35th ITEA Annual Test and Evaluation Symposium

Global T&E Environment in 2025 and Beyond

December 10 - 13, 2018

The Mandalay Beach Resort & Conference Center, Oxnard, CA

Welcome to Southern California and the 35th ITEA Annual Symposium!

My name is Terry Clark, and I have the privilege of chairing this year's symposium. We appreciate you taking the time out of your busy schedules to join us for what we believe will be an informative and enjoyable event. Our theme this year is "The Global T&E Environment in 2025 and Beyond." Our intent is to present information, and engender conversations, about the readiness of our T&E capabilities to support testing in the out years. Our belief is that we are in a period of revolutionary change across many areas of systems – hypersonics, unmanned and increasingly autonomous vehicles, increasingly longer range and duration systems, and huge amounts of data, to name a few. The T&E infrastructure must be ready for the arrival of these systems, some of which have already started to arrive. Our hope is that the exchange of information, which we expect to occur during the symposium, will help the T&E Professionals ensure they are ready for this future. Thanks for your participation. We hope you find these few days informative and helpful. Again, Welcome!

Terry Clark, Symposium Chair



TUESDAY NIGHT HAPPY HOUR



ACADEMIA DAY



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MESSAGE FROM THE PRESIDENT



Welcome to ITEA's 35th Annual Symposium. I would like to thank all the attendees, volunteers, speakers, panelists, tutorial instructors, exhibitors and sponsors for their great efforts to make this symposium a success. I would also like to thank senior leaders in government and industry for their support, and for seeing the value of this organization in ensuring our entire workforce remains at the cutting edge of T&E best practices. After a number of years of travel austerity, we at last have an opportunity to hear from and interact with our colleagues at a symposium on the west coast. Our theme this year is "Global T&E Environment in 2025 and Beyond." We are faced with increasing high-tech security challenges and threats. Acquisition is key to meeting those challenges, and T&E is naturally a big part of it. Please take an active role in the learning and stimulating dialogue that will surely take place this week!

Bill Keegan President, ITEA

MISCELLANEOUS INFORMATION

Registration: Located in the hotel lobby Meeting Space: Located on the 2nd floor Exhibit Hall: Located on the 1st floor Speaker Ready Room: Coral Room – 2nd floor Ad Hoc Meeting Space: Costa De Oro Room – 2nd floor Breaks and Receptions: All breaks, as well as Happy Hour and Networking Reception will be with the Exhibitors

Lunch: Coastal Grill Restaurant - 1st floor

SPECIAL APP

ITEA will utilize the **FutureOrb™ App**

to enhance the conference with proximal engagements that include Q&A during the plenary sessions and the ability to view presentations while attending the tracks.

Sponsored By:



AD HOC MEETING SPACE

While at the Symposium, if the need arises for a private meeting room with colleagues or customers, visit the Registration Desk to reserve space in the Costa De Oro Room. The room is located on the second floor and has seating for up to twelve.

Nobody can do everything, but everyone can do something.

You stepped up when asked, you gave us your energy and creativity, your talents and your valuable time; it really does take a village. We know you are the reason this event is successful. Know that we appreciate you.

- The International Test and Evaluation Association Members



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ITEA Offers Continuing Education Units (CEUs)

Each of the 4-hour Pre-Symposium Tutorials provide 4 contact hours of instruction (4 CEUs) that are directly applicable to your professional development program, including the Certified Test and Evaluation Professional Credential (CTEP).

In addition to the Pre–Symposium Tutorials, the Annual Symposium provides 4 contact hours of instruction (4 CEUs) for each half–day, 8 contact hours of instruction (8 CEUs) for each full–day, or 20 contact hours of instruction (20 CEUs) for attending the full Symposium, that are directly applicable to your professional development program, including the Certified Test and Evaluation Professional Credential (CTEP).

Stop by the Registration Desk to learn more about elevating the T&E profession with a globally recognized credential.



A Snapshot of the Pre-Symposium Tutorials that were offered on Monday and Tuesday

Abbreviated abstract below. For more details visit the Registration Desk.

Building Better Models Using Robust Data Mining Methods Tom Donnelly, Ph.D., CAP – SAS Institute Inc.

Through case studies, you'll learn to build better and more robust models with advanced predictive modeling techniques. You will also see how to use graphical and statistical comparison techniques to help choose the best predictive model. This tutorial is for analysts, scientists, engineers and researchers interested in learning how predictive modeling can help them use the data they have today to better predict tomorrow.

Improvements in Distributed T&E Using TENA and JMETC Gene Hudgins, KBRwyle

Together, TENA and JMETC enable interoperability among ranges, facilities, and simulations in a timely and cost-efficient manner. This tutorial addresses using the well-established TENA and JMETC tools and capabilities to reduce risk in an often-uncertain environment; regularly saving ranges time and money in the process.

Introduction to Agile Test and Evaluation Jennifer Rekas, The MITRE Corporation

Agile software engineering process models, such as Scrum, Kanban, or XP, have been a popular for several years. Originally, Agile testing practice was focused on individual software projects and how automated test could be accomplished for small teams. As Agile has become a more accepted process model, organizations look to scale it for larger, more complex systems that are not all software-based, as well as identify how to perform test and evaluation in an Agile context using DevOps technologies. This tutorial introduces several Agile and DevOps process concepts, with a focus on Test and Evaluation.

Topics for this lecture-based tutorial include:

- Review of the Agile process at the individual project level and scaled process models for larger systems
- Examples of agile testing practices
- Introduction to DevOps, particularly how test and evaluation fits into that paradigm
- Explore a case study of how agile test and evaluation was implemented on a large system of systems effort

Process and Statistical Methods for M&S Validation Laura Freeman, Ph.D., and Kelly Avery, Ph.D., Operational Evaluation Division, Institute for Defense Analyses

This tutorial motivates the importance of models and simulations in operational evaluations. It summarizes the key steps and processes of a defensible validation. We review multiple statistical design and analysis techniques that support rigorous validation and uncertainty quantification. A case study walks through potential design and analysis methods, highlighting the strengths and weakness of different techniques. Students will gain an appreciation for the different statistical methods available for validation and establish a framework for selecting the right methods based on the type of model and/or simulation that needs to be validated.

Processes for Testing with International Partners: Part III Robert Butterworth & Gloria Deane (DOT&E), and Wright Yarborough, Ph.D. (A&S)

The Office of the Director, Operational Test and Evaluation (DOT&E) will offer a tutorial to inform members of the test community of the capabilities and limitations of the international T&E Program and how to develop project arrangements bilaterally and with multiple partnering nations. Speakers will be representatives from the Office of the Director, International Cooperation in the Office of the Undersecretary of Defense for Acquisition and Sustainment, the International T&E team within DOT&E, and international partners.

The Shallow End of Deep Learning: T&E for Artificial Intelligence

Chris Milroy, Turin Pollard, and Evelyn Rockwell, Alion Science & Technology Corporation (ALION)

The 2018 National Defense Strategy highlights artificial intelligence (AI) as one of the core technologies driving national security competition and as a modernization investment area. However, testing and evaluation techniques for defense applications of modern AI—particularly deep learning systems—have yet to evolve to meet the unique challenges and opportunities posed by the field. This tutorial will give interested professionals the concepts, vocabulary, intuitions, and scientific foundations necessary to understand and apply the features of modern AI, including deep learning, to the T&E field.

Software Reliability Engineering in Agile Development Robert Binder, Software Engineering Institute, Carnegie Mellon University

The specific goals of the tutorial are to provide: for Agile practitioners a practical summary of how to blend SRE practices with your Agile development approach, for Reliability Engineers considerations for applying SRE to Agile projects in your organization, for developers and managers an overview of the intersection of these two areas, and for testers at all stages, a practical and rigorous strategy for testing that will produce credible software reliability estimates.

Statistics Every T&E'r Needs for Critical Thinking Mark Kiemele, Ph.D., Air Academy Associates

This tutorial will cover the need for critical thinking as well as a high-level view of a variety of data analytic tools that can be used to enhance critical thinking. In a data-driven economy, industry and government leaders rely increasingly on skilled professionals who can see the significance in data and use data analytic techniques to properly collect data, solve problems, create new opportunities, make better decisions and shape change. The key takeaway that will be demonstrated is that statistical thinking is a necessary ingredient for effective critical thinking.

Telemetry Over IP Gary Thom, Delta Information Systems, Inc.

This tutorial will begin with the motivation for moving to Telemetry over IP (TMoIP). It will then provide a basic networking foundation for understanding TMoIP and TMoIP formats. With this basis, we will be able to discuss network design considerations and tradeoffs for a successful TMoIP deployment. Finally, we will present some of the real-world problems and issues that may arise in a TMoIP system and the troubleshooting techniques that can be used to resolve them.

T&E as a Part of Agile Development Robin Poston, Ph.D., System Testing Excellence Program

The goal is for attendees to be able to evaluate whether requirements testing is being properly integrated into the agile software development process, coordinate development of the operational test strategy into the agile software development environment, coordinate and oversee testing in the agile development environment with government and contractor personnel, and specify testing requirements in the RFP for a software development project in which the agile development process is to be used.

Test and Evaluation: The Timeless Principles Matthew T. Reynolds, Consultant

Learn about the policies and practices of T&E, particularly for novices and for those wanting a refresh. This tutorial will describe the fundamental principles of T&E and will identify corollaries in domains other than defense, such as communications, transportation, energy, and even consumer products. Key lessons learned and best practices will be described. Topics such as statistics-based test design, modeling and simulation, reliability test engineering, enterprise level approaches and cybersecurity verification will be discussed.





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Agenda Program as of 26 Nov. 2018

MONDAY, DECEMBER 10

11:00 am – 5:00 pm	Registration Desk Open [Hotel Lobby]	7:0
1:00 pm – 5:00 pm	Pre-Symposium Tutorials	
	Building Better Models Using Robust Data Mining Methods Tom Donnelly, Ph.D., SAS Institute	7:0
	Introduction to Agile Test and Evaluation Jennifer Rekas, The MITRE Corporation	8:0
	Improvements in Distributed T&E Using TENA and JMETC Gene Hudgins, KBRwyle	
	Software Reliability Engineering in Agile Development Robert Binder, Software Engineering Institute, Carnegie Mellon University	
	Telemetry Over IP Gary Thom, Delta Information Systems	
	Test and Evaluation – The Timeless Principles Matthew Reynolds, Consultant	
6:00 pm	ITEA Board of Directors Annual Meeting [Costa De Oro Room]	
7:00 pm – 10:00 pm	Exhibitors set-up [Mandalay Ballroom]	

Symposium 2018 Volunteers

Terry Clark, Symposium Chair, EWA GSI Gil Torres, Technical Chair, NAVAIR Joyce Matias, Channel Islands Chapter, NAVAIR Joseph Bulger III, Greater San Diego Chapter, Boarhog LLC Lena Moran, Logistics Chair, TRAX Int'l Eileen Redd, Exhibits and Sponsors, EWA GSI Gloria Deane, International Participation, DOT&E Jim Bak, Academia Day, GBL Systems Corp Terry Murphy, DHS Gene Hudgins, KBRwyle Ed Romero, NAVAIR John Cunnick, NAVAIR Scott Oss, The Boeing Company Erwin Sabile, Booz Allen Hamilton Doresa Ringer, Georgia Tech Research Institute Dawn Southern, Georgia Tech Research Institute And to those who will be supporting on-site that we haven't met yet; we thank you!

TUESDAY, DECEMBER 11

7:00 am – 11:00 am	Exhibitors continue to set-up [Mandalay Ballroom]
7:00 am – 5:00 pm	Registration Desk Open [Hotel Lobby] Speaker Ready Room Available [Coral Room]
8:00 am – 12:00 pm	Pre-Symposium Tutorials
	Process and Statistical Methods for M&S Validation Laura Freeman, Ph.D. and Kelly Avery, Ph.D., Institute for Defense Analyses
	Processes for Testing with International Partners: Part III Robert Butterworth, Gloria Deane, Wright Yarborourgh, Ph.D., DOT&E
	Statistics Every T&E'r Needs for Critical Thinking Mark Kiemele, Ph.D., Air Academy Associates
	The Shallow End of Deep Learning: T&E for Artificial Intelligence Chris Milroy, Turn Pollard, Evelyn Rockwell, Alion Science and Technology Corporation
	T&E as a Part of Agile Development Robin Poston, Ph.D., University of Memphis, System Testing Excellence Program (STEP)
12:00 pm – 6:30 pm	Exhibit Hall Open [Mandalay Ballroom 1st floor]
1:00 pm	OPENING CEREMONY [Embassy Ballroom 2nd floor]
	Naval Base Ventura County Color Guard
	National Anthem performed by Antonio Williams, USN
	Welcome and Opening Remarks Mr. Bill Keegan , President, ITEA Mr. Terry Clark , ITEA Symposium Chairman
1:20 pm – 2:05 pm	Opening Keynote The Honorable Robert Behler , Director, Operational Test and Evaluation, Office of the Secretary of Defense

2:05 pm – 2:40 pm	Afternoon Break in the Exhibit Hall	9:40 am – 10:10 am	Featured Speaker
2.40 mm 2.25 mm	Fastured Speaker		Wir. George Rumford, Deputy Director
2:40 pm – 5:25 pm	Mr. lim Eaist Director of DB&E		Analysis Tost Resources Management
	for Advanced Capabilities DT&E		Contor
	and TRMC Office of the Secretary		Center
	of Defense	10:10 am – 10:40 am	Morning Break with Exhibitors
3:25 pm – 4:55pm	PANEL 1 Open Air Ranges: Testing (& Training) in an Integrated,	10:45 am – 12:15 pm	PANEL 2 Testing for Homeland Security
	Connected Environment for 2025 and Beyond		Moderator: Mr. Gregory Simmons , S&T
	Moderator: Mr. Tom Dowd , NAVAIR Ranges Division		Preparedness Programs, DHS, Office of T&E
	Mr. Michael T. McCarthy, Deputy Chief of Staff of the Army Capabilities		Mr. Yaron Kron , Ministry of Public Security, State of Israel
	Eileen Bjorkman, Ph.D., Deputy		Dr. Lee Fook Kay , Ministry of Home Affairs, Republic of Singapore
	Director of lest and Evaluation, Headquarters U.S. Air Force		Mr. Ian Robbins , National Research Council, Canada
4.55 pm	To Be Announced		Mr. Charles Hall , United States Coast Guard
4:55 pm	Mr. Gil Torres, Symposium Technical		Mr. Aimel Ariz Department
	Chair		Homeland Security Science and Technology, United States
5:00 pm – 6:30 pm	HAPPY HOUR Sponsored by		
	EWA Government Systems Inc. [Mandalay Ballroom]	12:20 pm – 1:30 pm	ITEA Professional Awards Luncheon [Coastal Grill Restaurant]
WEDNESDAY,	DECEMBER 12	1:30 pm – 3:10 pm	TECHNICAL TRACKS 1–5
		3:10 pm – 3:45 pm	Afternoon Break with Exhibitors
7:00 am – 6:00 pm	Registration Desk Open		
	[Hotel Lobby]	3:45 pm – 5:15 pm	PANEL 3 Diversity in T&E
	Speaker Ready Room Available [Coral Room]		Moderator: Ms. Kathy Smith , GBL Systems Corporation
9:00 am 7:00 nm	Evhibit Hall Open		Mr. John Fitzgibbon , President/CEO,
9:00 am – 7:00 pm	[Mandalay Ballroom]		IEQ Games
			Greg Zacharias, Ph.D., Chief
8:15 am – 8:25 am	Opening Remarks [Embassy Ballroom]		Evaluation, Office of Secretary of
	Mr. Gil Torres, Symposium		Mr. Edward C. Bomoro, Doputy
	Technical Chair		Director, Business Operations, NAWC Weapons Division, Test
8:25 am – 9:10 am	Keynote Speaker		and Evaluation
	ivir. коріп н. Locksiey, Director, Flight		
	Integrated Systems Evaluation	5:15 pm	Day 2 Closing Remarks
	Experimentation and Test		Mr. Gil Torres, Symposium
	Department		Technical Chair
	Naval Air Systems Command	5:15 pm – 7:30 pm	Networking Reception
9:10 am – 9:40 am	Featured Speaker		[IVIandalay Ballroom]
	Steven J. Hutchison, Ph.D.,		

Director, Office of T&E, Department of Homeland Security

WEDNESDAY, DECEMBER 12 • TECHNICAL TRACKS 1–5

All Tracks will begin at 1:30 pm with a 10 minute introduction of the presenters by the Chair

~	Logistics in Chair: TBA	n Future T&E
TRAC	1:40 pm	Life Cycle Sustainment Methodologies Applied to Legacy Weapon Systems Mr. Patrick I. Buckley and Co-Authors, Walt Davis, Andre Lovas, Ken Hudson , David Pyne , Georgia Tech Research Institute
	2:10 pm	Software Testing Certifications Mr. Andrew Pollner , American Software Testing Qualifications Board (ASTQB)
	2:40 pm	Demonstration of a 500-kW T&E Simulator for High Energy Lasers (TSHEL) Young K. Bae, Ph.D., Y.K. Bae Corporation
8 ⊻	Increasing Chair: Mr.	Use of Modeling & Simulation for T&E Kent Pickett, The MITRE Corporation
FRAC	1:40 pm	Injecting Statistical Rigor to Drive Your Modeling & Simulation Validation Program Jim Simpson, Ph.D. , Air Force Institute of Technology, WPAFB
	2:10 pm	New Simulation Environments for Supporting Operational T&E Mr. Kenneth Sanchez , NAVAIR Weapons Division Point Mugu
	2:40 pm	Quantifying Uncertainty in Scale Model Echo Measurements Ed Pees, Ph.D., NUWC Newport, RI
m ⊻	T&E with Chair: Mr.	Advanced Threat Environments Marcus Makarehchi, NAVAIR WD Point Mugu
TRAC	1:40 pm	Data Association Algorithms for Open Air Range Electronic Warfare Testing Mr. Daniel Carlson , Air Force, 771st Test Squadron
	2:10 pm	Autonomous Swarms of High Speed Maneuvering Surface Vessels Mr. Tyler Halpin-Cha n, NAWCWD Surface Targets Engineering
	2:40 pm	Common Threat T&E Models Ms. Melody Johnson ,Test Resource Management Center
× 4	Advanced Chair: Ms.	T&E Planning Kathy Smith, GBL Systems Corporation
RAC	1:40 pm	Adaptive Network Planning for Operational Tests Rajive Bagrodia, Ph.D. ,Scalable Network Technologies, Inc.
	2:10 pm	Lessons Learned: Improving an Analyst's Role in Driving the Test Planning Process Mr. Michael Harman , Scientific Test & Analysis Techniques (STAT) Center of Excellence (COE)
	2:40 pm	Capabilities Based T&E Ms. Jennifer Daniel, NAWCAD Patuxent River
2 ⊻	Range Infr Chair: Mr.	r <mark>astructure</mark> Mike Laber, NAVAIR WD Point Mugu
IRAC	1:40 pm	Extending CRIIS for Spectrum Needs, other Range Applications, and LVC-Enabled Test and Training Mr. Jonathon Skarphol , Rockwell Collins
	2:10 pm	Updated Status on the Telemetry Range Support Aircraft (TRSA) Program Mr. Kyle Roudebush , NAVAIR WD Pt. Mugu Mr. Scott Kujiraoka , GBL Systems
	2:40 pm	A Novel Approach to a Small Modular Data Link Re- Transmission System Mr. Mark McWhorter , Lumistar, Inc.

THURSDAY, DECEMBER 13

7:00 am – 2:30 pm	Registration Desk Open [Hotel Lobby]
7:00 am – 5:00 pm	Speaker Ready Room Available [Coral Room]
9:00 am – 1:30 pm	Exhibit Hall Open [Mandalay Ballroom]
8:15 am – 8:25 am	Opening Remarks Mr. Gil Torres , Symposium Technical Chair [Embassy Ballroom]
8:25 am – 9:55 am	Panel 4 T&E of Emerging Threats in Complex Environments Moderator: Mrs. Gloria Deane, International Programs Specialist, DOT&E
	Dai Morris, Ph.D. , Head of Capability (Weapons, Evaluation and Capability Assurance)/UK MOD
	Mr. Wayne Dumais , Test Area Manager, Office of T&E/Department of Homeland Security
	Keith Joiner, Ph.D., Senior Lecturer,
	University of NSVV, Caliberta Australia
10:00 am – 10:30 am	Morning Break in the Exhibit Hall
10:00 am – 10:30 am 10:30 am – 12:10 pm	Morning Break in the Exhibit Hall TECHNICAL TRACKS 6–10
10:00 am – 10:30 am 10:30 am – 12:10 pm 12:15 pm – 1:15 pm	Morning Break in the Exhibit Hall TECHNICAL TRACKS 6–10 Lunch [Coastal Grill Restaurant]
10:00 am – 10:30 am 10:30 am – 12:10 pm 12:15 pm – 1:15 pm 1:30 pm	Morning Break in the Exhibit Hall TECHNICAL TRACKS 6–10 Lunch [Coastal Grill Restaurant] Exhibits Close
10:00 am – 10:30 am 10:30 am – 12:10 pm 12:15 pm – 1:15 pm 1:30 pm 1:15 pm	Morning Break in the Exhibit Hall TECHNICAL TRACKS 6–10 Lunch [Coastal Grill Restaurant] Exhibits Close Re-convene for Afternoon Session [Embassy Ballroom]
10:00 am – 10:30 am 10:30 am – 12:10 pm 12:15 pm – 1:15 pm 1:30 pm 1:15 pm 1:15 pm – 1:45 pm	Morning Break in the Exhibit Hall TECHNICAL TRACKS 6–10 Lunch [Coastal Grill Restaurant] Exhibits Close Re-convene for Afternoon Session [Embassy Ballroom] Featured Speaker Keith Joiner, Ph.D., Senior Lecturer, University of NSW, Canberra Australia
10:00 am – 10:30 am 10:30 am – 12:10 pm 12:15 pm – 1:15 pm 1:30 pm 1:15 pm 1:15 pm – 1:45 pm 1:45 pm – 2:15 pm	Morning Break in the Exhibit Hall TECHNICAL TRACKS 6–10 Lunch [Coastal Grill Restaurant] Exhibits Close Re-convene for Afternoon Session [Embassy Ballroom] Featured Speaker Keith Joiner, Ph.D., Senior Lecturer, University of NSW, Canberra Australia Closing Keynote Mr. David Duma, Principal Deputy Director, Operational Test and Evaluation (OT&E)
10:00 am - 10:30 am 10:30 am - 12:10 pm 12:15 pm - 1:15 pm 1:30 pm 1:15 pm 1:15 pm - 1:45 pm 1:45 pm - 2:15 pm 2:15 pm - 2:30 pm	Morning Break in the Exhibit Hall TECHNICAL TRACKS 6–10 Lunch [Coastal Grill Restaurant] Exhibits Close Re-convene for Afternoon Session [Embassy Ballroom] Featured Speaker Keith Joiner, Ph.D., Senior Lecturer, University of NSW, Canberra Australia Closing Keynote Mr. David Duma, Principal Deputy Director, Operational Test and Evaluation (OT&E) State of ITEA Mr. Bill Keegan, President, ITEA, Equator Corp.

4:00 pm	ITEA Symposium Volunteers Hot Wash By invitation only
5:30 pm	ITEA Board of Directors Election of Officers By invitation only
6:00 pm	ITEA Leadership Dinner By invitation only

FRIDAY, DECEMBER 14

8:00 am	CTEP Examination
0.00 um	

Proceedings will be uploaded to the ITEA website approximately one week after the conference concludes. Please visit www.itea.org.

ACADEMIA DAY

On Thursday morning from 9:00 am – noon, ITEA will be hosting Academia Day sponsored by Belcan, LLC and The Boeing Company. This exciting event is bringing together scholars, teachers, and students of our local Academia to learn about the dynamic science and technology activities from our government agencies, commercial industry and academic institutions.

The High School and College students will meet panel members from different science and technology domains who will be describing the excitement of creating real world technological solutions and how they are addressing the challenges of conducting Test & Evaluation in 2025 and beyond. After the panel session, the students will have the opportunity to visit with our Exhibitors.

Moderator: **Mr. Jim Bak**, Chief Engineer – Software, GBL Systems Corporation

Mr. John Fitzgibbon, President/CEO, TEQ Games

Mr. Joel Helling, Software Engineer, GBL Systems Corporation

Robin Poston, Ph.D., Interim Dean, Graduate School; Professor, Department of Business Information and Technology, University of Memphis

Mr. Edward C. Romero, Deputy Director, Business Operations, NAWC Weapons Division, Test and Evaluation

THURSDAY, DECEMBER 13 • TECHNICAL TRACKS 6–10

All Tracks will begin at 10:30 am with a 10 minute introduction of the presenters by the Chair Cybersecurity T&E 9 Chair: Mr. Brian Moore, EWA Government Systems Inc. TRACK 10:40 am CYBER Penetration Testing and Statistical Analysis in DT&E Mr. Timothy McLean, MCTSSA, Camp Pendleton 11:10 am Artificial Intelligence and Impacts on Cyber Security T&E Mr. Donald Lane, KBRWYLE Thinking in the Box: Artificial Intelligence for Cyber T&E 11:40 am Mr. Turin Pollard, Alion Science & Technology Corporation T&E of System of Systems with Manned & Unmanned Capabilities Chair: Mr. Kevin Knudsen, The Boeing Company -RACK 10:40 am Initial Results of the CABLE/TRAX-West Maritime Atmospheric Measurement Event Mr. Roberto Garcia, NAVAIR, Pt Mugu Determining Safe Separation of UAS and Aircraft in Mixed-use Airspace during Testing 11:10 am Mr. Muhammad Sohail, NAVAIR AD Patuxent River Testing as a Service: Model and Lessons Learned from JLTV MOT&E 11:40 am Mr. Tony Hawkins and Mr. Brian Wright, Ravenswood Solutions **Big Data Tools & Cloud Computing for T&E** Chair: Mr. Erwin Sabile, Booz Allen Hamilton 00 TRACK Software Test Automation Implementation Practices 10:40 am Mr. Jim Wisnowski, Air Force Institute of Technology, WPAFB An Automated Artificial Intelligence Assistant for TSPI Post Mission Processing 11:10 am Farrokh Vatan, Ph.D., Jet Propulsion Lab Applying Automated Methods of Managing T&E Processes 11:40 am Mr. Chad Steven, KBRwyle SPECIAL SESSION: T&E Workforce Development Session 0 XC Moderator: Mr. Terry Murphy, Department of Homeland Security RA Robin Poston, Ph.D., Interim Dean, Graduate School; Professor, Department of Business Information and Technology, University of Memphis Ms. Mindy Dowling, T&E Engineer, FAA Mr. Kenneth Stefanek, Learning Director, T&E, Defense Acquisition University **Big Data Analytics Technical Track** TRACK 10 Chair: William Wolfe, Ph.D., GBL Systems Corporation Improving Data Collection for Real-Time Casualty Assessment (RTCA) in Operational Tests 10:40 am Mr. Jeff Weaver, Scalable Network Technologies, Inc. Deep Learning Framework for Cyber Threat Monitoring in Virtual Environment 11:10 am Himanshu Upadhyay, Ph.D., Florida International University 11:40 am Synthetic Target & Augmented Reality for Automated Deep Learning Test Data Generation Tom Lu, Ph.D., Jet Propulsion Laboratory

Exhibitor Floor Plan



Happy Hour at 5:00 pm

Hours: 9:00 am - 7:00 pm Networking Reception at 5:00 pm **THURSDAY, DECEMBER 13**

Hours: 9:00 am - 1:30 pm

Meet our Exhibitors

Air Academy Associates Booth #2

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Kathi Swagerty, Director

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American Software Testing Qualifications Board Booth #8

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Earl Burba, ASTQB Director

🖂 eeburba@pcgus.com

Analytical Graphics, Inc. Booth #9

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Joe Murphy, Director, Integrated Solutions 🔕 610.981.8039 🖂 jmurphy@agi.com

AssetSmart[®] Booth #11

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Chris Campbell 310.450.2566

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Brian Conway 909.519.3254 Sinan.conway@emc.com

Emhiser Research Inc. Booth #6

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Phil Tannenholz

🔇 541.840.1139 🛛 phil@encorenevada.com

EWA GSI Booth #17/18

EWA Government Systems Inc. [EWA GSI] has a broad array of EW products and services including analysis, simulation & training, RF threat simulators and custom instrumentation for laboratories and open air ranges, signal analysis software, and embedded training hardware and software. We also provide engineering products and services in cyber defense, intelligence, security, training, tactical mission planning, information operations, wireless applications, range instrumentation, spectrum, radar development, force protection, and counter-UASs. Learn more at www.ewa-gsi.com

Eileen Redd, Director Marketing

🔇 703.904.5763 🛛 🖾 eredd@ewa.com

GTRI Booth #3

Georgia Tech Research Institute (GTRI) develops advanced technological solutions and large-scale system prototypes to address the most difficult problems in national security, economic development and overall human betterment. Core research areas include complex and agile systems engineering, sensor design and integration, information management and cyber security, and defense technology development. GTRI performs independent modeling, testing and evaluation at the component, subsystem and system level of legacy, current and planned weapons and sensor systems.

Pete Crump, Senior Research Engineer 850.609.2300 © pete.crump@gtri.gatech.edu

JT4 Booth #24

JT4 is building on the legacy of support earned on the original J-Tech contract and will continue to provide award-winning service to the U.S Air Force and Navy on the new J-Tech II contract. JT4 and its teammates proudly provide technical expertise to utilize new technologies, test new and modified weapons systems, develop new tactics, and support ongoing military training at multiple Western test and training military ranges. Learn more at www.jt4llc.com

Jacquie Lehman

🔇 661.275.9427 🛛 Jacquie.Lehman@jt4llc.com

KBRwyle Booth #13/14

KBRwyle is the global government services business of KBR, Inc. KBRwyle delivers full life cycle professional and technical services from over 60 US and 40 international locations. KBRwyle solutions improve military readiness, drive innovation, and help ensure mission success on land, in air, at sea, in space and in cyberspace. KBRwyle areas of expertise include engineering, logistics, operations, science, program and acquisition management, IT and cybersecurity. Learn more at www.kbrwyle.com

Katie Messer, Marketing Support Manager ③ 301.863.4271 🛛 katherine.messer@wyle.com

MTEQ Booth #19

MTEQ provides high-end engineering and manufacturing services, offering full-spectrum capabilities spanning all phases of the product lifecycle, from research and development, system engineering, design and specialty engineering, prototyping and production, testing, and field support for defense and commercial industries. We are a woman-owned, small business with over 25 years of specialized experience committed to quality management at each step of our production process because we value delivering high-quality products and services at competitive rates. Learn more at https://mteq.com

Charles Shaw, III, VP, Business Development & Strategic Initiatives

540.658.2720

Naval Base Ventura County (NBVC) Booth #22

Naval Base Ventura County (NBVC) is composed of three operating facilities - Point Mugu, Port Hueneme and San Nicolas Island. NBVC is strategically located in a non-encroached coastal area and a key element in the DoD Test and Evaluation infrastructure. Tenant commands encompass diverse specialties, including Naval Air Warfare Center Weapons Division, Naval Surface Warfare Center Port Hueneme Division and Naval Facilities Engineering and Expeditionary Warfare Center.

Patti Sauers

🔕 805.989.3873 🛛 patricia.sauers@navy.mil

Photo-Sonics Booth #1

Photo-Sonics Inc. designs and manufactures optical tracking systems used in the test and evaluation of weapon systems, including stabilized optical trackers, and custom gimbals used for other applications such as beam directors and positioners. Our optical tracking systems are known for their highperformance, reliability, and accuracy. We offer turnkey Time-Space-Position-Information systems to Test Ranges around the world. Learn more at www.photosonics.com

QinetiQ LTD. Booth #5

QinetiQ has extensive experience in delivering Test and Evaluation (T&E) for the Ministry of Defence (MOD). Our collaboration with industry partners and the MOD in developing a long-term vision for T&E provides a springboard for the promotion of our capability internationally. QinetiQ operates and manages Land, Maritime, Air, Weapons and Training sites / ranges, combining single capabilities to produce bespoke 'end to end' solutions and complex managed services.

Patrick Geraghty

🔇 571.275.4361 🖾 pgeraghty@qinetiq-us.com

Rockwell Collins Booth #23

Rockwell Collins is a pioneer in the design, production and support of innovative solutions for our aerospace and defense customers. Visit us in booth #23 to learn more about our expertise in range solutions, multi-level security, and high-throughput software defined data links, all integrated in an open architecture, is strengthened by our global service and support network spanning 150 countries.

Lowell Buchholz, T&TI Business Development Manager 319.295.8629 Evell.buchholz@rockwellcollins.com

Saalex Booth #10

Saalex Solutions, Inc. is an engineering and information technology solutions company focusing on range operations, integrated logistics support and engineering services for space and combat weapon systems. Founded in 1999, Saalex is a Service Disabled Veteran Owned Small Business (SDVOSB) with prime and subcontract expertise serving the Navy, Army, Air Force, NASA, corporate clients, and local governments. We employ a workforce of over 600 at military and NASA installations and our regional offices nationwide. Learn more at www.saalex.com

Devin Sappington, Director of Business Development 321.604.3702 Ødevin.sappington@saalex.com

SA-TECH Booth #4

Founded in 1989, **SA-TECH** is a mature professional services company specializing in providing Range and Target Operations and Maintenance services in support of Test and Evaluation and Training missions for a variety of DoD customers. Our mission is to offer the highest level of technical quality and professional services to our customers at a competitive rate. As a mid-sized company, SA-TECH's customers benefit from our Large Business capability delivered with Small Business flexibility & responsiveness. Learn more at www.SA-techinc.com

Stephanie Clewer, Capture Manager (
\$\overline{4} 43.945.0203 \overline{2} sclewer@sa-techinc.com

SRC Booth #15-16

Scientific Research Corporation [SRC] is a 30 year old advanced engineering company providing innovative technical solutions and specialized support services to the DoD. For the US Army, we design realistic threats used to evaluate US Army systems; instrument operational systems for testing and training; support Cyber event planning, training, and test execution. We are on the leading edge of developing computer networks to defend, exploit, and attack through the convergence of Cyber Operations and Electronic Warfare. Learn more at www.scires.com

Rich Kniskern, Vice President (© 757.810.5025 🖾 rknisker@scires.com

Symvionics, Inc. Telemetry Systems / IAD Booth #21

IADS is an interactive analysis and display system that provides engineers with advanced data organization, processing and display capabilities, in the real-time environment and at the office desktop. IADS includes high fidelity time history displays, eliminating the need for strip chart recorders and providing instant review capability for the entire test.

Danielle Metzger

🔕 661.273.7003, Ext. 200 🛛 🖂 dmetzger@symvionics.com

Zodiac Data Systems Booth #7

Zodiac Data Systems is a leading provider of flight-test instrumentation, data recording & replay, mission recorders, airborne & ground Telemetry solutions dedicated to the U.S. Department of Defense, aerospace, research, development and defense prime contractor communities. We specialize in providing high technology and cost-effective solutions comprised of high-quality, modular, off-the-shelf systems to a wide variety of military, industrial, utility, educational, and research organizations.

Rob Dawson (© 6678.232.6706 🛛 Rob.Dawson@zdsus.com

The Leadership of ITEA would like to extend their appreciation to the Exhibitors of this year's Annual Symposium. We wish you high visibility, solid contacts and an enjoyable time.



Join us on Wednesday, December 12 at the special awards luncheon honoring our recipients who have made significant contributions to advancing the Test and Evaluation (T&E) profession. Learn about their accomplishments by reading their citations in the Award Program Guide.

ALLEN R. MATTHEWS AWARD | Edward Greer

Named after Dr. Allen R. Matthews, founder and first president of ITEA. It is presented to an individual for a lasting, significant contribution to the field of T&E, such as the cumulative effect of a distinguished career. The Allen R. Matthews award is the highest award bestowed by ITEA.

RICHARD G. CROSS AWARD | John C. O'Connor | US Naval Test Pilots School

Named after the late Major General Richard G. Cross, Jr., USAF, a highly respected figure in T&E and one of the first directors of ITEA. It is presented to an individual, team, or organization for a significant contribution to education for T&E in teaching, administration, or research.

SPECIAL ACHIEVEMENT AWARD | Long-Range Anti-Ship Missile Integrated Systems Test Team | NAVAIR

Given for an exceptional special act of achievement in T&E, such as the solution of a major problem, or a notable project success for which there is evidence that tangible benefits have accrued.

TECHNICAL ACHIEVEMENT AWARD | Aerial Refueling Receiver Simulator Tool Team | JT4

Recognizes an individual or group for outstanding achievement in applying instrumentation, information technology, modeling and simulation, time-spacepositioning information, electro-optics technology, or other T&E technology to cause a test and evaluation program to be better, faster, and less expensive.

PUBLICATIONS AWARD | Michael Barton, Ph.D., and Venkat Dasari, Ph.D.

Recognizes outstanding contributions to test and evaluation literature. Given for a book, technical paper, or article that improves or increases the body of knowledge and understanding of T&E. Published works must be original.

JUNIOR ACHIEVER AWARD | Captain Christopher Handy, USAF

The Junior Achiever Award recognizes a young professional who, during his/her first 5 years of practicing in the T&E field, has accomplished a significant achievement(s) which enhances and strengthens the T&E profession.

ITEA BOARD OF DIRECTORS' AWARD | Stewart "Stu" Burley (posthumously)

The Board of Directors Award, established in 1997, is presented to an individual who has contributed to the growth, development, goals, and mission of the Association.

ITEA PRESIDENT'S AWARD | Darryl Johnson, CTEP, Southern Nevada Chapter

The President's Award was established in 1996 to give the president of ITEA the prerogative of acknowledging individuals whom he or she deems worthy of recognition.

ENERGIZER AWARD | Jason Vosatka, Emerald Coast Chapter

Recognizes "behind the scenes" volunteer contributions that have supported the Test and Evaluation community and/or member organizations.

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Biographies Plenary Session Speakers and Panel Members

TUESDAY, DECEMBER 11



Robert F. Behler was sworn in as Director of Operational Test and Evaluation on December 11, 2017. A Presidential appointee confirmed by the United States Senate, he serves as the senior advisor to the Secretary of Defense on operational and live fire test and evaluation of Department of Defense weapon systems.

Prior to his appointment, he was the Chief Operating Officer and Deputy Director of the Carnegie Mellon University Software Engineering Institute (SEI), a Federally Funded Research and Development Center. SEI is a global leader in advancing software development and cybersecurity to solve the nation's toughest problems through focused research, development, and transition to the broader software engineering community.

Before joining the SEI, Mr. Behler was the President and CEO of SRC, Inc. (formerly the Syracuse Research Corporation). SRC is a not-for-profit research and development corporation with a forprofit manufacturing subsidiary that focuses on radar, electronic warfare and cybersecurity technologies. Prior to working at SRC, Mr. Behler was the General Manager and Senior Vice President of the MITRE Corp where he provided leadership to more than 2,500 technical staff in 65 worldwide locations. He joined MITRE from the Johns Hopkins University Applied Physics Laboratory where he was a General Manager for more than 350 scientists and engineers as they made significant contributions to critical Department of Defense (DOD) precision engagement challenges.

General Behler served 31 years in the United States Air Force, retiring as a Major General in 2003. During his military career, he was the Principal Adviser for Command and Control, Intelligence, Surveillance and Reconnaissance (C2ISR) to the Secretary and Chief of Staff of the U.S. Air Force (USAF). International assignments as a general officer included the Deputy Commander for NATO's Joint Headquarters North in Stavanger, Norway. He was the Director of the Senate Liaison Office for the USAF during the 104th congress. Mr. Behler also served as the assistant for strategic systems to the Director of Operational Test and Evaluation. As an experimental test pilot, he flew more than 65 aircraft types. Operationally he flew worldwide reconnaissance missions in the fastest aircraft in the world, the SR-71 Blackbird.

Mr. Behler is a Fellow of the Society of Experimental Test Pilots and an Associate Fellow of the American Institute of Aeronautics and Astronautics. He is a graduate of the University of Oklahoma where he received a B.S. and M.S. in aerospace engineering, has a MBA from Marymount University and was a National Security Fellow at the JFK School of Government at Harvard University.

Mr. Behler has recently been on several National Research Council studies for the National Academy of Sciences including: "Critical Code," "Software Producibility, Achieving Effective Acquisition of Information Technology in the Department of Defense" and "Development Planning: A Strategic Approach to Future Air Force Capabilities."



Mr. James "Jim" A. Faist is the Director of Defense Research and Engineering for Advanced Capabilities, reporting directly to the Under Secretary of Defense Research and Engineering within the Office of the Secretary of Defense. Jim directs an organization whose mission is to recognize, explore, and force the development and

integration of new technology to maintain U.S. technological superiority. He is responsible for establishing a Department of Defense joint mission engineering capability, oversight of developmental testing and test facilities as well as demonstration and validation of technology prototype and rapid fielding activities. Jim serves as the mission area advisor for warfighter portfolios in hypersonics, space, autonomy, and networked command, control, and communication architectures. He also provides independent technical risk assessments of major acquisition programs.

Jim has an extensive career in industry and government in national defense, including progressive responsibilities and experience in military operations, advanced technologies, system development, engineering leadership, and program management. He is a recognized expert in advanced sensors, weapons, and electronic warfare for space, air, and ground capabilities.

Faist was a chief engineer for the Northrop Grumman and Harris Corporations. He held senior executive positions at Schafer Corporation, Trident Systems Incorporated, and System Planning Corporation. Prior to his work in the industry, he served in the United States Air Force as a Weapons Systems Officer and an Electronic Warfare Officer in the F-4D/E Phantom II fighter aircraft.

Jim earned a Bachelor of Science in Electrical Engineering from Virginia Military Institute in Lexington, Virginia, and a Master of Science in Electrical Engineering from Cornell University in Ithaca, New York, with emphasis on microwave and power systems. During his career he received numerous performance awards and honors from the U.S. Air Force, academia, and industry.



Mr. Thomas C. Dowd currently serves as the Director, Range Department and is responsible for all Naval Air Systems Command (NAVAIR) Ranges as well as the Air Vehicle Modification and Instrumentation (AVMI) Department. The department headquarters is located at Point Mugu, CA and is a part of the Naval Air Warfare Center

Weapons Division Command. The department is responsible for the management of NAVAIR's ranges, primarily located at three sites: Patuxent River, MD, China Lake, CA, and Point Mugu, CA.

Mr. Dowd has 29 years of civilian service with the Department of the Navy and was appointed to the Senior Executive Service in November 2014. Mr. Dowd began his civilian career in 1988 as an aerospace engineer with the Point Mugu Missile Test Center after graduating from Boston University in 1987 with a bachelor's of science degree in aerospace engineering. Mr. Dowd worked for 5 years as a flight test engineer performing test and evaluation of Navy cruise missile systems such as the SLAM, HARPOON and Penguin missiles.

From 1992-2001 Mr. Dowd worked in the Airborne Threat Simulation Division, Threat/Target Systems Department at Point Mugu where he served as the division head for 7 years. The division focused on the exploitation and hardware simulation of foreign threat electronic warfare systems. The simulators, that the Airborne Threat Simulation Organization produced, were used for the test and evaluation of Navy, Army and Air Force platform radar and missile seeker systems. From 2001-2003 Mr. Dowd worked in the NAVAIR Network Centric Warfare (NCW) Office at Patuxent River, MD. In 2002 Mr. Dowd became the civilian deputy for the NCW office in support of the expanding office and its role in bringing about the FORCEnet initiative for the Navy and other capabilities for naval aviation.

After returning to Point Mugu in 2003 and completing his MBA at Pepperdine University in 2005, Mr. Dowd became the Associate Department Head for the Threat/Targets Systems Department at NAVAIR and was selected as the Department Head in April of 2007. Mr. Dowd is a graduate of NAVAIR's Senior Executive Management Development Program and is a recipient of the DoN Meritorious Civilian Service Award.



Dr. Eileen A. Bjorkman, a member of the Senior Executive Service, is Deputy Director of Test and Evaluation, Headquarters U.S. Air Force, Arlington, Virginia. She is responsible for policy, resources and oversight of developmental and operational testing, and is a focal point for foreign materiel acquisition and exploitation. She assists the Director in overseeing the Air

Force's test infrastructure worth \$4 billion and the programming and execution of the Air Force test portfolio, with an annual budget of \$1.9 billion.

Dr. Bjorkman was commissioned through Officer Training School in 1980 and served nearly 30 years in the Air Force, retiring as a colonel. During her military career she served as a flight test engineer, instructor and test squadron commander. She was a senior non-rated aircrew member and flew more than 700 hours as a flight test engineer in over 25 different aircraft, primarily the F-4, F-16, C-130 and C-141. She also held multiple staff and director positions involving modeling, simulation, analysis and joint testing, retiring from active duty as the Chief of the Modeling and Simulation Policy Division, Warfighter Systems Integration and Deployment. Dr. Bjorkman was appointed as a Senior Leader executive in January 2010, and entered the Senior Executive Service in 2015.



Mr. Michael T. McCarthy is a Department of the Army Civilian currently serving as the Deputy Chief of Staff of the Army Capabilities Integration Center (ARCIC), Fort Eustis, Virginia. Mr. Mccarthy is currently on an extended temporary assignment to the Army Futures Command (AFC) Task Force supporting the activation of AFC. Prior to his current assignment, he was

detailed to serve as the Deputy to the Commanding General of the Maneuver Support Center of Excellence (MSCOE) at Fort Leonard Wood, MO. Previous assignments include Chief, LANDWARNET Division of ARCIC, Director, and Program Manager for the Mission Command Complex of the Brigade Modernization Command at





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Innovative Data Acquisition, Processing, and Routing Solutions www.calculex.com Fort Bliss, TX. From 2009 -2016, Mr. McCarthy also led the U.S. Army's "Connecting Soldiers to Digital Applications" project for assessing the military utility of mobile technologies across the Army. Mr. McCarthy served various command and staff positions in the United States, Germany, and Korea following his commission into the Field Artillery upon graduation from the Virginia Military Institute. Mr. McCarthy is a graduate of the US Army Command and General Staff College receiving a Master of Arts in Operations, Tactics, and Training. He is a 2015 graduate of the Air War College, earning a Master of Arts in National Security Studies and Theory from The U.S. Air War College Grand Strategy curriculum. Mr. McCarthy is a 2016 graduate of the prestigious Defense Senior Leader Development Program.

WEDNESDAY, DECEMBER 12



In October 2015, **Mr. Robin Locksley** was selected to the Senior Executive Service to serve as the Director for Flight Test Engineering within the Naval Air Systems Command's (NAVAIR) Integrated Systems Evaluation, Experimentation and Test (ISEET) Department. He serves as the Chief Flight Test Engineer for naval aviation leading

more than 900 flight test engineers across four geographic sites in the performance of integrated systems test, evaluation, and experimentation to deliver critical war fighting capabilities to our sailors and marines.

In October 2011, Mr. Locksley was selected as the Head of the Systems Test Experimentation Management Division within the ISEET Department, where he was responsible for a national workforce performing the planning, execution, management, and reporting on all integrated systems evaluation, experimentation and test in support of defense acquisition programs managed by NAVAIR and the Naval Aviation Program Executive Offices (PEOs). He technically directed and administratively managed over 150 engineers, scientists, program managers, and analysts developing test programs that balanced program cost, schedule, and technical performance requirements with acceptable acquisition risk across the acquisition lifecycle. While in this role, he established the competence for Assistant Program Managers for Test and Evaluation (APM(T&E)) and Test Resource and Information Managers, and developed a comprehensive training program to ensure uniform highly-skilled support across the command.

In April 2007, Mr. Locksley became the Head of the PEO for Unmanned Aviation and Strike Weapons Programs Test Branch within the ISEET Department. Mr. Locksley provided technical direction and leadership of T&E efforts managed and conducted by 10 program offices performing Research, Development, Test and Evaluation. He was integral to the establishment of the APEOs(T&E) and APMs(T&E) across NAVAIR which elevated test program development from an element of systems engineering to a stand-alone discipline.

In October 1998, Mr. Locksley served as the Principle Flight Test Engineer for engineering and manufacturing development of the United States Marine Corps H-1 helicopter upgrades program. He provided technical, managerial, and financial leadership for T&E of high risk flight testing on three AH-1Z and two UH-1Y prototype developmental aircraft. In 2002 he received the Wernecke Award for technical excellence in rotorcraft T&E.

Prior to serving as principle flight test engineer, Mr. Locksley conducted aircraft T&E planning, provisioning, execution, analysis, and reporting on test programs for diverse platforms such as Frigates, AEGIS Class Ships, and aircraft systems on SH-2F, SH-3H, and SH-60B/CH-60 platforms including torpedo armament systems, onboard data recorders, training systems, acoustic signal processors, ship/air data links, electro optical rangefinders, "glass cockpit" primary flight displays, and the AGM-114 Hellfire Missile System.

Mr. Locksley received his bachelor's of science degree in Electrical Engineering from Drexel University in Pennsylvania in 1989. He earned his master's degree in Electrical Engineering from Florida Institute of Technology in 1995. Mr. Locksley is a graduate of the United States Naval Test Pilot School (Class 112), the NAVAIR Senior Executive Management Development Program, the Federal Executive Institute, and the Naval Post Graduate School.

Mr. Locksley has over 29 years of civilian federal service.



Dr. Steven J. Hutchison is the Director of Test and Evaluation in the Department of Homeland Security (DHS) Science and Technology Directorate.

Prior to coming to DHS, Dr. Hutchison served in various test and evaluation roles in the DoD, including Developmental Test and Evaluation, the Defense Information Systems Agency

(DISA), the office of the Director, Operational Test and Evaluation, and in the Army Test and Evaluation Command.

Dr. Hutchison retired from the US Army in 2002. His military career included assignments in the 82nd Airborne and 3rd Infantry divisions, the Department of Mathematics at the United States Military Academy, and as Assistant Technical Director and system evaluator in the Army Test and Evaluation Command.

Dr. Hutchison earned a Bachelor of Science degree from the United States Military Academy, a Master of Science in Operations Research at the US Naval Postgraduate School, and a Ph.D. in Industrial Engineering from Purdue University.



George J. Rumford is the Deputy Director for Major Initiatives and Technical Analyses for the Department of Defense (DoD) Test Resource Management Center (TRMC), a field activity that reports directly to the Under Secretary of Defense for Acquisition, Technology, and Logistics. In this capacity, Mr. Rumford serves as the Program Manager

for the Test and Evaluation / Science and Technology (T&E/S&T) Program. Sponsoring advanced technology research and development in industry, academia, and government laboratories, the T&E/S&T Program develops technologies to upgrade the capabilities at test and training ranges to support future warfighting systems. Advancing common instrumentation solutions at test and training ranges, Mr. Rumford also oversees the Test and Training Enabling Architecture (TENA) Software Development Activity (TENA SDA) and the Joint Mission Environment Test Capability (JMETC). The TENA architecture provides a common integrating software solution for the variety and multitude of range systems, simulations, and facilities in the test and training communities, and JMETC provides an enterprise solution to network test facilities and laboratories across the Services and in industry, including at multiple independent levels of security classification, to enable early testing of warfighting systems in an operational Joint context.

In addition, he is the Senior Technical Advisor for the National Cyber Range (NCR) and all TRMC Cyber T&E Infrastructure investments to conduct realistic cybersecurity testing, evaluation, experimentation, and training.

Prior to joining the TRMC, Mr. Rumford worked at the Defense Information Systems Agency (DISA) and for the Army at White Sands Missile Range, supporting testing of missile defense systems, space systems, and several multi-Range, multi-Service exercises.

Born in St. Louis, Missouri, Mr. Rumford has received degrees with honors in Electrical Engineering and in Computer Engineering from the University of Missouri.

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Greg Simmons has built a career as a leader in technical acquisition supporting the nation's defense, serving the Departments of Homeland Security and Defense for a combined three decades. Originally from Atlanta, GA, Greg is the Deputy Director for National Preparedness Programs in the Office of Test and Evaluation, DHS Science

and Technology. He oversees Test and Evaluation of FEMA and Coast Guard major acquisitions. Before entering federal service, Greg supported test and evaluation with the Department of the Navy's Sea System Command at the Washington Navy Yard as a senior test manager, where he oversaw and supported the test and evaluation of US Navy torpedo projects.

Before the Navy Yard, Greg led a career as a naval officer in the surface warfare community. He is a Desert Shield/Desert Storm veteran and was awarded the Combat Action Ribbon for Operations in the Arabian Gulf. Greg is also a veteran of the Department of Navy staff at the Pentagon, where he was responsible for weapons systems requirements development and the budget execution of the USS ZUMWALT Class Destroyer. He also served in the Navy Office of Legislative Affairs. In his final assignment on active duty, Greg served as the Director, Test and Evaluation for the US Navy Torpedo program, overseeing the successful test and evaluation of the jointly developed MK 48 Heavyweight Torpedo with Australia.

Greg is a graduate of the US Naval Academy with a bachelor's of science degree in political science. He earned a master's degree in organizational management from the George Washington

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University. Greg holds numerous professional certifications, including DHS certifications in program management and test and evaluation. He was also a 2018 Harvard Kennedy School of Government Senior Executive Fellow. He currently resides with his family in the Washington, DC suburbs of Northern Virginia.



Prior to joining the National Research Council of Canada, **Ian Robbins** worked in the marine transport and aerospace industries as a systems integration specialist and technical manager. He was heavily involved in the design, development and implementation of Voyage Data Recorder's (VDR) when this technology was being mandated by the

International Maritime Organization. The SOLAS regulations started coming into effect in 2002 so that all vessels of 3000 gross tonnage and above must carry these devices to assist with accident investigation. During this period Ian also worked extensively in marine radar processing and tracking systems integration and on other marine safety related products. In 2008, Ian transferred his technical skills to the aerospace industry and worked on deployment of maritime surveillance aircraft for the United Arab Emirates (UAE) Air Force. The country was creating a new maritime patrol unit and had selected Thales Airborne Systems as the integrated systems supplier. Ian was hired as a technical liaison between the technical and management teams from the various subcontractors involved in the project. When the project concluded, Ian continued to work on airborne and land based maritime surveillance systems until he joined NRC in 2014.

As the engineering manager for the Ocean, Coastal and Rivers Engineering (OCRE) research centre in St. John's, Ian has been involved in many test and evaluation programs and research initiatives for Canadian and international clients. The Research Centre supports a broad cross section of industry sectors by developing creative and practical solutions to engineering challenges in rivers, lakes and marine environments. Among the many large scale hydrodynamic testing facilities in St. John's is one of the world's largest ice tank facilities, used to evaluate the performance and safety of ice-going ships and structures in controlled model-scale conditions. The United States Coast Guard (USCG), U.S. Department of Homeland Security (DHS) Science and Technology Directorate (S&T), and U.S. Navy have been testing and evaluating the design models for the U.S. heavy polar icebreaker acquisition program at this facility since early 2017.



John Fitzgibbon understands how to design and develop immersive, themed environments that capture the attention of participants and engage their imagination. He brings nearly 25 years of development experience in themed attractions, hotels and theme parks to his role of President of TEQ Games. Together with the company's

leadership, he is focused on creating compelling and immersive learning experiences through virtual world game play and simulation technology. He spent 16 years with Universal Creative to ensure guest experiences were elevated to new heights in creativity and cutting-edge technology. As President of TEQGames, since its founding in 2008, the company, through Fitzgibbon's leadership, has focused on the development of immersive and creative learning applications for Training, Education, and Qualifications that use virtual world game play and simulation technology.





Greg Zacharias, Ph.D. was appointed Chief Scientist to the Director of Operational Test and Evaluation on July 23, 2018. He provides scientific and technical guidance on the overall approach to assessing the operational effectiveness, operational suitability, and survivability of major DOD weapon systems, and

advises the DOT&E on matters dealing with critical technology areas including: software effectiveness and cybersecurity; emerging technologies; modeling and simulation; humansystems integration; and test design/analysis. Dr. Zacharias also represents the DOT&E on technical groups focused on policy, programs, and technology assessments, interacting with the DOD, industry, and academia.

Before this appointment, Dr. Zacharias was the Chief Scientist of the U.S. Air Force (USAF), serving as the chief scientific adviser to the Secretary and the Chief of Staff, providing assessments on a range of scientific and technical (S&T) issues affecting the Air Force mission, and interacting with other Air Staff principals, acquisition organizations, and S&T communities to address cross-organizational technical issues. He served on the Executive Committee of the Air Force Scientific Advisory Board (SAB), and was the principal USAF S&T representative to the civilian scientific/engineering community and the public.

Earlier, Dr. Zacharias served as President and Senior Principal Scientist of Charles River Analytics, providing strategic direction for the Government Services and Commercial Solutions Divisions. Before co-founding Charles River, he was a Senior Scientist at Raytheon/BBN, where he developed and applied models of human perception, decision-making, and control in multi-agent dynamic environments. As a Research Engineer at the C. S. Draper Laboratory, Dr. Zacharias focused on advanced human/machine interface design issues for the Space Shuttle, building on an earlier USAF assignment at NASA, where he was responsible for preliminary design definition of the Shuttle reentry flight control system.

Dr. Zacharias served on the Air Force SAB for eight years, contributing to nine summer studies, including chairing a study on "Future Operations Concepts for Unmanned Aircraft Systems." As a SAB member he also chaired the Human System Wing Advisory Group, was a member of Air Combat Command's Advisory Group, and served as a technical program reviewer for the Air Force Research Laboratory (in Human Effectiveness and Information Systems). He was a member of the National Research Council (NRC) Committee on Human Factors (now the Committee on Human-Systems Integration) for over 10 years, supporting several NRC studies including one for the Defense Modeling and Simulation Office evaluating the state-of-the-art of military human behavior models, and co-chairing a follow-up USAF-sponsored study entitled "Organizational Models: from Individuals to Societies," which presents a roadmap for future DOD S&T investments in this area. He has served on the DOD Human Systems Technology Area Review and Assessment (TARA) Panel, Embry-Riddle's Research Advisory Board, MIT's Engineering Systems Division Advisory Board, the Board of the Small Business Technology Council (SBTC), and was the founding Chair of the Human Systems Division of the National Defense Industrial Association (NDIA).

Dr. Zacharias obtained his B.S., M.S., and Ph.D. degrees in Aeronautics and Astronautics at MIT. He was an MIT Sloan Scholar and a Distinguished Graduate of USAF Officer Training School, and has received the USAF Meritorious Civilian Service Award (twice) and the USAF Exceptional Civilian Service Award.





Ed Romero graduated in 1985 with a Bachelors of Science in Engineering and began his Civil Service career in 1986 with the US Navy at the then Pacific Missile Test Center, Point Mugu. He graduated with a Masters in Management from the Naval Postgraduate School in 1990. He has held numerous positions from test engineer, project engineer, lead experimentation

engineer, and supervisor. He has worked in logistics, armament, targets, ranges, test and evaluation and Command staff. He has received many awards among them the Warfighter Support Award in June 2004 and the Meritorious Civilian Service Award in November 1998. He has done several tours during his career: PMA-201 – 1989; Commandeer of Third Fleet in 1998; and US Joint Forces Command in 2003. Serving as the T&E Director for the Joint Surface Warfare (JSuW), JCTD, he tested the first ever Naval Net Enabled Weapon LINK 16 capability. He served as the Mission Area Test Engineer (MATE) for the Integrated Warfare Capabilities (IWC) for Surface Warfare (SuW) where he innovated distributed test assets collecting data to platform performance for SuW Kill Chains. He currently serves as the Deputy Director, Business Operations, for NAWCWD 5.0 Test and Evaluation. Mr Romero manages a budget of over \$387M per year in Major Range and Test Facility Base funding for NAWCWD, including future investments.



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THURSDAY, DECEMBER 13



Dr Keith Joiner, CSC, was an Air Force aeronautical engineer, project manager and teacher for 30 years before joining the University of New South Wales to teach and research test and evaluation. As Defence's Director-General of Test and Evaluation for four years he was awarded a Conspicuous Service Cross and for doing drawdown

plans for the Multi-National Force in Iraq he was awarded a U.S. Meritorious Service Medal. He is a Certified Practising Engineer, a Certified Practising Project Director, and has over 50 published articles and contributions on T&E in work.



Mr. David Duma is the Principal Deputy Director, Operational Test and Evaluation. He assumed this position in January 2002. Prior to returning to government service, he worked in private industry managing a variety of projects involving test and evaluation; requirements generation; command, control, communications, intelligence, surveillance,

and reconnaissance; modeling and simulation; and software development. He served as Acting Director, Operational Test and Evaluation from February 2005 to July 2006, June 2009 to September 2009, and January 2017 to December 2017.

Mr. Duma completed 30 years of Naval service, which included serving as the Acting Deputy Director for Conventional Systems in the office of Director, Operational Test and Evaluation and Director, Test and Evaluation Warfare Systems for the Chief of Naval Operations. His Naval career also included service as the Deputy Commander, Submarine Squadron 10 and Commanding Officer of the nuclear powered submarine USS Scamp (SSN 588).

Mr. Duma holds Masters of Science degrees in National Security and Strategic Studies and in Management. He holds a Bachelor of Science degree in Nuclear Engineering. He received the U.S. Presidential Executive Rank Award on two occasions; in 2008, the Meritorious Executive Award and in 2015, the Distinguished Executive Rank Award. He received two lifetime achievement awards for his work in defense test and evaluation; first in 2017, from the International Test and Evaluation Association and second in 2018, from the National Defense Industrial Association.



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