Evaluating the Performance Measures and Metrics Development for the Global Nuclear Detection Architecture

Committee

Arden L. Bement, Jr.

Chair

Arden Bement is the founding director of the Global Policy Research Institute and is the David A. Ross Distinguished Professor of Nuclear Engineering at Purdue University. He served as director of the National Science Foundation (NSF) from 2004 until 2010. Prior to his confirmation as NSF director, Dr. Bement served as director of the National Institute of Standards and Technology (NIST). He has held previous appointments at Purdue University in the schools of Nuclear Engineering, Materials Engineering, and Electrical and Computer Engineering, as well as a courtesy appointment in the Krannert School of Management. Dr. Bement joined the Purdue faculty in 1992 after a 39-year career in industry, government and academia where his positions included: vice president of technical resources and of science and technology for TRW Inc.; deputy under secretary of defense for research and engineering; director, Office of Materials Science at DARPA; and professor of nuclear materials at the Massachusetts Institute of Technology. He served as a member of the U.S. National Commission for UNESCO and as the vice-chair of the Commission's Natural Sciences and Engineering Committee. He is a member of the National Academy of Engineering, a fellow of the American Academy of Arts and Sciences, and a fellow of the American Association for the Advancement of Science. Dr. Bement has served on and has chaired numerous NRC studies, most relevant to this study chairing the Committee on the Scientific and Technical Assessment of Stockpile Stewardship. Dr. Bement is a retired lieutenant colonel of the U.S. Army Corps of Engineers, and a recipient of the Distinguished Civilian Service Medal of the Department of Defense. He received his B.S. in engineering of metallurgy from the Colorado School of Mines, his M.S. in metallurgical engineering from the University of Idaho, his Ph.D. in metallurgical engineering from the University of Michigan, and honorary doctorates from Cleveland State University, Case Western Reserve University, the Colorado School of Mines, the University of Idaho and the Korean Advanced Institute of Science and Technology, as well as a Chinese Academy of Sciences Graduate School Honorary Professorship. He has been awarded the Order of the Rising Sun, Gold and Silver Star, from the Empire of Japan and the Chevalier dans l'Ordre National de la Légion d'Honneur from the French Republic.

Kelley S. Coyner

Member

As a senior researcher at the University of Maryland Center for Health and Homeland Security, Kelley Coyner serves as the Chief of Staff of the Senior Policy Group of the National Capital Region. In this capacity ,she creates and facilitates multi-agency teams to oversee the selection, implementation, and evaluation of federal funded projects across all levels of government and more than 20 disciplines. She is an expert in the development and implementation of strategic planning for technically and social complex fields; designing, implementing and evaluating, complex programs and policies across disciplines; and fostering innovation through public policy. Her previous work in emergency preparedness and response includes serving as the senior official in charge of emergency preparation and response at the Department of Transportation; civilian advisor to the U.S. Coast Guard Academy on coordinated disaster response (2001); visiting researcher at MIT's Center for Transportation Research (2001-2002); and observer, Executive Session on Domestic Preparedness at the Kennedy School of Government at Harvard University (2001-2003). Ms. Coyner’s six years as a senior official at DOT included service as the Senate-confirmed Administrator of the Research and Special Programs Administration. For her work in technology, transportation, and education, she received the Secretary’s Gold Medal. From 2001 to 2006, Ms. Coyner lived in Bolivia and Paraguay where she served as an advisor to local and international nonprofits on institutional development, conservation, community health, disaster relief, and risk mitigation. Ms. Coyner has served as an Ex-Officio member of the NRC’s Transportation Research Board. She received her B.S. from Georgetown University’s School of Foreign Service and the Dean’s award for outstanding public service. A graduate of University of Virginia School of Law, Ms. Coyner clerked for Hon. George P. Kazen, Chief Judge (ret.), U.S. District Court, Southern District of Texas and practiced with the Arent Fox law firm.

Martha Crenshaw

Member

Dr. Martha Crenshaw is a senior fellow at the Center for International Security and Cooperation (CISAC), a senior fellow at the Freeman Spogli Institute for International Studies (FSI), and a professor of political science by courtesy at Stanford University. She was the Colin and Nancy Campbell Professor of Global Issues and Democratic Thought and professor of government at Wesleyan University from 1974 to 2007. She chaired the American Political Science Association Task Force on Political Violence and Terrorism. She was also a lead investigator at the National Consortium for the Study of Terrorism and Responses to Terrorism (START), a center of excellence of the Department of Homeland Security based at the University of Maryland. She has long written extensively on the issue of political terrorism; in 2011, Routledge published Explaining Terrorism, a collection of her previously published work beginning with her 1972 article, "The Concept of Revolutionary Terrorism." She was a Guggenheim Fellow in 2005. Dr. Crenshaw has served on several NRC committees, most relevantly: the Committee on Determining Basic Research Needs to Interrupt the Improvised Explosive Device Delivery Chain. She received her B.A. from Newcomb College and an M.A. from Wesleyan University. She received her second M.A. and her Ph.D., both in political science, from the University of Virginia.

James S. Dyer

Member

Dr. James S. Dyer holds the Fondren Centennial Chair in Business in the College of Business Administration at the University of Texas at Austin. In 1999, he received the College of Business Administration Foundation Advisory Council Award for Outstanding Research Contributions. He served as chair of the Department of Information, Risk, and Operations Management for nine years (1988-97). He was the Philip J. Rust Visiting Professor of Business at the Darden Business School at the University of Virginia in 1999. He is the former president of the Decision Analysis Society of the Operations Research Society of America (now INFORMS). He received the Frank P. Ramsey Award for outstanding career achievements from the Decision Analysis Society of INFORMS in 2002. He was named a fellow of INFORMS in 2006 and also received the Multiple Criteria Decision Making Society's Edgeworth-Pareto Award in 2006. Dr. Dyer has consulted with a number of companies regarding the application of decision and risk analysis tools to a variety of practical problems, including the Jet Propulsion Laboratories, the RAND Corporation, and the Department of Energy. Dr. Dyer has published three books and more than 60 articles on risk analysis and investment science. His recent articles focus on decision making including a multi-attribute utility analysis for the disposition of weapon-grade plutonium in the United States and Russia. He received a B.A. with honors, Phi Beta Kappa, in physics with minors in mathematics and philosophy and his Ph.D. in business quantitative methods and management from the University of Texas at Austin.

Roger L. Hagengruber

Member

Dr. Roger Hagengruber is the director of the Office for Policy, Security and Technology, the Institute for Public Policy, and a professor of political science at the University of New Mexico. Dr. Hagengruber previously served as senior vice president at Sandia National Laboratories. During his 30 years at Sandia, he concentrated on non-proliferation issues and served as a negotiator in Geneva and the Soviet Union. Most recently, he co-authored the report: "Nuclear Power and Proliferation Resistance: Securing Benefits, Limiting Risk," which was published by the Nuclear Energy Study Group of the American Physical Society. His most recent and relevant NRC committee membership was serving on the Committee on Evaluating Testing, Costs, and Benefits of Advanced Spectroscopic Portals and the Committee on Risk-Based Approaches for Securing the DOE Nuclear Weapons Complex. He received his B.S., M.S and Ph.D. from the University of Wisconsin System. His Ph.D. is in nuclear physics.

John M. Holmes

Member

As deputy executive director of operations at the Port of Los Angeles, Capt. John M. Holmes oversees the Port Police, Port Pilots, Emergency Preparedness, Wharfinger and Homeland Security divisions at one of the busiest container ports in the nation. He works cooperatively with associated government and law enforcement agencies to uphold maritime laws, enforce safety and security regulations, and continually test and enhance emergency response and preparedness procedures to ensure the safety of the Port workforce and residents in the surrounding harbor communities. Capt. Holmes has 30 years of international management experience in a variety of positions that include a chief operating officer, Fortune 500 executive, senior level Coast Guard officer and industry renowned maritime security specialist. As Captain of the Port of Los Angeles, Holmes was at the helm on September 11, 2001, and has been credited with swift and decisive actions that ultimately led to the creation of a number of national security initiatives, including the Maritime Transportation Security Act (MTSA), Area Maritime Security Committee and Sea Marshal Program. He most recently served as a principal and chief operating officer of the Marsec Group, a full-service security consulting firm specializing in supply chain security, technology and operations. Prior to forming the Marsec Group, Holmes was vice president and director of business development for Science Applications International Corporation, where he assisted government and commercial customers with the development of technological solutions to homeland security challenges, with an emphasis on port, border and military solutions. His most relevant NRC committee membership was serving on the Committee on Evaluating Testing, Costs, and Benefits of Advanced Spectroscopic Portals. Capt. Holmes holds B.A. in English and education from Boston College, and an M.S. in business administration from Washington University’s John M. Olin School of Business.

Edward H. Kaplan

Member

Dr. Edward Kaplan currently serves as the William N. and Marie A. Beach Professor of Management Sciences at the Yale School of Management, Professor of Public Health at the Yale School of Medicine, and Professor of Engineering in the Yale School of Engineering and Applied Sciences. He is an expert in operations research, mathematical modeling and statistics and studies problems in public policy and management. His recent research has focused on counterterrorism topics such as the tactical prevention of suicide bombings, bioterror preparedness, and response logistics in the event of a smallpox or anthrax attack. He has received three Koopman Prizes from the Institute for Operations Research and the Management Sciences (INFORMS) Military Applications Society, one for his work on smallpox , another for his models evaluating suicide-bomber-detector schemes and most recently for his paper “Terror Queues,” which was won in 2011. Dr. Kaplan co-directs the Daniel Rose Technion-Yale Initiative in Homeland Security and Counterterror Operations Research. He served twice as the Lady Davis Visiting Professor at the Hebrew University of Jerusalem—in the School of Public Health and Community Medicine in 1994, and in the Department of Statistics in 1997—and is also an elected member of the Board of Governors of the Technion-Israel Institute of Technology. For all of his contributions to the operations research profession, Kaplan was designated an INFORMS Fellow in November 2005 and is a member of both the National Academy of Engineering and the Institute of Medicine. He has served on numerous NRC committees, most relevently on the Committee on Behavioral and Social Research to Improve Intelligence Analysis for National Security. He obtained his B.A. from McGill University with First Class Honors in economic and urban geography, and proceeded to graduate study at the Massachusetts Institute of Technology where he completed three masters’ degrees (in operations research, city planning, and mathematics) in addition to his doctorate in urban studies.

John Mattingly

Member

Dr. John Mattingly recently joined the North Carolina State University (NCSU) where he is conducting basic research in radiation measurement and analysis methods applied to nuclear security applications, including nuclear materials control and accountability (NMC&A), arms control, safeguards, nonproliferation, counterterrorism, emergency response and forensics. Prior to joining the NCSU faculty, he worked for 15 years at two national laboratories, Oak Ridge National Laboratories (ORNL) and Sandia National Laboratories (SNL). At ORNL, he helped to develop measurement systems and analysis methods for active neutron interrogation of special nuclear material for NMC&A, safeguards, arms control, and nonproliferation applications. This work included conducting experiments at several facilities in the US nuclear weapons complex, and at foreign facilities including the Russian Institute of Experimental Physics (VNIIEF). At SNL, Dr. Mattingly was one of two lead developers of the Gamma Detector Response Analysis Software (GADRAS) which is commonly used by the on-call analyst community to simultaneously analyze gamma spectroscopy and neutron multiplicity counting measurements. At SNL, he also served as a 24/7 on-call analyst for the Department of Energy (DOE) and Department of Homeland Security. In this job, he learned to rapidly analyze gamma spectroscopy and neutron multiplicity measurements to assess the potential threat posed by a radiation source discovered in the stream of commerce and other settings. Dr. Mattingly received his B.S., M.S. and Ph.D. all in nuclear engineering at the University of Tennessee.

Gregory Parnell

Member

Dr. Gregory S. Parnell is a professor of systems engineering at the U.S. Military Academy at West Point and is now on sabbatical as a Distinguished Visiting Professor at the U.S. Air Force Academy. His research focuses on decision analysis, risk analysis, resource allocation, and systems engineering for defense; intelligence; homeland security; research and development; and environmental applications. He is Chairman of the Board and a senior principal with Innovative Decisions, Inc., a decision and risk analysis firm. Dr. Parnell is a former president of the Decision Analysis Society of the Institute for Operations Research and Management Science (INFORMS) and of the Military Operations Research Society (MORS). He has also served as editor of Journal of Military Operations Research. Dr. Parnell has published more than 100 papers and book chapters and has co-edited Decision Making for Systems Engineering and Management, Wiley Series in Systems Engineering (2nd Ed, Wiley and Sons, 2011). He has received several professional awards, including the U.S. Army Dr. Wilbur B. Payne Memorial Award for Excellence in Analysis, MORS Clayton Thomas Laureate, two INFORMS Koopman Prizes, and the MORS Rist Prize. He chaired the NRC Committee on Methodological Improvements to the Department of Homeland Security's Biological Agent Risk Analysis (2008) and was a member of the Improving Metrics for the Department of Defense Cooperative Threat Reduction Program (2011). He is a fellow of MORS, INFORMS, the International Committee for Systems Engineering, and the Society for Decision Professionals. He received his B.A. in aerospace engineering from the State University of New York at Buffalo, his M.E. in industrial and systems engineering from the University of Florida, his M.S. in systems management from the University of Southern California, his Ph.D. in engineering-economic systems from Stanford University. Dr. Parnell is a retired Air Force colonel and a graduate of the Industrial College of the Armed Forces.

Donald Prosnitz

Member

Dr. Prosnitz is presently a Sr. Principal Researcher (adjunct) at RAND Corporation, a visiting scholar at the physics department of the University of California, Berkeley, and an independent technical consultant. His current activities include research on free-electron lasers and a range of studies at RAND concentrating on the utilization of technology to solve national and homeland security issues. Dr. Prosnitz was previously the Deputy Associate Director (Programs) for Non-Proliferation, Homeland and International Security at Lawrence Livermore National Laboratory (LLNL) where he was responsible for overseeing all of the directorate's technical programs. He spent two years as an assistant professor at Yale University before joining LLNL. Over the next three decades, he conducted research on lasers, particle accelerators, high power microwaves, free electron lasers, and remote sensing, and managed the design, construction, and operation of numerous research facilities. In 1990, he was awarded the U.S. Particle Accelerator Award for Achievement in Accelerator Physics and Technology. In 1999, Dr. Prosnitz was named the first Chief Science and Technology Advisor for the Department of Justice (DOJ) by Attorney General Janet Reno. He was responsible for coordinating technology policy and technology projects among the DOJ's component agencies and with state and local law enforcement entities. In 2002, he was named a Fellow of the American Physical Society. He is a former chair of the American Physical Society Forum on Physics and Society. He recently served on the NRC Committee to Review the Department of Homeland Security's Approach to Risk Analysis. Dr. Prosnitz received his B.S. from Yale University and his Ph.D. in Physics from the Massachusetts Institute of Technology. He is a licensed amateur radio operator and an active member of his community's CERT (Community Emergency Response Team.)

Thomas C. Schelling

Member

Dr. Thomas Schelling is a Distinguished Professor of Economics at the University of Maryland. In 2005, he was awarded the Nobel Prize in Economics for enhancing the "understanding of conflict and cooperation through game-theory analysis." In 1990, he left the John F. Kennedy School of Government, where he was the Lucius N. Littauer Professor of Political Economy. He has also served in the Economic Cooperation Administration in Europe and has held positions in the White House and Executive Office of the President, Yale University, the RAND Corporation, and the Department of Economics and Center for International Affairs at Harvard University. Most recently, he has published on military strategy and arms control, energy and environmental policy, climate change, nuclear proliferation, and terrorism. Dr. Schelling is best known for his books The Strategy of Conflict and Micromotives and Macrobehavior. He is a member of the National Academy of Sciences, the Institute of Medicine, and a fellow of the American Academy of Arts and Sciences. In 1991, he was President of the American Economic Association, of which he is now a Distinguished Fellow. He was the recipient of the Frank E. Seidman Distinguished Award in Political Economy and the National Academy of Sciences award for Behavioral Research Relevant to the Prevention of Nuclear War. He has served on numerous NRC committees, most relevantly the Roundtable on Social and Behavioral Sciences and Terrorism. Dr. Schelling received his B.A. in economics from the University of California, Berkeley and his Ph.D. in economics from Harvard.

Detlof von Winterfeldt

Member

Prior to returning to the University of Southern California (USC), where he is a professor of Industrial and Systems Engineering and a Professor of Public Policy and Management, Dr. Detlof von Winterfeldt served as the director of the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria. Concurrently with his term at IIASA, he was a Centennial Professor in the Operational Research Group of the School of Management in the London School of Economics and Political Science. In 2003 he co-founded the National Center for Risk and Economic Analysis of Terrorism Events (CREATE) at USC, the first university-based center of excellence funded by the U.S. Department of Homeland Security. He served as CREATE's director until 2008. For the past thirty years he has been active in teaching, research, university administration, and consulting. His research interests are in the foundation and practice of decision and risk analysis as applied to technology development, environmental risks, natural hazards and terrorism. He is the co-author of two books, two edited volumes, and author or co-author of over 100 journal articles and book chapters on these topics. He is a former president of the Decision Analysis Society of the Institute for Operations Research and Management Science (INFORMS) and is an elected fellow of INFORMS and of the Society for Risk Analysis. In 2000 he received the Ramsey Medal for distinguished contributions to decision analysis from the Decision Analysis Society of INFORMS. In 2009 he received the Gold Medal from the International Society for Multicriteria Decision Making for advancing the field. He has served on numerous committees and panels of the NRC and the U.S. National Science Foundation; most relevant to this study was his service on the NRC's Committee on Transportation of Radioactive Waste. He received his B.S. in psychology with a minor in philosophy and his M.S. in psychology from the University of Hamburg, Germany, and his Ph.D. in mathematical psychology from the University of Michigan.