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OPERATIONAL TEST
AND EVALUATION

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MEMORANDUM FOR DOT&E STAFF

SUBJECT: Test and Evaluation (T&E) Initiatives

Since assuming my duties as Director in September, I have reviewed with the senior leadership of DOT&E the state of operational test and evaluation (OT&E) in light of the urgent needs of our forces deployed to combat, the new acquisition reform legislation, and the existing priorities under which DOT&E has operated.

The Congress and President, through legislation, have defined our role clearly. We have great responsibility to provide information to the Congress and the Secretary of Defense on whether the systems we oversee are survivable, effective, and suitable for combat. The information we provide, however, can do more than provide a final judgment just before full rate production. It can improve substantially the chances that new systems actually meet the needs of Soldiers, Sailors, Airmen, and Marines. In time of war, getting capability to those in combat must be a priority. We will contribute by participating early in the development of all systems -- both rapid fielding initiatives and major programs -- to provide insight on the operational and technical aspects of requirements, assure early testing discovers problems at a time when they can be fixed most easily, and help develop the tactics, techniques, and procedures (TTPs) our forces need to make best, immediate use of new systems.

With those thoughts in mind, my expectation is that each individual in DOT&E will work to provide rigorous, objective, and clear information supporting the following initiatives:

1. **Field new capability rapidly**
2. **Engage early to improve requirements**
3. **Integrate developmental, live fire, and operational testing**
4. **Substantially improve suitability before Initial Operational Test & Evaluation (IOT&E)**

These initiatives subsume the priorities and metrics that have guided the organization for the past several years and formed the basis of our annual reports to Congress. The remainder of this memorandum provides additional guidance regarding how I expect DOT&E staff to implement each of these initiatives.

Field new capability rapidly. Secretary of Defense Robert Gates has made clear that his top priority is to get the capability needed by our fighting forces to them as quickly as possible. The test and evaluation community has been both helpful and unobtrusive in rapidly fielding new capability.

To extend DOT&E's efforts to support rapid fielding as far as possible, DOT&E staff will begin a systematic review of their programs to assess whether they are candidates for early fielding or accelerated testing.

- If testing has already confirmed that the system would be effective and suitable in the current theaters of operation, those findings will be identified.

- If only a small amount of testing remains in order to determine effectiveness and suitability, identify opportunities for accelerating testing.

As they seek proactively to be involved in early fielding initiatives, DOT&E staff should assess whether planned testing will be sufficient to identify fully the capabilities and limitations of the program being fielded. DOT&E staff should also identify opportunities to streamline T&E procedures and processes to support early fielding initiatives. As appropriate, staff should communicate for action their assessments and those opportunities to program offices, the Operational Test Agencies (OTAs), and the DOT&E leadership.

The feedback loop from testing to program development also needs to be strengthened, particularly for rapid fielding initiatives. Thus, DOT&E staff must work with the OTAs to identify and communicate for action to program offices and the DOT&E leadership critical problems with fielded equipment that should be fixed without delay.

We must be committed to making test and evaluation contribute to the rapid fielding of new capability to our forces. That contribution will include test and evaluation of individual systems, efforts to find cases where the delivery of capability can be accelerated, working to assure test-fix-test cycles are planned and occur, advocating use of quick reaction testing to help develop TTPs, and the effective and rapid communication of test results to our commanders in the field.

Engage early to improve requirements. DOT&E staff members who assess programs will work to assure that systems have realistic, relevant, and testable requirements and will identify to DOT&E leadership for action programs that fail to meet that standard. To accomplish this initiative, DOT&E staff must do the following:

- Review requirements as they are developed to assess whether they are unambiguous, testable, relevant to accomplishing missions in combat, and operationally and technically realistic;

- Seek opportunities to be involved in reviews of requirements conducted before those requirements are submitted for consideration within OSD;

- For each project under oversight, review the Test and Evaluation Strategy (TES) and Test and Evaluation Master Plan (TEMP) to assure they include testing in realistic operational environments initiated during development and continuing through operational testing. This continuum of realistic testing will place increasing stress on subsystem components before final integration into a "full-up" system, thereby identifying problems when they can be fixed cost-effectively;

- Identify operational concerns to program offices and DOT&E leadership at the earliest possible time so that they can be resolved in a timely manner;

- Identify for action by DOT&E leadership test-critical resource shortfalls;

- Assure testing in a joint environment is included in TESs and TEMPs where appropriate and feasible;

- Assure developers and the operational community share a clear, common understanding of the planned Concept of Operations (CONOPS) or identify for action by DOT&E leadership inconsistencies in those views. If the CONOPS is not available, work to assure a representative set of CONOPS is included in TESs and TEMPs.

- Identify to DOT&E leadership when programs lack a Reliability, Availability, Maintainability-Cost report providing the rationale for meeting reliability requirements.

Integrate developmental, live fire, and operational testing. Integrated testing will never do away with the need for a dedicated operational test to confirm that systems will work in combat. The legal requirement for a dedicated operational test is also clear. Nonetheless, separation of developmental and operational testing has caused difficulties in the development process that have been documented by the Defense Science Board and the National Academies. Most notably the lack of operational realism in early testing hides failure modes and performance limitations that then become evident only at the end of a program, when fixing the problems is expensive, time-consuming, and, often, simply not possible. Therefore, action officers will work with their counterparts in the office of

Developmental Test and Evaluation (DT&E) and the program offices to incorporate integrated testing into TESs and TEMPs.

The DOT&E staff, as part of its determination of TES and TEMP adequacy, will assess whether the realism included in the early testing is adequate to identify the factors key to understanding whether a new system will actually provide improved military capability, as well as those factors that are not key. Identifying these key factors and screening out unimportant factors is essential to constructing the initial operational test.

One important means to achieve integrated testing, endorsed by DOT&E and the OTA Commanders in May 2009, is Design of Experiments (DOE). DOE provides the scientific and statistical methods needed to rigorously plan and execute tests and evaluate their results. DOE is currently used to construct individual tests. The DT&E and OT&E offices are working with the OTAs and Developmental Test Centers to apply DOE across the whole development and operational test cycle for a program.

DOE should allow DOT&E to make statements of the confidence levels we have in the results of the testing. Whenever possible, our evaluation of performance must include a rigorous assessment of the confidence level of the test, the power of the test and some measure of how well the test spans the operational envelope of the system.

Substantially improve suitability before IOT&E. To accomplish this initiative, DOT&E staff will do the following:

- Assess at appropriate milestones whether programs meet the requirement to have a reliability growth program and identify for action by DOT&E leadership cases where this requirement is not met;

- Work with developmental testers to incorporate in the TEMP a reliability growth curve or software failure profile, reliability tests during development, and evaluation of reliability growth and reliability potential during development;

- Work with developmental testers to assure data from the test program are adequate to enable prediction with statistical rigor of reliability growth potential and expected IOT&E results. The rigor should be sufficient to calculate the probabilities of accepting a bad system and rejecting a good system and those probabilities should be used to plan IOT&E.

For new or restructured programs DOT&E will not approve TESs and TEMPs lacking a reliability growth curve or software failure profile.

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Director