The National Academies of
SCIENCES • ENGINEERING • MEDICINE

DoD Range Capabilities Testing for the Future Fight:

Virtual Public Briefing

Speaker Biographies

Dr. Raymond O'Toole

Dr. O'Toole is the Acting Director, Operational Test and Evaluation as of January 20, 2021. Dr. O'Toole was appointed as the Principal Deputy Director, Operational Test and Evaluation in February 2020. In this capacity he is the principal staff assistant for all functional areas assigned to the office. He participates in the formulation, development, advocacy, and oversight of policies of the Secretary of Defense and in the development and implementation of test and test resource programs. He supports the Director in the planning, conduct, evaluation and reporting of operational and live fire testing. He serves as the Appropriation Director and Comptroller for the Operational Test and Evaluation, Defense Appropriation and the principal advisor to the Director on all Planning, Programming, and Budgeting System matters.

Dr. O'Toole is the former Deputy Director for Naval Warfare within DOT&E. He oversaw the operational and live-fire testing of ships and submarines and their associated sensors; combat and communications systems, and weapons. He was also responsible for overseeing the adequacy of the test infrastructure and resources to support operational and live-fire testing for all acquisition programs across the Defense Department.

Dr. O'Toole was previously an employee of the Naval Sea Systems Command as the Deputy Group Director of Aircraft Carrier Design and Systems Engineering. Prior to that, he was the Director of Systems Engineering Division (Submarines and Undersea Systems) where he led a diverse team of engineers who supported all Submarine Program Managers. His other assignments include being a Ship Design Manager/Navy's Technical Authority for the USS VIRGINIA Class submarines during design and new construction and for Amphibious Ships, Auxiliary Ships, and Command & Control Ships during inservice operations.

Dr. O'Toole has also held other positions within the Department of Defense such as Deputy Program Executive Officer (Maritime and Rotary Wing) at the United States Special Operations Acquisition Command, Staff to the Deputy Assistant Secretary of the Navy for Research, Development & Acquisition (Ship Programs), and Deputy Director of Regional Maintenance for COMPACFLT (N43).

In addition, Dr. O'Toole has over 30 years of experience as a Naval Officer (Active and Reserve) retiring at the rank of CAPTAIN. His significant tours include 5 Commanding Officer tours.

Dr. Raymond D. O'Toole, Jr. is a native of Long Island NY and a graduate of the State University of New York - Maritime College earning a Bachelor of Engineering in Marine Engineering. He also holds a Master of Engineering Degree in Systems Engineering from Virginia Polytechnic Institute and State University, a Master of Science Degree in National Resource Strategy from the Industrial College of the Armed Forces, and a Doctorate in Engineering in the field of Engineering Management from the George Washington University, where he is now a Professional Lecturer of Engineering Management and Systems Engineering. He has received the SECDEF Meritorious Civilian Service Award and the USN Meritorious and Superior Civilian Service Awards.

Dr. Dana "Keoki" Jackson (NAE), Chair

Keoki Jackson (NAE), is senior vice president and general manager, MITRE National Security Sector. In this role, he is responsible for the strategic growth and execution of MITRE's national security programs, including support to the U.S. Department of Defense, the U.S. Department of Justice, and the Intelligence Community. He also leads the National Security Engineering Center. After more than two decades at Lockheed Martin, Jackson brings robust technical leadership and business experience, including directly contributing to the design, development, deployment, and flight operation of major national security spacecraft and programs. He also held management roles on the GPS III position, navigation, and timing program, and the Space-based Infrared System missile warning program. Jackson held several executive and senior management roles at Lockheed Martin, including chief technology officer and chief engineer, and vice president of engineering and program operations. He most recently served as vice president of supply chain and program performance and was responsible for program and supply chain management strategy, execution, and success across the enterprise. Before joining Lockheed Martin, Jackson was a NASA research fellow at the Massachusetts Institute of Technology (MIT) in the field of human adaptation to the space environment. Jackson is a fellow of the United Kingdom Royal Aeronautical Society and the American Institute for Aeronautics and Astronautics (AIAA). He is a member of the National Academy of Engineering, Sigma Xi, the International Academy of Astronautics, and the Institute of Electrical and Electronics Engineers. He previously served on the Sandia Corporation Board of Directors, the AIAA Foundation Board of Trustees, the Georgia Institute of Technology President's Advisory Board, the University of Maryland Clark School of Engineering Board of Visitors, and the MIT Department of Aeronautics and Astronautics Visiting Committee. Jackson received his bachelor's, master's, and doctoral degrees in aeronautics and astronautics from MIT and completed the Stanford Executive Program at the Stanford Graduate School of Business.

Dr. Rob Kewley, Committee Member

Rob Kewley currently serves as a director and systems engineer at simlytics.cloud LLC. Prior to that, he served as the Acting Executive Director of the Office of the Chief Systems Engineer. In this position, Dr. Kewley was responsible for developing systems engineering capabilities and processes for Army modernization. At West Point, Dr. Kewley served as the Head of the Department of Systems Engineering and the UMSA Director of Operations Research. In this position, he led studies in support of Army and DoD analytic challenges. Dr. Kewley received his B.S. in Mathematics from West Point, an M.S. in Industrial and Management Engineering and a Ph.D. in Decision Science and Engineering Systems both from Rensselaer Polytechnic Institute.

Ms. Heidi Perry, Committee Member

Heidi Perry is currently the Chief Technology Officer at the Massachusetts Institute of Technology Lincoln Laboratory. In her role, she is responsible for establishing technology strategy across the Laboratory, managing the internal research and development investments, and establishing and growing strategic relationships outside of the Laboratory. Prior to this role, she served as an Assistant Division Head for the Air, Missile and Maritime Defense Technology Division at MIT Lincoln where she worked strategic initiatives in innovation and research in undersea systems, artificial intelligence and autonomous systems. Previously, Ms. Perry was Director, System Engineering, at the Charles S. Draper Laboratory, Incorporated. She also served in other senior leadership roles, including Director, Algorithms & Software and Director, Internal R&D Portfolio. Her expertise includes guidance, navigation, and control; global position system anti-jam and ground control; autonomous systems; mission-critical software; and command, control, communications, computers, intelligence, surveillance, and reconnaissance systems. Ms. Perry began her career with General Electric as a systems engineer working on the AN/BSY-2 Sonar System before moving to IBM, as a systems engineer for avionics design and flight test programs. From IBM she moved to Draper Laboratory as task leader for the Dolphin Navigation System Upgrade and remained with Draper for over 20 years. In these years at the laboratory, she served as technical director for various research and development programs involving autonomous spacecraft, aircraft, robotics systems, and underwater vehicles. A former member of the Naval Studies Board (2008-2013), she also served on the National Academies' Committee on Capability Surprise for U.S. Naval Forces, Committee on National Security Implications of Climate Change on U.S. Naval Forces, and Committee on the "1,000 Ship Navy"—A Distributed and Global Maritime Network. She served as the co-chair of the National Academies' Committee on Mainstreaming Unmanned Undersea Vehicles into Future U.S. Naval Operations and recently served as the chair for the Transportation Research Board's Committee on Leveraging Unmanned Systems for Coast Guard Missions. She received a B.S. in electrical engineering from Cornell University and an M.S. in computer engineering from the National Technical University. She currently serves as a member of the President's Council of Cornell Women.

Mr. Karl Schneider, Committee Member

Karl Schneider previously served as the senior official to perform the duties of the Under Secretary of the United States Army. The Under Secretary of the Army performs the duties of the Secretary of the Army's senior civilian assistant and principal adviser on matters related to the management and operation of the Army, including development and integration of the Army Program and Budget. Prior to this position, Mr. Schneider served as the Principal Deputy, Assistant Secretary of the Army (Manpower and Reserve Affairs), providing oversight of all planning, analysis and assessment support to the Total Force manpower and personnel policy. He served as the Acting Assistant Secretary of the Army (Manpower and Reserve Affairs) from September 20, 2013 until April 18, 2014.

ASSESSING THE PHYSICAL AND TECHNICAL SUITABILITY OF DOD TEST AND EVALUATION RANGES AND INFRASTRUCTURE

Statement of Task

The National Academies of Sciences, Engineering, and Medicine will convene an ad hoc committee to assess the physical and technical suitability of the Department of Defense's (DoD) ranges, infrastructures, and tools used for test and evaluation (T&E) of military systems' operational effectiveness, suitability, survivability, and lethality across all domains (land, sea, air, space, and cyberspace).

Specifically, the committee will:

1) Assess the aggregate physical suitability of DoD's ranges to include their testing capacity, the condition of their infrastructure, security measures, and encroachment challenges.
2) Assess the technical suitability of ranges to include spectrum management, instrumentation, cyber and analytics tools, and their modeling and simulation capacity.
3) Evaluate the following attributes for each range:
    - Physical Attributes of Range: Do ranges allow for full exercise of tested systems in the manner they will be used to achieve their mission?
    - Electromagnetic Attributes of Range: Can the system under test, and emulated threats to the system, access and utilize spectrum as designed and needed?
    - Range Infrastructure: Can range instrumentation properly and fully assess system performance and record test data (as well as training data that could be applied to T&E requirements)? Can range tools adequately process and transmit test data and efficiently provide test results?
    - Test Infrastructure Security: How secure are ranges, infrastructure and test capabilities against physical and cyber intrusion that could lead to exploitation of weapon systems performance data by an adversary?
    - Encroachment Threats and Impacts: What are the existing and potential future encroachment threats and impacts (physical space, spectrum, alternative/competing DoD uses)?
4) For each area discussed above, the committee will recommend how the DoD can address and/or mitigate any existing or anticipated deficiencies, and test and evaluate future technologies anticipated to arrive between now and 2035. These technologies include, but are not limited to:
    - Directed energy, hypersonic systems, autonomous systems, artificial intelligence, space systems and threats, 6th generation aircraft, advanced acoustic and non-acoustic technologies for undersea warfare, and advanced active electronic warfare/cyber capabilities.