Model-Based TEMP Strategy & Integrated Decision Support Key
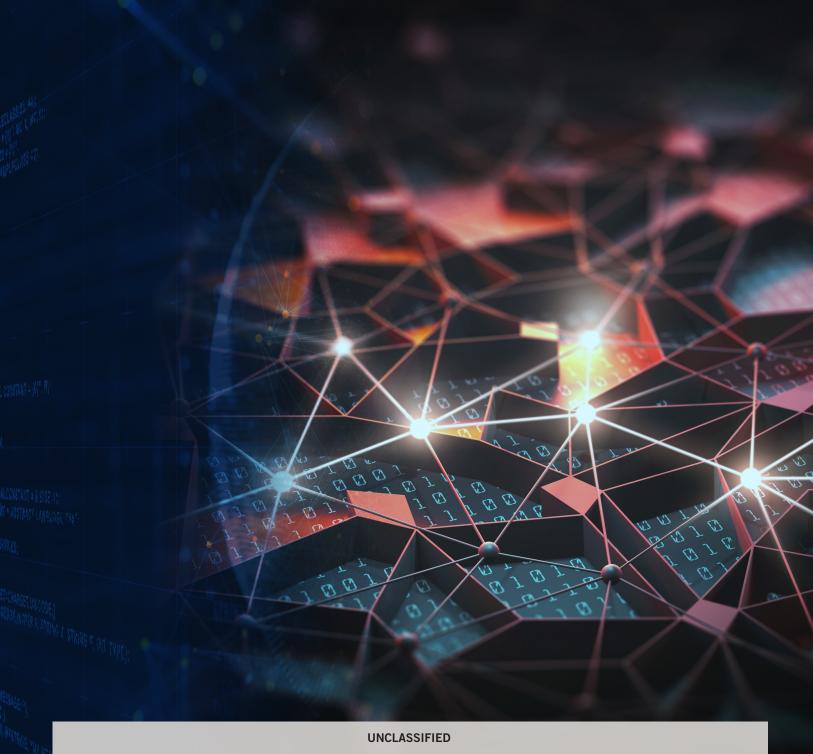
Research Workshop, August 2-3, 2023

Sponsored and organized by Director, Operational Test and Evaluation (DOT&E),
Virginia Tech National Security Institute (VTNSI), the Acquisition Innovation Research
Center (AIRC), and Johns Hopkins University-Applied Physics Lab (JHU-APL).

AIRC
ACQUISITION INNOVATION
RESEARCH CENTER

APL JOHNS HOPKINS
APPLIED PHYSICS LABORATORY

VT VIRGINIA TECH

Table of Contents

The views, findings, conclusions, and recommendations expressed in this material are solely those of the authors and do not necessarily reflect the views or positions of the United States Government (including the Department of Defense (DoD) and any government personnel), the Stevens Institute of Technology, or Virginia Tech National Security Institute.

Workshop Summary

The Challenge: The United States Department of Defense (DoD) and its supporting industry, research, and academia partners have proposed using Digital Engineering (DE) methods and tools to update traditional systems engineering (SE) and test and evaluation (T&E) practices to improve acquisition outcomes and accelerate traditional processes.

One critical element of the T&E process is the development of the Test and Evaluation Master Plan (TEMP), in which the program office, systems engineers, and testers come together to document an adequate test and evaluation strategy that spans major program milestones. DE provides opportunities to enhance the TEMP by directly incorporating data and models into the process of documenting the test strategy and program.

A new core element of the TEMP is the Integrated Decision Support Key (IDSK) and Evaluation Matrix family of related tables (e.g., requirements, evaluation measures and metrics, key program decisions, test events, etc.). The IDSK derives acquisition decisions from the developmental and operations test-based evaluations; the Evaluation Matrix links high level systems performance metrics to their supporting test data.

The Workshop: On August 2 and 3 of 2023, a diverse team of DoD T&E subject matter experts convened in a hybrid setting to explore and advance the practices of Model Based (MB) TEMP and IDSK. The in-person portion of the workshop was held at the University of Southern California (USC), Information Sciences Institute in Marina Del Rey, California, while the virtual component was held via ZoomGov. Approximately 115 colleagues participated in the workshop, with more than 40 participating in-person.

The objective of the workshop was to build on prior MB-TEMP workshops and demonstrate examples of MB-TEMPs and IDSKs that are being developed across the T&E community. The team of subject matter experts shared best practices and challenges to help advance the US Government's methods of implementing DE practices for T&E.

IDSK Implementation: The series of three workshops larger objective was to improve understanding of how DE and IDSK can help us accelerate weapons system that work. However, as many noted there is uncertainty on what the IDSK is and how to implement it. Therefore, this third workshop focused on the IDSK as the kernel of MB-TEMP.

In short, the IDSK is table relating programmatic decisions to data. With the digital implementation we can expand to related tables (evaluation framework), expand to lower-level requirements, and expand to detailed test events. Workshop presentations highlighted that there are lots of way to implement, but emphasized moving away from paper products to solutions that included relational databases, software-based implementations such as R-Shiny/Markdown, to model based systems engineering approaches. The workshop highlighted that there are myriad solutions for what "right looks like," and the right solution depends on the program (e.g., a new start taking a DE approach, or legacy program).

The focus coming out of this workshop should be a basic understanding of what an IDSK is and how to implement it in a MB-TEMP. In addition to presentations the workshop discussions looked at IDSK implementation through three targeted discussions:

1. Defining the IDSK Front End
2. Defining the IDSK Implementation
3. Defining IDSK relationships and process flow

Objective 1: Defining the IDSK Front End

The "Front End" of the IDSK refers to the process of gathering and inputting the needed information for the IDSK. Presenters highlighted that this is already work that the T&E Working Integrated Product Team (T&E-WIPT) undertakes, but often assumptions about relationships go uncaptured when decisions about measures, metrics and test conditions are translated into un-linked tables in documents. The discussion around IDSK front end focused on three key elements: stakeholders, decisions, and visualizations.

Workshop participants identified multiple stakeholders/decision-makers that the IDSK should serve:

- Program leadership: Senior Acquisition Executive (SAE), Program Executive Office (PEO), Program Manager (PM), and Operational Acceptance Authority

- Command Organizations: COCOM, MAJCOM

- National Level Stakeholders (IC, NSA, etc.)

- Congress

- TEMP Stakeholders: DOT&E, DTE&A, TRMC, Ranges, Service T&E Executives

- Chief Architect/Engineer and Operational Capability Owner

- Testers: Chief Developmental Tester (CDT), Lead Developmental Test Organization, Participating Test Organization, and Operational Test Agency (OTA)

They also identified a variety of decisions that the IDSK could/should support:

- Acquisition lifecycle and operational fielding

- Technology and integration readiness

- Test adequacy

- Design of Concept of Operations, and Tactics, Techniques and Procedures

- Test design and analysis

- Risk

- Model Verification, Validation, and Accreditation (VV&A)

Finally, when considering the intersection of the decision makers with the types of decisions, workshop participants concluded that flexible visualization of evaluation results was critical to informing the decisions at varying levels. Some recommendations for visualizations that came from the workshop include:

- Present high-level results with drill down capability

- Develop separate stakeholder dashboards based on common backend

Participants noted that stakeholders need to be able to ask questions, get results how they expect and that these questions might now be simple queries. To develop meaningful visualizations workshop participants noted that we should start with key decisions and/or questions and translate those into specific views (visualizations). They highlighted that while the IDSK is the core of the TEMP, interconnected data is the core of the IDSK. Best practices highlighted included ensuring exchange and interchange of data by conforming to open standards.

Objective 2: Defining the IDSK Implementation

Workshop participants worked through tactical questions of how to implement the IDSK. Questions considered included:

- How does the IDSK incorporate sequential test design, how do evaluation results impact future test design requirements?

- How do we articulate test resources through the IDSK?

- How do we link operational at technical requirements?

In terms of sequential test design, there was general consensus that future tests need to be informed by learning about factors, uncertainty estimates from past tests. This will allow testers to better scope future data needs. Multiple feedback loops were emphasized to include: 1) test results can be fed back into simulations / models to better inform future events model development and 2) test results can also improve system / capability design. Technical discussions highlighted how techniques such as response surface methodology can be used to formally iteratively test, calibrate, and inform the next test.

One challenge raised was how does the analysis formally integrate with IDSK. For example, the response surface models, or Bayesian models would need to be captured in code that links to IDSK data tables. This also raises the question of how often should the IDSK be updated – coordinating with TEMP updates seems insufficient to workshop participants.

In discussions on test resources, workshop participants noted that at the very least, resourcing was one of the many interconnected data tables that supports the IDSK. There was a concept for a future state in which these connections could allow testers to flag disconnects between test planning activities and resources available that could be updated as tests plans or resources available changed. However, workshop participants noted that that is not the state today and that there is danger in trying to make the IDSK the solution to all planning challenges.

Finally, participants discussed at length the need to link operational to technical requirements via the IDSK. Participants discussed that a mission-task-system decomposition was needed to flow between system specifications, operational requirements, and test measures. They also highlighted that when new requirements are identified during test or due to an evolving threat, we need to create subsets of requirements to add to the requirements set.

The concept of the ability to update requirements (and then resourcing) in a more fluid process is needed in the current era of rapidly evolving technologies. Updates might be based on results from test, models and simulations (M&S), etc.

Objective 3: IDSK Process Flow

Finally, a major outcome of the two days of briefs and discussion was the development of an IDSK Process flow. The flow outlined below can be leveraged by any program developing an IDSK. Participants noted that this process flow maps well with existing mission/capability-based test design processes implemented in the Services.

- Planning (Front End: gathering and linking information):

    - Define the decisions

    - Define mission and system under test (SUT)

    - Define the questions underlying each decision

    - Define the operational capabilities and their measures

    - Define the technical capabilities and their measures, how deep into technical requirements do we need to go?

    - Link the operational and technical capabilities

    - Link the decisions/questions to the capabilities that need to be evaluated (identify need for a data source)

    - Define the data sources (test, M&S events)

    - Define the test details (statistical-based test design, resources, etc.)

- Execution (Back End: model execution):

    - Run the test/M&S – gather and catalog the data

    - Conduct the analysis of measures

    - Aggregate measures to evaluate capabilities *(and technical capability implication on operational capability)*

    - Answer the questions/inform decisions (queries?)

- Reporting/decision-support (Front End: user interface):

    - Display results on stakeholder-specific decision-maker dashboard

        - Evaluation results

        - "Answers" to questions

        - Decision-supporting recommendations

    - Provide a dive-down capability (e.g., what does that "red" mean?)

Presentation Summaries

Day 1 (August 2, 2023) presenter highlights:

- Dr. Dinesh Verma of the Stevens Institute of Technology kicked off the workshop and gave a summary of the Systems Engineering Research Center (SERC) and Acquisition Innovation Research Center (AIRC) mission, leadership, and the research being performed by AIRC for DOT&E.

- Dr. Jeremy Werner of the Director, Operational Test and Evaluation (DOT&E) office hosted the meeting and began the intense two-day session by explaining the overarching objectives. Dr. Werner emphasized the goal of establishing a Minimum Viable Product for an IDSK. (Reference DoDI 5000.89)

- Mr. Randy Saunders of Johns Hopkins University-Applied Physics Lab (JHU-APL) provided a summary of the prior MB TEMP workshops that JHU-APL hosted, emphasizing the importance of collaboration across the test community to advance the application of model-based practices within the greater T&E enterprise.

- Dr. Laura Freeman of Virginia Tech National Security Institute (VTNSI) and Dr. Suzanne Beers of MITRE discussed current DoD guidance on IDSKs and current practices implementing IDSKs. In addition, they presented current policy and expressed a need to move from a paper based IDSK to a model-based version. This briefing highlighted the need for interoperable tooling to facilitate a true decision key that would be dynamically maintained.

- Ms. Caitlin Szymendera of NAVAIR briefed on the US Navy's Integrated Test and Evaluations Measurements System (iTEMS), which implements an agile development tool suite supporting Navy testing. The Navy has an iTEST system that provides program test scheduling and tracking to meet TEMP policy requirements. Ms. Szymendera offered access to the Navy's tools to all the other services.

- Mr. Hans Mair of JHU-APL provided an MB TEMP Pilot Projects overview. Mr. Mair shared the four categories of pilots being pursued in the program: current acquisition programs embracing a model centric relying on digital mission engineering structure, enterprise T&E processes undergoing digital transformation, potential MB TEMP pilots, and notional exploration of the use of a MB TEMP.

- Mr. Jason Bigger of the US Army explained how the Future Long Range Assault Aircraft (FLRAA) program acquisition is being conducted. Mr. Bigger highlighted the programs method of transitioning from a text-based TEMP to a Cameo, Model Based TEMP even though the acquisition strategy for FLRAA has been based on Model Based Systems Engineering from the start. The program now has the T&E engineering methods fully integrated into their digital engineering approach. Mr. Bigger completed the briefing with a Cameo demonstration of the FLRAA product models for a TEMP.

- Mr. Hans Mair next introduced a group discussion on Joint All Domain Command and Control (JADC2) and a Joint Test Concept (JTC). During this discussion a conversation arose around the definition and use of Digital Twins in a Joint assessment, without resolution. Ms. Christina Houfek of VTNSI briefly described AIRC's research for DOT&E to develop a JTC and emphasized the importance of a top-down view of approaching a Joint Warfighting Concept to enable true joint force capability assessments versus specific weapon system assessments, which focuses on capability options versus a "pass/fail" evaluation. During the group conversation a point was made that an IDSK approach also needs to be applied to Joint assessments to ensure critical decision making is timely.

- Maj CJ Werner of the U.S. Space Force (USSF) with Second Lt. Samantha Beck and Mr. Ken Sexe described Space Force's digital lifecycle management approach to system development, deployment, and sustainment. The current focus has been to convert existing document-based processes into digital, modeled processes. Following this effort, USSF will reassess for automation and process improvement opportunities.

- Ms. Trisha Radocaj, of JHU-APL gave an in-depth demonstration of the MB TEMP and IDSK being developed for the Next Generation Jammer program. This thorough demonstration highlighted the benefits of model-based test planning connected to mission objectives and operational assessment. Ms. Radocaj demonstrated how the resultant integrated models can be queried to inform design and programmatic decision making.

- Mr. James Ferry of Metron, Inc. closed out the first day discussions with a discussion and demonstration of Bayesian-Based Adaptive T&E methods as a "Moneyball for T&E" process. The method converts statistical analysis of capability assessments to dollar values for cost type trade decisions on how to formulate test planning. Mr. Ferry and his team plan to perform proof of concept research utilizing the TPQ-53 radar system.

Day 2 (August 3, 2023) presenter highlights:

- Dr. Kelli Esser of VTNSI and Mr. David Mulligan of MITRE started the second day with a demonstration of an R-based IDSK using Q53 data sets. As a lesson learned, Dr. Esser emphasized the importance of understanding the available data and the incorrect assumption that data will be available when decision analysis is required. Programs need to architect and plan for the data that will be used to support the analysis. The discussion also emphasized the importance of linkage from original mission analysis and modeling into the IDSK for operational assessment decisions. MITRE is currently linking the Air Force Advanced Framework for Simulation, Integration, and Modeling (AFSIM) to Cameo for developing the assessment information required for an IDSK. The tooling, though impressive, is still under development and needs further maturation before being ready for broader use.

- Dr. Craig Arndt of George Tech Research Institute (GTRI) described the work and architecture they are developing to tie system models, programmatic and technical risk models, TEMP models and the IDSK specific data at multiple layers. The project example utilized a current Electronic Warfare system that is under development for source data. Dr. Arndt advised the program offices and services to be sure they understand the labor required to produce such an integrated model, through in the total lifecycle, to ensure the investment is worthwhile.

- Several representatives from the US Army Cyber Resiliency and Training command, including Mr. Brent Bell, Mr. John Donaldson, and Mr. Gilbert Duverglas discussed the Army's Persistent Cyber Training Environment (PCTE) that integrates cyber assessments in a Development Secure Operations (DevSecOps) software development pipeline. The tooling allows for rapid, agile development and delivery of software products that meet cyber security requirements. The team highlighted how the PCTE is utilized to support both development and operational test in a continuous innovation/continuous deployment methodology.

- Mr. Brian Kelly of the Army Test and Evaluation Command (ATEC) and Mr. Davin O'Neill of MITRE described how the Army is developing an Evaluation Framework utilizing DE principles. ATEC is integrating data from numerous sources thus equipping programmatic decision makers to make faster more informed decisions. Working directly with program offices, ATEC is able to identify test capability gaps in support of program execution.

- Mr. Jonathan Brown of Agile Data Decisions, Inc. (Agile DD) described Agile DD's Human-in-the-loop Artificial Intelligence (AI) tooling "ARGIS" to extract model information from traditional, unstructured program documentation. This enables legacy programs to shape and inform MB TEMPs for follow on development/ enhancement evaluations. A tool demonstration was offered by Mr. Brown.

Next Steps

Dr. Jeremy Werner and the event participants felt the workshop was very informative and beneficial in accelerating the implementation of MB test planning and execution. Dr. Werner requested that a virtual only session be conducted within a few weeks to address a few additional topics that could not be accommodated in this workshop's schedule. The VTNSI and AIRC teams will see to the collection and distribution of briefing material and will schedule the follow on, continuation of this very productive session.

Conclusion

The two-day MB TEMP and IDSK Workshop met its objective of demystifying the IDSK. Presentations brought clarity on what an IDSK is, particularly for the full range of programs. Based on that clarity, the workshop participants developed an IDSK process flow that programs can implement and build an IDSK. The workshop highlighted that more collaboration and communication would be beneficial to test and evaluation practitioners. Dr. Werner in subsequent correspondences is already pursuing a recurring working group engagement to continue the sharing and to focus on how best to integrate the various methodologies. The AIRC research team will continue to partner with Johns Hopkins and DOT&E to advance the application of model-based test and evaluation within the DoD.

Appendix A: Workshop Organizers

Workshop Technical Leads:

- **Dr. Jeremy Werner,** *Office of the Secretary of Defense (OSD) / Director, Operational Test and Evaluation (DOT&E)*
- **Mr. Geoffrey Kerr,** *Virginia Tech National Security Institute*
- **Mr. Randy Saunders,** *Johns Hopkins Applied Physics Lab*

Moderator:

- **Dr. Laura Freeman,** *Virginia Tech National Security Institute*

Report Authors:

- **Mr. Geoffrey Kerr,** *Virginia Tech National Security Institute*
- **Dr. Laura Freeman,** *Virginia Tech National Security Institute*

Appendix B. Acronyms and Abbreviations

AI	Artificial Intelligence
AIRC	Acquisition Innovation Research Center
AFSIM	Advanced Framework for Simulation, Integration, and Modeling
ATEC	Army Test and Evaluation Command
CDT	Chief Developmental Tester
DE	Digital Engineering
DevSecOps	Development Security Operations
DoD	Department of Defense
DOT&E	Director, Operational Test and Evaluation
DTE&A	Director for Developmental Test, Evaluation, and Assessments
FLRAA	Future Long Range Assault Aircraft
GTRI	Georgia Tech Research Institute
IDSK	Integrated Decision Support Key
iTEMS	Integrated Test and Evaluation Measurement System
JADC2	Joint All Domain Command and Control
JHU-APL	Johns Hopkins University-Applied Physics Lab
JTC	Joint Test Concept
M&S	Models and Simulations
MB	Model-Based
MBTEMP	Model-Based Test and Evaluation Master Plan
OSD	Office of the Secretary of Defense
OTA	Operational Test Agency
PCTE	Persistent Cyber Training Environment
PEO	Program Executive Office
PM	Program Manager
SAE	Senior Acquisition Executive
SE	Systems Engineering
SERC	Systems Engineering Research Center
SUT	System Under Test
T&E	Test and Evaluation
T&E-WIPT	Test and Evaluation Working Integrated Product Team
TEMP	Test and Evaluation Master Plan
TRMC	Test Resource Management Center
VTNSI	Virginia Tech National Security Institute
VV&A	Verification, Validation, and Accreditation
USC	University of Southern California
USSF	United States Space Force

Model-Based TEMP Strategy & Integrated Decision Support Key Workshop

Agenda times in PDT

JOHNS HOPKINS APPLIED PHYSICS LABORATORY · VIRGINIA TECH · USC

DAY 1 / August 2

8:00 AM	**Check-In**
8:30 AM	**Welcome, Introductions & Goal of the Workshop** *Dr. Jeremy Werner, DOT&E*
8:35 AM	**Results from Prior MB TEMP Workshops** *Dr. Randy Saunders, JHU-APL*
9:05 AM	**Vision on TEMP and IDSK Policy and Research** *Dr. Laura Freeman, VTNSI* *Dr. Suzanne Beers, MITRE*
9:35 AM	**Navy's Integrated Test and Evaluation Management System (iTEMS)** *Ms. Caitlin Szymendera, NAVAIR*
10:20 AM	**Break**
10:30 AM	**MB TEMP Pilot Projects Overview** *Mr. Hans Mair, JHU-APL*
10:45 AM	**FLRAA Program Test Planning Demonstration - PILOT** *Mr. Jason Bigger, US Army* *Mr. George Michael Winter, US Army*
11:45 AM	**Lunch**
1:15 PM	**JADC2/Joint Test Concept Planning Panel** *Mr. Hans Mair, JHU-APL*
2:00 PM	**Space Force Digital Lifecycle Management Focus on MB TERM w/ IDSK** *Maj CJ Werner, US Space Force* *Mr. Ken Sexe, US Space Force*
3:00 PM	**Break**
3:15 PM	**Next Generation Jammer MB TEMP/IDSK Pilot** *Trisha Radocaj, JHU-APL*
4:15 PM	**Bayesian-Based Adaptive T&E** *Mr. James Ferry, Metron, Inc.*
4:45 PM	**Review Day 1 Conclusions & Day 2 Agenda** *Dr. Jeremy Werner, DOT&E*
4:50 PM	**Adjourn**

DAY 2 / August 3

8:00 AM	**Check-In & Brief Day 2 Kickoff**
8:30 AM	**IDSK Exemplar and STARCOM IDSK Concept**
	Approach for Developingn Front-end IDSK w/ Flexibility for ME Alignment *Dr. Kelli Esser, VTNSI* *Mr. David Mulligan, MITRE*
9:30 AM	**Model Based IDSK Implementation - EW System Example** *Dr. Craig Arndt, GTRI*
10:15 AM	**Break**
10:30 AM	**Persistent Cyber Training Environment and the DevSecOps Process** *Mr. Brent Bell, US Army Cyber Resiliency and Training* *Mr. John Donaldson, US Army Cyber Resiliency and Training* *Mr. Gilbert Duverglas, US Army Cyber Resiliency and Training*
11:15 AM	**ATEC Enterprise Architecture (Video Recording)** *Brian Kelly, ATEC* *Davin O'Neill, MITRE*
11:45 AM	**Demo** *Mr. Jonathan Brown, Agile DD*
12:15 PM	**Workshop Close Out and Plans for Follow On** *Dr. Jeremy Werner, DOT&E*
12:30 PM	**Lunch**
2:00 PM	**In-Person Only Session** **IDSK Technical Working Group - Develop a Baseline, Industry Wide IDSK structure** *Dr. Laura Freeman, VTNSI* *Maj CJ Werner, US Space Force* *Mr. Ken Sexe, US Space Force* *Mr. Faris Avdic, Axient Corp.*
5:00 PM	**Adjourn**

Appendix D. Workshop Participants

Full name	Organization	Title/Department
Amos Powell	Air Force Operational Test and Evaluation Center (AFOTEC)	Engineer/A-5R
Angela Jones	US Army; Uncrewed Aircraft Systems Project Office	Test and Evaluation Lead
Annemarie Kibbe	Lockheed Martin	System Engineer
Austin Omlie		
Breeana Anderson	IDA	
Brian Hoffman	AgileDD	Directory of Software Development
Charles Dunehew	GTRI	Principal Research Associate/Electro-Optical Systems Lab
Chris Voris	Edaptive Computing, Inc.	Business Analyst
Clarissa Hoyt	Space Force	Intern (CS, Automation & AI)
Col (R) Jason Rusco	Joint Strike Fighter/Joint Program Office F-35	Test and Evaluation
Daniel Byrne	The Aerospace Corporation	Senior Project Leader / System Integration and Test Office
Daniel Doster	AVIAN Inc	NGJ-LB ADMT&E Support
Daniel Wolodkin	VT	
David Green	Ansys	Principal Federal Programs
David Mulligan	HQ STARCOM S2/3V	MITRE/T&E Enterprise Division
David Pine	F-35 JPO	Test Planning and Strategy
Deborah Cafarelli	Directorate for Test and Evaluation; F-35 Joint Program Office	F-35 Block 4 Contractor Support
Donald Lambert	USAF	AF DCGS Lead Systems Integrator
Dr. Ari Cortes	NSWC PHD/HII	Principal T&E Engineer
Dr. Craig Arndt	GTRI	Division Chief / Principal Faculty
Dr. Dinesh Verma	SERC/AIRC	Executive Director
Dr. Frederick Sexe	Space Systems Integration Office (SSIO)	Command Test Authority
Dr. James Ferry	Metron, Inc.	Senior Research Scientist / Advanced Data Analytics Division

Full name	Organization	Title/Department
Dr. Jeremy Werner	DOT&E	Chief Scientist
Dr. Laura Freeman	Virginia Tech	Deputy Director, National Security Institute
Dr. Matthew Baczkowski	AFLCMC/XA	Test Manager
Dr. Phil Anton	SERC/AIRC	AIRC Chief Scientist
Dr. Suzanne M. Beers	MITRE Corporation	Department Manager, Defense Systems Engineering
Edward M. Kraft	Edmkraft Inc.	Consultant
Ellen Preiss	JITC	OT Division Technical Director
Ethan Hollenback	AFLCMC	Test Manager
Faris Avdic	SSC	MBSE Engineering
Gilbert Henri Duverglas	PdM CRT	Operational Test Engineer
Jason Brotherton		
Jennifer Milburn	AFMC AFLCMC/WN	
Joe Ellis	KBR	Project Manager, Defense Systems Engineering
John C Nilsen	DEVCOM	PM, MOSA Management Office (MMO)
Kelli Esser	Virginia Tech National Security Institute (VT NSI)	Associate Director, Intelligent Systems Division
Lt Col Jay Vizcarra	Headquarters Air Force	Division Chief / Programs and Policy
Maj CJ Werner	SSC/SSIO	Digital Life Cycle Management
Major David A. Rodriguez	STARCOM Delta 12	Liaison Officer to SSC
Mark Temnycky	OUSD(A&S)/ASD(A)/D(ADA)/AIRC	Project Controls Analyst
Melanie Loncarich	Office of the Under Secretary of the Army - Test and Evaluation	Chief, Policy and Education Division
Melissa Beaverson	DOT&E	Air Warfare
Mike Taschner	Space Force	
Mr Bruce Bishop	USSF STARCOM Test Enterprise Division	Technical Director

Full name	Organization	Title/Department
Mr Johnston Coil	LinQuest Corporation	Digital Engineering
Mr. Alan Perry	Aerospace Corporation	Sr. Project Leader/Space Systems Architecture Division
Mr. Alex Margolis	Edaptive Computing, Inc	Subject Matter Expert
Mr. Brentson J Bell Jr.	PEO STRI (PdM CRT)	Deputy Product Manager
Mr. Brian Flaherty	DUSA-TE	Operations Research Analyst
Mr. David Rudolph	SSC/BZED SSIO Digital Transformstion	Senior Digital Engineer
Mr. Davin O'Neill	MITRE	Systems Engineer/ATEC
Mr. Douglas Jaquish	AFLCMC/WAQ	F-15EX CDT
Mr. Elisha Fitzsimmons	NTWL	Flight Test Data Analyst/Data, Displays, and Controls for CH-53K ITT
Mr. Geoffrey Kerr	Virginia Tech National Security Institute	Senior Research Associate
Mr. George Michael Winter	PEO Aviation - PM FLRAA	Model Based Systems Engineer/Systems Engineering
Mr. Gunnar Graham	AFLCMC/XA	Test Manager
Mr. Hans Mair	Johns Hopkins Applied Physics Laboratory	Senior National Security Analyst
Mr. Ian Medina	SSC/BC	T&E Kobayashi Maru
Mr. James Bechtel	US Army PEO Ground Combat Systems	Lead Systems Engineer / APEO Systems Engineering & Integration
Mr. Jason Bigger	U.S. Army FLRAA Program Management Office	Test Subject Matter Expert/ T&E Branch
Mr. Jay C Huston	AFLCMC - Center Test Authority (CTA)	Test Manager
Mr. Jeffery Mackey	AFOTEC	Technical Advisor
Mr. Jeffery Weaver	PEO C3T	PM Tactical Radios	Electronics Engineer
Mr. John Donaldson	PEO STRI	Cyber Test Lead for Product Manager, Cyber Resiliency and Training (CRT)
Mr. Jonathan Brown	Agile Data Decisions	Business Development
Mr. Kenneth Kiesel	DISA	JITC
Mr. Kevin G. Westburg	OSD DOT&E	Space Systems Action Officer

Full name	Organization	Title/Department
Mr. Kevin Torres	AFLCMC/WL	Digital Architect
Mr. Matt Coburn	AFOTEC	A-3, Program Manager
Mr. Matthew Alexander	The MITRE Corporation	Senior Systems and Mission Engineer
Mr. Michael Keltos	USAF AFMC AFLCMC	Branch Chief
Mr. Mitchell Rambin	OSD, DOT&E Land and Expeditionary Warfare	Military Evaluator
Mr. Paul Martinell	US Army Test and Evaluation Command	General Engineer/Policy and Standardization Division
Mr. Paul T. Cross	AFLCMC	Director of T&E, Mobility and Training Aircraft (MATAC) Directorate
Mr. Robert B. Crombie	Aerospace	Senior Project Leader/Systems Integration and Test Office
Mr. Robert Wojciechowski	Office of the Director, Operational Test and Evaluation, Office of the Secretary of Defense	Senior Military Program Evaluator
Mr. Sean Hamilton	OSD\DOT&E	Action Officer
Mr. Steven Kroll	OSD	Action Officer/DOT&E
Mr. Stuart A. Whitfield	JITC	Operational Test Division
Mr. TJ McKelvey	OUSD(R&E) DTE&A	CHENG - Modernization
Mrs. Christine J. Crabill	DOT&E	Military Analyst, Land and Expeditionary Warfare
Mrs. Jeannette N. Mills	Deloitte.com	Governance Analyst/Strategy Implementation
Mrs. Michelle Brown-Gordon	USAF	Senior Test Manager / WLNN
Mrs. Sylvia Conques	LinQuest	Principal Systems Engineer
Ms. Caitlin Szymendera	NAVAIR	Director, RDT&E Data & Technology
Ms. Christina Houfek	Virginia Tech Applied Research Corporation	Lead PjM Decision Science Department
Ms. Elizabeth Jones	ATEC	AEC
Ms. Eryn Turckes	AFLCMC/WN	Director of Test & Evaluation
Ms. Jazmine Garard	AIRC	Project Manager
Ms. Jean Imboden	PEO CS&CSS	PAT&E Lead

Full name	Organization	Title/Department
Ms. Kara Pepe	SERC/AIRC	Director of Operations
Ms. Laura Gest	USSF	SSC/BZT
Ms. Lubna Khaled-Noveloso	Army Future Command / Ground Vehicle Support Center and PEO Ground Combat Systems - APEO	Systems Engineer
Ms. Melissa Morgan	US Army - PEO CS&CSS	PM Force Projection - Product Assurance & Test Division Chief
Ms. Tara Kelly	SERC/AIRC	Research Project Manager
Nick Mastromanolis	U.S. Army Test and Evaluation Command	Directorate of Capabilities Integration, Chief T&E Policy and Standardization Division
Olanrewaju Adeyemo	NAVY Test Wing Atlantic	Mission Systems Test and Evaluation Department
Patrick Bayliss	F-35 JPO	
Randall Britto	Systems Planning and Analysis Inc.	Sr Systems Engineer / SSC
Randy Saunders	Johns Hopkins APL	National Security Analysis
Rebecca Medlin	IDA	Research Staff Member
Ryan Brunton	Johns Hopkins University Applied Physics Laboratory	Senior Professional Staff
Sabrina Taylor, 2LT, USSF	SSC/SNET	Next Gen Missile Warning Test Manager
Samantha Beck, 2d LT	SSC/BZED	Digital Pathfinder Engineer
Sandra Hobson	DOD	DOT&E
Sara Campbell	ATEC	
Steve Slatter	HQ AMC/TE (USAF)	HQ AMC/TEP
Sunil Klein	Frontier Technology Inc	Systems Engineer
Tabitha Macko	Space Force	Intern (SE&I and MBSE Modeler)
Terry Powell	JITC	Operational Test and Evaluation
Trisha Radocaj	Johns Hopkins University Applied Physics Lab	Systems Engineer/Mission Engineering Group/Advanced Architecture Development
Troy Snow	Defense Acquisition University	Professor
William Cory Bogler	US Army	Senior Test Office

References

DoD Instruction 5000.89., "Test and Evaluation", November 19, 2020.
https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/500089p.PDF