VISITING COMMITTEE ON ADVANCED TECHNOLOGY (VCAT)
MINUTES OF THE JUNE 19-20, 2012, MEETING
GAITHERSBURG, MD

ATTENDANCE:

Visiting Committee Members Attending
Cerf, Vinton
Chand, Sujeet
Chowdhry, Uma
Haymet, Tony*
Holt, William
Kerr, Karen
Kheradpir, Shaygan*
Khosla, Pradeep
Padovani, Roberto
Romig, Al
Taub, Alan

VCAT Exec. Dir.
Ehrlich, Gail

NIST Leadership Board/Desginee
Boehm, Jason
Brockett, Del
Dimeo, Robert
Fiotes, Stella
Gallagher, Patrick
Gebbie, Katharine
Hertz, Harry
Kayser, Rich
Kilmer, Roger
Kimball, Kevin
Locascio, Laurie
May, Willie
Rivera, Eddie
Romine, Chuck
Schufreider, Jim
Singerman, Phillip
Sunder, Shyam
Whitman, Lloyd
Wiggins, Tom

NIST Staff
Aksyuk, Vladimir
Allocca, Clare
Anderson, Gary
Arrisueno, Gladys

Participated by Webinar

NIST Staff Cont:
Balicao, Francisco
Baras, John
Belford-Gemar, Diane
Bello, Mark
Beers, Kate
Blake, Bill
Brewer, Tanya
Campbell, Stephen
Cavanagh, Richard
Centrone, Andrea
Cesaro, Rene
Cherny, Paul
Chin, Joannie
DelRio, Frank
Denicola, Lawrence
Dodson, Donna
Dohne, Kirk
Evans, Heather
Fasolka, Michael
Gayle, Frank
Goldstein, Barbara
Greer, Chris
Gupte, Prasad
Harary, Howard
Hardis, Johnathan
Hastings, Nelson
Hight Walker, Angie
Jillavenkatesa, Ajit
Kaiser, Debra
Kushmerick, James
Lightman, Suzanne
Liu, Rosa
Martinez, Ileana
Messina, Elena
Migler, Kalman
Miller, Cameron
Molnar, Michael
Nam, Sae Woo
Olbrich, Emil
Olthoff, James
Orr, Dereck
Ouimette, Mylene
Page, Kirt

NIST Staff Cont:
Paris, Reenie
Pellegrino, Joan
Phelan, Frederick
Prochaska, Dean
Salit, Marc
Satterfield, Mary
Saunders, Mary
Schen, Michael
Scholl, Matthew
Seiler, David
Shaw, Stephanie
Souppaya, Murugiah
Srinivasan, Vijay
St. Pierre, Jim
Stine, Kevin
Tarlov, Mike
Tassey, Greg
Thorne, Roger
Van Zee, Roger
Walker, Nathan
Warren, Jim
Wavering, Albert
Windover, Donald
Wollman, David
Zielinski, Paul

Others
Canfield, Neil – U.S. House Subcommittee on Technology and Innovation
Gomez, Anna – National Telecommunications and Information Administration (NTIA)
Mayfield, Harry – Lewis-Burke Associates LLC, Government Relations
Pentz, Alan – Corner Alliance Consulting
Webber, Naomi – Lewis-Burke Associates LLC, Government Relations

Call to Order – *Dr. Vinton Cerf, VCAT Chair*

Dr. Cerf called the meeting to order at 8:30 a.m. and pointed out the emergency exits. He introduced new VCAT member, Bill Holt, Senior Vice President and General Manager of Intel Corporation's Technology and Manufacturing Group. Dr. Cerf noted that he attended part of the NIST CTO Roundtable on Cyber-Physical Systems held on June 18, 2012, in Washington DC and it was an extradordinarily productive meeting.

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

Presentation Summary – In his opening remarks, Dr. Gallagher acknowledged the Committee for its record-breaking productivity last year and noted that much of this year's work will build on these past efforts. He also welcomed new VCAT member Bill Holt and emphasized the value of having a senior leader from the semiconductor industry with technical expertise and a focus on manufacturing help address many areas in the new VCAT charge.

The update on organizational changes at NIST focused on Laurie Locascio, the new Director for the Material Measurements Laboratory; Rich Cavanaugh, the new Director of the Special Programs Office; and Susanne Porch, the new Chief Human Capital Officer. The Special Programs Office works with Willie May, the Associate Director for Laboratory Programs, to manage cross-laboratory functions, such as NIST's national security portfolio.

Dr. Gallagher provided an update on NIST's Fiscal Year (FY) 2013 budget request before Congress and the FY 2014 budget request submitted to the Department of Commerce (DOC) on June 7, 2012. The FY 2013 Commerce, Justice and Science Appropriations Bill includes a mark of $826 million for NIST's total discretionary funding while the Senate Appropriations Bill includes $830 million. Although these marks were below the President's request for the laboratory programs, these amounts are substantially higher than the FY 2012 level. The marks also were similar for the Manufacturing Extension Partnership (MEP) and Construction accounts; however, the House provided more funding for the Advanced Manufacturing Technology (AMTech) Consortia program. No specific action is expected on Appropriation bills until after the recess and probably not until after the election. A sequestration of $1.2 trillion in cuts across all discretionary spending for FY 2013 could take place if the Committee's recommendations are not accepted and passed. Other issues affecting the appropriations relate to the Bush tax cuts and Medicare. The FY 2014 budget request was submitted to DOC on June 7, 2012.

In addition, the President's FY 2013 budget request for NIST includes mandatory funding of $1 billion for the National Network for Manufacturing Innovation (NNMI) and $300 million the Wireless Innovation Fund. These mandatory funds are not included in appropriation accounts. Instead, this funding relies on an authorization to withdraw these amounts from the Treasury over a seven to ten year period. The mandatory $300 million has been authorized but the availability is contingent upon the proceeds from the auction of the spectrum. The mandatory $1 billion is not yet available since the legislation authorizing the NNMI is pending.

Dr. Gallagher highlighted the directives that impact NIST from OMB's May 2012 guidance directing federal agencies to reduce their costs for travel, conferences, property, and fleet management. Many of these directives are disruptive as they change the decision making process at NIST. Restrictions on travel and conferences could impact the ability of NIST scientists to collaborate with other scientists and organizations.

The update on the Technology Innovation Program (TIP) which was defunded and terminated in FY 2012 covered staff reductions, number of continuing agreements, and shutdown costs through 2014. NIST will use reprogrammed laboratory-based funds and prior-year de-obligations to cover these costs. Valuable legacy information for TIP and the Advanced Technology Program is being archived to show the long-term impact of these high risk/high payoff programs for future use.

Federal funding for the Baldrige Performance Excellence Program (BPEP) was terminated in FY 2012; however, the program is still authorized by Congress. The Baldrige Foundation has committed to fund the BPEP through FY 2015 as the transition to the new business model takes place. The program continues with examiner training to be conducted over the summer. Also, the Board of Overseers and the Panel of Judges recently held meetings.

In March 2012, a panel of the National Academy of Sciences (NAS) conducted a new assessment process where it reviewed NIST's mission-specific work supporting manufacturing across the organization. Dr. Gallagher described the charge to the assessment Panel and the specific program areas covered. The panel has provided preliminary feedback and the full report will be delivered in September 2012. NIST will share the full report with the VCAT.

Dr. Gallagher explained the importance of the four major NIST issues included in the 2012 charge to the VCAT, as follows:

- Advanced Manufacturing - The VCAT is charged with providing feedback on the design of the NNMI, using the Committee's recent recommendations for AMTech as a launching pad plus input from the Request for Information (RFI) and regional workshops. The NNMI is a collaboration between NIST, the Department of Defense, the Department of Energy, and the National Science Foundation to establish up to 15 Institutes for Manufacturing Innovation.
- Public Safety - The VCAT is charged with using its recent report on the Nationwide Public Safety Communications System to address how NIST can best support the public-safety broadband network in the context of the "First Responder Network Authority" (FirstNet) legislation. NIST will coordinate the development of interoperability standards, technologies, and applications to advanced public safety communications.
- Forensic Science - The VCAT is charged with providing feedback on the NIST analysis of the NIST/Department of Justice joint program plan for forensic science and standards which is under development, and making recommendations on the impact to NIST laboratory programs. The President's FY 2013 budget request includes a $5 million initiative for NIST in this area. Forensic science is a hot topic which stems from recommendations in a 2009 National Research Council study.
- NIST Centers of Excellence - The VCAT is charged with sharing its unique experiences in public-private collaborations to help ensure that the mission and goals of the proposed NIST Centers of Excellence are met. The President's FY 2013 budget request includes $20 million for up to four Centers of Excellence in measurement science areas defined by NIST for collaborations with academia and industry. This initiative builds on NIST's long-standing and successful partnerships with academic organizations, such as JILA at the University of Colorado, Boulder, and the Institute for Bioscience and Biotechnology Research at the University of Maryland.

Lastly, Dr. Gallagher reviewed the meeting's agenda in which many of the topics relate to the charge to the Committee.

For more details, see Dr. Gallagher's presentation.

Discussion Summary – The group discussed the following topics:

- **Cost Control Efforts** --The cost control areas with the most serious impact on NIST cannot be identified until the final requirements have been issued. The VCAT would like to review NIST's categories of mission-critical activities that would be affected by these requirements and, if appropriate, send a letter to the Secretary of Commerce which describes the importance of these areas to the NIST mission.
- **NNMI** – The definition of the term "network" used in the NNMI title is a little vague intentionally to allow for all ideas to be considered during the proposal and competition process. The Albany Nanoscience Center is a good domestic model for the NNMI.
    - The management and operation of the one-time $1 billion federal investment for the NNMI would be carried out in a cross-agency mode to allow other federal agencies input into the potential investments. The FY 2013 budget request proposed that the $1 billion investment be available over seven years; however, the exact timeframe would need to be included in the authorizing legislation still under development. There appears to be a lot of bipartisan interest and support on the Hill for the NNMI.
    - The VCAT members would like to see the schedule for the NNMI workshops.
- **Forensics** – The interagency process around forensics has been very strong, including the National Institutes of Health (NIH) efforts in DNA technology. All of the other S&T agencies will most likely be asked to play an increased role. NIST's extensive work in DNA diagnostics is well connected to both NIH and the Federal Drug Administration.
    - NIST has a core role in promoting the adoption of new forensic measurement methods and techniques at the state and local levels.
    - Global standards for forensics do not yet exist, but is a natural outcome.
    - NIST's Information Technology Laboratory has certain capabilities in cyber security-related forensics at the machine level, including maintaining the national software reference library which helps law enforcement streamline their analysis.
    - This year, NIST launched a Forensics Measurement Challenge competition for its scientists in which the proposals were evaluated by the law enforcement standards community.
- **Centers of Excellence** – Participation by other government labs will need to be addressed.
    - These Centers are intended to enhance NIST's measurement science capabilities and facilities in critical areas of emerging technologies.
    - The Request for Proposals should clearly define measurement science. NIST is open to all approaches for these Centers which can best enhance the agency's capabilities.
    - Both models for hosting university researchers either at NIST facilities or vice versa have worked extremely well for NIST.

Update on Safety Progress since the NIST Blue Ribbon Commission on Management and Safety II (BRC II) Report – *Dr. Rich Kayser, Chief Safety Officer, NIST*

Presentation Summary – Dr. Kayser reviewed the three-part mission statement of NIST's Office of Safety, Health, and Environment (OSHE). The first part of the mission is "to partner with the rest of NIST to make safety, health, and environment (SH&E) integral core values and vital parts of the NIST culture." This commitment to safety was made by the NIST senior management about a year ago at the two-day Safety Summit convened by Dr. Gallagher. Dr. Kayser also summarized NIST's SH&E priorities and emphasized that the principal focus has been the continuing development and implementation of NIST's SH&E management systems which is a prerequisite to the other two priorities. These priorities align well with the recommendations of the BRCII to develop a suite of metrics and to establish an audit mechanism.

Dr. Kayser described the criteria used in selecting the SH&E metrics which cover potential impact, alignment with management priorities, and practical considerations, such as the suitable frequency for data collection. The initial set of six SH&E metrics cover the following areas: 1) safety culture; 2) safety management system development; 3) hazard management; 4) ionizing radiation safety; 5) fire and facilities safety; and 6) environmental management. NIST also has developed incident reporting and investigation measures aimed at improving its ability to do thorough and complete incident and investigations. The primary measure being used among this set is the "average completeness of incident investigation reports."

Dr. Kayser reviewed the list of the external SH&E assessments performed in Gaithersburg and the Boulder labs since the BRC II report and noted that the Nuclear Regulatory Commission will be conducting a "deep-cut" assessment of NIST's radiation safety program. He also highlighted the Assessment of the NIST Hazard Review Program which was completed in June 2012. A significant activity for NIST over the coming months is to analyze the results from this assessment and identify and take actions at all levels to strengthen NIST's management of hazards. NIST also hired an expert SH&E assessor to lead and manage its SH&E assessment program. The next steps are to formalize NIST's overall SH&E assessment program.

Lastly, Dr. Kayser shared example highlights of the NIST Operating Units (OUs) hazard review programs and encouraged the VCAT members to discuss these activities with the laboratory directors.

For more details, see Dr. Kayser's presentation

Discussion Summary – The group discussed the following topics:

- The Hazard Management metric should be broadened to include physical facilities and equipment.
- NIST continues to track classic measures such as case rates and recognizes the need for leading indicators.
- NIST may want to rethink its primary measure and consider replacing it with the "percentage of corrective actions taken on time."
- The VCAT would like copies of written reports related to the Assessment of NIST Hazard Review Program.
- OSHE includes a group of individuals in Boulder who are dedicated to safety.
- Most of the OUs have internal safety committees who conduct self-assessments.
- As part of each VCAT meeting, the members would like to see data on safety trends. NIST plans to establish a safety dashboard.

Formation of a VCAT Subcommittee on Safety –*Dr. Tony Haymet, VCAT Member*

Discussion Summary – Dr. Haymet, who served on the BRC II, described the concept for a VCAT Subcommittee on Safety and invited interested VCAT members to participate in this Subcommittee. The main purpose of this Subcommittee would be to review NIST's progress in building a safety culture since the plutonium incident in June 2008 and the previous two reviews by the BRC I and BRC II chaired by Charles Shank. He remarked that NIST is well along its journey of building a safety culture and shared an anecdote from his team review of the Hollings Marine Laboratory in South Carolina cohabited by five different organizations. Dr. Haymet also noted that NIST did not have a full set of metrics in place at the time of the BRC II review and suggested that the Subcommittee review the new suite of metrics. The Subcommittee also may want to review NIST's process for hiring a few key safety professionals.

The first Subcommittee meeting could be held at the NIST labs in Boulder, CO, on a day adjacent to the upcoming October VCAT meeting. One or two other members from the BRC II could be invited to the

Subcommittee meeting to provide their input. The Subcommittee meeting should follow the successful formula of the BRC II which included a mixture of presentations and interviews of the various constituencies.

Dr. Haymet agreed to chair this Subcommittee. VCAT members William Holt, Uma Chowdhry, Alan Taub, Al Romig, and Darlene Solomon are the initial set of Subcommittee members.

R&D Planning at NIST – *Dr. Willie May, Associate Director for Laboratory Programs and Principal Director, NIST*

Presentation Summary – Dr. May reviewed NIST's enacting legislation, NIST's planning environment, its current priorities and resource alignment, its new organizational structure and how it facilitates better planning, and the roles of the NIST Director and Associate Directors in planning and resource allocation.

The National Bureau of Standards (NBS), now NIST, was established by the Organic Act of 1901 which was updated in 2008. This legislation provides a broad framework for NIST's programs. As a non-regulatory agency within DOC, NIST has a unique mission within the Federal Government. The Institute's deep research expertise underpins technological innovation in areas such as new materials and advanced communications. Since its inception, in addition to maintaining the more traditional National physical standards, NBS/NIST has also focused a significant portion of its research and measurement service activities on addressing contemporary societal needs. Given its broad mission, NIST currently has Strategic Investment Priorities in eight areas.

In support of the U.S. Innovation Agenda, the past two Administrations agreed to substantially increase funding for the NIST laboratory programs which has grown from $383 million in FY 2006 to $567 million in FY 2012. The FY 2013 President's budget request includes $648 million for NIST's laboratory programs. NIST is faced with the challenge of how to do strategic planning for leveraging these new investments with the existing base to develop programs with maximum impact.

NIST's planning environment has several elements. Drivers include S&T priorities from each Congress, each Administration, industry, and other federal agencies. NIST needs to prioritize these inputs around the uncertainty of the federal budget process. Due to NIST's unique mission and broad responsibilities, effective planning at NIST cannot mimic other scientific laboratory-based organizations although there are some common attributes.

Turning to NIST's organizational structure, Dr. May noted that the Institute had an unstable leadership core from about 1992-2010 and the various laboratories, external programs, and administrative areas operated independently. In addition, congressional appropriations were provided as line items for the various scientific disciplines and the planning was done in each laboratory. The new NIST organizational structure was implemented to help the Institute align itself to address strategic program areas by establishing three Associate Directors who assist the NIST Director. The NIST Director is responsible for NIST's policies and priorities, and directs NIST's programs within the guidelines set by the Secretary of Commerce.

As the Associate Director for Laboratory Programs (ADLP), Dr. May serves as the Principal Deputy to the Director, assists in the overall direction of NIST, and has specific responsibility for the Laboratory Program. The ADLP is responsible for the Laboratory Program's strategic planning with assistance from the Program Coordination Office and the Laboratory Directors. The R&D planning and capacity building in the NIST Labs has a longer time scale and is the responsibility of the Laboratory Directors. Dr. May outlined the other specific responsibilities of the ADLP and the Laboratory Directors.

Dr. May described the diverse set of fiscal resources that are used for research to maximize the effectiveness of NIST's mission. These resources consist of laboratory base funds to support long-term R&D, budget initiatives to support new programs, Strategic and Emerging Research Initiatives (SERI) for specific projects, Innovations in Measurement Science (IMS) funding for innovative and creative ideas from NIST scientists and engineers, and Director's Reserve funding for short-term program needs. The ADLP controls the allocation of the latter three funding resources. The investment portfolio of the NIST Laboratory Program by strategic growth area was illustrated on a "work-in-progress" pie chart.

For more details, see Dr. May's presentation.

Discussion Summary – The group discussed the following topics:

- The presentation focused on the mechanics and tools available to address strategic priorities rather than the strategic planning process and NIST's strategic plan. The VCAT would like to learn more about NIST's strategic process and issues, for example:
    - How does NIST form its strategy?
    - What is the decision process for priority setting?
    - How are gaps identified?
    - How are decisions made to terminate programs? What programs are being terminated and how are these resources being reallocated?
    - What issues need attention and why? What are the future challenges?
    - What is the rationale for choosing a particular area over another?
    - What are the priorities for NIST over the next five years and why?
    - What are NIST's strategic issues?
- A histogram of past and future funding trends by focus area along with the explanation for the changes would also be of interest to the VCAT.
- NIST should consider updating its matrix of priorities presented to the VCAT several years ago and map its past and future projects against these areas.
- Strategic planning involves understanding the gaps and where future investments are needed.
- A strategic planning process for NIST is critical in this period of unsustainable growth.
- Although NIST has a unique mission to support industry, NIST may be able to learn from the planning processes used at other government research laboratories, such as the Naval Research Laboratory.
- NIST's strategic priorities are articulated in its Three-Year Programmatic Plan.
- Advanced Manufacturing is an example of the importance of understanding what needs to be done differently to keep the U.S. competitive.
- NIST has conducted several formalized strategic planning activities to identify drivers and measurement needs in particular areas, such as biosciences, which serve as the basis for developing initiatives. Some of these have not resulted in external reports.
- The NIST Director explained that optimizing the agency to have the greatest impact occurs at three levels. At the top level, decisions are being made about the optimization of the Laboratory Program versus the MEP program versus the new programs. The second level involves optimization within each of these programs, for example, looking at the Laboratory Program relative to its metrology mission, supportive standards mission, and its provision of measurement capability. The third level addresses optimization within the sub-mission space of each laboratory within the Laboratory Program.
- The NIST Director emphasized how NIST influences national priorities, such as the National Program Office of Advanced Manufacturing, and why the interagency process is important in having the White House and Congress amplify priorities proposed by NIST.
- NIST's funding from other federal agencies has been basically flat over the past six years.

- The role of the VCAT is to respond to propositions and reasons that lead to certain strategic directions at NIST and identify areas that need attention.

Overview of FirstNet – *Ms. Anna Gomez, Deputy Assistant Secretary for Communications and Information and Deputy Administrator, National Telecommunications and Information Administration (NTIA)*

Presentation Summary – Dr. Gallagher introduced Ms. Gomez who has been instrumental in the public safety broadband efforts and a key player in working with NIST as well as in the broader interagency context with other participants. He also noted that Ms. Gomez as well as Larry Strickling, the Assistant Secretary for Communications and Information at NTIA, deserves the credit for the strong interactions between NIST and NTIA. Ms. Gomez also acknowledged the wonderful working relationship between NIST and NTIA, and in particular, with Dereck Orr and his team in the Public Safety Communications Research Program.

Ms. Gomez reviewed Title VI of the Middle Class Tax Relief and Job Creation Action of 2012, Public Law 112-96, which includes provisions for the public safety communications and electromagnetic spectrum auctions. This legislation creates the path toward a nationwide public safety broadband network (PSBN) and is a long overdue promise to our Nation's first responders. This Act implements three key Administration priorities. It provides for a dedicated public safety spectrum, establishes the governance structure for the nationwide network through the First Responder Network Authority (FirstNet), and authorizes a funding level of $7 billion through proceeds of spectrum auctions. The Act also established a Technical Advisory Board for First Responder Interoperability within the Federal Communications Commission (FCC). Dereck Orr from NIST serves on the Board as the technical representative for NTIA.

Ms. Gomez also described the governance and purpose of FirstNet which was established by the Act as an independent authority within NTIA. FirstNet is headed by a 15-member Board which takes all actions necessary to ensure the design, construction, deployment, and maintenance operations of the nationwide PSBN in consultation with others, including the NIST Director. The Board is not an advisory committee; however, it will establish a public safety advisory committee.

FirstNet must consult with regional, State, tribal, and local jurisdictions regarding the distribution and expenditures of any amounts required to carry out its responsibilities. This consultation must occur through the designated single officer or governmental body designated by each state. To enable this consultation process, NTIA is required to establish a grant program to assist State, regional, tribal, and local jurisdictions to identify and plan the most effective way to utilize and integrate the infrastructure, equipment, and other architecture associated with the nationwide PSBN. NTIA issued a Request for Information (RFI) on the development of the State and Local Implementation Grant Program for the PSBN and comments are due by June 15, 2012.

FirstNet must also conduct and complete the Request for Proposal (RFP) process for the construction, operation, maintenance, and improvements of the nationwide PSBN. Once the RFP process is completed, FirstNet will notify each Governor about the deployment details and the funding levels for the State as determined by NTIA. Ms. Gomez reviewed the next steps involved with each Governor's decision whether to opt out of participation in the deployment as proposed by FirstNet or to conduct its own deployment of a radio access network in the State, including FCC's role in approving or disapproving the State's alternate plan. If the FCC approves the plan, then the State may apply to NTIA for a grant to construct the radio access network. There are also user fees and matching share requirements for those States that choose to build their own radio access network.

With regard to funding, Congress granted NTIA borrowing authority not to exceed $2 billion to implement the governance of the public safety spectrum and $135 million for the State and Local implementation grants. NTIA will borrow the initial funds from the general fund of the Treasury prior to the deposit of auction proceeds into the Public Safety Trust Fund (PSTF). Once the auctions take place, funds deposited in the PSTF are available on a cascading order of priority as mandated by statute, beginning with the repayment of the amounts borrowed by NTIA. If the auction raises $7.235 billion, then $100 million will be available to NIST to manage for public safety research and development. Further down on the priority list is $200 million for additional public safety research provided the auction raises these funds. The research funds may be available in a few years.

Lastly, Ms. Gomez reviewed the timeline for the major activities under the Act.

For more details, see the presentation.

Discussion Summary – The group discussed the following topics:

- NTIA will find a way to ensure that NIST's current standards work in support of the nationwide PSBN, including the 700 MHz demonstration network, will be funded before the $300 million for R&D becomes available from the auctions.
- Interoperability of the PSBN with the Department of Defense assets, such as the National Guard, is important. The Act allows for federal first responders to be eligible to use the PSBN.
- Some states may choose to opt out of FirstNet's proposed deployment if they are ready sooner or if they have cultural concerns over managing their local networks.
- The Interoperability Board's report on *Recommended Minimum Technical Requirements to Ensure Nationwide Interoperability for the Nationwide Public Safety Broadband Network* is available to the public on-line.
- NTIA received 70 responses to the RFI on the implementation grant program.

Public Safety Communications Research – *Mr. Dereck Orr, Program Manager, Public Safety Communications Research Program, Law Enforcement Standards Office, NIST*

Presentation Summary – Mr. Orr described NIST's efforts in support of public safety communications, NIST's expectations in response to the Middle Class Tax Relief and Job Creation Act of 2012, and complications that the spectrum auction requirement places on NIST in the short term.

The Public Safety Communications Research (PSCR) Program is a successful joint partnership between NIST's Office of Law Enforcement and NTIA's Institute for Telecommunications Sciences housed in Boulder, CO. This program is comprised of staff from both organizations that have been operating as a team for about 15 years. This program also leverages resources and expertise across the OUs in Gaithersburg by working collectively in such areas as security issues and helping to populate standards bodies. The Department of Homeland Security's Office of Interoperability and Compatibility has been the primary other agency funding sponsor for the PSCR and funding will no longer be provided by the Department of Justice Office of Community Oriented Policing Services. Mr. Orr reviewed the PSCR portfolio and noted that over the past few years the focus has dramatically shifted from local area networks (LAN) mobile radio standards and technology to at least 80 percent of its current work now in broadband standards and technologies.

The Act provides $100 million to NIST after the spectrum auctions net $7.2 billion or more and an additional $200 million to NIST if the spectrum auctions next more than $27.6 billion. The Congressional Budget Office estimates that these spectrum auctions could take upwards of 7 years before NIST can access these funds. Therefore, NIST needs to plan how to address the key issues required by FirstNet to

ensure the early success of this program without any expectation of this additional funding in the near term. The statute includes two different sections authorizing funding for NIST and for FirstNet's specific activities. FirstNet can provide funding from its $2 billion borrowing authority to meet its specific requirements related to PSCR activities.

Mr. Orr reviewed the areas in which PSCR's current activities directly overlap FirstNet's responsibilities within the parameters of the legislation. These responsibilities cover requirements, standards, testing, and research and development (R&D). PSCR has been working in the area of public safety requirements for the safety, security, and resiliency of the network for years, especially in the broadband arena by chairing, leading, and/or participating in working groups and other activities. With regard to standards, PSCR has been working to drive public safety needs into international standards bodies when developing standards for voice, data, and video communications. For example, PSCR has introduced a work item into the 3rd Generation Partnership Project to address Direct Mode communications, an effort which aligns directly with the recent VCAT report on public safety. In the area of testing, PSCR is working to identify the commercial test processes that FirstNet can leverage. Turning to R&D, the PSCR is responsible for the only operational multi-vendor broadband Demonstration Network in the United States, which is now deploying four separate operational cellular networks from different manufacturers. Over 60 manufacturers are involved with the Network though Cooperative Research and Development Agreements (CRADAs) and about $60 to $70 million of equipment has been donated through CRADAs. Other R&D efforts include audio quality testing, video quality testing, 700 MHz modeling and simulation, and Land Mobile Radio to Long Term Evolution (LTE) interface.

Lastly, Mr. Orr described some of the activities that would need to be covered under the $100 million R&D funds but cannot wait five years to begin planning. For example, a standards panel is needed to bring together various organizations to help develop a long-term roadmap for R&D for public safety communications, using the Smart Grid approach. A contract is in process to start planning for this effort.

For more details, see Mr. Orr's presentation.

Discussion Summary – The group discussed the following topics:

- The first round of tests for the Demonstration Network were built around the performance capabilities of the current LTE equipment and these results should influence FirstNet's design and architecture of the PSBN.
- The concept of a "single nationwide public safety 700 MHz pubic land mobile network" could include some roaming into a commercial network, which looks like a single network from the user perspective.
- A lot of planning and coordination will be needed to ensure coverage for the PSBN between the United States, Mexico, and Canada.
- Security across the PSBN will be a significant and major challenge for FirstNet. The VCAT report on public safety addressed the need for strong authentication mechanisms and rapid registration.
- A VCAT member congratulated Mr. Orr and his team for their "great" work in a difficult environment with complex issues.

Update on the Administration's Policy Framework for Advanced Manufacturing – *Dr. Phillip Singerman, Associate Director for Innovation and Industry Services, NIST*

Presentation Summary – In his introductory remarks, Dr. Singerman noted that the President's State of the Union remarks in February 2012 included 15 references to manufacturing and manufacturers which reflects the broad consensus at a high level within the Administration on the strategic importance of manufacturing and advanced manufacturing.

Dr. Singerman summarized the key components of the emerging policy consensus on advanced manufacturing. These include the recognition that manufacturing is important for U.S. economic productivity and global competitiveness in terms of quality jobs and large economic multiplier effects, advanced technology exports, a national security capability, and a sustained innovation ecosystem. Another emerging policy consensus is that the Federal Government's role is to create a supportive environment for manufacturing through policies dealing with technology, trade, training, and taxes. The other key areas address the importance of a robust R&D regime to technology development, public/private partnerships, regional innovation clusters, state and local economic development organizations, and small and medium sized enterprises. Many third-party studies and reports on advanced manufacturing have significantly informed the emerging policy consensus, such as those issued by the Information Technology and Innovation Foundation, the Council on Competitiveness, the Brookings Institute, and the National Academy of Sciences.

The emerging policy consensus reflects strong bipartisan congressional support. In particular, the America COMPETES Reauthorization Act of 2010 includes several provisions regarding the DOC and NIST roles in manufacturing. Additional legislation with bipartisan support is pending. For example, Dr. Singerman recently testified before the House Subcommittee on Commerce, Manufacturing and Trade on a national manufacturing competitive strategy.

Recent reports by the President's Council of Advisors on Science and Technology (PCAST) and the National Science and Technology Council (NSTC) provide the context for NIST's activities in advanced manufacturing to implement the emerging policies. The PCAST recommendations cover the need for a whole-of-government effort led by DOC and the importance of public/private partnerships, shared facilities, improved tax policy, supporting research at three key science agencies, and strengthening the workforce. The PCAST report also provides a definition of advanced manufacturing and identifies the critical technologies. In response to the America COMPETES Reauthorization Act of 2010, an NSTC Interagency Working Group on Advanced Manufacturing was established to develop a strategic plan to guide federal programs and activities in support of advanced manufacturing R&D. Dr. Gregory Tassey, the NIST Chief Economist, co-chaired this working group and co-authored their report, *A National Strategic Plan for Advanced Manufacturing*, released in February 2012. This report outlined five objectives for federal policy including increasing public and private investments, and fostering national and regional partnerships.

Turning to how NIST implements these policies, Dr. Singerman noted that strengthening U.S. advanced manufacturing is one of three priorities described in NIST's 3-Year Programmatic Plan for FY 2013-2015. He also reviewed the funding levels in the FY 2013 President's budget request in support of advanced manufacturing which total $135 million for the NIST Laboratories, $128 million for MEP, $21 million for the launch of AMTech, and $1 billion for the establishment of the NNMI. Dr. Singerman described how each of NIST's Innovation and Industry Services Programs are aligned with manufacturing priorities and, in particular, highlighted MEP's broad legislation and its new focus on technology and innovation, such as MEP's engagement in the Manufacturing Skills Certification Program and the Buy American Supplier Scouting.

In closing, Dr. Singerman provided an update on the Advanced Manufacturing Partnership (AMP) established by President Obama on June 24, 2011. The AMP Steering Committee is comprised of leading experts from industry and academia, operating under PCAST to provide recommendations on advanced manufacturing. Four AMP regional outreach workshops were held across the country with participation by over 1,200 stakeholders. On April 16, 2012, PCAST reviewed the AMP Steering Committee report and unanimously approved its transmittal to the President. The Steering Committee reached consensus on 16 recommendations in three major themes: enabling innovation, securing a talent pipeline, and

improving the business climate. Dr. Singerman emphasized that one of the recommendations calls for a key role for the NIST National Program Office in coordinating the "whole of government" response.

For more details, see Dr. Singerman's presentation.

Discussion Summary – The group discussed the following topics:

- More time and energy needs to be spent on getting technology adopted by small manufacturers, which is very challenging.
- A "throw away economy," the need for sustainability, and the vision for smart manufacturing also were discussed. NIST can play a role in providing the tools to use for a sustainability assessment but the more difficult issue is addressing the culture shift in finding the balance between consumer needs and supply markets. A remanufactured product can be considered as an opportunity for advanced manufacturing but in some cases, consumers need to balance societal and environmental needs.

Update on the Advanced Manufacturing National Program Office – *Mr. Mike Molnar, Chief Manufacturing Officer, NIST*

Presentation Summary – Mr. Molnar provided an overview of the Advanced Manufacturing National Program Office (AMNPO), its strategic work plan, and intra Commerce related programs. Hosted by NIST, AMNPO was established in December 2011 to provide interagency planning and coordination of advance manufacturing programs, lead federal initiatives resulting from the NSTC and PCAST/AMP reports, and provide a linkage to the private-sector partnerships between manufacturers, government and universities. AMNPO is charged under the Executive Office of the President and will receive guidance from agency leaders within the NSTC. AMNPO's core team will be comprised of members from key federal agencies, industry and academia. To date, eight full time detailees from other agencies have been identified.

AMNPO has identified three priorities for FY 2012. One priority will focus on strategic plans for Advanced Manufacturing to coordinate strategy, programs, and projects for federal activities supporting AMP through NSTC. Mr. Molnar showed an example of AMNPO's work plans that structures each of the NSTC and AMP recommendations around goals, metrics, and mappings to agency plans and programs. Concurrence has not yet been reached on the priorities and leadership of these recommendations.

A second priority is to lead by providing a whole-of-government interface to stakeholders. These activities will focus on implementing the national strategy for advanced manufacturing and coordinating federal activities in support of AMP. Furthermore, AMNPO will facilitate this interface through electronic outreach with websites focused on federal advanced manufacturing activities (www.manufacturing.gov) and government data on manufacturing (www.manufacturing.data.gov) and through physical outreach such as convening U.S. regional planning meetings and other public events. AMNPO is on track to meet its stretch targets of holding six regional NNMI workshops and having 12 major keynote speakers at all major manufacturing conferences in 2012.

The third priority is to pilot a multi-agency initiative in Additive Manufacturing to demonstrate the concept of multi-agency, industry, and academia jointly executing a single program and to use the lessons learned to benefit the design and structure of the NNMI. Mr. Molnar emphasized that this initiative is not a Pilot Institute for Manufacturing Innovation (IMI) since the IMIs have not yet been designed. The award for the Additive Manufacturing Pilot is expected to be finalized by August 15, 2012. This topic was selected based on U.S. industry's needs.

As additional context, Mr. Molnar reviewed the President's announcement of the proposed $1 billion NNMI and noted that the AMNPO's task is to design the NNMI. The NNMI will be composed of up to

15 linked IMIs which will serve as regional hubs of manufacturing excellence to bridge the gap separating research discoveries, inventions, and promising ideas from product development and eventual commercialization. To facilitate public engagement in the design of the NNMI and the IMIs, NIST issued an RFI open from May 4 through October 31, 2012. In addition, public workshops will be held around the nation in partnership with the private sector and will emphasize the regional needs.

Examples of other interagency partnerships include the Federal Funding Opportunity for the Advanced Manufacturing Jobs and Innovation Accelerator Challenge in which the MEP will play a major role, and Select USA, an information clearinghouse that advocates investments in U.S. cities, states, and regions. In closing, Mr. Molnar stated that the AMTech complements the NNMI.

For more details, see Mr. Molnar's presentation.

Discussion Summary – The group discussed the following topics:

- The management of intellectual property (IP) and the use of IP by foreign companies need to be addressed. The IP environment for the IMIs will probably be project specific.
- Once the IMIs are operational, the Federal Government should identify lessons learned with respect to interagency coordination. The President's Information Technology Advisory Committee (PITAC) is an example of a successful cross-agency coordination effort. Some of the interagency mechanisms used in the Technology Reinvestment Project should also be considered in the design of the NNMI.

Advanced Materials for Industry: NIST and the Materials Genome Initiative –*Dr. Laurie Locascio, Director, Material Measurement Laboratory, NIST*

Presentation Summary – In her opening remarks, Dr. Locascio announced that NIST's efforts in the Materials Genome Initiative (MGI) reflect a very strong collaboration between the Information Technology Laboratory, the Material Measurement Laboratory (MML), and the Engineering Laboratory (EL). She described the NIST program in the context of the MGI for Global Competitiveness that was announced by the Office of the President in June 2011. The goal of the MGI is to decrease the cost and time to market for advanced materials products by 50 percent. Three separate sub-goals are associated with this goal. A graphic of the Materials Innovation Infrastructure illustrated how the intersection of advanced experimental tools, advanced computational tools, and digital data will allow for great leaps in innovation within the context of materials development.

In addressing the need for the MGI, Dr. Locascio explained that materials are complicated systems and modeling of these systems is a challenge. Without adequate modeling, informatics, and data exchange, the development of next generation materials has been delayed. Dr. Locascio described the images of the microstructure of an alloy cooled at different temperatures to illustrate why materials processing is difficult without appropriate modeling.

NIST's FY 2012 budget initiative in Advanced Materials for Industry was funded at $4 million to provide the measurement and standards infrastructure needed to realize the MGI. Dr. Locascio described how NIST will implement this initiative in the first few years by working with stakeholders in industry, academia and government to develop standards, tools, and techniques in three areas and summarized the expected outcomes.

NIST selected two initial pilot projects in advanced materials design that build upon its existing expertise in materials experimental analysis, materials data, and software. The initial pilot projects are 1) Structural Metallic Alloys with application areas in aerospace, automotive, structural steels, and infrastructure; 2) Advanced Polymer Composites with application areas in lightweight replacements for metals, national

security: and 3) sustainable and bio-based materials. These pilots were developed to respond to a key set of overarching questions from NIST's stakeholders and industrial partners.

The Calculation of Phase Diagrams (CALPHAD) is an example of NIST's historical success. Although CALPHAD was not created at NIST, the Institute helped improve its performance and validation. The National Academies recently identified the CALPHAD method as "one of the pillars in Integrated Computational Materials Engineering."

MGI will change the way that NIST does science and service in the material science and engineering area. The MGI's structural models and property/structure models will allow NIST to take leaps in material measurement science. The structural models will provide powerful new tools for interpreting and mining data-rich materials images while the property/structure models will allow rational screening rather than Edisonian screening of the discovery space. In addition, the MGI will support NIST's next generation reference material and data services. MGI's predictive models will radically expand the scope and depth of NIST standard reference data which will help industry improve materials selection and design. The structure/property models will enable NIST to accelerate the development and deployment of standard reference materials to better serve the needs of materials developers in areas such as energy, electronics, infrastructure, and transportation.

From the onset, NIST has played a key leadership role in working with OSTP and other agencies to move forward the MGI as demonstrated by recent coordination events. The recent White House Event entitled, "The MGI: Catalyzing a National Movement" began as a NIST workshop but was elevated to kick-off the MGI on a national level and highlight new efforts in this area across the United States. NIST helped organize this event and was a participant, as well. Soon after this event, NIST sponsored a workshop, "Building the Materials Innovation Infrastructure: Data and Standards," which was attended by many of the same participants as the White House event. This workshop's outcomes included the identification of critical data/infrastructure challenges and the determination to develop Web 2.0 resources to enable collaborations. NIST will hold follow-on workshops in the fall of 2012 for uncertainty and in the winter of 2013 for model interoperability.

In conclusion, Dr. Locascio remarked that NIST has a nationally scoped program with broad stakeholder buy-in. In addition, NIST mission defines a central role to realizing the MGI goals and the NIST MGI efforts builds off a strong and focused set of internal efforts. The hard work has already begun.

For more details, see Dr. Locascio's presentation.

Discussion Summary – The group discussed the following topics:

- The NNMI and the MGI are distinct programs at NIST and carried out in two different parts of the organization. The MGI program is focused on NIST's core mission in metrology while the NNMI activities are externally focused. However, industry will be involved with both programs.
- NIST has coordinated efforts across MML, the Center for Nanoscale and Technology, and the NIST Center for Neutron Research to study different materials properties under the "Nano" headline.
- NIST may want to consider involving students in the modeling efforts as done in DARPA's Metal Oxide Silicon Implementation System program as a way to get people excited about understanding new materials. There also may also be an opportunity for the students to use one of MEP's distributed facilities.

Foundations for Innovation in Cyber-Physical Systems – *Dr. S. Shyam Sunder, Director, Engineering Laboratory, NIST*

Presentation Summary – Dr. Sunder described why Cyber-physical systems (CPS) are the future, the fundamental R&D needed to support CPS, and NIST's current engagement in this area. Consistent with its standards mission, NIST is focusing on CPS and has been actively engaged in the Federal Networking and IT R&D (NITRD) Program which coordinates interagency CPS R&D. Although many federal agencies have CPS linked to their mission and to innovation and growth, they may not have very active R&D programs.

The convergence of networking and IT with manufactured products, engineered systems of products, and associated services will enable a new generation of "smart" systems. These "smart" cyber-physical systems will have applications in a number of domains such as buildings and structures, transportation, health care, infrastructure, emergency response, war fighting, and smart production. Cyber-physical systems are integrated, hybrid networks of cyber and engineered physical elements and need to be co-designed and co-engineered to create adaptive and predictive systems. These systems will improve performance including safety and security, reliability, agility, privacy, and efficiency and sustainability. Dr. Sunder showed a concept map of the CPS platform technologies such as cybersecurity, validation and verification, and wireless sensing and actuation.

Dr. Sunder summarized six key R&D challenges, NIST's CPS R&D strategy, and the potential economic and national impacts. NIST plans to 1) address cross-cutting R&D challenges through fundamental and applied research; 2) enable self-consistent solutions across diverse applications through platform-based architectures, tools, and standards; and 3) establish strong interagency and public-private partnerships.

NIST has been engaged in many CPS activities, beginning with the establishment of a NIST CPS Working Group in January 2011, which meets at least three times a month. NIST also established a cooperative agreement with the University of Maryland for CPS R&D, conducted a Short Course for NIST executives and senior staff, and co-sponsored several CPS workshops with a focus on R&D needs assessment, performance metrics for intelligent systems, and cybersecurity. A NIST-hosted CTO Roundtable on CPS was held in June 2012 to explore CPS drivers and articulate a strategic vision for CPS R&D as input to the federal planning process at all levels. NIST is also developing a CPS testbed that will integrate multiple, distributed applications in four study areas covering architectures, models, sensors, and cybersecurity. Lastly, the President's FY 2013 budget request includes a $10 million initiative for NIST to support smart manufacturing, some of which would be invested in CPS.

In closing, Dr. Sunder noted that CPS is critical for our future, significant fundamental research issues remain, numerous measurement science barriers exists, and programmatic efforts are underway at NIST.

For more details, see Dr. Sunder's presentation.

Discussion Summary – The group discussed the following topics:

- A different type of environment is needed to mesh the on-going classified CPS work and industry's proprietary CPS efforts with NIST's activities.
- A VCAT member remarked that the CPS program is a great example of strategic planning. The CPS program at NIST was created from the top down by the NIST Director to build a core capability that could address the likely explosion of cross-cutting needs in domain-specific areas, such as Smart Grid, Health IT, smart buildings, and smart manufacturing.
- One example of a success outcome relates to the time savings to an automotive plant in addressing the interoperability between their systems.
- The CPS testbed will be physically distributed across the NIST campus and discussions have been taking place with other organizations about remote access to the testbed as a longer-term goal. An instrumentation plan for the CPS testbed was also discussed.

- NIST has an opportunity for a leadership role in driving the needed system-level standards.

NIST Centers of Excellence – *Dr. Willie May, Associate Director for Laboratory Programs, NIST*

Presentation Summary – In describing the concept for the proposed NIST Centers of Excellence, Dr. May noted the importance of establishing more strategic partnerships with external organizations to help carry out the NIST mission. He also provided an overview of NIST's successful partnerships with academia and others through four joint institutes: JILA in Boulder, Colorado; the Institute for Bioscience and Biotechnology Research (IBBR) in Rockville, Maryland; the Joint Quantum Institute (JQI) in College Park, Maryland; and the Hollings Marine Laboratory (HML) in Charleston, South Carolina. The National Center for Cybersecurity is planning to have its facilities at the IBBR.

A funding level of $20 million for the NIST Centers of Excellence is included in the President's FY 2013 budget request. NIST would create up to four competitively-selected centers which would complement and extend NIST measurement science capabilities and facilities in critical areas. Dr. May noted six strategic areas and emphasized that these are only examples and that NIST has not yet determined the specific areas. Furthermore, NIST would benefit to have a presence beyond its two campuses in Gaithersburg and Boulder.

The immediate questions to be answered address the nature of the new Centers, along with the governance model and the selection criteria. NIST is discussing whether the new Centers should be aligned with a subset of NIST's investment priority areas or be based more on the mission of an individual Operating Unit. NIST also is thinking about the possibility of using any of these resources to enhance its current joint institutes or to invest all of the new resources into one center. While reviewing the proposed framework for the governance model, Dr. May highlighted issues involving the use of a grant or cooperative agreement to fund these Centers and the feasibility of an annual review. Dr. May also asked for the Committee's input on the proposed selection criteria and emphasized the need for a very open, transparent, and firm selection process.

For more details, see Dr. May's presentation.

Discussion Summary – The group discussed the following topics:
- NIST may want to consider having the National Science Foundation (NSF) as a partner in these Centers.
- Forensics is another area which NIST may want to consider for a Center of Excellence.
- The $20 million funding request will be added to the NIST base which represents a long-term commitment but it is still undetermined whether the funding to a particular Center will be on an annual basis.
- NIST may want to identify the major gaps and opportunities that should be addressed in each emerging area of national need to reflect a more strategic process. This process has been done for quantitative biology in which NIST has identified synthetic biology as an area requiring more engagement.
- The governance models for the JQI and JILA were designed to create research preeminence in areas that are aligned to the NIST mission. Both of these institutes receive funding from NIST, NSF, and other agencies. Dr. Gallagher described the dual benefit of JILA, which will be celebrating its 50th anniversary this summer. Furthermore, Jan Hall, a JILA Fellow, was awarded the 2005 Nobel Prize and has helped influence JILA's focus on measurement science.
- The HML is an example where NIST exerts control over the activities through participation with the other partners in an Executive Board and a Science Board.

- The Centers of Excellence could be more problem-focused, such as the HML, where different types of science and agency missions form a partnership to address a common problem.
- The predominant focus of the National Cybersecurity Center of Excellence is to have joint ventures with industry working with NIST on specific use cases and problems.
- NIST wants to leave its options open in designing these Centers so that it can preserve the flexibility to use the new funding to create meaningful partnerships and design each of the joint activities in an appropriate fashion.

National Cybsersecurity Center of Excellence: Update, Operational and Business Model – *Dr. Charles Romine, Director, Information Technology Laboratory, NIST*

Presentation Summary – In his introductory remarks, Dr. Romine noted that NIST has made significant progress on the National Cybersecurity Center of Excellence (NCCoE) since his June 2011 briefing to the VCAT. He emphasized that the name of this Center was mandated in the legislation and reviewed the Center's vision and mission. The purpose of the NCCoE can best be summarized in a quote from the NIST Director's remarks at the Memorandum of Understanding signing ceremony between NIST, the State of Maryland, and Montgomery County in February 2012 in which he stated, "…cyber crime hurts individuals, businesses and government agencies. We want to bring together the best minds and provide them with the best tools to create and test solutions…"

NIST has identified internally three initial use cases for the NCCoE focus in the short term: 1) Health IT Use Case with an emphasis on information exchange; 2) Cloud IT Use Case dealing with security policy enforcement; and 3) a Federal Use Case for continuous monitoring as a key component of securing federal systems. In steady state, the Center is expected to have four to eight active use cases at any one time. The business model calls for external input to determine future use cases. Since the NNCoE also will be used as a mechanism for fostering the exchange of knowledge, NIST is planning to host a focused technology session centered around the protected and signed Basic Input/Output System (BIOS).

Dr. Romine also reviewed the the NCCoE's staff and support, facilities, and immediate next steps. The NCCoE staff and support will be comprised of NIST staff, contractors, and detailees from other federal agencies, including the Department of Homeland Security and the National Security Agency. A staffing goal of about 15 to 18 NIST employees is envisioned at steady state. For Phase 1, facilities at the University of Maryland consisting of 6,092 square feet have been identified to house the labs, offices, and collaboration spaces. An architectural firm has been awarded a contract to design the interior space required for a more collaborative environment in Phase 2. NIST also is working collaboratively with Montgomery County and the State of Maryland regarding access to incubation space. The immediate next steps involve holding the first workshop to initiate public engagement; beginning to open business community engagement to identify next communities and solicit requirements for future use cases as well as to solicit business drivers; and to solicit feedback and comment on the business engagement plan and the operations process. As an example of a proposed use case workshop, Dr. Romine described the business need for a security platform to enable the exchange of electronic health information by small healthcare providers along with the related data and information, sectors, and relevant technologies, standards, and infrastructure. He noted that there are big challenges associated with this user case and that the NCCoE will emphasize the usability of the solutions.

The three next steps for the NCCoE are to establish communication mechanisms, establish metrics and measures, and provide value. Communications mechanisms include input from an Advisory Board, business leader groups, and other relevant consortia as well as open public involvement through social media and future workshops. Metrics and measures will be reported as a key function and used to adjust the NNCoE approach, as needed. To provide value, the NNCoE will publish reference materials and

gather feedback on their use. The reference materials are envisioned as integrated templates that have demonstrated the delivery of a secure environment in which the business can operate.

The NCCoE business model consists of two major phases, each with two components. The Planning Phase involves business engagement and the problem statement selection which leads to the proposed use case. The second phase involves an open call for IT industry participation, including agencies, academia, and consortia, and the identification of the components followed by the implementation of the reference architecture in the Center's operational environment. The solution will be documented with enough detail that it can be reproduced and traced to standards, guidelines, and best practices. As one of the most important outreach mechanisms, the NCCoE will also host technical sessions to explain the reference architecture to the community. Dr. Romine also reviewed several expected benefits from the NCCoE, including the accelerated adoption of practical, affordable, and usable cybersecurity solutions.

Lastly, Dr. Romine provided a pictorial representation of the NCCoE operational model. Donna Dodson, Chief of ITL's Computer Security Division, is serving as the Center's Acting Executive Director. The Center will provide the collaborative space for a standards-based trusted environment with the ability to draw expertise from across NIST.

For more details, see Dr. Romine's presentation.

Discussion Summary – The group discussed the following topics:

- NIST does not expect any staffing challenges for the NNCoE related to citizenship.
- Sandia National Laboratories has a fine IT department and should participate in the use case recommendations.
- Packaging cybersecurity research in a usable and adoptable format such as "reference architectures" is currently missing and, once developed, can have an impact on raising the security bar in various sectors.
- There also is a need for conformity assessment on security.
- The NCCoE's connection to the research mode is absolutely critical.
- NIST may want to consider how to architect the NIST IT system to monitor intrusions as a use case.
- The balance between the software and hardware side of cybersecurity is a concern.
- Members from the venture and investment community should be consulted about IP management when thinking about how to drive the technologies from commercialization into the marketplace.
- A member suggested that NIST consider operating the Center similar to the MEP network.

Federal Engagement in Standards and Conformity Assessment Activities: Recent Developments – *Dr. Mary Saunders, Director, Standards Coordination Office, NIST*

Presentation Summary – Dr. Saunders reviewed the key objectives and high-level principles set forth in the January 17, 2012, White House Memorandum for Heads of Executive Departments and Agencies on Principles for Federal Engagement in Standards Activities to Address National Priorities and noted that the agencies are heavily involved in its implementation phase. The memo and principles have already had substantial impact, including providing the private sector with greater clarity and certainty about federal government engagement and conveying the U.S. government's continuing commitment to public-private partnerships which is unique globally.

The uptake of the White House principles have been substantial as illustrated by a partial list of the key technology areas of interest to the NSTC subcommittees and committees. For example, NIST was asked by the White House to lead the standards element in the National Strategy for Global Supply Chain Security pursuant to the principles set forth in the White House memorandum referenced above. Dr.

Saunders also summarized the standards activities and federal engagements in the other areas on this list: global internet governance, information sharing across the government, smart disclosure, and financial data sharing.

There have been several significant developments in the agency use of standards. In December 2011, the Administrative Conference of the U.S. issued recommendations on international regulatory cooperation and incorporation of standards by reference in regulations. The Office of the Federal Register received a petition for rulemaking on incorporation by reference. NIST also is working with the Office of Management and Budget (OMB) on implementing the Executive Order on Promoting International Regulatory Cooperation. The recent World Trade Organization decision confirming the principles for international standardization reflects the U.S. approach.

Another significant development is the OMB RFI on OMB Circular A-119 to comment on current issues regarding federal agencies' standards and conformity assessment activities and attend a related workshop held at NIST. OMB is deciding whether and how to supplement this Circular which was last revised in 1998. Several staff in the NIST Standards Coordination Office have spent a tremendous amount of time reviewing the 70 RFI responses from 67 different organizations, including Standards Developing Organizations (SDOs), conformity assessment entities, and trade associations.

NIST has begun to update its conformity assessment guidance for agencies which was issued in 2000 and will follow whatever OMB's decision is regarding addressing conformity assessment more comprehensively. Over the past five years, NIST has been working with many agencies on modeling conformity assessment programs and recommends a risk-based approach to conformity assessment system design. NIST plans to revise its guidance by the end of 2012 following OMB's action on the Circular. The revised guidance will be structured to assist agencies in conformity assessment activity development and use, and will focus on methods to reduce redundancy and complexity and where possible reduce industry burden.

Dr. Saunders also reviewed the NIST roles and recent developments in standards for Health IT and Smart Grid. NIST has been collaborating with Health and Human Services, industry, and SDOs for emerging Health IT standards as well as developing test tools to accelerate adoption, advising on a software certification system, and assisting in the implementation of a certification system. NIST roles in Smart Grid are to develop and maintain the NIST Smart Grid Interoperability Framework, administer the Smart Grid Interoperability Panel (SGIP) and the Advisory Committee, and engage actively the broad range of stakeholders, including Federal and State regulators and about 25 SDOs. While NIST is supporting the transition of the SGIP to private sector funding, it remains committed to continued engagement and leadership within the SGIP and shifting its funds to increasing internal Smart Grid measurement science program. With regard to new opportunities, NIST is having discussions with the Gas Technology Institute and other stakeholders to make connections between electricity, gas, and water infrastructures.

Dr. Saunders summarized industry's concerns regarding the expanding role of the International Telecommunications Union (ITU) which will be meeting at the end of this year for the first time since 1988 to discuss updating the International Telecommunications Regulations dealing with global interconnections and interoperability of telecommunications services. NIST is part of the core delegation working on the U.S. positions on each of the issues and is very concerned about the standardization and conformity aspects.

Lastly, Dr. Saunders reiterated NIST future activities related to the topics discussed above and noted that NIST will continue to work with OMB and the agencies on access to and timeliness of documents incorporated by reference. Web links to several of the documents addressed in this talk were provided.

For more details, see Dr. Saunders's presentation.

Discussion Summary – The group discussed the following topics:

- NIST has not yet met with Terry Kramer, the new U.S. Head of the Delegation for the WCIT.
- NIST has not yet been asked to take a position on the incorporation of standards by reference but is working closely with the Administrative Conference in developing their recommendation as well as with OMB on the Circular A-119 RFI and the Office of the Federal Register. NIST has also begun discussions on this topic with the SDOs who have been very cooperative.
- The OMB RFI for Circular A-119 refers to the copyright associated with the documents that are incorporated by reference in the Code of Regulations, not special publications from NIST.
- More details were provided on the Health IT software certification process for implementing electronic health records.

Tour of the Net-Zero Energy Residential Test Facility

The Net-Zero Energy Residential Test Facility is a unique laboratory at NIST designed to demonstrate that a typical-looking suburban home for a family of four can generate as much energy as it uses. The two-story, four-bedroom, three-bath facility incorporates energy-efficient construction and appliances, as well as energy-generating technologies such as solar water heating and solar photovoltaic systems. Following an initial year-long experiment to prove net-zero energy usage, the facility will be used to improve test methods for energy-efficient technologies and develop cost-effective design standards for energy-efficient homes that could reduce overall energy consumption and harmful pollution, and save families money on their monthly utility bills.

Adjournment

The meeting was adjourned at 11:30 a.m. on Wednesday, June 20, 2012.

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. Vinton Cerf, Chair, NIST Visiting Committee on Advanced Technology