Problem Discovery Affecting Operational Test and Evaluation

Developmental testing and evaluation serves as a means for detection and identification of problems in program software and hardware. It provides programs the opportunity to correct those problems prior to commencement of production and operational test and evaluation. As such, the developmental test and evaluation phase must be rigorous and realistic to provide an accurate validation of system performance and to identify a program's readiness for operational testing.

In order to provide an accurate assessment of operational effectiveness, suitability, and survivability, it is paramount for operational test and evaluation to be of a production-representative system working in an operationally-realistic environment. The operational test should not be a time for problem discovery, nor should it be a time for resolution of lingering problems left over from developmental test and evaluation.

The Congress expressed concern that significant problems with weapons acquisition programs are discovered during operational test and evaluation that should have been detected during developmental test and evaluation and corrected during subsequent development. I am including this new section of my annual report with my assessment of significant issues observed in operational testing of systems under my oversight in 2010-2011 that in my view should have been discovered and resolved prior to the commencement of operational testing. This section also provides my assessment of significant issues observed in early testing of systems during 2010-2011, that if not corrected could adversely affect my evaluation of those systems' effectiveness, suitability, and survivability during their initial operational test and evaluation (IOT&E).

Since the implementation of the Weapon Systems Acquisition Reform Act (WSARA) of 2009, I have received seven formal Assessments of Operational Test Readiness (AOTRs) from the Deputy Assistant Secretary of Defense, Developmental Test and Evaluation (DASD(DT&E) which provide detailed assessments of Key Performance Parameters and make specific recommendations to the Services regarding readiness to enter into IOT&E. In four of those AOTRs (C-5 Reliability Enhancement and Re-Engining Program, Global Hawk Blocks 20 and 30, Standard Missile-6, and the Joint Tactical Radio System Handheld, Manpack, and Small Form Fit Rifleman Radio, the DASD(DT&E) recommended that the program not proceed to IOT&E, and in all four cases, the Services elected to proceed into IOT&E. The trend is that major discrepancies are being discovered and raised to the Service leadership, but decisions to enter IOT&E are not being affected by these AOTRs.

The tables below list systems for which we observed and evaluated operational testing during FY10 and FY11. Some of the systems had significant issues discovered during the IOT&E that should have been discovered in developmental testing; other systems had issues observed during early testing that if not corrected, could adversely affect my assessment of operational effectiveness, suitability, and survivability during IOT&E (to be conducted within the next two years) and should be resolved prior to that testing.

SIGNIFICANT DISCOVERIES IN IOT&E	
AGM-88E Advanced Anti-Radiation Guided Missile (AARGM)	LPD-17 *San Antonio* Class Amphibious Transport Dock
C-130J	Multi-functional Information Distribution System (MIDS) Joint Tactical Radio System (JTRS)
Common Aviation Command and Control System (CAC2S)	Navy Multiband Terminal (NMT)
CV-22 Osprey	Nett Warrior
Department of the Navy Large Aircraft Infrared Countermeasures (DoN LAIRCM)	Space-Based Space Surveillance (SBSS)
Early Infantry Brigade Combat Team (E-IBCT)	Standard Missile-6
Financial Information Resource System (FIRST)	Stryker Nuclear, Biological, and Chemical Reconnaissance Vehicle (NBCRV)
Force XXI Battle Command Brigade and Below (FBCB2) Joint Capabilities Release (JCR)	Vertical Launch Anti-Submarine Rocket (VLA) Mk 54
Joint Tactical Radio System (JTRS) Ground Mobile Radio (GMR)	

DISCOVERIES IN EARLY TESTING THAT SHOULD BE CORRECTED PRIOR TO IOT&E	
Aegis Ballistic Missile Defense (BMD)	Miniature Air-Launched Decoy – Jammer (MALD-J)
AIM-120 Advanced Medium-Range Air-to-Air Missile (AMRAAM)	Mk 48 Advanced Capability Mod 7 Common Broadband Advanced Sonar System (CBASS) Torpedo
Apache Block 3 (AB3)	Mk 54 Lightweight Torpedo
Defense Enterprise Accounting and Management System (DEAMS)	MQ-1C Gray Eagle Unmanned Aircraft System (UAS)
E-2D Advanced Hawkeye	MQ-9 Reaper Unmanned Aircraft System (UAS)
Enhanced AN/TPQ-36 Radar System (EQ-36)	P-8A Poseidon
EProcurement	RQ-4B Global Hawk Block 30
Joint High Speed Vessel (JHSV)	Spider XM7 Network Command Munition
Joint Tactical Radio System (JTRS) Handheld, Manpack, and Small Form Fit (HMS)	Surveillance Towed Array Sensor System (SURTASS) and Compact Low Frequency Active (CLFA)
Joint Tactical Radio System (JTRS) Network Enterprise Domain (NED)	Vertical Take-Off and Landing Unmanned Aerial Vehicle (VTUAV) Fire Scout
Littoral Combat Ship (LCS) Mission Modules	Warfighter Information Network – Tactical (WIN-T) Increment 2
LHA-6 (formerly LHA(R)) New Amphibious Assault Ship	

PROBLEMS DISCOVERED DURING OPERATIONAL TEST AND EVALUATION THAT SHOULD HAVE BEEN DISCOVERED DURING DEVELOPMENTAL TEST AND EVALUATION

AGM-88E Advanced Anti-Radiation Guided Missile (AARGM)

The AARGM began IOT&E in June 2010, but the Navy stopped the test in September 2010 after eight anomalies occurred during 12 captive carry flights. Of the eight anomalies, six operational mission failures included:

- Three separate "weapon fail" indications from the built-in test (BIT) equipment (this presents a caution on the cockpit display that the weapon will not work), a BIT indication for a communications failure between the aircraft and the weapon, a BIT indication for a guidance control section failure, and finally, the BIT system did not detect a malfunction in which an anti-radiation homing failure occurred; it was noted because of an absence of displayed track files while flying on an instrumented range with known radar systems emitting radio frequency energy.

Of the eight anomalies, two additional discrepancies included:

- The misidentification of an unambiguous target emitter
- One instance during post-flight inspection where the pilot received an electrical shock from the weapon

C-130J

The C-130J is in production with periodic Block Upgrades to correct deficiencies and to provide capability enhancements.

- Reliability problems with the Station Keeping Equipment prevented the achievement of the required formation flight success rate. Consequently, the C-130J is still not certified for formation flight in instrument meteorological conditions and is therefore only partially mission capable for the airdrop mission.

Common Aviation Command and Control System (CAC2S)

The Marine Corps conducted IOT&E of the CAC2S Phase 1 this year. The testing revealed the following deficiencies:

- The inability to receive data via Joint Range Extension Application Protocol A and B and provide an accurate and timely air picture from these sources.
- The inability to interface with Theater Battle Management Core System as designed and access web-based applications via the system hyperlink functionality.
- The inability of net time server to synchronize time with the GPS through the CAC2S Defense Advanced GPS Receiver.

CV-22 Osprey

The Air Force conducted the CV-22 IOT&E in three phases from September 2007 through April 2008. Intended capabilities added by electronic warfare and communications equipment unique to the CV variant of the V-22 have not reached their full potential and limit mission accomplishment.

- Poor reliability and performance shortfalls of the Directional Infrared Countermeasures system, the Suite of Integrated Radio Frequency Countermeasures system, and the multi-mission advanced tactical terminal as installed on the CV-22 limit mission accomplishment by necessitating avoidance of threats and reliance on visual cueing and manual dispense of chaff and flares if unknown threats are encountered.

Department of the Navy (DoN) Large Aircraft Infrared Countermeasures (LAIRCM)

DOT&E submitted a Beyond Low-Rate Production Report to Congress in December 2009 on the DoN LAIRCM as installed on the CH-53E helicopter. This report highlighted a critical classified performance shortfall.

- Critical system performance shortfalls in certain environments and terrain because of software errors.
- The results from the Navy verification of correction of deficiencies testing using a CH-46E aircraft indicated the correction to the major DoN LAIRCM deficiency identified in the CH-53E IOT&E was effective.

Early Infantry Brigade Combat Team (E-IBCT)

The Army conducted a Limited User Test (LUT 10) at White Sands Missile Range, New Mexico, in September 2010. LUT 10 was the second operational test of the E-IBCT systems and was intended to assess progress in E-IBCT operational effectiveness and suitability in a realistic operational environment. The E-IBCT Increment 1 comprised: Network Integration Kit mounted on a tactical wheeled vehicle such as High Mobility Multi-purpose Wheeled Vehicle or Mine Resistant Ambush Protected vehicle, Unattended Ground Sensors, Class 1 Unmanned Aerial System Block 0, and Small Unmanned Ground Vehicle (SUGV).

- E-IBCT Increment 1 systems contributed little to mission effectiveness. Blue force combat power was sufficient to accomplish assigned missions with or without employment of the E-IBCT systems. Key performance parameters not met are: Net Ready, SUGV recognition range at night, Material Availability.
- Based upon analyses of the results from LUT 10 and developmental testing, DOT&E's current assessment of the E-IBCT systems is that, with the exception of the SUGV, none of the systems have demonstrated an adequate level of performance to be fielded to units and deployed in combat.

Financial Information Resource System (FIRST)

The 346th Test Squadron and Air Force Financial Systems Operations conducted the OT&E of the FIRST in the Pentagon from March 28-31, 2011. DOT&E assessed the system to be operationally effective and operationally suitable, but with limitations in the areas of interoperability and information assurance.

- FIRST was able to process flying hours data, but was unable to correctly process inventory data provided by the Reliability and Maintainability Information System, thus hampering planning actions.

Force XXI Battle Command Brigade & Below (FBCB2) Joint Capabilities Release (JCR)

In FY11, the Army and Marine Corps conducted a Limited User Test (LUT) of FBCB2 JCR/Blue Force Tracker 2 (BFT2). The FBCB2 JCR/BFT2 LUT highlighted the following deficiencies:

- Situational awareness "fading," which would freeze display icons for 30 seconds to 5 minutes.
- New Equipment Training was not adequate to train new FBCB2 operators.
- All versions of FBCB2 supported by line-of-sight Enhanced Position Location Reporting System (EPLRS) radios demonstrated poor mission effectiveness and interoperability.
- Less than required reliability.

Joint Tactical Radio System (JTRS) Ground Mobile Radio (GMR)

The Army planned a Milestone C Limited User Test of the JTRS GMR in June and July 2011 and later downgraded that test to a Customer Test because of a Nunn-McCurdy breach and continuing performance and reliability problems that could not be fixed prior to the planned operational test.

- During the Customer Test at the Army's Network Integration Evaluation (NIE), commanders attempted to use the JTRS GMR Wideband Networking Waveform (WNW) network, but found the network was not useful due to range limitations and poor reliability.
- The JTRS GMR schedule delays were due to technically immature GMR hardware, software operating environment, and waveform software.
- JTRS GMR was not reliable during the NIE. Reliability was 125 hours Mean Time Between Essential Function Failure versus a 466-hour requirement.
- The Joint WNW network manager is not an effective tool to manage the WNW network, and the Soldiers preferred the commercially-available Simple Network Management Protocol Console software for WNW network management.

LPD-17

The Navy completed two IOT&E events in FY10: a Rolling Airframe Missile engagement on the Self-Defense Test Ship in December 2009 and Probability of Raid Annihilation modeling and simulation in November 2009. The Navy completed two LFT&E events in FY08: the Full Ship Shock Trial was conducted in August and September 2008 and the Total Ship Survivability Trial was conducted in September 2008. DOT&E noted the following deficiencies:

- Poor reliability of critical systems (network, voice communications, engineering control), support systems (cargo ammunition magazine elevators, vehicular ramps, main propulsion diesel engines, electrical distribution system, and steering system), and combat systems (SPQ-9B horizon search radar, the Mk 46 Gun Weapons System (GWS), and the Magnetic Signature Control System) adversely impacted mission capability.
- LPD-17 self-defense systems (Mk 46 GWS, Ship Self-Defense System (SSDS) Mk 2, SPQ-9B, and SPS-48/Cooperative Engagement Capability did not demonstrate adequate capability.
- The ship provided poor command and control capability for embarked troops.
- The conduct of the Full Ship Shock Trial and the Total Ship Survivability Trial on the LPD-17 class ships were adversely affected by reliability issues with the same critical system

identified by IOT&E. These reliability issues resulted in increased cost and schedule delays for the trials.

Multi-functional Information Distribution System – Joint Tactical Radio System (MIDS JTRS)

The Navy completed IOT&E of the MIDS JTRS core terminal integrated into the F/A-18E/F in November 2010. The MIDS JTRS IOT&E data indicated performance shortfalls.

- Link 16 messages that provide situational awareness of friendly force positions and intentions were consistently exchanged during only 90 percent of the F/A-18E/F sorties flown, compared to the Key Performance Parameter threshold requirement of 98 percent.
- Link 16 close air support messages were successfully exchanged in only 26 percent of the attempts.
- Poor system reliability during start-up prevented timely mission launch during 16 percent of sorties.
- Post-test causality analysis indicated that manufacturing and quality control problems with ViaSat-produced MIDS JTRS terminals led to new failure modes discovered during IOT&E. Other deficiencies were traced to errors in the Link 16 waveform software code and inadequate aircrew and maintenance personnel training.

Navy Multiband Terminal (NMT)

DOT&E completed an Early Fielding Report in April 2011 when the Navy deployed an operational NMT on the USS *Roosevelt* (DDG 80) prior to IOT&E. The Navy completed integrated testing in June 2011 and operational testing in August 2011.

- The program stopped testing due to schedule pressure prior to completion of the Reliability Growth Test (RGT). The program conducted a composite reliability analysis from a collection of data sources, to include contractor integrated tests, Government independent verification and validation activities, and hours collected from operational fleet that indicated that the reliability could be met. However, in order to meet the schedule, the program did not conduct a thorough failure analysis with corrective action before starting the integrated test and IOT&E. During the RGT, the NMT demonstrated a Mean Time Between Critical Failure (MTBCF) of 892 hours against a 1,400-hour requirement. During the integrated testing, NMT demonstrated an MTBCF of 338 hours. The IOT&E confirmed the NMT is not reliable. While the full failure analysis is ongoing, results from the operational test have revealed that the MTBCF is comparable to that of the integrated test.

Nett Warrior (formerly Ground Soldier System)

The Army conducted the Nett Warrior Limited User Test (LUT) of three competing systems from October 18 – November 5, 2010, at Fort Riley, Kansas. There were two problems observed during the LUT that should have been corrected earlier:

- Unclear voice communications
- Excessive light emissions

Space-Based Space Surveillance (SBSS) Block 10

The Air Force launched the SBSS satellite at the end of FY10. During FY11, the Air Force completed both on-orbit developmental testing and IOT&E.

- During the later stages of integrated testing, a data formatting problem was discovered, which prevented full utilization of SBSS mission data by one user. This problem could have been identified earlier in developmental testing by sharing sample data products with the end users.

Standard Missile 6 (SM-6)

The Navy completed the remaining FY10 missions during developmental and operational flight scenario testing of the SM-6 in January 2011 and completed SM-6 IOT&E flight testing in July 2011. There were two classified performance anomalies in IOT&E that a more rigorous developmental testing program may have discovered earlier. Additionally, two anomalies discovered in developmental testing did not have sufficient corrective action prior to the IOT&E:

- One anomaly discovered in developmental testing (antenna debris) carried forward to IOT&E without corrective action fully implemented on all missiles; there were additional occurrences during IOT&E on this configuration.
- One anomaly discovered in developmental testing (Mk 54 Safe-Arm Device) carried forward into IOT&E and remains under investigation; additional occurrences were experienced during IOT&E. This anomaly could influence the SM-6 lethality.

Stryker Nuclear, Biological, and Chemical Reconnaissance Vehicle (NBCRV)

The Army conducted IOT&E phase two at Dugway Proving Ground, Utah, from September 20 – October 1, 2010. In IOT&E phase one, conducted from September to October 2006, the NBCRV experienced numerous operational mission failures. The program undertook a reliability improvement program and made a number of changes to the system configuration tested in IOT&E phase one with the result of significantly improved reliability of the base vehicle.

- Initial testing of the NBCRV, equipped with Stryker Reactive Armor Tile II, indicates the added weight of the armor kit negatively affects NBCRV mobility in steep terrain, such as Afghanistan. During a 3,090-mile NBCRV reliability test with the Stryker Reactive Armor Tile II, the system experienced multiple driveline failures, including three broken differentials and multiple broken axle half-shafts. Driveline failures negatively affect mobility by limiting the speed of travel and the vehicle's ability to traverse steep terrain.

Vertical Launch Anti-Submarine Rocket (VLA) with the Mk 54 Mod 0 Lightweight Hybrid Torpedo

The Navy conducted operational testing of the VLA with an Mk 54 torpedo payload at the Pacific Missile Range Facility in February 2009; DOT&E published a BLRIP in 2010.

- The Mk 54 torpedo experienced excessive depth excursion on entering the water that could cause the torpedo to impact the bottom in shallow water. Testing suggests that the excessive depth excursion problem is linked to VLA rocket delivery method rather than the weapon itself.
- The Mk 54 VLA is not operationally effective in its primary mission environment because the ship's Combat System cannot effectively detect, classify, and target a threat submarine; this deficiency was identified by the Navy in 2007, but the Combat System continued to experience performance problems during the 2009 IOT&E.
- The Navy has not completed sufficient operational testing of the Mk 54 torpedo to verify its effectiveness. The testing completed so far indicates the Mk 54 torpedo may not be effective in attacking the target. (The Mk 54 torpedo is discussed further below.)

PROBLEMS OBSERVED DURING EARLY TESTING THAT IF NOT CORRECTED, COULD ADVERSELY AFFECT MY ASSESSMENT OF OPERATIONAL EFFECTIVENESS, SUITABILITY, AND SURVIVABILITY DURING INITIAL OPERATIONAL TEST AND EVALUATION (CONDUCTED WITHIN THE NEXT TWO YEARS)

Aegis Modernization Program

The Navy conducted operational testing of Aegis Guided Missile Cruisers (CGs 52 58) upgraded with Aegis Warfare System (AWS) Advanced Capability Build 2008 (ACB08) and Aegis Guided Missile Destroyers (DDGs 103-112) upgraded with AWS Baseline 7.1R in FY10 with the exception of air defense and suitability testing, which is expected to complete in 1QFY12.

- Aegis Guided Missile Cruisers upgraded with AWS ACB08 and Aegis Guided Missile Destroyers upgraded with AWS Baseline 7.1R have limited ability to counter high-speed surface threats in littoral waters.

AIM-120 Advanced Medium-Range Air-to-Air Missile (AMRAAM)

The next update to the AIM-120 AMRAAM, the AIM-120D, is currently in developmental testing by both the Air Force and Navy at Eglin AFB, Florida, and China Lake Naval Weapons Station, California. Progression to operational testing has been suspended pending resolution of four key technical deficiencies. The AIM-120D was originally scheduled to begin operational testing in 2008; it is now more than three years behind schedule.

- The four key deficiencies include missile lockup, built-in test (BIT) failures, aircraft integration problems, and poor GPS satellite acquisition.
- DOT&E approvals of the Test and Evaluation Master Plan and test plan are awaiting resolution of the deficiencies that suspended operational testing in 2009. Raytheon has solved the BIT fail problem and has developed a pending solution to the GPS failure problem. Weapons failure and aircraft integration deficiencies remain.

Apache Block 3 (AB3)

In November 2009, the Army conducted the Apache Block III (AB3) Limited User Test (LUT).

- Initial testing of the fire control radar indicated performance comparable to that of the legacy radar in most operating modes. However, the new radar generated excessive false targets in some operating modes.
- During the LUT, the Integrated Helmet and Display Sight System did not fit well and limited the pilots' visibility of the Helmet Display Unit imagery.
- Mission planning tools do not allow creation of a flight plan for the Unmanned Aerial System or multiple frequency settings for the ARC-231 radios.
- During flight testing, pilots discovered that the Modernized Targeting Acquisition Designation Sight voice communication and navigation subsystems video vibrates excessively during certain flight regimes. Subsequent testing revealed that the cause of the vibration was the natural frequency of the Electronics Display and Control overlays with the main rotor frequency.
- Interoperability testing between the AB3 and Gray Eagle unmanned aircraft is ongoing. Ground and flight testing between the Gray Eagle and AB3 programs have identified differences in frame size of the video sensor movement, inverted commands, and differences in the data rate and data format between AB3 and Gray Eagle

Defense Enterprise Accounting and Management System (DEAMS)

The Air Force Operational Test and Evaluation Center (AFOTEC) began, but did not complete, an Early Operational Assessment (EOA) of DEAMS Spiral 2 from August through December 2010 at Scott AFB, Illinois, and at the Defense Finance and Accounting Service in Limestone, Maine. AFOTEC curtailed the EOA when it became apparent that major system deficiencies were present. The data from the incomplete EOA were insufficient to determine readiness for IOT&E, currently scheduled for 1QFY14, and a full evaluation of operational effectiveness, suitability, and mission capability.

- Important interfaces were inoperable. During the EOA, non-functioning interfaces with the Component Billing and Automated Funds Management systems required manual procedures from onsite personnel.
- Required reports were not being produced or were inaccurate or incomplete.
- Since the Air Force released Spiral 2 in May 2010, 2,313 deficiencies have been reported and 1,680 have been closed, leaving a gap of 633 open deficiencies. Although the program has made progress on closing the deficiencies, new ones continue to accrue.

E-2D Advanced Hawkeye

The Navy completed an operational assessment in December 2010 of the E-2D to support a decision to procure the next two lots of low-rate production aircraft.

- DOT&E identified potentially inadequate overland performance of the E-2D radar system as a risk to a successful Theater Air Missile Defense/Anti-Air Warfare mission effectiveness assessment during IOT&E.

Enhanced AN/TPQ-36 Radar System (EQ-36)

The Army is developing and fielding 38 Quick Reaction Capability radars to support an Urgent Materiel Release. Fielding began in 2010 with 10 systems operating in Iraq and Afghanistan. The Army conducted three radar test events at Yuma Proving Ground, Arizona, in October 2010, January 2011, and June 2011. Testing focused on acquiring threat rocket, artillery, and mortar fires, and the radar's integration with the Counter Rocket, Artillery, and Mortar system.

- The live ammunition system demonstration averaged one system abort in less than 30 hours. This demonstrated performance will impact operational suitability without an increased effort to increase the hours between system aborts. The EQ-36 Program of Record requirement is one system abort every 185 hours.

EProcurement

EProcurement extends the functionality of the Defense Logistics Agency Enterprise Business System in three releases. The final release, Release 1.2, is currently in limited deployment and is planned for IOT&E in 2012. The Joint Interoperability Test Command (JITC) conducted an operational assessment (OA) of Release 1.1 in June 2011. JITC conducted validation tests of fixes to deficiencies in Release 1.1 in August and October 2011.

- JITC found 20 critical software defects that have subsequently been fixed. These defects inhibited users from successfully processing purchase requisitions and orders, managing and processing contracts, and managing contract line items. Another 22 moderate software defects remain open and require large amounts of functionality workarounds to use Release 1.1.
- The user community found manual award processing and post-award processing for modifications to be largely inaccurate, incomplete, and unusable.
- Only one-third of the Release 1.1 users rated the human-system interface and other system usability attributes as acceptable during the OA. User dissatisfaction may also have been due, in part, to slow screen refresh times for some operations.
- During the developmental test of Release 1.1, numerous critical system defects were discovered and documented. These defects were reported as fixed just prior to deployment of Release 1.1 into the production environment; however, the OA still found many critical defects, which indicates that defect resolution and developmental testing may not be as robust as they should be.

Joint High Speed Vessel (JHSV)

A Navy-led operational assessment in January 2009 identified multiple areas of risk to the program's achieving operational effectiveness and suitability. The JHSV will likely meet or exceed its threshold requirements; however, missions other than basic transport, as outlined in the Capabilities Development Document and Concept of Operations, may prove to be too challenging unless the program pursues objective requirements in selected areas such as ammunition storage and communications.

- The absence of forced ventilation and air quality monitors in the mission bay jeopardizes the safety of the crew and embarked force during onload and offload of vehicles, particularly in port or at anchor when there is little natural circulation.
- Storage space for embarked force personal equipment is inadequate.
- JHSV will not have the capability to support the Joint Integration Concept to interface with Sea Base units at high sea states. The Navy is developing a ramp for Sea State 3 but interfacing at Sea State 4 is unlikely.
- To support more challenging Army concepts of employment, the JHSV must have more robust communications, capability to land armed helicopters, and store palletized ammunition.
- JHSV requirements do not include any metrics for reliability, availability, and maintainability.

Joint Tactical Radio System (JTRS) Handheld, Manpack, and Small Form Fit (HMS)

The JTRS HMS program provides handheld and two-channel manpack radios supporting Army, Marine Corps, Navy, and Air Force operations. In June 2011, the Army conducted a Manpack Limited User Test (LUT) as a part of the 2011 Network Integration Evaluation (NIE). During the NIE JTRS HMS Manpack LUT, the radio demonstrated the following:

- Poor reliability
- Short range of the Soldier Radio Waveform and Single Channel Ground and Airborne Radio System (SINCGARS) waveforms that significantly constricted the operational area of the cavalry troop
- Inconsistent voice quality
- SINCGARS waveform did not support unit operations and was immature for operational test

Littoral Combat Ship (LCS) Mission Modules

The Littoral Combat Ship is intended to accommodate a variety of individual warfare systems (mission modules) assembled and integrated into interchangeable mission packages. The Navy split the program into two separate acquisition programs – one for seaframes and the other for mission modules.

- Both developmental and operational testing of the AN/AQS-20A Sonar Mine Detecting Set, an Airborne Mine-countermeasures mission module system within the LCS Mine Countermeasures (MCM) mission package, revealed the system is deficient in meeting required

thresholds for False Classification Density (FCD) and Vertical Localization. These deficiencies may preclude the LCS MCM mission package from meeting its required threshold for Area Coverage Rate Sustained (ARCS). If the FCD and Vertical Localization deficiencies are not corrected prior to IOT&E, they may adversely affect the operational effectiveness of the LCS MCM Mission Package.
- Developmental testing of the Airborne Laser Mine Detection System (ALMDS), an Airborne Mine-countermeasures mission module system within the LCS MCM mission package, revealed the system is deficient in meeting the required threshold for FCD. This deficiency will likely preclude the LCS MCM mission package from meeting its required threshold for ARCS. If the ALMDS FCD deficiency is not corrected prior to IOT&E, it will adversely affect the operational effectiveness of the LCS MCM Mission Package.
- LCS is not expected to be survivable (i.e., be capable of continuing to fight after being attacked) in a hostile combat environment.

LHA-6 (formerly LHA(R)) New Amphibious Assault Ship

The Navy conducted an operational assessment of the LHA-6 large-deck amphibious ship from June to August 2008. Experienced fleet operators (Navy and Marine Corps) reviewed ship plans and specifications, data on fielded systems, and previous testing conducted on systems that will be installed on LHA-6. Since that time, no specific operational testing has occurred with the exception of enterprise testing on the Self-Defense Test Ship.
- Due to long-standing and previously identified legacy sensor limitations, LHA-6 may be vulnerable to certain airborne threat flight profiles.
- Based on combat systems testing on other platforms, it is unlikely that LHA-6's Ship Self-Defense System Mk 2-based combat system (including Nulka, SLQ-32, and Evolved Sea Sparrow Missile) will meet the ship's Probability of Raid Annihilation requirement against anti-ship cruise missiles.

Miniature Air Launched Decoy – Jammer (MALD-J)

The Air Force completed IOT&E on MALD (the decoy only variant) in 2011 after additional development test missions were flown to evaluate upgrades resulting from deficiencies found in the 2010 IOT&E. DOT&E conclusions regarding MALD-J suitability---particularly its reliability---depend in part upon data from MALD testing, which will be used by DOT&E to evaluate whether the vehicle reliability problems have been resolved. In the interim, outstanding MALD reliability deficiencies pose some risk to the planned FY12 MALD-J IOT&E due to the vehicle commonality between the two variants.
- During the 2010 IOT&E, the MALD reliability point estimate that combines free-flight and aircraft carriage time was 77 percent, which fell short of the threshold requirement of 93 percent.
- MALD carriage life during the 2010 IOT&E failed to meet the required threshold of a minimum of 60 hours. All MALDs that accumulated over 14 hours of carriage time, and were subsequently launched by the Air Force, failed during free-flight test. This is significant for long-endurance B-52 missions, which are likely to accumulate 14 or more hours of carriage time before operational employment.
- The MALD IOT&E failure in FY10 was most likely a result from long-term vehicle exposure to rain and moisture during aircraft carriage, which caused excessive ice accumulation in the fuel filter and flamed out the motor during open-air free-flight. During the MALD IOT&E retest in August 2011 (following hardware, firmware, and software fixes), one of the vehicles experienced another (unrelated) malfunction after failing to complete the engine start sequence after aircraft release. An Air Force review board concluded the malfunction was likely a result of cold soak of the arming lanyard during long endurance flight. Cold soaking reduces the tensile strength of the wire.
- The August 2011 mission failure during the final event of the MALD IOT&E further validates the DOT&E assessment of poor vehicle material reliability. The testing failed to demonstrate the resolution of deficiencies when MALD is employed in an operationally-realistic manner.

Mk 48 Advanced Capability Mod 7 Common Broadband Advanced Sonar System (CBASS) Torpedo

In FY11, the Navy began operational testing of the Advanced Processor Build 4's (APB4) tactical software for the Mk 48 Advanced Capability (ADCAP) Mod 7 CBASS torpedo and Mk 48 ADCAP Mod 6 Advanced Common Torpedo (ACOT). OT&E is expected to continue through the end of FY12. From January to February 2011, the Navy conducted a Quick Reaction Assessment of the Mk 48 APB4 to evaluate the torpedo's capability against an emerging submarine threat.
- DOT&E assessed that testing to date indicates the Mk 48 APB4 has a limited capability, under certain operational conditions, against the threat identified in the urgent operational need statement; however, the Navy did not have adequate threat surrogates for the evaluation. DOT&E's assessment also reported that the APB4 torpedo did not demonstrate expected improvements over the legacy torpedo, and may degrade current capability in certain warfare scenarios.
- The completed Mk 48 APB4 test events are being assessed for operational realism and validity incrementally as the fleet training and test events are completed. Due to delays in completing the development of the Submarine Launched Countermeasure Emulator (SLACE) mobile countermeasure surrogate, some important operational testing to confirm performance has not begun. DOT&E assesses that Mk 48 APB4 performance against SLACE-like threats is high risk because the program office completed little in-water developmental testing.

Mk 54 Lightweight Torpedo

The Navy's Fifth Fleet issued an Urgent Operational Need Statement (UONS) in March 2010 requesting solutions to address an emerging submarine threat. The Navy identified the Mk 54 Block Upgrade (BUG) software as a solution. In August to September 2011, the fleet fired 22 Mk 54 BUG torpedoes against a Steel Diesel Electric Submarine surrogate target and against U.S. attack submarine targets. Based on preliminary results of this test, the Navy scheduled an additional phase of in-water trials in November 2011 and delayed the planned early fielding until January 2012.

- The Navy did not complete adequate in-water or model and simulation developmental testing of the Mk 54 BUG. As the program office shifted resources to demonstrate that the Mk 54 BUG has a capability against the UONS emerging submarine threat, testing focused on the UONS threat scenarios vice the operational scenarios for which the Mk 54 BUG was originally intended.
- The Navy developed an unmanned Steel Diesel Electric Submarine target. This Steel Diesel Electric Submarine target has different signature characteristics than the UONS emerging threat, thus this surrogate is of limited utility in assessing torpedo operational performance for the UONS. However, completing set-to-hit-terminal homing testing may address some unresolved test scenarios identified in the IOT&E. Mk 54 BUG performance in these previously unresolved test areas will affect the overall effectiveness and suitability of the torpedo against other submarine threats.
- Testing in structured scenarios and relatively benign environments indicates the Mk 54 BUG likely has a limited capability against the Steel Diesel Electric Submarine surrogate target. The Mk 54 BUG performance in other environmental areas and against operationally-realistic target scenarios is unresolved.

MQ-1C Gray Eagle (formerly Extended Range Multi-Purpose (ERMP)) Unmanned Aircraft System (UAS)

Deployment of the Gray Eagle Quick Reaction Capability took place prior to completion of IOT&E and the full-rate production decision. The Army conducted a Limited User Test in conjunction with training for unit deployment to Afghanistan from May to June 2010.

- Gray Eagle did not meet reliability requirements for the ground station, the aircraft, and the electro-optical/infrared sensor payload. The poor aircraft reliability was largely due to ARC-231 radio subsystem failures.
- Remote video from Gray Eagle to the One System Remote Video Terminal was generally not available, not clear, and not reliable. Integration of Gray Eagle with a reliable remote video display system is not complete.
- Soldiers did not receive training on fundamentals of reconnaissance, mission planning, set-up and operation of radios, distribution of video, or optimal employment of Gray Eagle.
- Manning of the quick reaction capability unit is not adequate to sustain the required operational tempo of 22 flight hours per day.

MQ-9 Reaper Armed Unmanned Aircraft System (UAS)

Responding to urgent operational needs and incorporating associated emerging technologies has affected the MQ-9 UAS ability to meet program of record requirements within a predictable development timeline and stable test and fielding schedule in FY11.

- Deficiencies with fusing, aircraft integration, and cockpit integration identified during the ongoing GBU-38 Joint Direct Attack Munition (JDAM) evaluation indicate that the developmental testing of JDAM integration with the MQ-9 system was insufficient.
- The program faces systemic challenges in prioritizing and maturing software flight programs to meet development and fielding timelines for the Increment One program of record. The projected FOT&E for the final Increment One configuration slipped from FY13 to FY14, and the desired June 2011 Milestone C decision was deferred due to the program's inability to demonstrate sufficient system integration maturity in the FY11 development schedule. Until the program is able to better prioritize and control maturation and development of the Increment One program of record capabilities, future delays in operational testing and fielding of capabilities will continue to occur.

P-8A Poseidon

The P-8 integrated test team is conducting 10 to 14 integrated test flights per week.

- The P-8A currently has an operational flight envelope limit that precludes it from flying at a bank angle greater than 48 degrees when maneuvering. In order to fly operationally realistic tactics during anti-submarine warfare missions, the aircraft will have to fly maneuvers that require a bank angle of 53 degrees. The P-8A full flight envelope should be cleared for flight to conduct operationally-realistic missions and maneuvering flight profiles during the IOT&E.
- Priority 1 and 2 software problems that will affect IOT&E remain open. Although 92 percent of the priority 1 and 2 software problems have been closed, the current closure rate is not sufficient to have all the priority 1 and 2 software problems resolved by the start of IOT&E. Priority 1 software problems prevent a mission-essential capability from being performed. Priority 2 software problems affect mission-essential capabilities, and there is no acceptable workaround for these problems onboard the P-8A. There are 369 priority 1 and 2 software problems as of September 21, 2011. Software problems discovered during the later stages of the integrated testing may not be fixed in the software version that is currently planned for IOT&E, and may require additional software upgrades prior to starting IOT&E to ensure the software is production-representative.

RQ-4B Global Hawk Block 30, High-Altitude, Long-Endurance Unmanned Aerial System

The Air Force conducted RQ-4B Global Hawk Block 30 IOT&E from October 2010 through January 2011. Operational testing for the next incremental Block 30 capability began in July 2011.

- When operating at near-continuous operational tempos, the system provided less than half the required 55 percent Effective-Time-On-Station coverage over a 30-day period.
- The system was not operationally suitable due to low air vehicle reliability, incomplete maintenance technical data, inadequate maintenance training, and ineffective integrated diagnostic systems.
- The Airborne Signals Intelligence Payload provided a limited operational utility, but did not consistently deliver actionable signal intelligence products to operational users, due to technical performance deficiencies and immature training, tactics, techniques, and procedures.
- The system did not meet joint interoperability certification and information assurance requirements.
- In August 2011, the Air Force halted follow-on operational testing due to a serious air vehicle command and control software deficiency. The RQ-4B Global Hawk Block 30 developmental test program previously identified this deficiency, but underestimated its impact during operational missions.

Spider XM7 Network Command Munition

The Army continued corrective actions to address Spider system and training deficiencies following the FOT&E conducted in May 2010. The Army conducted a Spider Limited User Test as part of the Army's Network Integration Evaluation at Fort Bliss, Texas, and White Sands Missile Range, New Mexico, in June 2011.

- Current software development to achieve requirements for munition control unit reliability and reuse are inadequate. Increased efforts are needed to achieve operational suitability.
- Further development focused on identifying ways to reduce the system's complexity and increase its ease of use by Soldiers is needed to achieve operational suitability.

Surveillance Towed Array Sensor System (SURTASS) and Compact Low Frequency Active (CLFA)

The Navy completed an operational assessment of the SURTASS CLFA during FY11.

- The operational assessment identified some classified deficiencies with the CLFA detection algorithms and with some components' software and hardware reliability.

Vertical Take-Off and Landing Unmanned Aerial Vehicle (VTUAV) (Fire Scout)

The program deployed two systems aboard Navy frigates USS *McInerney* in 2010 and USS *Halyburton* in 2011 to conduct Military Utility Assessments. In May 2011, the Navy deployed a land-based VTUAV system to Afghanistan in support of ongoing Army operations. Developmental testing was also conducted during 2011.

- The lack of ability to disseminate VTUAV near-real-time imagery off the host frigate limits VTUAV effectiveness. In the foreseeable future, this problem is a function of the shipboard infrastructure and the Navy's overall command and control system. While not required as part of the program of record, it is an area that the Navy should address to maximize the utility of the VTUAV and other Unmanned Aerial Systems.
- The focus on non-program of record activities between 2010 and 2011, such as the Military Utility Assessments and Afghanistan deployment, slowed developmental testing. The time spent training additional operators and maintainers, modifying air vehicles, integrating non-program of record payloads, and a requirement to provide spare parts to three operating locations, delayed the program's efforts to address deficiencies.
- Challenges with system reliability and the lack of a dependable communications relay capability continue to delay the IOT&E.

Warfighter Information Network – Tactical (WIN-T) Increment 2

The Army conducted a combined WIN-T Increment 2 and Increment 1b Limited User Test at Fort Stewart, Georgia; Fort Lewis, Washington; and Fort Gordon, Georgia, in March 2009. DOT&E assessed the WIN-T Increment 2 as supportive of voice, video, and data communications. However, the network needs improvement in the following areas:

- Reliability
- Ability to support on the move communications
- Training provided to Soldiers due to complexity of the system
- Speed of communication due to network routing
- Network Operations Management
- Information Assurance