

# Gansler Addresses International Test and Evaluation Association

## Strengthening Defense Testing — A Challenge to the Community

UNDER SECRETARY OF DEFENSE (ACQUISITION & TECHNOLOGY), DR. JACQUES S. GANSLER DELIVERED THE FOLLOWING REMARKS TO THE INTERNATIONAL TEST AND EVALUATION ASSOCIATION (ITEA) SEPT. 22, IN ATLANTA, GA.

**T**his morning, I want to spend a few minutes talking about testing from the Acquisition and Technology perspective, specifically as it relates to both our warfighting and management needs for the coming years, i.e., to the Revolution in Military Affairs [RMA] and to the Revolution in Business Affairs [RBA].

As you know, we have recently completed a significant reorganization of our Testing and Evaluation Community, in order to strengthen our overall program. I also want to discuss that with you and give you my views on why I believe it is a key element in our overall efforts to achieve the combined goals of the RMA and the RBA.

### T&E Goals From a Global Perspective

I think it is important to begin, however, with a brief overview of the geopolitical situation and put our testing and evaluation goals into a global, strategic perspective. Not too long ago, we could refer to "future" or "predicted" threats emerging in the early years of the 21st century. Recent events — the North Korean and Iranian missile launches, the terrorist attacks on our embassies in Africa, the nuclear explosions in India and Pakistan, the repeated, sophisticated cyber attacks on U.S. Defense Depart-



PICTURED IS A MINUTEMAN INTERCONTINENTAL BALLISTIC MISSILE (ICBM). THE BALLISTIC MISSILE DEFENSE ORGANIZATION'S NATIONAL MISSILE DEFENSE JOINT PROGRAM OFFICE ANNOUNCED OCT. 2. IT HAS SUCCESSFULLY COMPLETED THE FIRST TEST INVOLVING A PLANNED INTERCEPT OF AN ICBM TARGET. THE TEST SUCCESSFULLY DEMONSTRATED "HIT TO KILL TECHNOLOGY" TO INTERCEPT AND DESTROY THE BALLISTIC MISSILE TARGET.

ment information systems – all these have made us painfully aware that those threats are with us now.

The end of the Cold War, the breakup of the Soviet Empire, the emerging power of rogue nations, the rise of transnational terrorist threats, and other equally dramatic geopolitical events – accompanied by revolutionary advances in science and technology – are transforming our vision of 21st century security needs and military strategy. At the same time, rapid globalization of industry and the increasing importance of coalition warfare are creating issues that the United States and its partners must face in the immediate future. All these changes make our need to respond to this new environment an urgent one.

### **Two Fundamental Changes**

Two fundamental changes seem clear: First, we will see more short, intense regional conflicts – often followed by extended periods of peacekeeping. And, second, our military will seek to project power without putting a large number of forces at risk. Massed forces will be replaced by massed firepower, precisely placed on targets. Modern, so-called “reconnaissance/strike” warfare (often referred to as the essence of the “Revolution In Military Affairs”) is based on two things: real-time, all-weather, accurate and secure information systems, combined with long-range, unmanned, “brilliant,” highly lethal weapons designed to achieve precision kills.

Obviously, such changes in the nature of future conflict not only require different equipment, but – perhaps even more important – require a significant change in doctrine, tactics, organization, equipment, and, particularly, decision making – a task made far more difficult in a coalition environment.

### **Coalition Operations**

Yet, the current and likely future geopolitical situation will generally foster – in fact, usually require – coalition operations. In this environment, each nation’s security is highly interdependent on the performance of its coalition partners. This means that our allies’ systems must

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be fully interoperable – and equally secure; and these characteristics must be fully demonstrated long before any future conflict.

Unfortunately, much of the new technology available to us is also readily available to potential enemies; for example: commercial communications/navigation/earth surveillance satellites; low-cost biological/chemical weapons; cruise and ballistic missiles, etc. (which, if they can’t develop them, they can purchase them – and the skills to use them – on the world arms market). Therefore, we must develop effective countermeasures to this technology; for example: information warfare defenses; vaccines and special medical agents to counter biological and chemical weapons; defenses against ballistic and cruise missiles; and the ability to destroy hard and deeply

buried targets are all required; and, again, need to be demonstrated – an expensive and difficult challenge.

In addition to developing and deploying countermeasures to our adversaries’ use of advanced technology (weapons of mass destruction, information warfare, etc.), perhaps the most important implication of the revolution in technology and its global spread is the speed with which our adversaries can lock on to our technology. Since the terrorist or rogue nation can easily acquire much of their required advanced technology on the world arms market or from readily available commercial sources, our advantage is quickly lost unless we keep at least two steps ahead of the enemy. This requires us to reduce cycle times in the development and procurement of new weapons systems, and in the modification of existing systems. Current cycle times run as long as 18 years for major systems. If we are to continue to outpace our adversaries, we must begin to think in terms of very short cycles – 18 months is the norm for current commercial information systems. In order to meet the demands for such vastly reduced cycle times, we must be willing to abandon traditional methods of acquiring advanced technology. And, since testing is often the “long pole in the tent,” new approaches are clearly required.

### **Emulating World-Class Commercial Practices**

One place we have been looking for ideas on how to revise our acquisition practices to match the needs of the likely 21st century environment is to emulate – where appropriate – world-class commercial practices. In recent times, testing and evaluation of weapons systems in the defense procurement process have been focusing on very different rationale than in the commercial world. Commercial testing focuses on going “outside the envelope,” as they say, with the intention of getting a product to fail in order to clearly determine the failure modes and to make the design more robust. That way, we learn from our failures. Defense testing, on the other hand, has become more like a final exam. (So much so, that in some cases, one or two

successes, inside of the envelope, are considered adequate to go ahead.)

We recently published the results of a study on commercial T&E best practices. What we found in this study is that, in commercial testing the technology is usually demonstrated first; requirements and specifications for a product exploiting that technology are then created based on market (or “needs”) analysis; and product development and testing are then done to determine if the technology was successfully incorporated into a product [that] satisfies the customer.

In DoD, the requirements are expressed for a system to meet a set of mission needs; technology is then sought as an answer to the requirement question. As a result, the technologies are frequently not as far along or as well understood. The difference between the DoD and commercial paradigms affects their respective conduct of T&E. In testing a DoD system against its requirements, two basic failure modes can be revealed: (1) technology failures; and (2) failure of the system to meet its mission needs.

In the commercial paradigm, characteristics of the technology (including limitations) have already been incorporated into the requirements, so that commercial testing mainly has to address how well the product meets the needs of the market. The DoD approach thus tends to involve far more risk – and, usually, much more time – because it may ask an inappropriate or immature technology to do more than it has been shown capable of.

When we begin to think of testing as an integral part of the procurement process and less as a final, pass/fail exam, we realize that, if we can begin operational (user) testing much earlier, we can drastically shorten our weapons cycle times. Also, because of the rapid evolution of modern technology, we must be prepared for frequent – and continuous – updates to our existing systems. Finally, we must consider the fact that many of our upgraded systems will contain commercial elements. Each of these changes

is a critical challenge for the testing and evaluation community.

### **Increased Use of M&S in DoD Testing Programs**

One way to meet these challenges is to make far greater use of modeling and simulation in our test and evaluation process. There is no reason that we have to choose between “test” and “simulation.” They are not competing functions. Instead, they are complementary and mutually supportive approaches to understanding weapon system performance. Obviously, simulations are of extremely limited value if they are not validated by realistic system and subsystem testing. Conversely, testing alone can be of extremely limited value – considering the very few data points obtained with the exceptionally high cost of modern weapons, and the vast array of possible test conditions. Simulation and modeling are clearly required to, at least, fill in the rest of the envelope. (In fact, in many cases, there is a good argument that can be made for using testing primarily to validate models and simulations.) As we move more and more to concepts of “systems of systems” – where, for example, remote sensors are linked to weapons that are retargetable in flight – and where the cost and complexity of the testing is dramatically increased, the use of simulations becomes even more critical in representing various elements within the system of systems.

You have heard many of the criticisms about modeling and simulation: that physical prototypes are the only way to see what you have; that you can’t really believe simulations; that nothing can replace real testing; and that there’s no incentive to develop models and simulations because the payoff is too far into the future.

I don’t agree. I am committed to the expanded use of simulation and modeling in our testing programs, because we are already beginning to see impressive results – and, frankly, I see no choice. I know Phil Coyle has been advocating more effective use of modeling and simulation, also. And, as more and more of our acquisition workforce ‘buy in’ to the notion that modeling and simulation

can pay big dividends – in terms of improved performance, reduced cycle time, and reduced costs – the barriers to the use of this impressive technology will collapse.

Overall, I believe that the various changes in military requirements, business practices, and modern technologies have the following implications for DoD testing:

- Shorter development cycles require that we must begin testing much earlier in the development process, and we must perform this early testing in more realistic operational situations (for example, in the presence of likely countermeasures, such as information warfare).
- As we become more successful in focusing new weapons on the use of demonstrated technologies, then the emphasis in testing shifts to the integration of these elements in the weapon system and to the determination of whether it meets the user’s needs – including the interfaces with other systems in a joint and coalition environment.
- As we expand our efforts to adopt commercial products and processes to defense procurement, we must seek closer ties between commercial testers and government testers. We must also be aware that a previously tested commercial product embedded in one system may present new problems when embedded in a different system.
- We must test outside the[box] in order to determine failure modes and to enhance the robustness of the system. Our objectives in testing must be both to learn and to confirm. Testing is not only a “pass/fail” final exam; it is an integral part of the development process. Thus, we must test early and often.
- We must be continuously testing, not only to develop critical new systems, but also to improve and upgrade existing systems. Rapid technological change requires an acquisition process that assumes a “spiral” development, test, and deployment process.
- We must make far greater use of modeling and simulation – to cut costs, as well as to shorten development cycles;

and these simulations must expand to address the growing interoperability requirements of modern systems-of-systems.

- Finally, I see testing and evaluation taking on an increasingly prominent role in the growing area of information warfare and security. Here again, we see an area that lends itself well to modeling and simulation testing, but one also requiring a demand for continuous awareness of the rapidly changing state-of-the-art.

### **Interoperability**

One point I must emphasize is the growing importance of interoperability. It will pose a major challenge as we develop sophisticated systems-of-systems to meet the challenges anticipated in the early 21st century. We consider this area to be a top priority. To underscore it, I have recently formed an Office of Interoperability and have named a Director, V. Garber, who is already at work to move us more rapidly toward our goals. He will work closely with Phil Coyle and his staff, as we increasingly emphasize interoperability in our early operational testing. Recently, the Vice Chairman of the Joint Chiefs of Staff, General Ralston, and I signed a Directive requiring the addition of "Interoperability" to the list of Key Performance Parameters for all Operational Requirements Documents and Capstone Requirements Documents. I might add that this Directive also requires that "cost" be included as a military requirement in all our new weapons requirements documents. This is a critical incentive to apply cost-conscious commercial approaches in all aspects of DoD acquisitions – including testing. The objective is not to simply cut costs; rather it is to encourage process changes that will result in higher quality and performance at lower overall costs. This is what world-class firms are achieving and what we must learn to do.

### **Organizational Changes**

Institutionally, to help us achieve the needed changes required in our defense testing processes, we have made some significant organizational changes aimed at bringing together the people and re-

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sources to strengthen Testing and Evaluation. Phil Coyle will be briefing you on the details of this reorganization later in the week, with emphasis on the expanded responsibilities and duties of Operational Testing and Evaluation.

Phil and I have worked very closely on this reorganization and believe it will get operational testers involved much earlier in the acquisition cycle and, most important, help identify and solve problems early. Unless we do this, our new equipment, our modifications, and our systems will cost more and take longer, with far greater overall risk.

I realize that there has been some confusion as to what happened to our De-

velopmental Test and Evaluation component as a result of this reorganization. Rest assured, it is alive and kicking. This function is of great importance to me and will continue as a vital Acquisition and Technology responsibility. What I was looking for was greater integration of this activity with our overall weapons development policy and oversight. So, I have established an office under George Schneider in Strategic and Tactical Systems, responsible for all developmental test and evaluation activities. Rick Lockhart heads up this office and will essentially continue to perform many of the functions that were done under the previous organizational structure, including responsibility for directing the Joint Test and Evaluation Program. Rick will also be briefing you later in the week on the DT&E office's roles and responsibilities.

### **Great People — Just Old Processes**

In summary, testing – developmental and operational – are essential to both the Revolution in Military Affairs and the Revolution in Business Affairs. We must produce our weapon systems on greatly reduced cycles, and with greatly enhanced performance. We must also do all this at greatly reduced cost. Testing throughout the developmental process is a key to our success in these objectives. This puts our testing community on the front lines of the Revolution – and as an integral part of the acquisition team. You, as testers, have a significant challenge – and a tremendous opportunity to play a leadership role in the required transformation.

We have great people, just old processes. We are changing those processes, matching great people with the policies and tools they need to do the job. We count on you. But, much more important, our fighting men and women count on you. And, overall, the American people count on you to keep our nation safe and secure. I know we'll be successful.

**Editor's Note:** This information is in the public domain at <http://www.acq.osd.mil/acqweb/usd>.