Maintaining Operational Effectiveness for U.S. Naval Forces in Highly Degraded Environments: Ensuring Trusted, Resilient Data in the Face of Data Warfare (Phase 2)

Committee

Donna M. Gregg

Co-Chair

Ms. Donna M. Gregg is head of the Asymmetric Operations Sector at the Johns Hopkins University Applied Physics Laboratory (JHU/APL). In this role, Ms. Gregg is responsible for approximately 1,400 staff and the work of 4 mission areas supporting the emphasis of defeating the asymmetric threat, whether manmade or naturally occurring. Areas of focus include countering terrorism, weapons of mass destruction, offensive cyber and biological threats. A major thrust of the sector is the advancement and use of data science to find and combat these threats. Ms. Gregg's expertise includes information assurance, including emerging data integrity and data security techniques for sensitive U.S. government systems. Prior to becoming a sector head, Ms. Gregg served as the mission area executive for Cyber Operations in the Asymmetric Operations Sector, where she managed the standup of the National Information Assurance Engagement Center—a collaboration between JHU/APL and the National Security Agency ultimately evolving it into cyber situational awareness tools and techniques focused on mission impact. She is a current member of the Naval Studies Board and former member of the National Academies Committee for a Review of the U.S. Navy Cyber Defense Capability. Ms. Gregg earned a B.S. in mathematics from the University of Maryland and M.S. in mathematics from the Johns Hopkins University.

Katherine A. Rink

Co-Chair

Dr. Katherine A. Rink is the associate division head of the Air, Missile and Maritime Defense Technology Division at the Massachusetts Institute of Technology (MIT) Lincoln Laboratory, which develops and assesses new technologies and integrated systems for defense against ballistic missiles, cruise missiles, and air vehicles in tactical, regional, and homeland defense applications. Before this, she served for two years as the group leader of the Advanced Concepts and Technologies Group, developing and integrating advanced air and missile defense capabilities across the Department of Defense and the Services, with particular emphasis on developing new technologies for the U.S. Navy to address the advanced missile threat. Dr. Rink joined MIT Lincoln Laboratory in 1999 as a member of the technical staff in the Systems Engineering and Analysis Group, where she worked on many technical aspects of the then-emerging Aegis ballistic missile defense system, including systems analysis, tracking, and discrimination, prototyping, and flight test analysis. She led the laboratory's Aegis ballistic missile defense program and later led the development of advanced air and missile defense capabilities and electronic warfare prototypes for the U.S. Navy. Dr. Rink recently served on the National Academies Committee on Defending Forward-Deployed U.S. Navy Platforms from Potential Enemy Missile and Rocket Attacks. She is a member of the NSB. Dr. Rink received a B.S. in systems science and mathematics, a B.A. in mathematics, and an M.S. and D.Sc. in systems science and mathematics, all from Washington University in St. Louis, with an additional M.S. in operations research from Columbia University.

Arthur H. Barber

Member

Mr. Arthur H. (Trip) Barber is the chief analyst of Systems Planning and Analysis (SPA), Incorporated, where he is responsible for improving and expanding the quality, breadth, and depth of the analytic products of the company and skills of its workforce. (SPA is a privately held company that provides technical and analytical support services to government executive decision makers.) Prior to joining SPA in 2014, Mr. Barber served for 12 years as deputy director of the Assessment Division in the Office of the Chief of Naval Operations. As a member of the Senior Executive Service (SES) from 2002 to 2014, Mr. Barber served as the chief operating officer of the U.S. Navy's corporate analytic organization and the Navy's senior analyst, where his responsibilities included, in part, developing, managing and executing the Navy's overall corporate analytic agenda of over 120 studies/year on future capability and force structure requirements to inform budget and requirements decisions. Prior to his SES appointment, Mr. Barber served for 28 years in the U.S. Navy as a surface warfare officer, retiring at the rank of Captain after a career that included command of a destroyer and of the Norfolk Navy Base. Between his uniformed and civilian Navy careers he spent 25 years in the Pentagon working on program and capability analysis and budget development. He is a Fellow of the Military Operations Research Society and has been awarded three distinguished service medals by the Navy and the Department of Defense for his Pentagon work. In addition to his professional interests, Mr. Barber is the volunteer manager of a national rocketry-based STEM program for 6th through 12th graders called The American Rocketry Challenge (TARC), which he co-founded in 2002. Mr. Barber is currently a member of the National Academies Committee on Maintaining Operational Effectiveness for U.S. Naval Forces in Highly Degraded Environments. He earned a B.S. in aerospace engineering from the Massachusetts Institute of Technology and an M.S. in electrical engineering (with an additional subspecialty in weapon system engineering) from the Naval Postgraduate School.

May Casterline

Member

Dr. May Casterline is a senior data scientist at NVIDIA where she works with both industry and government to help enable developers, engineers, data scientists and analysts integrate artificial intelligence (AI) and graphics processing unit (GPU) accelerated solutions into their workflows and products. Her expertise includes satellite and airborne imaging systems, with her current research interests including deep learning, hyperspectral and multispectral imaging, innovative applications of machine learning (ML) approaches to remote sensing data, multimodal data fusion, data workflow design, high performance computing applications, and creative software solutions to challenging geospatial problems. Dr. Casterline earned a B.S. and Ph.D. in imaging science, with a focus on remote sensing, from the Rochester Institute of Technology.

William E. Gortney

Member

ADM William E. Gortney, U.S. Navy (Ret.), is an independent consultant, having retired from the U.S. Navy in 2016, after 29 years of service. In his last position, Admiral Gortney served as commander of U.S. Northern Command. Previously, Admiral Gortney commanded forces in the U.S. Central Command area of operations, providing support to Maritime Security Operations and combat operations for Operations Enduring Freedom and Iraqi Freedom, on three different occasions. His other flag officer assignments included Commander, U.S. Naval Forces Central Command / U.S. 5th Fleet / Combined Maritime Forces; Commander, Carrier Strike Group 10; and Deputy Chief of Staff for Global Force Management and Joint Operations, Fleet Forces Command. Admiral Gortney has flown over 5,360 mishap-free flight hours and completed 1,265 carrier-arrested landings, primarily in the A-7E Corsair II and the FA-18 Hornet. He earned a B.A. in history and political science from Elon College after which he entered the U.S. Navy as an aviation officer candidate receiving his commission in the U.S. Naval Reserve. He also earned an M.A. in national security and strategic studies from the Naval War College. Admiral Gortney is a current member of the Naval Studies Board.

Wilman J. Guevara

Member

Mr. Wilman J. Guevara is a member of the principal professional staff at the Johns Hopkins University Applied Physics Laboratory (JHU/APL). He has over 25 years of technical experience in systems engineering of complex multi-system problems and capabilities requiring multi-organizational subject matter expertise and collaboration. Mr. Guevara’s expertise includes resilient and agile networking approaches; communications sharing and control under challenging environments; and distributed architectures for the integration and interoperability across multiple systems (new systems and legacy infrastructure). Since 2009, Mr. Guevara has served as the JHU/APL cooperative engagement capability and sensor netting development lead for integrated warfare systems used in a variety of national security applications. He earned a B.S. and M.S. in electrical engineering from the Georgia Institute of Technology, and an M.S. in applied and computational mathematics from the Johns Hopkins University.

Wesley L. Harris

Member

Dr. Wesley L. Harris (NAE) is the Charles Stark Draper Professor of Aeronautics and Astronautics and former associate provost and head of the Department of Aeronautics and Astronautics at the Massachusetts Institute of Technology (MIT). His research focuses on theoretical and experimental unsteady aerodynamics and aeroacoustics, computational fluid dynamics, hemodynamics, sustainment of complex systems, and federal government policy impact on procurement of high-technology systems. Prior to MIT, Dr. Harris served as Associate Administrator for Aeronautics at the National Aeronautics and Space Administration (NASA). He has also served as the vice president and chief administrative officer of the University of Tennessee Space Institute and dean of engineering at the University of Connecticut. Dr. Harris has served on numerous scientific boards and advisory committees, including as a current member of the National Academies Air Force Studies Board and Laboratory Assessment Board in addition as a member for other National Academies activities (e.g., Panel on Engineering Sciences at the Army Research Office). Dr. Harris earned a B.A. in aerospace engineering (with honors) from the University of Virginia and an M.A. and a Ph.D. in aerospace and mechanical sciences from Princeton University.

Terry P. Lewis

Member

Dr. Terry P. Lewis is a senior associate and senior technical program manager/Chief Engineer at Booz Allen Hamilton, where his expertise includes military command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) and digitized battlespace systems design, communications and transmission security design, network and key management system design, analysis for secure systems implementation, anti-tampering technologies and Electronic Warfare. Previously, Dr. Lewis was senior program manager and off-site executive for the Raytheon Company, where he led an organization focused on radio frequency engineering, reverse engineering, cyber technology development (offensive and defensive), rapid prototyping, and system development. At Raytheon, he also led an agile group of engineers focused on Information Operations (cyber applications), signal processing, and embedded systems. LCDR Lewis (retired) served in both Enlisted and Commissioned Officer capacities in both the U.S. Air Force and the U.S. Navy reserves with 32 years of total service. Dr. Lewis has served on numerous scientific boards and advisory committees, including, for example, as a member of National Academies Committee on Distributed Remote Sensing for Naval Undersea Warfare, Committee for a Review of U.S. Navy Cyber Defense Capabilities, and Committee on a Strategy for Acquiring Secure and Reliable Electronic Components for Air Force Weapon Systems.

Scott G. Littlefield

Member

Dr. Scott G. Littlefield is a principal research engineer in the Robotics and Autonomous Systems Division at the Georgia Tech Research Institute (GTRI), where his expertise includes artificial intelligence (AI) approaches for augmenting autonomy in robotics and other unmanned systems, as well as verification and validation techniques of on-board mission planning tools for long endurance unmanned systems. Prior to joining GTRI, Dr. Littlefield was a program manager in the Tactical Technology Office at the Defense Advanced Research Projects Agency (DARPA) from 2011 to 2017, during which time he managed programs in unmanned sea systems. In particular, he served as the program manager for DARPA's Anti-Submarine Warfare Continuous Trail Unmanned Vessel program, which led to the development of a large unmanned surface vessel prototype that has since transitioned to the Navy as a medium displacement unmanned surface vessel. Dr. Littlefield earned a B.S. in mechanical engineering from the University of Michigan, an M.P.A. from the Kennedy School of Government at Harvard University, and a D.Eng. in engineering management from the George Washington University.

Thomas G. MacDonald

Member

Dr. Thomas G. Macdonald is the Assistant Head of the Communication Systems Division at the Massachusetts Institute of Technology Lincoln Laboratory (MIT/LL), where he helps direct a portfolio of efforts addressing communications challenges for a variety of national security applications. His expertise includes low profile antenna design, mobile ad hoc and wireless networking, military-satellite communications, and laser communications systems, as well as emerging networking approaches to provide more robust communications over intermittent links. During his career at MIT LL, Dr. Macdonald has served as a leader for three different groups within the Communication Systems Division; he has also held a technical leadership role in the U.S. Air Force under an intergovernmental personnel act agreement. His awards include the 2010 Armed Forces Communications and Electronics Association Meritorious Award for Engineering, and in 2013 he received the Outstanding Young Alumni Award from the College of Engineering and Science at Clemson University. Dr. Macdonald has also coauthored two book chapters and has published extensively in conference proceedings and journals. A longtime participant in Institute of Electrical and Electronics Engineers (IEEE) activities, he served as a chair for three IEEE Military Communications Conferences. Dr. Macdonald earned an M.S. and Ph.D. in electrical engineering from Clemson University.

Wen C. Masters

Member

Dr. Wen C. Masters is deputy director for research at the Georgia Tech Research Institute (GTRI), director of the Information and Cyber Sciences Directorate (ICSD) at GTRI, and a principal research scientist of the Georgia Institute of Technology. Dr. Masters is responsible for the strategic guidance and execution oversight of ICSD, whose major research areas include command, control, communications, and computers (C4); multi-domain mission planning and battle management; cyber security and protection; data, information, and human-centric systems, including artificial intelligence; health systems; and STEM outreach. Previously, Dr. Masters served as member of the Senior Executive Service for the Department of the Navy, where she led the Office of Naval Research's science and technology (S&T) portfolio in C4, as well as intelligence, surveillance, and reconnaissance. Throughout her twenty-three years of Federal civilian service, Dr. Masters led several S&T efforts that enabled numerous capabilities for national security applications. Her awards include the Department of Navy's Distinguished Civilian Service Medal, Superior Civilian Service Medal, and Meritorious Civilian Service Medal. Dr. Masters earned a B.S., M.S., and Ph.D. in mathematics from the University of California, Irvine and is a current member of the Naval Studies Board.

Jeffrey Picciotto

Member

Mr. Jeffrey Picciotto is the co-technical director of the Cyber Solutions Technical Center at the MITRE Corporation, where he provides leadership and strategic direction for the center's 440 staff; helps strengthen relationships and knowledge sharing across MITRE's sponsors; and implements new initiatives for technology, staff, and work program development. In addition, Mr. Picciotto is the cybersecurity lead for MITRE's nuclear command, control and communications (NC3) mission assurance enterprise efforts, where he helps establish and execute a cross-Corporation and cross-sponsor NC3 cybersecurity strategy focused on improving the integrated cyber security capabilities across the existing and future NC3 enterprise architecture. Mr. Picciotto's expertise includes cyber resiliency, data security, software reliability, supply chain security, secure software engineering and development, and computer security, including the securing of data in cloud services and across large-scale enterprise networks. He joined MITRE in 1985 and previously served as department head of the Applied Cyber Security Research and Development department, where he led information assurance research initiatives for the U.S. Air Force and the National Security Agency. Mr. Picciotto has published numerous conference papers and journal articles in the field of computer security. He earned a B.S. in computer science from the Massachusetts Institute of Technology and M.S. in computer science from Northeastern University.

Mikel Rodriguez

Member

Dr. Mikel Rodriguez manages the independent research and development efforts in the area of decision sciences at the MITRE Corporation and leads the Joint Artificial Intelligence (AI) Center's AI Red Team. For the past fifteen years his research has focused on exploring how artificial intelligence and, in particular, computer vision can be used to help solve problems for a safer world. He obtained his Ph.D. at the University of Central Florida's Center for Research in Computer Vision. He was a visiting researcher at the Robotics Institute at Carnegie Mellon and a post-doctoral fellow at the Institut national de la recherche agronomique (INRIA) at the Département d'Informatique of Ecole Normale Supérieure in Paris, France. Dr. Rodriguez was the chair of the Office of the Director of National Intelligence Video Analytics Research Working Group and is the senior technical advisor for the Pentagon's Algorithmic Warfare Cross-Functional Team. He serves on the program committee for the Institute of Electrical and Electronics Engineers (IEEE) Computer Vision and Pattern Recognition and the IEEE International Conference on Computer Vision and is an area chair of IEEE Transactions on Pattern Analysis and Machine Intelligence.

Nils R. Sandell, Jr.

Member

Dr. Nils R. Sandell, Jr. is an independent consultant having previously served from 2013 to 2016 as director of the Strategic Technologies Office at the Defense Advanced Research Projects Agency (DARPA). His areas of expertise include military and commercial networks and communications; command and control; communications; guidance, navigation and control; information fusion and management; intelligence, surveillance, and reconnaissance tracking and identification; low observables; modeling, simulation and analysis; science and technology management; and systems engineering. Prior to joining DARPA, Dr. Sandell served as the vice president and general manager of BAE Systems, Advanced Information Technologies, and was the co-founder and CEO of ALPHATECH, Inc. He is a former associate professor at the Massachusetts Institute of Technology (MIT) where he lectured in estimation and control theory, stochastic processes, and computer systems. Dr. Sandell has served on numerous scientific boards and advisory committees, including as a member of the National Academies Committee on Network-Centric Naval Forces, Committee on Operational Science and Technology Options for Defeating Improvised Explosive Devices, and Committee on the "1000 Ship Navy"—A Distributed and Global Maritime Network; and co-chair of the National Academies Committee on C4ISR for Future Naval Strike Groups and Committee on Information Assurance for Network-Centric Naval Forces. He recently served as vice chair of the U.S. Air Force Scientific Advisory Board, a federal advisory committee reporting directly to the Secretary of the Air Force and Chief of Staff of the Air Force. Dr. Sandell earned a B.S. in electrical engineering from the University of Minnesota, and an M.S. and Ph.D. in electrical engineering from MIT.

Dennis P. Shea

Member

Mr. Dennis P. Shea is a principle research scientist with the Center for Naval Analyses (CNA), where he has over 40 years of operations research experience, including five CNA field assignments. His expertise includes analyzing the networking and security performance of distributed U.S. Navy Fleet assets, including afloat (carrier strike groups) and ashore (maritime operations center) assets in highly degraded environments. From 2000 to 2018, Mr. Shea led CNA's research program on information technology and operations for Naval Forces, including research focused on understanding and improving the performance of networks and communications systems across afloat and ashore assets. Mr. Shea earned a B.S. in mechanical engineering from Temple University, an M.S. in operations research from Georgia Institute of Technology, and an M.S. in management of technology from the Massachusetts Institute of Technology.