



## **Air Force Test and Evaluation Days**

### **Conference Keynote**

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for Delivery  
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## **Introduction**

Thank you for that kind introduction, and for this opportunity to speak to you. General Sargeant, thank you very much for the invitation to attend this conference. This is a very worthwhile event for test and evaluation professionals, and, I assure you, extremely important to the continued success of the United States Air Force and the Joint team. As you listen to the thoughtful presentations and network with your peers and colleagues, bear in mind the broader importance of your efforts to ensure the continued viability of the Air Force. My hope here is to provide some thoughts for you on the current strategic environment; my estimate of what challenges—and opportunities—are arrayed before us; and how a robust T&E enterprise is absolutely essential to the success of the Air Force and the Joint team.

## **Overcoming Acquisition Challenges**

Two-thousand-nine was a watershed year for our Air Force, as it was for you in the T&E community—a year of many challenges, but also of considerable progress that set the stage for the significant amount of work that remains for this year and beyond. Among the top priorities for our Service was to “recapture acquisition excellence,” in which the test and evaluation community played, and continues to play, a pivotal role. Improving the process of generating requirements, and instilling more budgetary and financial discipline, are two of several initiatives that we pursued to regain and institutionalize acquisition excellence, and which directly affected the test and evaluation community.

Progress has been good; but, while we no longer are in crisis mode, make no mistake: we still must be at our highest performance and completely above reproach in our biggest acquisition efforts—F-35, KC-X, and others. We absolutely must maintain the hard-earned trust of the Congress, of OSD, and



of the American people, that we so intently worked to regain. So, in short, we absolutely cannot fail in our acquisition and T&E efforts.

## **The Strategic Environment, and the Importance of Testing and Evaluation**

In this current strategic environment in which uncertainties abound, threats emerge, and methods of warfare evolve, we must always remain vigilant for new requirements that must be fulfilled to effectively engage in warfare. Rapid technological advancements have led to advanced systems that afford us an asymmetric battlefield advantage. But, the proliferation of advanced conventional weapons and precise delivery systems such as missiles, rockets, and mortars, has allowed our adversaries also to be the beneficiaries of this technological innovation.

Therefore, we must make considerable efforts to ensure that we maintain the technological edge, neutralize the threats to friendly forces, and counter anti-access challenges that deny our ability to operate in the global commons and contested areas of operation. For that reason, a robust test and evaluation enterprise, capable of delivering smart and effective technology to the warfighter, is absolutely essential for our Air Force and Joint team to continue to prevail. The battlefield certainly is not the place to discover that our aircraft, weapons, and associated systems are not functioning as intended or are not integrated properly. T&E helps to identify problems early—to fix them before a new technology goes into final production and is operationalized; and, ultimately, it helps to determine whether it is capable of producing the desired tactical effect, enabling the warfighter to achieve even broader objectives.

## **Ongoing Issues**

I know that you are working hard to develop further efficiencies in testing processes. To that end, the broader acquisition community continues to make gains in working with users to establish requirements, while being sufficiently adaptable during trade-off decision and source selection processes. This is a



critical starting point from which cost, schedule, and performance criteria—in essence, the totality of the acquisition effort itself—develop.

For the foreseeable future, diminishing purchasing power will challenge you in the T&E community to balance the requirement for shorter, leaner, and more efficient test criteria, against ensuring the adequacy of testing. Your objective, then, is to devise effective tests that are both lean *and* reliable, and that efficiently report performance at key milestones. Because gathering sufficient data to ensure reliable testing can take a considerable amount of time, I realize that this is a daunting task, and will require all of us working together to achieve our objective.

But, I am encouraged that our T&E enterprise is producing sound results for our Air Force, because our ongoing operations in Iraq, Afghanistan, and elsewhere require agility and responsiveness to warfighter needs. The rapid testing of the CV-22 50-caliber ramp gun, for example, provided a critical defensive weapon for the CV-22 fleet, boosting aircrew survivability. Through a phenomenal effort, the 780th Test and 413th Flight Test squadrons completed developmental testing in less than a week, resulting in the fielding of the weapon system in less than two months from the initial statement of an urgent operational need.

And, when the T&E enterprise exhibits a similar sort of innovative spirit in its processes, as it does in the technologies themselves, we gain a significant capability to quickly respond to emerging requirements and meet our strategic imperatives. Your efforts in national security space are but one example. As the Air Force has had a unique and prominent role in this effort for over 60 years, it must continue to lead boldly. The development of a Space Operational Test and Evaluation Model was an important first step toward re-energizing and transforming Air Force space T&E—an area that, along with the broader space acquisition effort, had been identified as requiring more focus. By ensuring that space acquisition decisions are informed by more agile analysis and reporting, both at an earlier stage and also continuously throughout the acquisition process, stakeholders such as major and combatant commands are



able to better articulate user and operational requirements. This helps us more quickly field and accept new systems. An example is the Wideband Global Satellite Communications system, which was fielded 10 months early, at a savings of over 400,000 dollars.

These substantial accomplishments are crucial as we move forward with future systems, concepts of operations, and force posturing. To be sure, there is an intricate interplay between strategy development and the art of the possible. Ideally, operational requirements determine the end state, and ultimately, help to define the ways and means; but, in reality, the technologies that are on the horizon and the kinds of systems and capabilities that they will enable also, in part, help us to envision the future. To that end, developmental testing and evaluation helps to sharpen our view of what is feasible. And, as we envision a future of systems that are capable not only of multiple functions, but also of multiple methods of employment, it will prove even more crucial for testers to be creative and meticulous in defining test criteria, and executing tests for these new technologies.

## **Further Evolution in Testing and Evaluation**

Make no mistake: when the true cost of inadequate T&E could very well mean combat casualties on the battlefield, the inescapable conclusion is that we must adapt to future T&E needs, and avoid this unacceptable consequence. On this, I would also like to offer a few thoughts.

First, T&E must adapt to address technologies that are distinct from traditional “military” systems—aircraft, tanks, rockets, missiles, and such—and thus require their own testing methodologies. For example, information technologies, while not kinetic weapons themselves, power an entire universe of command and control of aircraft, space systems, ships, and ground forces, to provide myriad capabilities that are vital to Joint operations. But, with this growing and indispensable role is also a need to defend against cyber vulnerabilities, as our adversaries constantly seek ways to degrade or deny our ability to operate in cyberspace. It is no wonder, then, that I.T. and our ability to defend our systems are among the most substantial of our immediate



acquisition challenges, and why the Chief Scientist of the Air Force tells me that I.T. is the single largest area where T&E will need to grow, requiring us to conceive and develop entirely new facilities and methods of testing.

This suggests that novel testing approaches are as critical as new technologies themselves, especially for systems that differ as greatly as do traditional weapons and information technologies. Wherever possible, we must find commonalities in testing to leverage efficiencies; and, where there are not, we must innovate to produce essential test outcomes.

But, even where similar systems are being tested by familiar and proven methods, leveling budgets compel us to evaluate new ways of testing. We almost certainly cannot sustain the level of reliable, but admittedly costly, physical testing that we might otherwise prefer in a less constrained environment. Therefore, wherever possible, computer modeling and simulation must be used to augment physical testing. The challenge that I need for you—the bright and talented professionals in this room—to meet is finding the proper balance between testing the physics using wind tunnels, cross-section ranges, and the like; and computer modeling and simulation.

Along with this need to balance between physical and virtual testing, warfighting requirements for highly advanced systems also suggest that classic methods of physical testing might no longer be sufficient. T&E now must include verification and validation of software that drive highly-adaptive control systems, which are as critical as the physical components, and thus cannot fail if the weapon system is to be truly effective. Modern systems can sense performance degradation and accordingly adjust their control algorithms; but, verifying and validating these sophisticated systems require an almost inconceivable amount of inputs. When “testing to exhaustion” is defined in terms of budgetary constraints, and not of technical possibilities, then again, we need the T&E community to innovate, create, and deliver perhaps less-deterministic, but still reliable, testing and reporting methodologies.

The reality is that T&E is no longer just hypervelocity ranges and pole models; verification and validation is increasingly an integral part of the testing



mission. All of this can help move us toward the best technical judgment, while we employ a variety of testing methods, including non-traditional ones, that together produce reliable results and reporting. This really is nothing new; T&E has been adapting to meet emerging needs for decades now. We should embrace this opportunity to capture an even brighter future for T&E—one that will look somewhat different from today, but which will remain equally vital; for no matter how advanced simulation technologies become, there will always be a need to test—vigorously, reliably, and now more than ever, economically.

## Conclusion

At this strategic crossroads, and in the midst of force recapitalization within a constrained budget environment, newer ways to be leaner, timelier, more efficient, and less costly are required for acquisition efforts in general, and testing and evaluation in particular. We must work to find balance between *reliability* in the quantity and quality of data sets, and *efficiency* by reducing testing to the amount truly required to gather such data. Our highest priorities involve advanced systems that will require new methods of T&E.

The future of remotely-piloted aircraft will see myriad types—large and small, Predator-class and hand-launched; but, all classes will require T&E. Our biggest acquisition efforts—KC-X and F-35—will require T&E, and you and your Air Force will face intense scrutiny in every single related test undertaking, large and small. A renewed emphasis in electronic warfare will require facilities for T&E. I.T. will require T&E. Directed-energy systems for self-defense, force protection, and offensive strike will require T&E resources. You name it; you will be involved. So, I cannot overemphasize your importance.

Most likely, warfighters in the field do not think of T&E while they conduct their daily operations. And, I can assure you, they *definitely* are not thinking of those of us in the Pentagon. Instead, they are rightly focused on mission accomplishment. But, that undivided attention is possible because you have been doing your jobs so well, and have provided guidance on the best method



of employment, that they will have confidence in their equipment, and consequently, their combat capability. I, for one, am very appreciative of your inventiveness, innovation, and hard work.

And, I know that our warfighters are, too, for they not only are well-trained; they are well-equipped, ensuring that they are at peak readiness, and always ready to respond to rapidly emerging contingencies, as F-15E Strike Eagle crews from the 494th Expeditionary Fighter Squadron so recently demonstrated. These Airmen, who less than 24 hours earlier had arrived in Afghanistan and essentially were on their familiarity flights, were immediately thrust into the fight, and saved Coalition lives by skillfully suppressing enemy fire. Their success—in fact, each and every battlefield victory—is underwritten by the hard work that you undertake daily, from expeditiously testing new and innovative weapons like the Small Diameter Bomb and Laser JDAM, to developing new tactics for use with advanced targeting pods and handheld ROVER video receivers. You help to enable the countless acts of bravery that we honor.

This was but one example of the high level of performance that is required to prevail in conflict, and demonstrates that we cannot diminish our efforts, because our adversaries certainly will not ease theirs. We must pick up the pace to remain on the cutting edge, and give our warfighters everything that they need to prevail in conflict, and everything that they deserve to succeed and return safely to their loved ones.

I appreciate the opportunity to speak to you, and thank you for all of your efforts, now and in the future. Thank you.