VISITING COMMITTEE ON ADVANCED TECHNOLOGY (VCAT)
MINUTES OF THE FEBRUARY 6-7, 2013, MEETING
GAITHERSBURG, MD

ATTENDANCE:

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

VCAT Exec. Dir.
Ehrlich, Gail

NIST Leadership Board/Designee
Boehm, Jason
Brown, Essex
Celotta, Bob
Dimeo, Robert
Fowler, James
Gallagher, Patrick
Harary, Howard
Hertz, Harry
Kayser, Rich
Kelley, Michael
Kilmer, Roger
Kimball, Kevin
Locascio, Laurie
May, Willie
Olthoff, James
Romine, Chuck
Salber, Stephen
Saunders, Mary
Singerman, Phillip
Sunder, Shyam

NIST Staff
Acierto, Linda
Allocca, Clare
Arnold, George
Arrisueno, Gladys
Asmail, Clara

Participated by Webinar

NIST Staff Cont:
Averill, Jason
Balicao, Francisco
Banovic, Steve
Baum, Michael
Cavanagh, Richard
Cherny, Paul
Coraggio, Mary-Deirdre
Dobrzeniecki, Aimee
Driscoll, Anne
Edelstein, Monica
Evans, Heather
Fangmeyer, Robert
Fasolka, Michael
Folk, Alex
Gan, Ronald
Gates, Richard
Goldstein, Barbara
Hardis, Johnathan
Haynes, Ross
Henderson, Diane
Houston, Jeanne
Huergo, Jennifer
Hughes, Colleen
Ibberson, Richard
Jillavenkatesa, Ajit
Lagas, Brian
Lellock, Karen
Liu, Rosa
McCarty, Polly
Miller, Cameron
Miner, Laurel
Porter, Gail
Reidy, Kari
Rivera, Eddie
Satterfield, Mary
Schufreider, Jim
Seiler, David
Semerjian, Hratch
Shaw, Stephanie
Silcox, Barbara
Slattery, Oliver
St. Pierre, Jim
Tarlov, Mike

NIST Staff Cont:
Thatte, Dileep
Thorne, Roger
Varadi, Laslo
Wagner, Stacey
Warren, Jim
Whitman, Lloyd
Williams, Carl
Windover, Donald
Yakimov, Gary

Others
O'Brien, Francis – Alcatel-Lucent
Michael Coast – President, Michigan Manufacturing Technology Center
Rice, Mark – President, Maritime Applied Physics Corporation
Rogers, Kenneth – Consultant, Former Commissioner of the Nuclear Regulatory Commission
Stanley, Marc – Member of the Public
VanSchalkwyk, William – Managing Director, Environment, Health, and Safety Programs, Massachusetts Institute of Technology
Webber, Naomi – Lewis-Burke Associates LLC, Government Relations

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

Dr. Cerf called the meeting to order at 11:00 a.m. and pointed out the emergency exits. He announced that his membership term expires on March 31, 2013, which will result in a vacancy for the Chair. Nominations for the interim Chair and Vice Chair were received in advance of the meeting. Alan Taub was the only nominee for the interim Chair and Tony Haymet was the only nominee for the interim Vice Chair. The members voted by secret ballot and/or absentee ballot to express the will of the Committee. The members unanimously elected Alan Taub as interim Chair and Tony Haymet as interim Vice Chair to serve from April 1, 2013, through March 31, 2014.

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

Presentation Summary – Dr. Gallagher began his presentation by reviewing NIST safety metrics. NIST's Total Recordable Case (TRC) rates and its Days Away, Restricted, or Transferred (DART) rates for Fiscal Year (FY) 2007 – 2008 were compared with its peer laboratories within the Department of Energy. NIST's TRC rates are declining while its DART rates are increasing. A breakdown of NIST's injury data by Organizational Unit (OU) for FY 2012 and the first three months of FY 2013 revealed that the highest level of DART recordables occurred in Management Resources which includes facilities and property management activities rather than in the Laboratory Programs. The initial focus of the NIST Safety Management Program has been on high-hazard activities. To help improve the safety data, every Operational Unit at NIST will be identifying a specific area of safety improvement to focus their activities which will be reflected in performance plans. NIST is also in the process of identifying safety values that are critical to the agency.

Moving on to membership, Dr. Gallagher planned to welcome new VCAT member John Tracy to his first meeting today but due to a last minute work conflict, he could not attend. Dr. Tracy is the chief technology officer of The Boeing Company and senior vice president of Engineering, Operations & Technology. Dr. Gallagher also thanked departing members, Shaygan Kheradpir and Vinton Cerf, for their service and presented them with certificates of appreciation. Vinton Cerf was recognized for his leadership and crucial role in repositioning the VCAT to have maximum impact on helping to position NIST for success.

Two major organizational changes have taken place at NIST since the October VCAT meeting. Mary Saunders, the former Standards Coordination Office Director, is now the Associate Director for Management Resources. The new Standards Coordination Office Director is George Arnold, the former National Coordinator of the Smart Grid Interoperability Program.

Turning to the budget, NIST is currently operating under a Continuing Resolution through March 27, 2013. NIST has been planning for the Sequestration, which was postponed until March 1, and will not need to furlough staff or have a Reduction-in-Force at the expected sequestration levels. Instead, spending will be reduced mostly for other objects, grants, and contracts. Highlights from the OMB guidance on Sequestration were provided. The President's FY 2014 budget request is still pending and cannot be discussed. NIST has begun internal planning for the FY 2015 budget request.

With regard to planning, the updated NIST Three-Year Programmatic Plan has been delayed due to the timing of the release of the FY 2014 budget request and, therefore, has not been sent to the VCAT for comment. The updated three-year plan will include elements of NIST's new strategic planning framework. Dr. Gallagher described the new planning framework which looks at the NIST mission from three different perspectives: 1) long-term evolution and capacity building; 2) alignment with critical needs; and 3) internal goals and process improvements. Program planning addresses national priorities

with a focus on NIST's relevance and impact. Capacity planning looks at the science and technology drivers to identify the capabilities needed to best position NIST to carry out its mission over the next five to ten years. Internal improvement planning addresses processes needed for NIST to be more effective at its mission. For example, NIST has been focusing on safety improvement and recently launched the "Business of NIST" effort to improve activities involving the management of money, such as acquisition, agreements, and grants.

Dr. Gallagher provided updates for six programs. The National Cybersecurity Center of Excellence (NCCoE) has already attracted industry collaborations for its first use case in the realm of health IT and a Federally Funded Research and Development Center (FFRDC) is in the process of being set up as a governance structure. Smart Grid activities are now being managed by the fully private entity Smart Grid Interoperability Panel referred to as "SGIP 2.0." In the area of public safety communications, NIST is providing technical expertise to FirstNet in several areas, including requirements gathering and standards development. NIST is planning to establish a Center for Advanced Communications (CAC) in partnership with the National Telecommunications and Information Administration (NTIA) which would be housed in Boulder, as a focal point for industry and government engagement, and discussions are underway with the Department of Defense to leverage this Center. With regard to the National Network for Manufacturing Innovation (NNMI), a report on the preliminary design for the NNMI was released on January 16, 2013, which was developed by the interagency team led by the Advanced Manufacturing National Program Office, and a series of follow-up reports have been developed. The Engineering Laboratory and the Information Technology Laboratory are working together to address cross-cutting issues in cyber-physical systems (CPS), and this effort is one of NIST's capacity planning activities.

NIST staff continues to receive prestigious awards. NIST Fellow Deborah Jin was awarded the 2013 L'Oreal-UNESCO Award for Women in Science, representing North America. Also, Jon Boyens, Jeremy Grant, and Adam Sedgwick, all leaders in the Information Technology Laboratory, were honored with 2013 Federal 100 Awards.

The meeting agenda which will focus on the redefinition of the kilogram as one example of NIST's critical role in international metrology, the Manufacturing Extension Partnership (MEP) which plays a key role in advanced manufacturing and supply chains, the transition from federal funding of the critically important Baldrige Performance Excellence Program, safety, and a discussion of the VCAT's 2012 Annual Report.

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

Discussion Summary – The group discussed the following topics:

- Safety – The higher OSHA recordable rates in the Office of Facilities and Property Management (OFPM) reflect the nature of the work performed by the maintenance and ground crews. The new Acting Director of OFPM is continuing the organization's major focus on improving its safety data, such as implementing a pre-job hazard analysis. With regards to the data on the charts, the number of people in each organization may be beneficial internally, but percentages are needed to benchmark externally. The group also discussed the benefits of adding the total size of the workforce for each OU to the injury data chart for internal purposes only, as well as showing the OUs with zero injuries.
- Planning – The VCAT can be particularly helpful in the capacity planning axis in understanding future needs in science and technology. Capacity planning should involve looking at both emerging and sunsetting trends, which would be the responsibility of the laboratory directors.
- NCCoE – The group raised some of the challenges, issues, and advantages associated with establishing the NCCoE as an FFRDC which is designed to have a continuing long-term relationship with NIST. The vision for this Center is to create an environment that is conducive to bringing industry together to work on cross-cutting needs. In principle, the FFRDC can have a broader scope

than just use-case based interactions. NIST plans to work closely with the VCAT on this priority topic.

- Public Safety Communications – The VCAT should continue to track the technical activities of FirstNet.
- Planned CAC – NIST has an important interagency convening role in demonstrating the capabilities of spectrum sharing and to be able to look across the traditional public-private boundaries. The benefits of industry participation in test beds and demonstration projects were noted. With regard to the timeframe, it may take weeks or months to have a signed Memorandum of Understanding (MOU) between NIST and NTIA and to recruit a Director before the Center begins working with industry.
- CPS – Issues were raised concerning the safety and legal implications of these systems and the need to work with the Department of Justice.

International Metrology and the Redefinition of the Kilogram – *Dr. James Olthoff, Acting Deputy Director, Physical Measurement Laboratory*

Presentation Summary – Beginning with the Metric System adopted in 1799, Dr. Olthoff provided the historical context and background for international metrology, the redefinition of the kilogram, and NIST's critical leadership role in this effort. The 1889 definition of the kilogram was in terms of the mass of the international prototype, which is an artifact made of platinum-iridium kept at the International Bureau of Weights and Measures (BIPM) in France. This kilogram is the last remaining International System of Units (SI) basic unit defined by an artifact and poses long-term problems because its mass changes slightly over time. Compared to the International Prototype Kilogram, the measured masses of prototype kilograms around the world are diverging. In 2005, *Metrologia* published an article about the need and proposal to redefine the kilogram in which three of the five authors are affiliated with NIST. NIST's leadership in this international effort is based on its expertise in assigning the best values possible for all the physical constants in the world.

In October, 2011, the General Conference on Weights and Measures (CGPM) at its 24th meeting passed a resolution declaring that the kilogram is to be redefined in terms of the fixed numerical value of the Planck constant (*h*) along with redefinitions for the ampere, kelvin, and mole. Dr. Olthoff described the two different approaches for determining the value of *h:* the watt balance approach and the Avogadro Number approach. He then summarized the worldwide efforts in redefining the kilogram, reviewed a graph showing the status of determining *h* by different international organizations, and noted the technical challenges. The Committee on Data for Science and Technology (CODATA) is an international committee which reviews the data and determines the best value for a constant. The National Research Council (NRC) Canada and NIST are working together to understand the discrepancy in their values.

To help resolve this discrepancy, NIST contributed to the international Avogadro Project by providing independent measurement of the molar mass of the crystal, and continued with its main focus on building the next Watt Balance, W-3, with several improvements. All primary standards used by the NIST watt balance have been upgraded and are being cross-checked with NRC Canada with the goal of convergence on the *h* value prior to the June 13, 2013 meeting of the Consultative Committee on Units (CCU). NIST's watt balance group is currently involved in a blinded experiment involving measurements on a mass that has been calibrated by the BIPM. The new NIST-measured *h* value from W-3 will be determined by March 2013. With regard to the timeline, the earliest adoption of the new *h* value would occur in the fall of 2014 at the 25th meeting of the CGPM following recommendations from the CCU and the International Committee for Weights and Measures (CIPM). The next opportunity for adoption by the CGPM would be in the fall of 2018.

Assuming that the *h* value will be adopted and the redefinition completed, NIST is building a new smaller and more effective watt balance, W-4, to realize the kilogram through a process known as the electronic

kilogram. Dr. Olthoff described the impact of the W-4 as a practical dissemination of mass in terms of education and training, ease of use, transfer of standards between air and vacuum, and the realizations at arbitrary scale points.

Dr. Olthoff also emphasized that the framework established in 1875 for the permanent maintenance of the metric system standards throughout the world is still functioning today with participation from NIST at all three levels. At the top level, the CGPM consists of the representatives of the signatories of the meter convention and the NIST Director serves as the U.S. representative, as delegated by the U.S. State Department. The CIPM consists of 18 individuals with technical background and experience to advise the CGPM and Willie May is an elected member of this committee. The IBPM is an intergovernmental organization and NIST staff interacts with IBPM and the CIPM.

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

Following Dr. Othoff's presentation, the VCAT members participated in a laboratory tour of PML's efforts in moving from mass standards to the electronic kilogram, including a preview of the W-4.

Introduction to the Panel and Discussion on the Evolution of the Manufacturing Extension Partnership (MEP)

Dr. Alan Taub, Vice Chair of the VCAT, requested this session to educate the Committee about small and medium-sized manufacturers, how technology can help these companies, and how MEP carries out its role. The panel consists of three speakers with different perspectives on MEP: the MEP Director, an MEP Center Director, and a member of the MEP Advisory Board. Dr. Philip Singerman, Associate Director of Innovation and Industry Services, introduced each of the speakers and remarked that many of the individuals affiliated with the MEP Centers have industry experience and are very committed in their current service to a non-profit national program. The VCAT members were asked to hold their questions until the end of the presentations.

The Evolution of the Manufacturing Extension Partnership (MEP): The New Strategy – *Mr. Roger Kilmer, Director, Manufacturing Extension Partnership*

Presentation Summary – Mr. Kilmer has been with the MEP program since 1993 and with NIST since 1974. The presentation began with an overview of MEP's program attributes, history, partnerships, evaluation system, how the MEP Centers work with manufacturers, and the Centers' challenges. Mr. Kilmer also described MEP's evolution, the challenges facing MEP clients, and the next generation MEP strategy focused on innovation.

Created in 1988, the MEP works with small and medium-sized manufacturers (SMMs) through a nationwide network of 60 centers and 440 field locations across the U.S. and Puerto Rico with over 1,300 center staff and over 2,100 affiliated service providers. Set up as a Federal-state-industry partnership, the MEP was initially established because of "market failures" in terms of the SMMs access to information and technical expertise which is a very important role of the Centers. The MEP's system's budget is about $300,000 and consists of one-third Federal funds and two-thirds from States and industry. Partnerships with the Centers and other organizations having technology and manufacturing expertise, such as community colleges, consultants, and universities, are important in delivering the MEP services to its primary target of about 306,000 SMMs. The national network helps MEP inform the SMMs and enables MEP to understand the needs and requirements of the SMMs. MEP also works with larger manufacturers in terms of supply chain activities. MEP has a rigorous performance evaluation system, including a client impact survey covering sales, cost savings, investments, and work force as well as an analysis of future needs of the SMMs.

Mr. Kilmer summarized how the Centers work with manufacturers in assessments, identification of potential issues, and negotiations for fees for services, project execution, and project satisfaction. He also described the challenges faced by the Centers in generating revenue to meet the cost sharing requirement, having an economic impact on the manufacturers, and facilitating market penetration.

MEP has evolved from a "point solution" for a particular problem to a more strategic long-term approach in making changes within a company. From about 2008-2009, MEP began to concentrate on the role of technology in fostering innovation. MEP believes that small manufacturers and the manufacturing community are now in a position to understand the technology. According to MEP's client survey, the top three strategic challenges of companies over the next three years are continuous improvement, identification of growth opportunities, and production innovation/development. In addition, a recent Georgia Tech University study found that innovation pays off for firms and employees.

The overarching goal of the next generation MEP strategy is to increase the manufacturers' capacity for innovation resulting in profitable sales growth. The two-pronged approach is to provide a framework that reduces bottom line expenses and adds to top line sales. The next generation strategies will focus on five key inter-related areas: continuous improvement, technology acceleration, supply chain, sustainability, and workforce.

Mr. Kilmer highlighted MEP's partners, tools, and services which contribute to each of the three parts of the technology acceleration framework. MEP is working on the market end to influence manufacturers' growth strategies in partnerships with trade associations, original equipment manufacturers (OEMs), and other federal agencies. On the other end dealing with basic research through technology transfer, MEP works with universities and federal laboratories for specific technology solutions. The middle of the framework known as the "Valley of Death" is the most challenging area for MEP since SMMs do not know what technology is available and requires lots of help and partnerships, including the NNMI. For example, MEP Centers are involved in the National Additive Manufacturing Innovation Institute to help connect the technology being developed with SMMs. MEP also funded a project led by Polymer Ohio to develop a business model for that organization to work with small manufacturers and has found that even with flexible business models and access, it is difficult to get small manufacturers to embrace modeling and simulation software.

In summary, SMMs want and will pay for technology "services" and "solutions" that lead to profitable growth. The challenges and business model issues in helping SMMs along the innovation path include integration across diverse business models of partners to create a seamless, efficient system; geography; capacity for hundreds or thousands of interactions; scale; and time frame to transition and implement.

For more details, see Mr. Kilmer's presentation. The discussion is summarized at the end of the panel presentations.

Future of MEP Centers: An MEP Center Perspective – *Mr. Michael Coast, President and CEO, Michigan Manufacturing Center*

Presentation Summary – Mr. Coast has been with the Michigan Manufacturing Technology Center (MMTC) for 17 years and has served as its President and CEO for the last 12 years. Prior to joining the MMTC, Mr. Coast has had more than five years of technology development experience and more than 16 years of manufacturing experience.

The MMTC has five regional offices to serve the 12,580 small to medium-sized manufacturers in the state of Michigan. About 45% of these manufacturers are automotive supply companies. The mission of the

MMTC is to enhance the global competitiveness of Michigan's small and medium-sized manufacturers. MMTC's main focus is on the companies with 20-249 employees. As a public-private network, the MMTC is measured solely by the business results to the client's company. In describing the MMTC's business model, Mr. Coast noted the various funding sources associated with the Center's $8 million total budget and indicated that over one-third of the budget comes from client fees. He also described the balancing act faced by the Center in achieving client revenue from small and medium-sized companies, market penetration, and impacts demonstrated by the Center Operating, Reporting, and Evaluation System (CORE).

With regards to measures and impacts, Mr. Coast provided MMTC's documented business results based on clients surveyed over the last year and clients surveyed over the past ten years. Clients surveyed over the last year reported new and retained sales of nearly $180 million, cost savings of $16.4 million, 2,166 jobs created or retained, and $48.4 million in investments as a result of working with the MMTC. The results are obtained by an independent, third party client survey firm. Mr. Coast shares these results in his conversations with members of congress and other stakeholders, including economic development organizations. Also, MMTC issues a press release each year with the updated business results.

Mr. Coast also described how the MMTC is focused on improving the overall capability of the domestic supply chain. Their services help suppliers in the three traditional areas of lower cost, better quality outcomes, and shorter cycle and delivery times, as well as understanding their own costs, being more innovative and collaborative, and being more agile, among other capabilities.

The MMTC's core focus is on innovation strategies and involves a company's assessment, bottom-line improvements, and leadership development to plan and manage top-line growth. Assessments include a client data entry form with 12 key metrics in which the responses can be compared to other companies in the MMTC database. Based on the assessment, a three-day executive level hands-on workshop focused on planning and leading change is held which results in the development of an 18-month business plan. In addition, companies receive a four-hour overview on the four strategies for top-line growth. These cover customer cultivation, lead generation, market diversification, and innovation. MMTC's growth services help companies align its core competencies and strengths with new markets and customers, such as using the same CNC machine to manufacture a gear for an automobile as well for fire trucks, hospital beds, and other markets.

Mr. Coast also presented four case studies in growth from MMTC clients which involved innovation strategies that led to a successful transformation. J.C. Gibbons achieved market diversification beyond a dominant automotive customer. Omega Plastics diversified from auto tooling to multi-industry contract manufacturing. St. Claire Systems leveraged cost reductions to succeed as an exporter. Aluminum Banking was able to secure a new stainless steel market niche due to investment avoidance and leadership focus.

Lastly, Mr. Coast described the work going forward and emphasized the importance of company leadership, the alignment of the company's management team, employee engagement, and profitable growth. MMTC is moving toward new product contract manufacturing, engaging C-level management to plan succession to owners willing to invest, and ensuring a fully competent and aligned leadership committed to profitable growth.

For more details, see Mr. Coast's presentation. The discussion is summarized at the end of the panel presentations.

Future of MEP Centers: MEP Advisory Board Perspective – *Mr. Mark Rice, President, Maritime Applied Physics Corporation and Former Chair, MEP Advisory Board*

Presentation Summary – Mr. Rice, a former chair and current member of the MEP Advisory Board, is the President of the Maritime Applied Physics Corporation which he founded in 1986. With facilities in Baltimore, Maryland and Brunswick, Maine, the company has grown to 70 individuals. Mr. Rice, who has served on the MEP Advisory Board for six years, noted that the MEP is a "remarkable" system which could serve as a model for other sectors and that its program management is very difficult due to the diverse and complex nature of the system. The presentation covered both the Board's perspective on MEP and Mr. Rice's personal ideas on six specific areas for MEP to pursue in the future for MEP's evolution toward a technology-based organization.

In reviewing the MEP Advisory Board's charter, Mr. Rice indicated that this 10-member group has a "powerful voice" because they report through the NIST Director to the Secretary of Commerce to Congress. He then spoke about the MEP intricacies involved with responding to the needs of the States, Federal objectives, and small and medium enterprises (SME) goals and remarked that MEP is the only system in the U.S. that can reach out to a diverse set of SME companies throughout the country and effect change rapidly. A small manufacturing CEO prepared a timeline of SME catalysts which showed MEP on the commercial side and reported that MEP has the integrity and expertise to help the company.

Recommendations from a recent MEP Advisory Board meeting were reviewed and covered funding, management, workforce development, and national needs. These include the need to keep the cost share requirement, establish exchange programs for Federal and Center staff, devote more attention to workforce development, and as NIST considers new national initiatives, use the MEP system and the existing centers of excellence rather than re-inventing the public-private infrastructure. The Board requested an international benchmarking study of MEP, which found that the return on investment in MEP from federal dollars is very high in the U.S. relative to other countries. Mr. Rice also showed an excerpt from a White House report on innovation as the context for MEP's role as a government-industry bridge for innovation.

Based on his perspective, Mr. Rice described six critical SME problems and suggested MEP's future roles in each area. These problems involve: 1) the aging workforce; 2) the balance of trade in goods; 3) the technology "Valley of Death" for small companies; 4) the value chain evolution and its impact on SMEs; 5) process automation; and 6) accelerated product lifecycles. To address the aging workforce, NIST is uniquely qualified to translate emerging technology implications into training "standards" for next generation manufacturers; help bridge the gaps between antiquated training programs and the needs of industry; and collaborate with Federal agencies, States, and professional societies to reintroduce manufacturing engineering curricula. With only one out of six SMMs exporting about $1 million per year, the balance of trade in goods needs to be improved. This is an opportunity for MEP to expand the successful ExporTech program, develop a method to identify international opportunities and routinely communicate to SMEs, and develop a financial model for the Centers. With regard to the Valley of Death, MEP has moved from its traditional role in providing manufacturing knowledge, such as lean manufacturing, to its emerging role in driving innovation back into U.S. manufacturing. MEP can help in bridging the Valley of Death through the use of public/private partnerships, serving as a technology broker, and going beyond innovation to execution.

Supply chains are now becoming value chains and the relationships between large and small companies are changing, as exemplified in the semiconductor industry. MEP can serve as the value chain relationship broker between small and large businesses, serve as the broker for Innovation Impact Bonds (a la Social Impact Bonds), and facilitate information exchange in the era of the semantic web. The rate of technology change is constantly accelerating and there is a big role for MEP in the manufacturing process evolution in the areas of manufacturing process standards, technology awareness and infusion, government support of manufacturing technology insertion, and advanced manufacturing

training/infusion. To address accelerated product lifecycles, the financial and technology implications of rapid product lifecycles for SMEs are needed as well as new mechanisms to accelerate the transition of research into product, such as the NMMI.

For more details, see Mr. Rice's presentation. The discussion is summarized at the end of the panel presentations.

Summary of Discussion on the Evolution of the MEP – The group discussed the following topics with the Panel members:

- **MMTC's Impacts –** The sales data is associated with the client's customers located throughout the United States. With regard to exports, Canada is the biggest customer.
- **Supply Chains –** OEMs need to be open and transparent to help engage their supply chains. Nationally, 57% of the SMMs are suppliers in the supply chain.
- **New Website for Best Practices –** MEP may want to consider creating a website with best practices that can be shared among many companies as a way to scale this program on a national level.
- **Demand for MEP Services –** The MMTC reaches out to "latent clients" who do not know they need help. MEP has been able to consistently generate $100 million of revenue from small firms across the country.
- **Selection and Evaluation of MEP Centers –** MEP Centers are established through a competition and their projects are evaluated quarterly. Best practices for operating Centers are also shared.
- **Technology Needs –** The group discussed the significance of technology transfer since only 11.8% of the clients surveyed identified technology needs as one of the three most important strategic challenges over the next three years.
- **Fraunhofer Institute –** The success of the Fraunhofer Institute in Germany is difficult to compare to MEP since the Institute has a much broader scope and deeper expertise than MEP.
- **Doubling Clients –** It could be possible to double the number of clients and double the penetration if the Federal and State investments were doubled. MEP is wrestling with the question of the need to expand the penetration of the program horizontally versus the need to focus on specific areas of special value, such as developing new products and new services to provide to the companies.
- **National Manufacturing Strategy –** A national manufacturing strategy is still lacking and would help MEP be more responsive.
- **International Markets –** MEP is relying on the International Trade Administration in DOC to develop a mechanism for collecting opportunities overseas since the MEP system could match these opportunities with potential exporters.
- **Proprietary Issues –** The MMTC has ways to deals with proprietary issues.
- **Community Colleges –** The community colleges in Michigan cannot fill the need for a skilled workforce. The need for a skilled workforce is an issue in small companies as well as large corporations. The Fraunhofer Institute makes huge investments in community colleges.
- **MEP Network –** The MEP network has many different mechanisms for sharing best practices and connecting the Centers. The network also facilitates supplier scouting.
- **MEP Advisory Board -** Closer ties between the MEP Advisory Board and the VCAT should be established.

The Baldrige Program's Successful Transition from Federal Funding – *Dr. Harry Hertz, Director, Baldrige Performance Excellence Program*

Presentation Summary – In his introductory remarks, Dr. Hertz noted that although the Baldrige program transition from a primarily federally funded program to no federal funding has been amazingly successful, quotation marks should be used in reference to "successful" since there are still some challenges for the Baldrige program going forward.

The Baldrige Program was funded in FY 2011 with $9.6 million in federal appropriation and $1.5 million from the Baldrige Foundation. In November 2011, the federal funding was reduced to zero for FY 2012 and the Foundation stepped in and committed $5.2 million for FY 2012. In February 2012, the Foundation committed $15 million for the next three years to guarantee the sustainability of the program to DOC. In 2010, the program began a strategy mapping process and the map became the basis for a business plan development. The business plan was accepted by NIST and DOC in April 2012 and is now being executed.

The business model has three components: cost recovery, cost reduction, and support from the Baldrige Foundation. This model reflects the idea that as cost recovery and cost reductions are realized, the Foundation support would decrease. However, Dr. Hertz noted that the Foundation is now aggressively engaging in a fundraising campaign to look at the endowment for the program well into the future. Cost reductions include limiting the award eligibility to organizations that have already received its highest level state or regional award which has reduced the number of applications almost in half. In addition, many operations have been dramatically streamlined, staff has been reduced by 40% through attrition, and examiner reimbursements have been eliminated. Products and services have been expanded, including education and training such as the new and successful Baldrige Executive Fellows Program. In addition, a new collaborative assessment is being piloted for organizations that would prefer to have a Baldrige assessment rather than apply for the Award. Cost recovery includes fees for the award applications and award assessments, a charge for the Criteria for Performance Excellence, sponsorships and exhibit income not previously permitted, and fees and income from other products and services.

Overall, expenses were reduced from $10.3 million in FY 2011 to $5.5 million in FY 2012. A breakdown of the program expenses and income was provided for FY 2011 and FY 2012. Although the examiners are no longer being reimbursed, their number is holding steady at about 500 each year. The administrative costs associated with the mandatory contract with the American Society for Quality have also decreased as a result of some of the reductions in the Baldrige program.

Turning to program impacts, Dr. Hertz presented data from four recent studies. An economic impact study found that the ratio of benefits for the U.S. economy to Baldrige program costs is 820 to 1. According to a survey conducted by Truven Health Analytics, more than 60% of U.S. hospitals and 80% of teaching hospitals are now using Baldrige principles. In addition, 65% of U.S. hospitals are likely to use the Baldrige Criteria by 2018, as reported in *Futurescan 2013.* A study of two-time Baldrige winners with at least a six-year gap between awards found that the median growth in revenue and jobs for these companies was 93% and 63% respectively, as compared to 3.2% job growth for matched industries.

Dr. Hertz described four of the remaining challenges. There is diminished access to the Criteria for small organizations and non-profits now that the program has begun charging for the Criteria. The impact of this charge will not be known for a while. A second challenge is operating a "business" with government restrictions, while benefitting from Presidential award status and federal imprimatur for the Criteria. The third challenge is managing relationships with state, industry, and international Baldrige-based programs that use to get unlimited free materials. Lastly, the latest employee survey results from the Baldrige staff showed that both staff motivation and work overload are extremely high.

Two Baldrige events are planned for April in Baltimore, Maryland. The 25th Anniversary Gala for the Baldrige Program will be held on April 7 with speakers from the Baldrige community. On April 7-10, the Quest for Excellence Conference will be held featuring Dr. Ben Carson of Johns Hopkins University as the keynote speaker.

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

Discussion Summary – The group discussed the following topics:

- The 2012 VCAT Annual Report will reference the Baldrige transition and the program's contributions to health care.
- The transition is not complete as challenges still need to be addressed.
- The success of the transition to date has been a team effort involving the Baldrige staff, including the Deputy Director.

Safety Metrics – *Dr. Richard Kayser, NIST Chief Safety Officer*

Presentation Summary – Dr. Kayser reviewed NIST OSHA-recordable injury and illness incidence rates from FY 2006 through first quarter of FY 2013 and noted that there was no discernible trend in this data. The TRC data reflects any incident that involves medical treatment beyond first aid in comparison to the DART data that reflects days away from work or restricted duty or being transferred to another job as a result of the recordable incident. In comparison with peer laboratories, NIST's TRC rate is similar to Oak Ridge National Laboratory, Brookhaven National Laboratory, and Lawrence Berkeley National Laboratory. However, NIST's DART rate is above the average of these DOE laboratories for the past five years and indicates room for improvement. While reviewing NIST injury data by OU for FY 2012 and the first quarter of FY 2013, Dr. Kayser noted that future versions of the chart will include those OUs with zero recordables as suggested earlier. He also reminded the group that OFPM, with nearly half of OSHA's recordables, has already begun to take actions to reduce this number.

NIST has taken several actions to reduce the OSHA recordables across NIST. Targets for lower OSHA recordables in FY 2013 than FY 2012 have been set for the Laboratory programs and for Management Resources and are reflected in the performance agreements for the respective Associate Director of these organizations. In addition, each OU Director has been asked to identify one key area for improvement in their organization which is included in their performance plan. Other actions include discussing safety performance at the beginning of each monthly NIST leadership meeting as well as identifying the types of incidents contributing most to NIST's OSHA rates and taking steps to reduce their occurrence. NIST is using an Incident Reporting and Investigation System (IRIS) developed by the Bureau of Labor Statistics to code an incident in four different dimensions. For the fifteen-month period beginning October 2012, the injury data analysis using IRIS shows that about 75% of NIST OSHA recordables were due to five events covering slips, trips, and falls; struck by and struck against; and overexertion.

Dr. Kayser reviewed the data for three selected key safety metrics involving the timeliness of incident reporting and investigation from April 2012 through January 2013. These metrics cover the number of incidents reported, the number of incident investigation reports submitted within 20 business days, and the backlog of outstanding incident investigation reports. To address the current backlog of incident investigation reports, NIST set a target to submit 75% of these reports within 20 business days of the incident and is taking steps to eliminate the backlog.

For the future, NIST will continue to develop and deploy the NIST safety management system with new metrics and data sources and to integrate performance measurement into system-level occupational safety and health planning and implementation.

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

Discussion Summary – The group discussed the following topics:

- There does not appear to be a reluctance to report safety incidents at NIST.

- With regard to hazards, NIST will be deploying a system to identify unsafe or unhealthy working conditions. Workplace inspections are done within the OUs with participation from the NIST Office of Safety, Health, and Environment.
- Incidents should be reported within two business days.
- NIST is also planning to implement a system for tracking corrective and preventive actions with related metrics.
- NIST should consider changing its target from 75% to 100% of its incident investigation reports submitted within 20 business days.
- NIST is working on designing a pilot program on ergonomics.
- On-line safety training can help with identifying safety hazards.
- The appropriate comparators for NIST safety were discussed. NIST may want to consider looking at safety data from other organizations.
- NIST is concerned that there is no detectable change in its recordables after three years of considerable effort and agree that the goal should be zero incidents.
- NIST may be interested in learning about best safety practices at Rockwell Automation, including on-line training and awards.
- Safety statistics for associates and visitors would also be helpful to the VCAT.

VCAT Subcommittee on Safety Recommendations and VCAT Deliberations – *Dr. Tony Haymet, Chair, VCAT Subcommittee on Safety*

Presentation and Discussion Summary – Dr. Haymet reviewed the five recommendations from the first VCAT Subcommittee on Safety meeting which were presented at the October 2012 VCAT meeting. These cover establishing "ground rounds" audits by senior, trained NIST executives (not "executive"); setting firm targets; distributing and discussing IRIS statistics; increasing transparency on all safety metrics; and addressing ergonomic factors. For more details, see Dr. Haymet's presentation.

The Subcommittee held its second meeting on the morning of February 6, 2013, in Gaithersburg. Although no new major items were uncovered, there was a question pertaining to the number of Division Safety Representatives (DSRs) per unit as a result of some of the mergers in the reorganization that increased the number of scientists in some of the divisions. The DSRs also discussed the rate of new reporting requirements. The Subcommittee acknowledges that culture change is beginning to take place at NIST and picking up speed. NIST is moving from the "design-build" phase into one of continual improvement.

Based on the Committee's earlier discussions, Dr. Haymet also noted the importance of NIST setting zero as the goal for safety incidents, taking actions to facilitate filing investigation reports in a much shorter time period, and focusing on the top five categories that comprise 75% of OSHA recordables. He also remarked that NIST should be careful about messaging its zero goal so that incident reports continue.

The NIST Director reiterated that the NIST goal is to have zero incidents which is best in class. The comparisons with the three DOE labs were not intended to be a benchmark but rather to assess if NIST was an outlier. He also described how injury data can be used as a positive management focus for NIST and the importance of responding to the incident reports.

Several of the VCAT members complimented NIST on the progress made to date in the transition to a positive safety culture. Another suggestion was to ask the staff how NIST could be a world class safety organization and to reward the staff for their efforts.

The Subcommittee's recommendations were accepted by the full Committee without any objections and will be included in the 2012 VCAT Annual Report with some additional text.

Initial Observations, Findings, and Recommendations for the 2012 VCAT Annual Report – ***Dr. Vinton Cerf, VCAT Chair***

Discussion Summary – Dr. Cerf led this session which focused on the Committee's revisions to the draft 2012 VCAT Annual Report. The members agreed that the Safety section should be moved to the beginning of the report to emphasize the importance of this topic. Two additional safety recommendations were adopted which encourage NIST to have zero accidents as its safety goal and to concentrate its investigation time and reports on OSHA recordable incidents. The earlier recommendation on ergonomics was restated as an observation.

The members also agreed on changes pertaining to NIST role in advanced manufacturing, NIST role in the public safety network, NIST Centers of Excellence, R& D planning, and the NIST budget. The report will also include a comment about the sustainability of the Smart Grid Interoperability Panel. The VCAT's comments about NIST's updated three-year programmatic plan will be delayed since the plan is related to the FY 2014 budget request which has not yet been released.

VCAT Charge for 2013 – ***Dr. Patrick Gallagher, Under Secretary of Commerce for Standards and Technology and NIST Director***

Discussion Summary – Dr. Gallagher explained why the VCAT focus for 2013 should stay on course and continue to address advanced manufacturing, cybersecurity, advanced communications, and forensics with an emphasis on NIST's plans for program implementation and design. The VCAT could provide input on how NIST management is using its new planning methodology to address these topics. Specific issues related to these topics cannot be discussed until the FY 2014 budget priorities have been released.

The group discussed the benefits of having VCAT subcommittees and noted the success of three recent subcommittees that were established for safety, public safety, and manufacturing. VCAT subcommittees provide an opportunity for the members to gain more depth on a given topic by seeking expertise from other individuals. The VCAT Subcommittee on Safety will be retained on a standing basis. A new subcommittee may be needed to focus on cybersecurity and communications but will depend on the appointment and expertise of new VCAT members. VCAT candidates are being considered with expertise in cybersecurity and communications and in the biological sciences.

Adjournment

Prior to adjourning the meeting, the group agreed that the VCAT should acknowledge the depth and enthusiasm of the electronic kilogram team. They also want to continue the practice of sending congratulatory letters to the NIST recipients of major awards.

The meeting was adjourned at 10:40 a.m. on Thursday, February 7, 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