Director, Operational Test and Evaluation

DOT&E Strategy Update 2022

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Our Statement of Intent:

We will transform test and evaluation to enable delivery of the world's most advanced warfighting capabilities at the speed of need.

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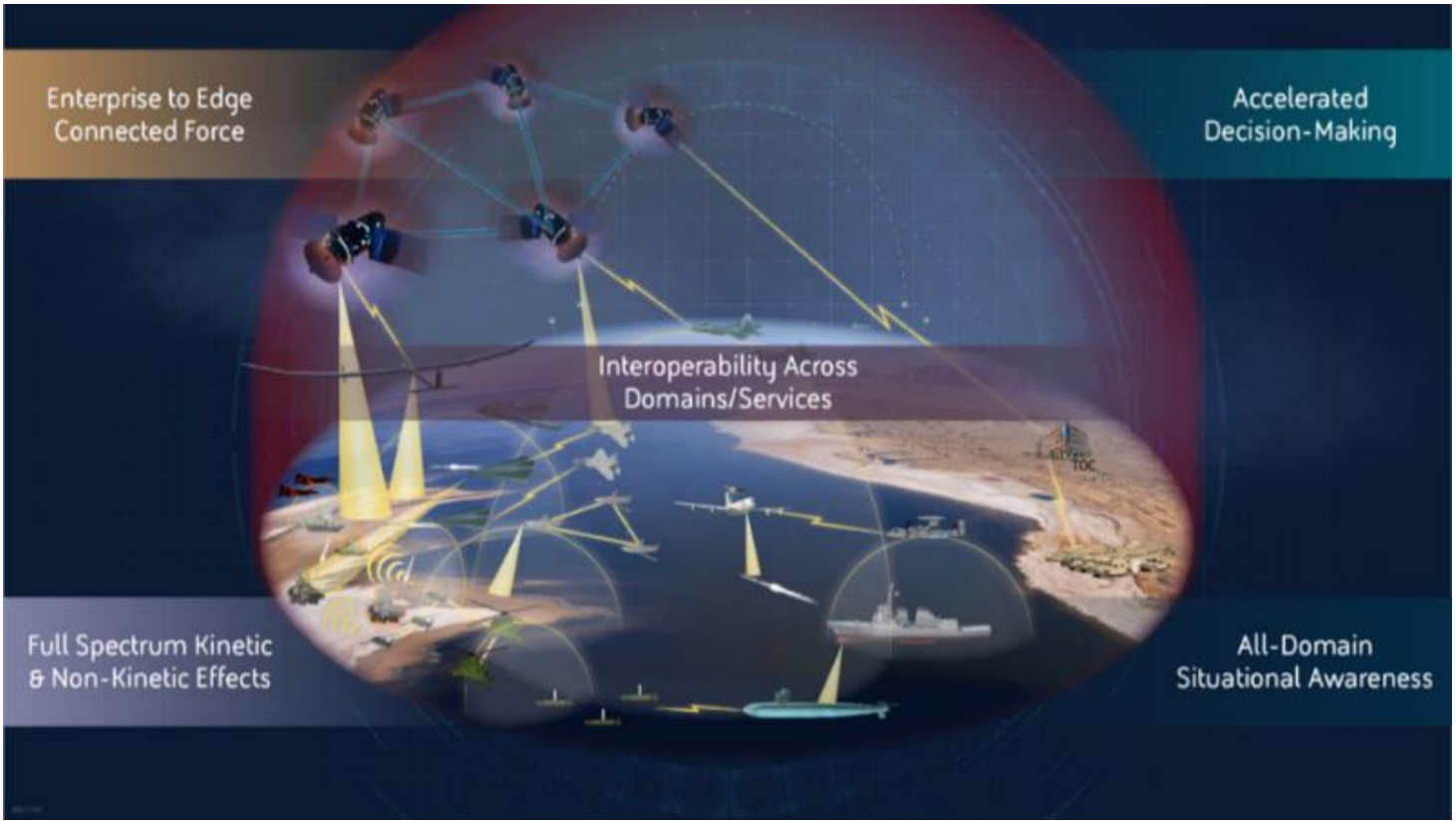
Proven Warfighting Capabilities Delivered at the Speed of Need.

The enduring mission of the Department of Defense (DOD) is to provide the military forces to deter war and ensure the Nation's security. Test and evaluation (T&E) is critical to DOD mission success: It enables delivery of the proven, combat-ready systems needed to achieve strategic objectives. T&E capitalizes on the knowledge of the operational environment and the latest advances in science and technology to inspire trust and confidence in our warfighting capabilities and help avoid operational failures in the battlespace.

The 2022 National Defense Strategy focuses sharply on integrated deterrence and the attributes of the future Joint Force. It calls for greater flexibility and mobility; increased operational tempo; and seamless, cyber- and electromagnetic spectrum-survivable integration of multiple platforms, weapons, and systems to achieve multi-domain superiority. Evaluation of the *lethality, suitability, resilience, survivability, agility and responsiveness of this future Joint Force* will stretch our core T&E capabilities further than ever before.

We have been providing independent and objective assessments of **operational effectiveness, suitability, lethality, and survivability** of DOD weapons, systems and equipment for nearly **40 years**.



Graphic: BAE Systems

Changes in both technology and warfighting concepts are converging in a defining moment leading us to transform T&E infrastructure, processes, concepts, tools, and workforce, now. There are seven drivers that animate this strategy:

- **Engineering of Software-Reliant Systems.** Software insertion allows rapid, incremental and iterative delivery of new capability to the field. Early and frequent user input drives the process. The T&E community must support this feedback loop via operationally relevant assessments, conducted earlier in the development cycle (Shift Left), that reveal whether a system performs as needed and how it may impact the kill web.
- **Artificial Intelligence (AI)/Machine Learning (ML).** AI and ML present both a challenge and a potential benefit for the T&E community to harness. We must develop tools and processes to determine the uniquely contextual operational and responsible performance of AI/ML capabilities, especially as they learn and change during real operational use. At the same time, the T&E community must explore how to use AI and ML to make test and evaluation more effective, more efficient and more robust.
- **Joint All-Domain Operations.** Machine-speed warfare, integrated across all combat domains, requires us to focus intently on testing the mission threads that make up the system-of-systems environment, to include the entire potential attack surface and the persistence we expect from our adversaries. The sheer volume of systems, and their extensive reliance on each other to form effective kill webs, will require tools that facilitate continuous and automated T&E.
- **Data.** On today's battlefield, sustained and effective operations require the ability to generate, exchange, process, validate, fuse, and analyze vast amounts of data at machine speeds. This will require innovative T&E data management tools to measure and evaluate data-oriented operational performance especially as data and elements of the kill webs change over time.
- **Speed to Field.** To deter and dominate potential adversaries, the DOD must get capability to the warfighter on operationally meaningful timelines. Doing so will require development and implementation of credible digital tools and automation that can propel better T&E, shorten T&E timelines, and illuminate performance shortfalls earlier.
- **Culture**. The volume of systems and the complexity of testing them require that we revamp processes and tools to support tighter collaboration, more effective T&E planning and execution, and timelier sharing and analysis of data.
- **Talent Management.** High-demand skillsets, especially those sought by the commercial sector, will always be difficult to develop, acquire and retain. The T&E community must therefore craft a new approach to recruiting, training, education, and long-term management of the talent pipeline.

Think and Act Like an Enterprise.

To fight as a Joint Force, we must plan and prepare as a Joint Force. This holds true for the T&E enterprise. Our success will depend not only on our ability to develop new concepts and tools, but also on our ability to embrace agile processes and a culture that incentivize collaboration and innovation.

The goal is for the T&E community to enshrine routine engagement and close cooperation with everyone in the capability procurement chain: requirement and technology developers, buyers, users, the intelligence community and, when possible, our allies and partners. It is imperative that we work together and promote a pioneering spirit, and a culture of continuous learning, agility, transparency, and co-ownership, in order to use our combined talents more effectively. We must institutionalize a mechanism for easy reach-back to industry and academia to accelerate development of innovative and interoperable T&E solutions. We will look for solutions that will enable sharing of data and ideas. We will promote establishment of interdisciplinary teams of experts to forge and accelerate research and development needed to transform T&E tools, processes, infrastructure, and human capital.

Thinking and acting as an enterprise will help us resolve the enterprise-level challenges we face in testing and evaluating the capabilities the acquisition community intends to deliver over the next decade. For example, going forward, T&E must assess new capabilities as elements of systems of systems – that is, how they affect interoperability, the expanding kill web, and joint, multi-domain operations. The community also must devise a framework for testing capabilities and systems built to change over time, throughout their entire life cycle. With the growing reliance on software to add and improve functionality, we must design methods and tools to examine cyber and electromagnetic spectrum survivability on a recurring basis.

The technology pipeline is broad and always changing but, based on the 2022 snapshot in time, we anticipate that some of the most challenging work ahead of us lies in:

- Artificial Intelligence
- Autonomous Systems
- Joint All-Domain Command and Control Solutions
- Space Systems
- Defensive and Offensive Cyber
- Electromagnetic Spectrum Operations
- Hypersonic Systems
- Directed Energy Weapons
- Interoperability
- Quantum-Enabled Systems

Strategic Pillars.

This refocused strategy defines five strategic pillars to deliver on our intent. With credibility as our guiding principle, we will support the delivery of physical and digital T&E infrastructure solutions that can adequately represent the future operating environment. We will focus on development and delivery of digital tools and processes to support automation, and more integrated T&E in both the development and deployed ecosystems. Lastly, we will foster an agile culture that is practiced by a well-equipped and trained workforce to quicken the pace of innovation.

	Strategic Pillars	Lines of Effort
Test the way we fight	Architect T&E around validated mission threads and demonstrate the operational performance of the Joint Force in multi-domain operations.	• Standardize development of a scalable and adaptive representation of the multi-domain operating environment. • Implement measures, tools, and processes to efficiently evaluate kill webs and system-of-systems performance.
Accelerate the delivery of weapons that work	Embrace digital technologies to deliver high-quality systems at more dynamic rates.	• Develop and implement an enterprise-level T&E data management solution. • Integrate T&E in model-based system engineering to operationalize and optimize the shift-left approach.
Improve survivability of DOD in a contested environment	Identify, assess and act on cyber, electromagnetic spectrum, space, and other risks to DOD mission – at scale and speed.	• Standardize and automate mission-based risk assessments. • Emphasize cyber and electromagnetic spectrum survivability. • Evaluate operational performance in a contested space environment.
Pioneer T&E of weapon systems built to change over time	Implement fluid and iterative T&E across the entire system lifecycle to help assure continued combat credibility as the system evolves to meet warfighter needs.	• Increase the use of credible digital twins in T&E. • Evaluate operational and ethical performance of AI-based systems. • Advance the evaluation of the operational performance of software-reliant systems.
Foster an agile and enduring T&E enterprise workforce	Centralize and leverage efforts to access, curate, and engage T&E talent to quicken the pace of innovation across the T&E enterprise.	• Identify and track current and emerging T&E workforce requirements and capabilities. • Establish and updated as necessary core T&E competencies and supply cutting-edge training and education resources.

Mobilizing to Action.

Healthy organizations periodically re-assess their core mission and determine strategic approaches to best achieve their objectives. The pillars outlined in this strategy plot the roadmap for evolving T&E into the future. Implementing this strategy will require enterprise-wide action. Community buy-in at all levels is critical for us to achieve our ultimate goal: fielding high-quality warfighting capabilities to maintain undisputed dominance over our adversaries.

- **Governance Structure:** To ensure quick action across the five strategic pillars, we will establish a comprehensive governance structure. This governance team will be responsible for implementation and de-confliction throughout this transformation journey. The forthcoming Implementation Plan will include further guidance.
- **Community Engagement:** The coordination challenges facing the T&E community are vast and complex. Budget pressures, concern about workforce changes, and fear of disrupting the status quo could undermine our progress. DOT&E will proactively engage with Congress, other Office of the Secretary of Defense colleagues, the Services, industry, and relevant research and engineering organizations to gain support and buy-in for the T&E capability agenda outlined here.
- **Communications and Change Management**: To achieve a successful transformation, the entire T&E community needs to innovate and participate in communicating our successes and challenges so that we can grow together. Well-crafted strategies can flounder without an effective communication plan that:
  - Explains the strategic intent to leadership and stakeholders and equips them with key messages at an appropriate cadence.
  - Consolidates strategy information releases across agreed-upon communication channels.
  - Coordinates the many stakeholders with voices and passion to advance our cause so that they deliver a consistent message that ties back to the actions outlined in this strategy.
- **Resourcing and Timeline**: The Implementation Plan will detail key actions, deliverables, and timing for each line of effort. It will include recommended owners for each strategic pillar and associated actions while detailing activities to gain and maintain momentum in the near term.