response to this charge, VCAT member, Roberto Padovani, will chair a new VCAT Subcommittee on Cybersecurity, and a new chair will be identified for a renewed VCAT Subcommittee on Manufacturing. Both of these subcommittees, which will provide their recommendations to the full VCAT, can consult with external technical experts.

The VCAT Subcommittee on Safety will continue with Tony Haymet as its Chair.

ADVANCED MANUFACTURING SESSION

Overview of NIST Activities in Support of Advanced Manufacturing – Dr. Willie May, NIST Associate Director for Laboratory Programs (ADLP) and Principal Deputy

Presentation Summary – NIST has an increasing role in supporting the U.S. Innovation Agenda in which manufacturing and job creation is a top priority. Activities in support of advanced manufacturing are carried out in the NIST laboratories, the Advanced Manufacturing National Program Office (AMNPO), and the MEP. Over the past two years, the NIST laboratories received an increase of \$37 million for Advanced Manufacturing and Materials research. The President's FY 2014 budget request for NIST includes an increase of \$50 million to continue supporting these activities. Roger Kilmer has been reassigned to the position of NIST Chief Manufacturing Officer to provide cross-organizational coordination within NIST's manufacturing programs and provide strategic advice to the NIST Director and the ADLP. NIST laboratory activities include visiting major companies to help make sure that its

programs are focused on what it “should do” rather than what it “could do” to strengthen U.S. manufacturing, new materials discovery, and innovation.

For the second part of the presentation, each laboratory director briefly summarized their laboratory activities in support of advanced manufacturing. These activities cover:

- Precision measurements for manufacturers which support a new paradigm in self-calibration capabilities for U.S. manufacturers, such as embedded standards / NIST on a Chip;
- Measurement science and standards to support emerging technologies in bio and nanomanufacturing;
- Smart manufacturing which will provide the foundations for optimizing production and quality;
- Measurement science and data infrastructure for advanced materials in support of the Materials Genome Initiative; and
- Neutron measurements at the NIST Center for Neutron Research (NCNR) for expanding NIST’s impact in advanced manufacturing.

For more details, see Dr. May’s [presentation](#).

Discussion – The group discussed NIST activities in additive manufacturing which will be a subset of the Smart Manufacturing program. The NCNR also has capabilities that support additive manufacturing. The VCAT members noted the importance of additive manufacturing and encouraged NIST to have a more focused programmatic view of this domain.

Update on NIST Extramural Programs in Advanced Manufacturing – Dr. Frank Gayle, Deputy Director, Advanced Manufacturing National Program Office and Mr. Alex Folk, Program Development Office Director, Manufacturing Extension Partnership

Presentation Summary – NIST’s new extramural programs in advanced manufacturing are designed to support U.S. manufacturing competitiveness by strengthening the innovation ecosystem and addressing market failures in technology scale-up. These new complementary extramural programs consist of AMTech, NNMI, and M-TAC. A diagram illustrated how the NIST laboratories, MEP, and the three new extramural programs relate to technology readiness levels.

AMTech works at the very earliest stages of manufacturing product and process development by supporting the planning and formation of industry-led consortia. Originally proposed in FY 2012, AMTech received \$7.5 million in FY 2013, for which \$3 million will be used to support the Department of Defense (DOD) Institutes for Manufacturing Innovation and \$4.5 million to support grants for consortia planning. Larger implementation grants will be awarded in the future. Many of the VCAT’s recommendations on the design of the AMTech have been reflected in the current Federal Funding Opportunity to be released in mid-July 2013.

The NNMI update included the importance of the National Science and Technology Council (NSTC) report on the preliminary design of the NNMI released in January 2013. The NNMI continues to be a centerpiece of the Administration’s efforts to revitalize U.S. manufacturing and was referenced in the recent State of the Union address. The FY 2014 President’s budget proposes one-time funding of \$1 billion to establish the NNMI, a network of up to 15 Institutes. DOD and the Department of Energy (DOE) will be launching three institutes as part of the NNMI network. An Executive Order is pending to establish the AMNPO, housed at NIST, more clearly as an interagency effort. Another new development is the establishment of an Advanced Manufacturing Subcommittee under the NSTC’s Committee on Technology.

An update on the Hollings MEP was provided as context for the M-TAC. With a focus on meeting the manufacturer's short-term needs, the Hollings Centers have six areas of common strength, reaches over 31,000 manufacturing firms, and completes over 7,600 projects per year. The FY 2014 President's budget request includes a new initiative for \$25 million to deploy M-TACs which will build on the strength of the MEP partnerships. The focus of M-TAC is to provide technology acceleration support to small and mid-sized U.S. manufacturers through a program that is nationally connected and locally deployed. The approach includes collaborating and partnering with local, regional and national resources to fill gaps not being addressed by other national efforts. Emphasis will be placed on supply chain development and optimization through technology adoption. To garner input from other organizations, industry, and the public, a Request for Information to inform investments and a Federal Funding Opportunity to initiate pilot projects are planned for FY 2013. Pending funding in FY 2014, NIST will begin to establish nationally focused M-TACs that leverage and amplify the network of the Hollings Centers.

More details are provided in the [presentation](#).

Discussion – The group discussed the interrelationship between AMTech, NNMI, and M-TAC and the potential for a growing bureaucracy; the importance of additive manufacturing; and plans for the VCAT Chair to address the MEP Advisory Board at its next meeting.

A Model for Working with Manufacturers – NIST Center for Automotive Lightweighting (NCAL) – Dr. Tim Foecke, Director, NCAL and Leader, Materials Performance Group, Materials Science and Engineering Division, Material Measurement Laboratory

Presentation Summary – This presentation covered NIST's path in developing its interactions with the U.S. auto industry and their suppliers through the NCAL. The U.S. auto industry presented an opportune space for NIST to work. The U.S. automotive industry comprises a huge part of the Gross Domestic Product and improving the corporate average fuel economy (CAFÉ) of the auto fleet has multi-benefits. The CAFÉ standard will increase to 54.5 miles per gallon by 2025 and lightweighting metrics have been developed. The U.S. auto industry has identified lightweighting as a primary way to meet these new goals. Sheet metal, the main structural component of a vehicle, makes up a great portion of the weight and material properties are needed to help design new and stronger components.

The U.S. automotive industry is highly reliant on empiricism and experience; is risk-averse regarding but materials, but wants to incorporate; uses design paradigms that do not facilitate adoption of new materials, and is mostly aware of what it needs to know, but needs help developing it since long-term research has been reduced. To address these needs, NIST wanted its role to focus on measurements, data, and standards that have a broad-based impact on the industry. NIST does not want to 'pick winners and losers'. In particular, NIST wanted to provide timely and appropriate impacts needed in the long-term and short-term. Hence, NIST formed the NCAL with the purpose of developing the next-generation test methods, standards, and metrology to assist the U.S. auto industry with introducing lightweight materials into vehicles.

The timeline of the NCAL development process at NIST began in 1997 as a co-funded internal project with the Advanced Technology Program (ATP) 2 millimeter project that involved a multi-company consortium followed by the ATP Springback Predictability Project. In 2003, NIST published the first data ever on yield surface evolution and published a springback standard that was accepted by ASTM. NIST founded the NCAL in 2006 once the staff was at critical mass and subsequently worked with the Auto/Steel Partnership Strain Path Project. With funding from the American Recovery and Reinvestment Act (ARRA.) in 2009, NIST purchased two new large pieces of equipment for the NCAL – a next generation system for deforming sheet metal and a high-rate testing machine for obtaining better data for

crash-worthiness situations. The NCAL will be performing mechanical testing in support of General Motor's Materials Genome Initiative (MGI) project.

To help gauge its activities in sheet metal forming simulation, NIST participates in NUMISHEET Conferences where the worldwide automotive industry shows their wares every three years through presentations and benchmark competitions.

The NCAL Workshop was held in May 2013 with almost 80 attendees to assess the current activities of the NCAL, introduce partners to the new NCAL facilities, and discuss priorities if NCAL is expanded. The attendees noted that the NCAL staff are essential partners, the equipment is a national resource, and NIST is the organization for measurements and data. Seven priority areas, including polymer composites, were identified if NCAL is expanded. The group was also supportive of a Lightweighting Consortium but concerned with how to do it.

NIST is now at a point of timely convergence to make a significant impact in lightweighting over the next three to seven years due to the President's thrust areas in manufacturing, the recovery of the auto industry, new CAFÉ regulations, the MGI, new NCAL equipment, and NNMI on Lightweight Metals and Digital Manufacturing. Lastly, Dr. Foecke shared five lessons learned from working with industry covering patience, consortia and individual interactions, consistent NIST role, essential management support, and "open space" to share ideas.

For more details, see Dr. Foecke's [presentation](#).

Discussion – The group discussed the impact of the springback standard; NIST efforts in applying more rigorous econometric models to evaluate its technology transfer activities; and the absence of foreign company participation in the NCAL. The VCAT is looking forward to seeing the industry-authored report from the recent NCAL Workshop.

CYBERSECURITY SESSION

National Cybersecurity Center of Excellence (NCCoE): Current Status and Future Plans – Ms. Donna Dodson, Acting Associate Director and Acting Chief Cybersecurity Advisor, Information Technology Laboratory (ITL)

Presentation Summary – NIST has a strong cybersecurity program that has been in existence for over 50 years and has provided a lot of thought leadership throughout the world in a number of important cybersecurity technologies. As part of the NIST Information Technology Laboratory, the NCCoE has access to a foundation of prodigious expertise, resources, relationships and experience. The vision is a secure cyber infrastructure that inspires technological innovation and fosters economic growth. The mission is to collaborate with innovators to provide real-world cybersecurity capabilities that address business needs. Customers include businesses, academia, government, individuals, the cybersecurity technology community, and systems integrators.

The NCCoE is located in a phase 1 facility at the University of Maryland, Shady Grove campus with a workspace designed to promote collaborations. The engagement and business model begins with describing the business problem and understanding the needs, partnering with innovators of cybersecurity and IT technologies, building and testing usable solutions, and finally providing the information back to the community.

Current activities include working with communities of interest across various industry sectors (i.e., health care, energy, financial services, manufacturing, and government) to capture cybersecurity concerns

and potential use cases; recruiting large IT and cybersecurity companies to participate in the National Cybersecurity Excellence Partnership (NCEP); building technical solutions to address industry's cybersecurity concerns in collaboration with IT and cybersecurity vendors; working with small groups of vendors to address security challenges that cut across multiple industry sectors; capturing and continually revising the NCCoE business process; and proceeding through the legal and acquisition processes to establish the first Federally Funded Research and Development Center (FFRDC) dedicated to cybersecurity. To date, there are 13 core NCEP companies and more are expected to join by the end of this week. Ms. Dodson reviewed the business need and status of the three active use cases - Health Care: Mobile Access and Data Exchange Security; Energy: Data Aggregation and Monitoring; and Energy: Identity and Access Management. Discussions are underway for additional use cases in Health Care and Energy as well as new use cases in financial services and manufacturing. The "building blocks" being established to address cybersecurity issues that are applicable across multiple industry sectors include trusted geolocation in the cloud, authentication email, continuous monitoring, security automation, and mobile device integrity.

Lastly, Ms. Dodson reviewed the rationale, progress, and costs and impacts of the FFRDC. NIST is preparing the second of three Federal Register Notices to announce intent and solicit comments. The cost to fund the FFRDC operations and overhead is expected to be \$10 million per year.

For more details, see Ms. Dodson's [presentation](#).

Discussion – The group discussed the following topics:

- The NCCoE does not expose intellectual property.
- NIST is not creating winners and losers; all of the best practices are open and available to all.
- Balancing needs between the different industry sectors is achieved via an open call for participation in the NCCoE and submission of use cases as well as working with different consortia to understand their challenges. NIST makes the final prioritization.
- A cybersecurity blueprint for a solution relies on best practices and standards.
- As a non-regulatory agency, NIST does not have the authority to state that certain capabilities meet other agency requirements.
- Cooperative Research and Development Agreements (CRADAs) help companies with different capabilities work together in use cases, as exemplified by the health care mobile access and data exchange security use case.
- NIST is interested in working with the transportation sector as part of the NCCoE.
- The private sector has identified a wealth of problems that could spawn a large number of use cases. As capabilities ramp up, the goal is to have an ever-changing pipeline of use cases that vary dramatically over time based on reprioritization.

NCCoE Partnership Perspectives: Building Blocks for Cybersecurity – Mr. Vernon Lee, Federal Civilian Chief Technology Officer, Microsoft Services

Presentation Summary – Mr. Lee described the importance of the NCCoE to Microsoft from its perspective as a partner in the National Cybersecurity Excellence Partnership (NCEP). The Microsoft Services group and the Trustworthy Computing (TwC) group recognized the value of partnering with the NCCoE and worked together to achieve the Microsoft partnership with the NCCoE. Mr. Lee reviewed the significance of the work completed in partnership with NIST and NCCoE which included embracing NIST's standards and guidance of Personal Identification Verification (PIV) to help customers implement this technology securely and providing resources to work in other areas, including Health Insurance Portability and Accountability Act (HIPAA) security settings and secure boot configurations.

The TwC expects that the NCCoE partnership will result in simplification of the security guidance, acceleration of adoption of security solutions, and securing the seams by working with other partners. From the Microsoft Services perspective, the partnership is expected to provide standard guidance on implementation using Microsoft products and technology; an architectural view of the solution; repeatability and consistency; and innovation and problem solving in a collaborative lab environment to help create WHITESPACE identification.

Mr. Lee also reviewed Microsoft's proven success in cybersecurity with a track record in the commercial and government sector. Microsoft will be providing consulting services, software, and all of its available enterprise products to the NCCoE lab. Microsoft's Surface Pro and Windows Phone devices also will be available in the lab for testing.

Lastly, Chuck Romine, the ITL Director, noted that this presentation is an example of the extraordinary level of commitment on the part of the NCEP partners to work with NIST in the laboratories by bringing their intellectual capital, products, services, and expertise to help solve challenging problems. NIST is very excited about working with all of its NCEP partners.

Discussion – The NCCoE laboratories are helping Microsoft by providing them the ability to work in a heterogeneous environment that mimics its customer spaces. By coming to the NCCoE, partners also have access to the Computer Security Division and the rest of ITL which are well integrated with the NCCoE.

For more details, see Mr. Lee's [presentation](#).

Cybersecurity Framework Development Overview: NIST's Role in Implementing Executive Order 13636 “Improving Critical Infrastructure Cybersecurity” – Mr. Adam Sedgewick, Senior Information Technology Policy Advisor, ITL

Presentation Summary – Mr. Sedgewick described NIST's role, progress, and next steps in implementing Executive Order (EO) 13636 “Improving Critical Infrastructure Cybersecurity” signed on February 12, 2013 and announced in the State of the Union. The Order recognizes that the cyber threat to critical infrastructure continues to grow and represents one of the most serious national security challenges that we must confront. The first part of the Order is focused on the sharing of cybersecurity threat information led by the Department of Homeland Security, the Department of Justice, and the Director of national intelligence. The second part of the Order directs NIST to lead the development of a cybersecurity framework defined as a set of standards, methodologies, procedures, and processes that align policy, business, and technological approaches to address cyber risks. NIST has 240 days to develop the initial framework.

This framework is being developed in an open manner with input from stakeholders in industry, academia, and government, including a public review and comment process, workshops, and other means of engagement. The framework development process involves a five-phase approach: 1) engaging the framework stakeholders; 2) collecting, categorizing and posting the Request for Information (RFI) responses; 3) analyzing the RFI responses; 4) selecting the framework components; and 5) preparing and publishing the preliminary framework in October 2013. NIST led the process by issuing an RFI in February 2013 with a wide range of questions and held the first Framework Workshop in April 2013 at the Department of Commerce with over 2,500 webcast viewers and about 600 attendees in person.

NIST analyzed the approximate 240 responses from national, multi-national, and some international companies, as well as local governments, local utilities, and some federal agencies. The comments were grouped to help identify common themes and omissions which were presented at the 2nd Framework

Workshop held at Carnegie Mellon University in May 2013. Dr. Sedgewick highlighted some of the major themes, such as the importance of senior management engagement.

NIST is currently selecting the framework components by identifying common practices, methods, and measures that support the EO objectives while continuing to support business needs. NIST will then present an annotated outline of the initial draft Framework for discussion and refinement at the 3rd Framework Workshop to be held in San Diego in July 2013. It is important that the Framework be usable, clear and unambiguous, suitable for multiple audiences, multi-tiered, and practical and implementable. The draft Preliminary Cybersecurity Framework will be presented for discussion at the 4th Framework Workshop in September 2013.

Lastly, Mr. Sedgewick reviewed seven key topics that came up for discussion throughout the Framework development, including governance models for an industry-led effort.

Discussion – The group discussed the following topics:

- The NNMI workshop announcements could serve as a good model for how to frame the Framework Workshops as building on the previous ones as a way to get a common audience at each workshop.
- The Smart Grid Framework with a collection of standards is the best analogy to the Cybersecurity Framework under development.
- The VCAT supports NIST's approach in developing the Framework.

For more details, see Mr. Sedgewick's [presentation](#).

FORENSIC SCIENCE SESSION

NIST's Role in Forensic Science – Dr. Willie May, NIST Associate Director for Laboratory Programs and Principal Deputy

Presentation Summary – Dr. May described NIST's past, current, and future activities in forensic science and the reason for its involvement. Changes in the needs and expectations in forensic science began in 1993 with the famous Daubert Case in which the Supreme Court emphasized that all scientific evidence admitted should be based on principles and methodology. In February 2009, the National Research Council (NRC) published a landmark forensics report which found that with the exception of nuclear DNA analysis, no rigorous forensic method exists to support court decisions.

In February 2013, NIST and the Department of Justice (DOJ) signed a Memorandum of Understanding (MOU) that established the National Commission on Forensic Science to help improve the reliability of forensic science/data information and to develop policy recommendations for the U.S. Attorney General. NIST will co-chair the Commission. More information about this MOU is covered in Mark Stolorow's presentation summarized below.

NIST has a long and rich history of work in support of law enforcement. Its involvement in forensic science began in the 1930's when William Souder, who worked at NBS, helped to solve the Lindbergh baby kidnapping case and participated in other federal investigations. In the late 1960's, the FBI turned to NBS for support in computerizing scanning equipment for fingerprints. In 1971, NBS established a Law Enforcement Standards Laboratory (LESL) to provide coordinated efforts to support and advance standards and technology used by law enforcement officers and agencies. This office has evolved into the current NIST Office of Law Enforcement Standards. In the 1980's, NIST became involved with fire investigations as well as forensic hair comparisons. Currently, NIST provides research and measurement services such as validated test methods, Standard Reference Materials (SRMs), and Reference Data in

many areas that support DOD, DOJ, and the Department of Homeland Security (DHS) in carrying out their programs.

Lastly, NIST and the Netherlands Forensic Institute in November 2012 signed an MOU to collaborate in activities focused on the advancement of forensic science.

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

MOU on Forensic Science between NIST and DOJ – Mr. Mark Stolorow, Director, Law Enforcement Standards Office

Presentation Summary – Mr. Stolorow summarized the evolution and the current plans of the MOU on Forensic Science between NIST and DOJ signed in February 2013. In 2005, Congress directed the National Academies (NAS) to study the state of forensic science in the U.S. and in 2006, appropriated \$1.5 million for the NRC to create a committee to identify the needs of the forensic science community. In 2009, NAS published “Strengthening Forensic Science in the United States: A Path Forward” which provided 13 recommendations and created considerable stir among the forensic science community. NIST was mentioned more than 50 times in this 258-page report and is involved in the first recommendation to establish a National Institute of Forensic Science (NIFS).

In 2009, the NSTC charted a new Subcommittee on Forensic Science (SOFS) co-chaired by NIST, DOJ, and the Office of Science and Technology Policy (OSTP). In 2013, SOFS delivered its final report to OSTP with 11 recommendations, including one for a Forensic Scientific Working Group (SWG) Program Management Office at NIST. NIST and DOJ initiated high level bilateral discussions on forensic science in 2011 and signed an MOU to create a National Commission on Forensic Science in 2013 which will provide recommendations and advice to the Attorney General concerning national methods and strategies. The Commission, chartered by DOJ under the Federal Advisory Committee Act and co-chaired by NIST and DOJ, will have a balanced membership of 30 scientists, practitioners, and criminal justice advocates.

NIST role under the MOU is to administer and coordinate “Guidance Groups”; conduct research supporting the development and dissemination of methods, standards and technical guidance for forensic science measurements; and test and validate select existing forensic science practices and standards. DOJ’s four-part role includes advising the Attorney General on priorities for standards development.

The Guidance Groups will replace the 21 SWGs currently organized in specific discipline areas and limited primarily to forensic science practitioners. The Guidance Groups will be consolidated by common science categories; include scientists and statisticians as well as practitioners; harmonize the standards development process compliant with openness and balance requirements; and develop prioritized list of research needs. NIST will seek public input in creating the framework for Guidance Groups.

As the path forward, NIST will administer and coordinate Guidance Groups, co-chair the National Commission on Forensic Science, and develop a coherent research, measurement and standards program to carry out its role under the MOU.

For more details, see Mr. Stolorow's [presentation](#).

Forensic Science and the NIST Laboratory Programs – Dr. Richard Cavanagh, Director, Office of Special Programs

Presentation Summary – Dr. Cavanagh emphasized the importance of the NIST laboratory programs being engaged with the entire forensics community in order to be successful in developing a coherent research, measurement and standards program to test and validate forensic science practices and standards, quantify metrics and uncertainty measurements, and identify gaps. According to the NAS 2009 forensic science report, DNA is really the only discipline among the forensic disciplines that consistently produces reliable results. Dr. Cavanagh described the five different integrated “puzzle pieces” that have led to the success of DNA forensics and summarized NIST’s recent efforts in each of these pieces for DNA forensics. He also reviewed the specific pieces associated with NIST activities in ballistics, chemical forensics, face and person recognition, and arson. In the future, NIST plans to have all of their forensic activities include all the puzzle pieces.

NIST’s recent efforts in DNA forensics cover each of the five puzzle pieces that are critical for success: 1) understanding gaps through contact with community; 2) documentary standards process; 3) providing training and texts; 4) measurement science research; and 5) SRM and SRD development. To understand gaps, the NIST DNA group has been in close contact with practitioners by visiting many crime labs over the past two years. In support of documentary standards, the NIST DNA group is actively involved with several committees, including chair and co-chair of the SWG on DNA Analysis Methods. With regard to training, the NIST DNA group hosted a webcast on DNA mixture interpretation for more than 1,000 participants. NIST also provides critical SRMs used for forensic DNA measurement assurance. In the areas of measurement science research, the NIST Applied Genetics Group authored 144 publications on forensic DNA since 2002, with most of the articles published in *Forensic Science International Genetics*, currently the highest impact journal in the field.

NIST currently has expertise in many forensic science areas. For example, in the area of ballistics, NIST has developed SRMs for a standard bullet and a standard cartridge case, and is conducting research and developing tools in support of bullet casing identification. NIST activities in chemical forensics are aimed at helping to validate the ASTM standard for trace explosive detectors, reducing the backlog of drug cases involving controlled substances, and combining chemical and biometric fingerprint analysis for detecting trace explosives. In support of face and person recognition, NIST is working with the community to understand the gaps involved with identifying people in video and to develop an approach to address this maturing technology. In the area of arson forensics, NIST is developing new instrumentation for measuring ignition, flame spread, heat release rate, and smoke yield as well as conducting research on fire patterns. The NIST Fire Dynamics Simulator is a big success and has been used widely in such investigations as the World Trade Center collapse and the Station Night Club Fire.

NIST is exploring how to integrate all 5 puzzle pieces within each of its forensic science areas. To help with this task, John Butler, a DNA forensic expert at NIST, is identifying NIST champions who will develop white papers on critical gaps, developing an internal NIST program on Forensic Research, lining up papers on NIST research for presentation and feedback at the American Academy of Forensics annual meeting, and publishing an NIST Newsletter on Forensic Science.

Discussion – The group discussed the following topics:

- Part of the decision process for funding forensic science activities at NIST is based on input from the Guidance Groups and the forensic community about the near-term gaps and the longer-term measurement needs so that it can focus its resources in the areas with the greatest impact.
- The members were interested in knowing the timeframe and what success would look like. NIST scientists would play a key role in supporting the research methods and standards development committees, but a strong external organization, similar to the National Commission on Weights and Measures, should own the full process in which NIST participates in and provides some guidance. It

may take five years to create such an entity, and NIST's core programs will continue to be needed in providing the scientific basis.

- There also is a potential for forensic science to follow the same model as Smart Grid for developing partnerships among 400 state and local crime laboratories, NIST, and DOJ.

For more details, see Dr. Cavanagh's [presentation](#).

ADVANCED COMMUNICATIONS SESSION

NIST and Advanced Communications – Dr. Jason Boehm, Director, Program Coordination Office

Presentation Summary – Dr. Boehm described the major drivers for focusing on advanced communications, the status of establishing the Center for Advanced Communications (CAC) and the National Advanced Spectrum and Communications Test Network (NASCTN). Technology advances in communications have revolutionized how we work, entertain, govern, and defend ourselves. These advances also have presented multiple challenges covering spectrum scarcity, broadband access, security threats, and the communications infrastructure.

There are several major policy drivers for a DOC role in advanced communications. The first driver is the 2012 spectrum report issued by the President's Council of Advisors in Science and Technology (PCAST) with a number of recommendations, including a potential role for NIST " ... to provide test services to support the development of the policies underlying technologies and system capabilities required to support dynamic spectrum sharing." Another driver is FirstNet tasked with establishing a nationwide public safety broadband network (PSBN) based on a single, national network architecture. The VCAT has provided input on the NIST role and the architectural features of a nationwide PSBN. The National Telecommunications and Information Administration (NTIA) and NIST have important roles in the PSBN as reflected in their successful joint public safety communications research (PSCR) program housed in Boulder. NIST is expected to receive \$100 million to support R&D on next generation public safety communications through the spectrum auction. Another driver is the recent issue with the company, LightSquared, which illustrates the need for clearly defined testing and evaluation capabilities.

In response to these policy drivers and issues, NIST and NTIA will work together and recently signed a Memorandum of Agreement to establish the CAC. The threefold planned objectives of this Center are to enhance mission effectiveness of both agencies by better coordinating research and testing functions; promote interdisciplinary research, development, and testing in advanced communication-related areas; and provide a single focal point for engaging industry and other government agencies. Under the proposed structure, the Center will function as an independent laboratory Operating Unit reporting to the NIST Associate Director for Laboratory Programs, be governed by a NIST appointed Director and an NTIA appointed Associate Director, and act as an umbrella organization with responsibilities for program management, coordination with other agencies, and outreach and engagement to the private sector. Its major focus areas are envisioned as R&D management, standards engagement, testbed operations, and the PSCR.

Next steps include establishing a transition team to begin finalizing organizational plans for the Center and complete the necessary approval steps with DOC and the Office of Management and Budget (OMB); initiate recruitment of the Center leadership; begin coordinated industry and stakeholder outreach; and finalize the agreement with DOD on NASCTN. The NASCTN will be housed in the Center and will be staffed by detailees from NIST, DOD, NTIA and other agencies. The NASCTN will organize a national network of federal, academic, and commercial test facilities, as well as modeling and simulation and

laboratory research capabilities to facilitate and coordinate the testing and evaluation of spectrum sharing capabilities.

Discussion – The group discussed the following topics:

- The VCAT's in-depth report on the design properties of a nationwide PSBN will be influential in developing and executing the framework.
- The VCAT members were encouraged to assist in the recruitment effort for the Center's leadership positions.
- The Center will be more effective and efficient as a new laboratory within NIST rather than operating under an existing laboratory.
- The capability for continuous scanning of potential technological advances and their impact on spectrum use and sharing is required.

For more details, see Dr. Boehm's [presentation](#).

NIST Centers of Excellence Session

NIST Centers of Excellence Program: An Update – Dr. Willie May, NIST Associate Director for Laboratory Programs and Principal Deputy

Presentation Summary – Dr. May provided a brief overview of NIST Centers for Excellence (CoE) program, described how the CoEs differ from NIST's existing Joint Institutes, and reviewed the program's status and implementation plans. The focus of the first new Center will be advanced materials discovery.

This Program will assist NIST in building new capacity and competencies it needs to carry out its mission in a dynamic and fluid technological environment. Consistent with its strategic planning emphasis on optimizing capacity, NIST will create multidisciplinary centers of excellence to assist in building or expanding capacity in critical areas of emerging technology and will leverage multidisciplinary capabilities of the Centers back into NIST core activities. The broadly defined objectives are to 1) provide an interdisciplinary environment in which NIST, academia, and industry can collaborate in pursuing research focused on innovations in measurement science and development of new technology focused on emerging areas of national need; 2) foster expanded development of expertise in measurement science and its role in innovation through the education and training of scientists and engineers; 3) enhance technical innovation through earlier alignment of measurement science with emerging and innovative new fields of research; and 4) further expand NIST's Laboratory Program's footprint beyond its Gaithersburg and Boulder campuses.

NIST has four successful "Joint Institutes" which have all become integral parts of its research and measurement service programs. These are JILA, located in Colorado and home to three of NIST's Nobel Prize winners; the Institute for Bioscience and Biotechnology Research in Maryland; the Joint Quantum Institute in Maryland; and the Hollings Marine Laboratory in South Carolina. The new NCCoE differs slightly from the joint institutes in that NIST performs its research at its campus and then collaborates with industry in a stand-alone center. The NCCoE as well as the Joint Institutes have proven to be mutually beneficial partnerships. The primary differences between these current partnerships and the COE program is that the COE cooperative agreements will have the specific objective of assisting NIST in building new capacity and competencies in critical areas and are expected to exist for a time sufficient for NIST to build the sought after capacity.

Turning to program implementation, Congress allocated \$20 million in FY 2013 to establish the COE program, but NIST requested a spend plan of only \$7 million for this purpose due to the late timing of the allocation and the desire to initially stand up one pilot center. The focus of the first new Center will be on advanced materials discovery and will help support the President's Materials Genome Initiative.

The FY 2014 President's budget request includes funding to complete the program build out. NIST plans to establish 2-3 additional centers to assist in new capacity building in emerging areas of national needs and has been working with the Science and Technology Policy Institute and soliciting input from its laboratory leadership to help identify these areas. A partial list of 10 areas under consideration was shown and NIST plans to make the final determinations over the next 12 months.

Discussion – The group discussed the following topics:

- The new COE is proposed to be a multidisciplinary and multi-partner entity operating in one physical location similar to the other joint institutes and the NCCoE.
- NIST explained its role and the rationale for selecting advanced materials discovery as the topic for the first COE.
- The new COE in advanced materials discovery will supplement the current laboratory programs by bringing in new resources and capabilities. This topic is central to the NIST mission since complementary measurement capabilities are needed for materials discovery.
- Intellectual property could become an issue.
- The first Center is actually focused on advanced materials with the expectation that the partners have strength in material discovery.
- VCAT has previously endorsed the concept of NIST leveraging external partners and the general COE model.
- The VCAT members would like follow-up discussions on the selection of the additional COE areas and progress in refining the COE model.

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

Adjournment

The meeting was adjourned at 11:40 a.m. on Wednesday, June 12, 2013.

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

Gail Ehrlich, Executive Director, NIST Visiting Committee on Advanced Technology
Dr. Alan Taub, Chair, NIST Visiting Committee on Advanced Technology