

Defense Materials Manufacturing and Infrastructure (DMMI)

Workshop on: Globalization of Defense Materials and Manufacturing

Washington D.C. March 2015 25th-26th (Wednesday-Thursday)
National Academy of Sciences Building, 2101 Constitution Ave., N.W., The Members Room



Over the past several decades, the global science and technology (S&T) landscape has changed, affecting both the means and rapidity by which S&T knowledge is created and shared around the globe. Countries whose S&T enterprises fail to maintain awareness of emerging technological advances and to engage and collaborate with those who lead their fields may find themselves falling behind. This reality has dramatic implications for economic competitiveness and national security¹. Global advances in Materials and Manufacturing Processes are of particular importance to countries who see high-value materials-related manufacturing as a key national competitive capability. Globalization presents new opportunities for leveraging investments, sharing costs, and solving environmental and societal challenges that require international coordination and collaboration. At the same time, global competition presents challenges in information sharing and collaborative R&D.

This workshop agenda will include topics such as:

- 21st Century Global Materials and Manufacturing R&D landscape
- Importance to National Security of Global Technology Awareness and Global Technology Collaboration
- Successful Mechanisms for Global Technology Awareness and Global Technology Collaboration

¹ National Research Council, “Strategic Engagement in Global S&T: Opportunities for Defense Research” (2014)

Day 1, March 25 (Wednesday), Members Room

8:00 Working Breakfast

8:30 Welcome, Meeting Objective, Introductions - **Mike McGrath**

Introduction

9:00 **Speaker Ruth David**, ANSER

Presentation title: *Strategic Engagement in Global S&T: Opportunities for Defense Engagement*

Topic 1: Globalization Effects on the R&D Landscape

9:40 **Speaker Michael Chui**, McKinsey

Presentation title: *The McKinsey "Disruptive technologies: Advances that will transform life, business, and the global economy" report.*

10:20 Break

10:40 **Speaker Mary Lee Gambone**, Rolls Royce North America

Presentation title: *Rolls Royce and Globalization*

11:20 **Speaker Andre Sharon**, Fraunhofer USA Center for Manufacturing

Presentation title: *How a presence in the US has changed the Fraunhofer Institute*

12:00 Lunch

Topic 2: Global Technology Awareness

1:00 **Speaker Nabil Nasr**, Rochester Institute of Technology

Presentation title: *UNEP International Resource Panel (IRP).*

1:40 **Speaker Cathy Foley**, (CSIRO) Australia.

Presentation title: *processing technology*

2:20 **Speaker Bob Pfahl**, Pfahl Consulting, L.L.C.

Presentation title: *The Approach of the Electronics Industry to Global S&T Engagement*

3:00 Break

3:30 **Panel Discussion – DoD S&T Global Offices** - *Global Technology Awareness and Engagement Opportunities and Challenges*

Panelists: **Brian Holloway**, Office of Naval Research

Panelists: **Ty Pollak**, Universal Technology Corporation

Panelists: **Shawn Thorne**, Former Office of Naval Research

Panelists: **Mark Maurice**, AFOSR/ION

Lead: **Bob Schafrik**

5:00 Adjourn

Day 2, March 26 (Thursday), Members Room

8:00 Working Breakfast

8:30 Welcome, and what we heard yesterday – **Mike McGrath**

Topic 3: Public-Private Partnerships for Technology Collaboration

8:40 **Speaker James Peddell**, Attache for Defence Research and Technology
Presentation title: *Technology Collaboration in Emerging Areas – A UK Perspective*

9:20 **Speaker Dan Nagy**, Intelligent Manufacturing Systems
Presentation title: *The IMS Network and How it Operates.*

Speakers David Romero, Intelligent Manufacturing Systems, Mexico

Steve Ray, Intelligent Manufacturing Systems

Presentation title: *Examples of IMS Collaborative Projects*

10:30 Break

10:50 **Speaker Johnnie DeLoach**, US Navy
Presentation title: *The National Network for Manufacturing Innovation Centers – Where Does International Collaboration Fit In?*

11:30 **Facilitator Paul Kern**, *Facilitated Workshop Discussion of Global Technology Awareness and Collaboration Needs, Opportunities, and Lessons*

12:00 Lunch

1:00 **Speaker Tom Bayha**, ATI Metals
Presentation title: *Materials Enable Defense Systems Yesterday, Today and Tomorrow: A Review of Materials and Manufacturing Evolution*

In Closing

1:40 Wrap up discussion of workshop, – **Mike McGrath**

2:00 Adjourn workshop

Planning

2:00 Break ROOM NAS118

2:10 Planning of future meeting (DMMI and Sponsors) ROOM NAS118

3:00 Full Adjourn

Biographies of Speakers and Panelists

Ruth David [NAE]

Dr. Ruth A. David, Ph. D has been the Chief Executive Officer and President of Analytic Services Inc. Dr. David initiated Analytic Services' Homeland Defense Strategic Thrust to address the growing national concern of multidimensional, asymmetric threats from rogue nations, sub-state terrorist groups and domestic terrorists. From 1995 to 1998, Dr. David served as Deputy Director for Science and Technology of Central Intelligence Agency. Previously, Dr. David served as Director of Advanced Information Technologies at the Sandia National Laboratories. Dr. David has also been an adjunct professor at the University of New Mexico. She is the coauthor of three books on signal processing algorithms. She is an Associate Fellow of AIAA. Dr. David received a B.S. degree in Electrical Engineering from Wichita State University in 1975, an M.S. degree in Electrical Engineering from Stanford University in 1976 and a Ph.D. in Electrical Engineering from Stanford University in 1981.



Michael Chui

Dr. Michael Chui is a partner at the McKinsey Global Institute (MGI), McKinsey's business and economics research arm. He leads research on the impact of information technologies and innovation on business, the economy, and society. Michael has led McKinsey research in such areas as Big Data, Web 2.0 and collaboration technologies, and the Internet of Things. Prior to joining McKinsey, Michael served as the first chief information officer of the city of Bloomington, Indiana, where he re-architected the enterprise architecture using open source technologies and led a project that resulted in Bloomington becoming the first community in the world to offer both live and archived video streaming of public meetings on the Web. Before that, Michael was founder and executive director of HoosierNet, Inc., a nonprofit cooperative Internet service provider that offered dial-up and broadband access to the Internet to consumers, nonprofits, governments, and businesses. Michael is based in McKinsey's San Francisco Office.



Mary Lee Gambone

Dr. Mary Lee Gambone joined Rolls Royce North America in Indianapolis in 1998, she is currently head of materials engineering. She was chief of research and technology strategy, and was chief of materials and processes. Dr. Gambone's early career as a materials engineer was with Allison Gas Turbine Division of General Motors, and she enjoyed several years with the US Air Force as team lead for metal matrix composites research in the Air Force Research Laboratory Materials Directorate. Dr. Gambone is a member of Purdue University's Materials Engineering Advisory Board and serves on the Materials Engineering Head Search Committee. During the fall 2011 semester, she gave a presentation on her career to MSE 390, our undergraduate seminar. In addition to her BS from Purdue in 1982, Dr. Gambone received an MS in materials engineering in 1984 from MIT and a PhD in materials science in 1995 from the University of Virginia.



Andre Sharon

Dr. Sharon has accumulated over 20 years of experience, both academic and industrial, conducting research, developing, and deploying computer-controlled automation systems, devices and instruments for several industries, ranging from sub-micron, high-precision machinery for optoelectronics, biotech/biomedical, and semiconductor fabrication to high-speed assembly of consumer products. As Director of the Fraunhofer Center for Manufacturing Innovation and Professor of Mechanical Engineering at Boston University, Prof. Sharon works closely with faculty, students and engineers to develop next-generation technologies for local and international companies. Drawing upon Fraunhofer's and Boston University's vast research base and working closely with industry, the Center goes beyond the scope of traditional academic research to develop and deploy actual working technologies all the way to deployment. These emerging technologies are incorporated into Prof. Sharon's courses in Engineering, educating a cadre of future engineers with proficiency in high-precision machine design and instrumentation.

**Nabil Nasr**

Dr. Nabil Nasr, Associate Provost and Director of the Golisano Institute for Sustainability, joined RIT in 1989 as an Assistant Professor in the College of Engineering. In 1997 he founded the Center for Remanufacturing and Resource Recovery. Since 2002 he has served as Assistant Provost and Director of the Center for Integrated Manufacturing Studies, whose mission is to increase competitiveness of manufacturers through applied technology and training. In 2007 he became the founding director of the newly established Golisano Institute for Sustainability. Sustainable production systems and the built environment are the focus of interdisciplinary academic and research programs within Golisano Institute for Sustainability. He has also developed strong ties to industry through efforts to implement and improve sustainable design and remanufacturing processes at hundreds of companies from diverse sectors. He has served as an expert delegate for the U.S. government in several international forums, including the Asia Pacific Economic Cooperation (APEC), the United Nations, and the World Trade Organization.

**Cathy Foley**

Dr. Cathy Foley was appointed Chief at CSIRO Materials Science and Engineering (CMSE) Division in April 2011. Dr. Foley has a world-class reputation in her field, and is the President of the Federation of Australian Scientific and Technological Societies (FASTS), a member of the Prime Minister's Science and Engineering Innovation Council (PMSEIC) and Fellow of the Academy of Technological Sciences and Engineering (ASTE). Dr. Foley's career at CSIRO has been broad, influential and widely cited. Her research expertise covers solid state physics, such as semiconductors, magnetism, superconductivity and nanotechnology. Highlights of her long career include leading the High Temperature Superconductivity (HTS) group in 1995, instigating CSIRO's presence in quantum engineering in 2001, and developing the fabrication technology which is the basis of CSIRO's successful HTS devices used in award-winning applications such as LANDTEM™ mineral exploration systems.



Robert Pfahl

Dr. Pfahl is a Principal at Pfahl Consulting, LLC, Senior Consultant at the International Electronics Manufacturing Initiative (iNEMI), and Principal Investigator of the iNEMI-MIT Photonic Systems Manufacturing Consortium (PSMC). He received his BME, MS, and PhD in mechanical engineering from Cornell University. He holds nine U.S. patents and is the inventor of the vapor phase soldering process. The IEEE CPMT presented him with its 2005 Electronics Manufacturing Technology Award. He is the past-chair of the IEEE-CPMT Award Committee. He is a past member of the Board on Materials and Manufacturing Systems of the United States, National Research Council. He received the United States EPA Stratospheric Ozone Protection Award and the Electronic Goes Green Award 2008+ from the German Fraunhofer Society

**Brian Holloway**

Dr. Brian Holloway joined the US Navy Office of Naval Research Global (ONRG) as an Associate Director in September 2013 where he focuses on creating new capabilities for the warfighter via international research engagement in the areas of functional materials, structural materials, and power and energy. Prior to ONRG, Dr. Holloway was a Program Manager in the Defense Science Office of the Defense Advanced Projects Agency (DARPA) where he managed over \$400 million of materials science, manufacturing and power and energy programs including the Limits of Thermodynamic Storage (LOTS) of Energy, Portable Photovoltaics (PoP), Robust Portable Power Sources (RPPS), Tactical Advanced Power (TAP), Wound Stasis System (WSS), Local Control of Materials Synthesis (LoCo), and Advanced Structural Fiber (ASF) programs. He also managed the Bio-Fuels, Deployable Energy Storage (DES), and Manufacturing Gradient Refractive Index (MGRIN) programs in the Strategic Technology Office. Before joining DARPA, Dr. Holloway established and led the Nano-Materials Research Group within the Technology Development Division of Luna Innovations Incorporated in order to apply innovative nano-materials solutions to significant problems across the government and private-sector business space. From 1998 to 2006, Dr. Holloway was an assistant and associate professor (with tenure) in the Applied Science Department at the College of William & Mary where he specialized in thin film deposition. Prior to joining the faculty at William & Mary, he served in the office of Senator John. D. Rockefeller (WV) as a legislative assistant. Dr. Holloway received a Bachelor of Science in mechanical engineering (Highest Honors) from the University of Florida and a Master of Science and Doctor of Philosophy in mechanical engineering with a materials science minor from Stanford University. He is a named inventor on multiple U.S. patents and has authored more than 40 articles in peer-reviewed technical publications. Dr. Holloway has served as the Associate Editor of the Journal of Vacuum Science and Technology B, the General Chair of the International Conference on Metallurgical Coatings and Thin Films (ICMCTF), and President of the Thin Film Division of the American Vacuum Society. He has been honored with a MRS/OSA Congressional Fellowship, the William & Mary Arts and Science Distinguished Associate Professor Chair, the 2013 University of Florida Mechanical Engineering Distinguished Alumni award, a letter of commendation from the US Navy, and the opportunity to ring the NASDAQ opening bell as a member of the Luna senior management team.



Ty Pollak

Dr. Randall (Ty) Pollak is currently a Senior Program Manager for Materials and Manufacturing at Universal Technology Corporation (UTC) in Dayton, OH. Since 2015, he manages UTC programs supporting the Air Force Research Laboratory's Materials and Manufacturing Directorate, including Technical Operations Support IV, a \$74.5M-ceiling contract supporting in-house research teams and extramural R&D programs. Prior to joining UTC, he served 20+ years as an Air Force active-duty officer. From 2010-2014, he managed the materials and nanotechnology program for AFOSR's London-based office, initiating over 50 basic research projects across Europe and Israel in predictive materials modeling, multifunctional composites, additive manufacturing, novel nanomaterials, advanced characterization, and other emerging areas, while also serving as Deputy Commander. He previously served as Assistant Professor at the Naval Postgraduate School, where he co-led student research in nanotube-based multifunctional composites. Previous assignments include Chief of AFRL's electronic/optical materials development section, analyst for operational testing of diverse systems, cruise missile flight test engineer, and staff officer for Headquarters Air Force Materiel Command. His PhD is in Materials Science and Engineering from the Air Force Institute of Technology, 2005.

**Shawn Thorne**

Dr. Thorne is the Associate Director for Functional Materials at the Office of Naval Research (ONR) Global office in London, United Kingdom. He is responsible for developing connections between the US Naval Research Enterprise and outstanding international academic and commercial researchers in the field of Functional Materials and is the ONR lead for international engagement in the field of metamaterials. In addition, Dr. Thorne is also responsible for ONR Global engagement of Europe in the field of Power and Energy. Dr. Thorne graduated summa cum laude in 2003 from Boston University with a Bachelor of Arts in Physics and a minor in Economics. He won numerous undergraduate research awards for his work in subsurface thermal imaging of silicon and GaAs processors and presented this work in numerous international conferences. Dr. Thorne graduated with a Master's and a Ph.D. in Materials Science and Engineering from University of California, Berkeley in 2008. His thesis work concentrated on relating the structure and properties of transition metal oxide nanowires grown using a novel electrochemical synthesis technique. In particular, he emphasized the application of these nanostructures to electrodes for dye-sensitized solar cells and lithium-ion batteries.



Mark Maurice

Presently, Mark is Chief of the AFOSR International Office located in Arlington, VA. This office works together with AFOSR Detachments in London, Tokyo, and Santiago to discover world-class basic research of interest to AFRL, and to develop collaborative relationships between AFOSR funded researchers in the U.S., and researchers world-wide. In 1983, Mark started in the Air Force Research Laboratory (AFRL) at Wright-Patterson AFB as a Mechanical Engineer. In 1993, he became the Chief of Aeronautical Engineering at a detachment of the Air Force Office of Scientific Research (AFOSR), in London, UK, where he served as a scientific liaison to seek out new collaborative opportunities between AFRL and those doing similar research in Europe, Africa, the Middle East, and the Former Soviet Union. In 1997, Mark returned to AFRL for a two-year assignment as the Assistant to the Chief Scientist for the Air Vehicles Directorate. Dr. Mark S. Maurice received his Bachelor of Mechanical Engineering (1982), M.S. in Aerospace Engineering (1986), and Ph.D. in Aerospace Engineering (1992) all from the University of Dayton. Mark is a licensed Professional Engineer, and a Fellow of the American Institute of Aeronautics and Astronautics (AIAA).



Robert E. Schafrik [NAE]

Dr. Schafrik is currently a private consultant. He recently retired as General Manager, Materials and Process Engineering Department at GE Aviation. As such he was responsible for developing advanced materials and processes used in GE's aeronautical turbine engines and their marine and industrial derivatives. He oversaw Materials Application Engineering activities supporting GE Aviation's global design engineering, manufacturing, and field support activities. He also operated a state-of-the-art in-house laboratory for advanced materials development, characterization, and failure analysis. Prior to joining GE in November 1997, he served in 2 concurrent positions within the National Research Council, which he joined in 1991: Staff Director, National Materials Advisory Board and Staff Director, Board on Manufacturing and Engineering Design. Under his direction, 33 final reports for studies were issued that addressed significant national issues in materials and manufacturing. Dr. Schafrik also served in the U.S. Air Force in a variety of R&D and system acquisition capacities; he retired as a Lieutenant Colonel, while recently he served as member of the Air Force Scientific Advisory Board, 2009-2013. He has a Ph.D. in metallurgical engineering from Ohio State University, an M.S. in information systems from George Mason University, an M.S. in aerospace engineering from the Air Force Institute of Technology, and a B.S. in metallurgy from Case-Western Reserve University. His experience in the aviation industry and their efforts for lightweighting will be indispensable for this workshop.



Michael McGrath

Dr. McGrath is a Principle at McGrath Analytics. He recently retired from the position of Vice President for Systems and Operations Analysis at Analytic Services Inc. (ANSER), a not-for-profit government services organization. He led ANSER's operations in Science and Technology and Operational Analysis and Management. Dr. McGrath holds a BS in Space Science and Applied Physics and an MS in Aerospace Engineering from Catholic University, and a doctorate in Operations Research from George Washington University. He previously served as the Deputy Assistant Secretary of the Navy for Research, Development, Test and Evaluation (DASN(RDT&E)), where he was a strong proponent for improvements in technology transition, modeling and simulation, and test and evaluation. In prior positions, he served as Vice President for Government Business at the Sarnoff Corporation, ADUSD for Dual Use and Commercial Programs in the Office of the Secretary of Defense, Assistant Director for Manufacturing at the Defense Systems Research Projects Agency, and Director of the DoD Computer-aided Acquisition and Logistics Support program. While at DARPA, he managed the Affordable Multi-Missile Manufacturing Program and the Agile Manufacturing program. He was also heavily involved in DARPA's dual-use Technology Reinvestment Project. His early government career included positions in Logistics Management at Naval Air Systems Command and in Acquisition Management in OSD. His background in Aerospace Engineering and Navy Research and Development background will be suitable for this workshop.



James Peddell

Mr. James Peddell joined the BDS(Washington) in September 2012. He is responsible for the development and maintenance of transatlantic research and technology relationships supporting UK defence, security and prosperity. This encompasses all aspects of Research, Science and Technology across Maritime, Land, Air, Counter-Terrorism, Cyber, Medical and Policy & Analysis. In addition, James maintains oversight of multi- and bi-lateral science and technology agreements, as well as all UK science and technology staff within the US. James was born in Colchester, England, and read Physics at York University. He joined the Ministry of Defence in 1993 as a scientific officer. In addition to his personal research, James has led teams engaged in fundamental research, operational systems development and intelligence analysis. When the UK government created 'QinetiQ plc' in 2001, James took the role of Chief Technologist for Underwater Platforms and Systems, in particular taking the lead on international and cross-government collaborations. In Jan 2003, James was posted to the US Naval Air Command (Pax River Naval Air Station) as a Programme Technical Director in Maritime Surveillance. Returning to the Defence Science and Technology Laboratory in 2006, James led a new unmanned systems programme for the MoD which supported the procurement of Reaper as a UK urgent operational requirement. He was then appointed head of the Sensor Systems group, responsible for sensor and ISTAR1 collector system capabilities across air, land, maritime and space. In 2011, James returned to the maritime environment to become head of the Maritime and Strategic Systems Domain. Responsible for the formulation and delivery of the Royal Navy's science and technology programme, encompassing above-water and under-water environments and those associated with the UK in-service deterrent, future deterrent and ballistic missile defence.

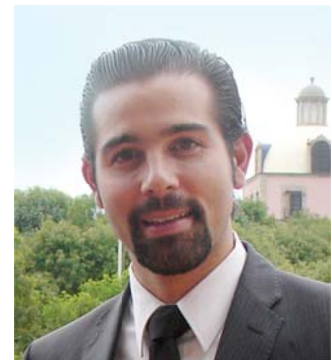


Dan Nagy

Mr. Nagy is Managing Director of the Inter-Regional Secretariat of Intelligent Manufacturing Systems that coordinates activities for its international members representing over thirty countries. With fifteen years of experience at IMS, he has successful experience guiding program activities for global collaboration in manufacturing research. Mr. Nagy is currently responsible for general management including strategic planning, marketing, finance, project portfolio, new member acquisition, and outreach activities. He also serves on various committees for the World Manufacturing Forum and has participated as an expert for international collaboration panels. Mr. Nagy was a former manager of corporate accounts for Apogent Technologies, where he guided sales and marketing of scientific products to large accounts. He developed and implemented contracts with major group purchasing organizations and large commercial laboratories, and pioneered group contracting with the Department of Veteran's Affairs and Department of Defense. In his early career, he worked as a medical technologist and laboratory manager. Mr. Nagy holds a Bachelor of Arts from Lycoming College, and a Masters of Business Administration degree from Baker University. He also holds certification in medical laboratory technology and others. He is a board member of IMS International and NACFAM (elect).

**David Romero**

Prof. David Romero is Senior Research Scientist and Scientific Project Manager for the National Graduate School of Science and Engineering at Tecnológico de Monterrey University, Mexico. He is currently acting as leader of the research line on Sustainable Process Industry & Industrial ecology (SPRING), within Advanced Manufacturing Research Group at the Center for Innovation in Design and Technology, and as MTP Project Development Coach and Academic Representative for the Intelligent Manufacturing Systems Program in the Region of Mexico. He has also occupied different executive director positions in his career in the departments of research and development, innovation and technology transfer, and business incubation and acceleration. He has participated in various national and international research projects, consulting services and training programs related to: Enterprise Architectures, Integration, Interoperability and Networking (EAI2N), Concurrent Engineering Enterprise (CEE), Sustainable Collaborative Networked Organizations (CNOs), and Technology & Innovation Management (TIM). Furthermore, he is actually member of the Ibero-American Community for Knowledge Systems (CISC), the Global Knowledge Based-Development Community (KBD), the Society of Collaborative Networks (SoColNet), the European Network of Living Labs (ENoLL), the ICE Community on Engineering, Technology and Innovation Management, the IEEE Technology and Engineering Management Society (TEMS), the IFAC TC-WG5.3 on Enterprise Integration and Networking (EIN), the IFIP WG5.7 on Advanced Production Management Systems (APMS), the IFIP WG5.12 on Enterprise Integration Architectures (EIA), and the Intelligent Manufacturing Systems (IMS) program. He has published more than 60 journal and international conference articles and serves at different editorial and scientific committee boards in the disciplines of business and industrial engineering.



Steve Ray

Steve Ray serves as the Project Development Coach for the U.S. Region within the Intelligent Manufacturing Systems Program. IMS is an industry-led, international business innovation and research and development (R&D) program established to develop the next generation of manufacturing and processing technologies through multi-lateral collaboration. He is also a Distinguished Research Fellow at Carnegie Mellon University Silicon Valley, where he researches semantics, information interoperability and standards in manufacturing, the smart electrical grid, and the Internet of Things. Formerly, he spent twenty-seven years initiating and leading technical R&D projects at the National Institute of Standards and Technology in Gaithersburg, Maryland, where he was responsible for the management of a \$13M division of 60 staff and visiting researchers dedicated to the solution of national problems related to measurements and standards supporting systems interoperation in the manufacturing sector. Dr. Ray served for one year as Chairman of the IGES/PDES Organization that coordinated the U.S. participation in the definition of STEP (Standard for the Exchange of Product Model Data, ISO 10303). He received his Ph.D. in Mechanical and Aerospace Engineering from Princeton University and his Bachelors in Physics from Bristol University in England.

**Johnnie J. Deloach, Jr.**

DeLoach is the U.S. National Representative on the Metals and Ceramics Technology and Performance Panel of The Technical Cooperation Program (TTCP). In 2014, he was selected to head the materials division of the Naval Surface Warfare Center, Carderock Division (NSWCCD). Prior to his current position, DeLoach served as the head of the Welding, Processing, and Nondestructive Evaluation (NDE) branch from 2001. He recently was selected to chair the NAVSEA Warfare Center Navy Materials Community of Interest, a collaboration intended to enhance synergy, teaming, and expertise in materials and materials-related technologies. In 2013, the Office of Naval Research (ONR) selected him to manage The Lightweight and Modern Metals Manufacturing Innovation (LM3I) Institute, a U.S. presidential initiative. DeLoach earned his B.S. in materials science and engineering from Brown University and his M.M.S.E. from Johns Hopkins University. He's received a number of awards and commendations from various Navy, Department of Defense, and civilian organizations. In 2012, he was inducted as a Counselor of the American Welding Society for lifetime contributions to the welding industry.



Paul Kern [NAE]

He served as President and Chief Operating Officer of AM General from August 2008 through January 2010 and is currently a Director with iRobot Corporation, and a member of the CoVant Board of Managers. Since retiring from the Army in 2005, he has held the Class of 1950 Chair for Advanced Technology at West Point, was a Vice President for Battelle, and a Director on the Anteon and EDO boards. GEN Kern retired after almost 38 years with the US Army as the Commanding General of the Army Materiel Command. The command of more than 50,000 personnel has worldwide responsibility for supply and maintenance support to the Department of Defense, manages the Army depot system, and conducts research for all the ground and rotary wing equipment. Previously he served four years as the Department of the Army Military Deputy for Research, Development and Acquisition. In 1996-97 he was the Commanding General of the 4th Infantry Division, Mechanized, where they developed the organization, tactics, techniques, and equipment implemented in today's networked force. From 1993 to 1996 he was the Senior Military Assistant for Secretary of Defense Bill Perry. GEN Kern graduated from West Point in 1967 with a Bachelor of Science degree. He holds Master Degrees in Civil and Mechanical Engineering from the University of Michigan and was elected to the National Academy of Engineering in 2006. He was a National Security Fellow at the J.F. Kennedy School, Harvard University and is currently a member of the Defense Science Board. His knowledge of ground and rotary wing equipment will be instrumental for the workshop.

**Tom Bayha**

Dr. Thomas Bayha joined ATI Specialty Materials in July 2001 as Director of Superalloy R&D Technology. He managed various product and process development programs in Ni-base alloys and high strength steels, before transferring to his position as Director of the Titanium R&D research group in 2005. Since his arrival at ATI Specialty Materials, Dr. Bayha has been the R&D Administrator of government-sponsored R&D programs, and was the Program Manager of the AFRL Metals Affordability Initiative Program on Electron Beam Single Melting of Ti-6Al-4V. In January of 2009, Dr. Bayha was named to his current position as the Director of Research and Development for ATI Specialty Materials. Prior to joining ATI, Dr. Bayha was employed from 1991 to 1997 at Lockheed Martin Aeronautical Systems Company as a Senior Engineer. In this capacity, he was the Principal Investigator for Metallic Materials Durability for the NASA High Speed Civil Transport Program, and the Program Manager of Ti-6-2-2-2-2 Characterization Program, funded by AFRL. He also worked as an R&D process engineer at Heraeus MTD from 1997 to 1999, where he led development efforts in high purity titanium and magnetic material sputtering targets for electronic materials applications. Subsequent to that position, Dr. Bayha spent two years (1999 to 2001) at the Alcoa-Howmet Research Corporation, where he was the Program Manager for externally funded Ni and Ti research programs.

